

Use and Impact of Electronic Resources in Engineering and  
Technological Institutions in India

A THESIS SUBMITTED

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THE DEGREE OF

**DOCTOR OF PHILOSOPHY**

IN

**LIBRARY AND INFORMATION SCIENCE**

By

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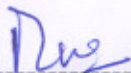
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*Formerly known as Thapar Institute of Engineering and Technology*

**CERTIFICATE**

Certified that the thesis **“Use and Impact of Electronic Resources in Engineering and Technological Institutions in India”** which is being submitted by Baljinder Kaur, in fulfillment of the requirements for the award of the degree of Doctor of Philosophy in the SCHOOL OF MANAGMENT & SOCIAL SCIENCES, Thapar University, Patiala, is an authentic record of the candidate’s own independent and original research work carried out by her under my supervision and guidance. The matter embodied in this thesis has not been submitted in part or full to any other University or Institute for the award of any degree.



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## ABSTRACT

The main focus of the research was to examine the acceptance of e-resources by users of Engineering and Technological Institutions in India, and determine usage, satisfaction of users and barriers faced in the access of e-resources. The study was carried out in four prestigious institutions of India, IIT, Delhi; IIT, Roorkee; TU, Patiala; and PEC, Chandigarh to study electronic resources & services provided to users of these libraries.

A survey was conducted in 2004 to 2006. The questionnaire method was used to examine and collect data from the students and faculty. 20% of the survey data was taken from total 12910 populations of the four intuitions. The questionnaire was distributed to 2686 user and response was received from 2322 users.

The collected data has been analyzed with the help of statistical package for social science (SPSS). Statistical method like percentage and Chi-Square were used. Different variables were used to study among the users (i.e., undergraduates, postgraduates, research scholars and faculty members) and institutions.

From total survey it has been found that 57.92% users have visited their library website/homepage. Institute wise, 66.30% users from IIT, Delhi and 73.52% are from IIT, Roorkee are aware of free e-journals on the internet as compared to TU, Patiala (8.66%) and PEC, Chandigarh (24.68%). From the total data 99.22% of users are aware of free e-journals on the internet

Users from both the IITs are more aware, i.e., 85.87% from IIT, Roorkee and 71.39% IIT, Delhi as compared to 22.37% from PEC, Chandigarh. Among the users, majority of (77.87%) faculty members and 91.11% postgraduates are aware about INDEST & UGC-INFONET. A majority of research scholars (98.95%), faculty (95.38%), postgraduates (73.24%) use the INDEST consortium more as compared to undergraduates (20%).

Internet is used more as compared to e-journals and CD-ROM. CD-ROM services are occasionally used by 42.38% users of all institutes. Internet is used daily and 2/3 time a week as compared to once a week and occasionally. E-journals are used mostly 2/3 times a week by 35.47% users, occasionally by 39.41% of users and daily by 12.08% users.

Users have started using e-resources and this shows that they have accepted electronic medium. Users have started feeling comfortable with electronic information. From the

total user data of all the four institutions, it has been found that internet/website are used maximum for e-mail i.e., 2108 (90.55%) and 2149 (92.55%) for finding relevant information as compared to 47.03% career development and 25.62% research work.

Internet and online catalogues are used more as compared to current and back volumes of e-journals. E-books are used minimum and the e-journals are mostly used for academic work.

The results show from the total users who are seeking information from e-resources 60.77% of users are using OPAC, 53.74% of users are using internet website, 52.46% are using on-line data bases, 34.10% of users are using current e-journals and 17.827% of users are using back volumes of e-journals. The use of video cassettes, e-books and CD-ROM is very less as compared to other e-resources.

Users felt that the electronic information saves the time, and they get required information, but slow speed of internet and vast information available are the barriers in seeking information. From the total users' data, 60.77% of users felt that the access to information through internet is a very slow process while 39.06% of users felt that they were short of time and 23.26% of users felt that it was difficult to read from the screen.

Most of the users (94.23%) from all the institutions are in favor of training and felt that with training use of e-resources will increase.

Usage of e-resources has increased due to the awareness among the users. Users prefer to use the information in both the formats i.e., electronic as well as print, although they feel that electronic document can't replace the print document. The response rate was below 30%, which shows that very few users feel that e-resources can replace print documents.

The impact on collection and usage in both the IIT's, TU and PEC indicates that every year there is an increase in the collection and usage of e-resources.

The result demonstrates that an academic library can become user centered in the electronic environment. The information provided on consortia base will expand access to electronic data bases. It has been found that users are accepting electronic information resources.

The use of e-journals has increased manifold. The printed material is being quickly replaced by the electronic resources.

*Dedicated*  
*To my Parents and Mr. Raj Kumar Gogna*

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## Abbreviations

IIT	Indian Institute of Technology
UG	Undergraduate
PG	Postgraduate
RS	Research Scholar
FA	Faculty
E-Resources	Electronic Resources
E-journals	Electronic Journals
TU	Thaper University
PEC	Punjab Engineering College
AICTE	All India Council for Technical Education
INDEST	Indian National Digital Library in Science and Technology
INFLIBNET	Information and Library Network
UGC-INFONET	University Grants Commission-Information of Library Network
CD-ROM	Compact Disc Read Only Memory
MHRD	Ministry of Human Resources Development
ILL	Inter Library Loan
E-book	Electronic Book
N (%)	Number (Per cent)
Back vol.	Back Volume
E-mail	Electronic Mail
LAN	Local Area Network
IT	Information Technology
Chi <sup>2</sup> (df;C)	Test of Independence and Coefficient of Contingency (Degree of freedom; Coefficient)
$\chi^2$	Chi-square
p	Probability
(p $\leq$ 0.01)	Significant at the 0.01 Level/ 1 per cent level

## **CHAPTER-1**

### **INTRODUCTION**

Traditional Libraries Towards Virtual Libraries

Historical Background and Growth of Electronic Resources

Electronic Resources and Services

Need of the Study

Objectives of the Study

Issues

Scheme of the Study

References

## **1.1 Traditional Libraries Towards Virtual Libraries**

Today, the advent of information technology has resulted in reducing the size of libraries. In fact, these smaller modern libraries are rich potential of information. It has been possible due to the digitization of information. The digital and electronic information is based on digitized data/information, which has gradually replaced paper-based records. As the visual information system in comparison to text based information system is getting more and more popular these days, the traditional libraries are becoming hybrid libraries as they are in the process of doing digitization of their documents and moving towards to become digital libraries. There are number of terms which are used by authors to represent the concept of digital libraries. These terms are; polyglot library, electronic library, desktop library, online library and library without walls etc. The term 'digital and electronic library' is the common word used by majority of the authors. A digital library is defined as "an organized collection of online full-text digital information focused on one or more specific subject areas" (Monopoli et al., 2002).

## **1.2 Historical Background and Growth of Electronic Resources**

The information in electronic format was created with the advent of computer in 1950s, it was not until the early 1960s that the first database suitable for searching was developed (Meadow, 1988). The advent of non-book materials in India had been slow. The non-book materials started to appear in the 1960s (Taher and Davis, 1994), like T.P.Sexena and Saifuddin's Problems of Cataloguing Microfilms in 1962; the Bombay based Atomic Energy Establishment Microforms Bulletin in 1963; M.S. Hussain's Audiovisual Librarianship; S.P. Singh's Automation in libraries in 1975 are few examples. Sodak and Schwarz being the first to (1973) conceive electronic form of the scholarly journal; their vision was distribution of computer output microfiche to individual subscribers (Lancaster, 1995). MEDLARS was the first on-demand computer-based information retrieval service, and it was developed primarily for the medical profession. In 1971, MEDLINE, the online version of MEDLARS, was the first major online dial-up database search service. DIALOG offered the first public online commercial database. With the introduction of CD-ROM in mid-1980s electronic resources began to have a major impact on selection practices in libraries (Meadow, 1998).

The emergence of various distribution systems of electronic journals from CD-ROM was the first step to local data loading, where publishers provided image and text data directly to libraries (Barnes, 1997). The three types of e-journals identified are as follows:

- 1) On-line,
- 2) CD-ROM, and
- 3) Networked Journals (Woodward and McKnight, 1995).

On-line: The on-line journals are available through on-line hosts such as DIALOG and BRS. They are not very likely to be part of library collections due to high cost.

CD-ROM: The CD-ROM journals are usually full text of individual or collected journals in a variety of subjects. They are mostly electronic versions of existing printed journals.

Networked Journals: These are based on mailing list software or client/server computing applications.

Duranceau (1996) outlined the characteristics of the *first generation networked based electronic journals* as ASCII-text files with simple file structure and small file sizes. The *second generation electronic journals* are “either HTML-based or use the WWW to disseminate specially formatted files.”

In the early 1990s publishers and universities explored ways of creating electronic journals that could be retrieved on the users desktop. There is significant growth in the number of electronic journals these days. The 7<sup>th</sup> edition of “*The ARL Directory of Electronic Journals Newsletters and Academic Discussion Lists*”(1997) shows that the number has increased from 110 in 1991 to 675 in 1995 and further to 3,414 in 1997(Mogge,1998). According to Stephen Harnad, Professor in Cognitive Sciences at Southampton University, around 24,000 research journals and 2.5 million articles are published per year worldwide (Johnston, 2003). Alongside the growth in the number and size of academic journals, there has been significant increase in the prices. With a 58% increase during the five-year’s period from 1998 to 2003 (LISU) has been reported. Price increases have been highest in the areas of science, technology and medicine. As per the 47th edition of Ulrich’s Periodicals Directory which covers the latest international information on journals, magazines and newspapers, there are over 51,440 serials available on-line (Ulrich’s 2008).

### **1.3 Electronic Resources and Services**

In the fast-emerging and ever-growing information explosion it is very difficult to retrieve particular information without wasting time. Recent advances in the field of information technology contribute significantly to improve the services of libraries. Now-a-days libraries are not only seen with printed document and non-print document but also with computers. The impact of technologies such as CD-ROMs, multimedia, computer networks, Internet, etc. have lead to a paperless society. With the availability of computers, capable of computing at very high speed and having large disc storage space, it is possible to digitize and store information in the form of high quality graphics, color images, voice signal and video clips at a relatively affordable cost.

There are several forms and types of electronic resources which are available on the internet, some of the popular ones that are gaining ground are the electronic journals, standards, technical specifications, reports, patents, full text articles, trade reports and hosts of other document sources. Also the printed editions of scholarly journals are available on the web. The publishers of journals are themselves providing services like contents, abstracts of articles, full text, before the actual printed edition is put on the stands. Majority of this kind of service providers are those publishers who have several journal publications to their credit, e.g., Elsevier, Academic press, Springer, Oxford University Press, Taylor and Franc's Blackwell Science and others. Their services are available to anyone having access to e-mail and importantly are free of cost. Some of the journals are only available on commercial basis for which library has to pay the required amount, and for these journals, users have to pay for the view and if need, per copy for the print also.

E-journals are called by various names such as electronic journals, internet based serials, online journals, e-serials and electronic serials. But the term 'e-journals' have become a standard name for calling the electronic journals, as these are available electronically via a computer or a computer network. These may or may not be published in some other (physical) medium but these are not available on CD-ROMs or diskettes. The advantage of the electronic resources is ubiquity – many users can simultaneous access a single electronic copy from many locations. Copies can be delivered with electronic speed, and it would be possible to reformat the material as per the reader's preference (e.g. character size). Since readers get a screen display of

the object, rather than a physical object, loss rates by theft are eliminated. Digital storage also permits libraries to expand the range of material, they can provide to their users since audio cassette tapes and records cannot stand a large number of playing without deterioration, their digital representation (digital audio) can produce a format that is much safer and of better quality. Digital material can also permit access to video tapes and new kinds of multimedia materials that are created only on computers and have no equivalent in any traditional format. The digital information can be copied without error. As a result preservation in a digital world does not depend on having a permanent object and keeping it under guard, but on the ability it makes multiple copies assuming that at least one will survive.

#### **1.4 Need of the study**

Today libraries are undergoing transformation, on one side they are facing three major challenges – shrinking budgets, shortage of space and increasing cost of publications, and on the other side 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 commenced 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” (Arora and Agarwal, 2003). 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, the results of which will facilitate other academic institutions to follow.

### **1.5 Objectives of the study**

The main objectives of this study are:

To study the use and impact of electronic resources on the traditional libraries and

To develop a plan for implementation of use of electronic resources in the academic libraries of India

### **1.6 Issues**

This research work includes the following issues to be taken up for study:

- Use of electronic resources by faculty, undergraduates, postgraduates students and research scholars
- Impact of electronic resources on print material, collection and usage
- Purpose of use of e-resources and internet /websites
- Search methods and services provided at their respective institute
- Obstacles preventing users from accessing an electronic resources
- Frequency of use of e-resources, CD-ROM and Internet
- Opinion on preference of use of electronic or printed version.

### **1.7 Scheme of the study**

The study has been divided into the following chapters:

Chapter 1: It describes in brief the traditional libraries and the present scenario of the libraries e-resources, need, and objectives of the study.

Chapter 2: It reviews the relevant literature published on the use of e-resources, services and impact of technology on libraries and users. The first part includes the study conducted on use of e-resources and the second part shows impact of e-resources. The emphasis has been laid on the review of the literature that is directly related to the present study.

Chapter 3: It deals with the scope of the study, hypotheses and research methodology used for the collection of the relevant data. Statistical methods used for analyzing the data have also been discussed.

Chapter 4: It gives in brief the growth and development starting with the pre-independence era of technical institutes in India. The chapter also includes the profile of the Technical Institutes taken up for the present study.

Chapter 5: This chapter is divided in to three parts. Part-A includes the case studies done of the four institutes, Part- B shows a comparison among the four institutes and Part-C gives the research of the present study. It discusses the results in the light of the studies conducted on use of e- resources and shows their impact.

Chapter 6: The study concludes with a detailed description of the findings and conclusions. It includes testing of hypotheses, suggestions for making the use of e-resources and services more efficient, and also suggestions for further study.

At the end of the thesis bibliography and appendices have been given as per the rules provided by Gibald, Joseph (2003).

## References

Arora, Jagdish and Agarwal, Pawan. (2003), "Indian National Digital Library in Engineering Sciences and Technology (INDEST) Consortium: Consortia-based subscription to Electronic resources for technical education system in India." In: Proceedings of CALIBER 2003 (eds. S.M.Salgar, et al.). Ahmedabad, India, INFLIBNET, pp. 271-290.

Barnes, J.H. (1997), "One Giant Step Lead, One Small Step: Continuing the Migration to Electronic Journals" *Library Trends*, 15(3), pp. 104-115.

Duranceau, E.F. (ed.) (1996). "Old Wine in New Bottles: Defining electronic Serials." *Serials Review*, 22(1), pp. 69-79.

Gibaldi, Joseph (2004), "*MLA Handbook for Writers of Research Papers.*" 6<sup>th</sup> edition Affiliated East- West Press, New Delhi, pp.1-361.

Johnston, Chris. (2003), *Call to put research free on websites.* Times Higher Education Supplement, December 19, p.7

Lancaster, F.W. (1995), "The Evolution of Electronic Publishing." *Library Trends*, 43(4), pp.518-527.

Library and Information Statistics Unit (LISU), Loughborough University Annual Library Statistics, 2003 Table 5.6a

Meadow, C.T. (1988), "Back to Future: Making and Interpreting the Database Industry Timeline." *Database*, 11 (5), pp14-16.

Mogge, D. (1998). "ARL Directory Tracks Growth in E-publishing." *ARL Newsletter*, 196, pp.1-2.

Monopoli, Mari.; Nicholas, David.; Georgiou, Panagiotis.; and Karfiati, Marima. (2002), "A User-oriented Libraries: Case Study 'The Electronic journals' Service of the Library Information Service of University of Patras, Greece." *Aslib Proceeding*, 54(2), pp.103-107.

Taher, Mohamed.; and Davis, Donald Gordon Jr. (1994), "*Librarianship and library science in India.*" Concept Publishing Company, New Delhi, pp.108.

*Ulrich's periodicals directory, 2009.* www.bowker.com/index

Woodward, H.; and McKnight, C. (1995), "Electronic Journals Issues of Access and Bibliographical Control." *Serials Review*, 21 (2), pp. 71-78.

## **CHAPTER -2**

### **REVIEW OF LITERATURE**

Review of Literature on Use of Electronic Resources

Review of Literature on Impact of Electronic Resources

Observations Based on the Review of the Literature

References

In this chapter an endeavor has been made to provide an overview of various aspects and issues of this study through a review of literature. Only the research studies, which are directly related to the present study, have been reviewed.

The review of literature has been divided into two parts, viz review of literature on use of electronic resources and impact of electronic resources.

## **2.1 Review of Literature on Use of Electronic resources**

**Al-Najran (1998)** conducted a research in Kuwait on “Internet Adoption and Use by Kuwait University Students: New medium, same old gratifications (diffusion of innovation).” The sample was restricted to 598 Kuwait university students. The major findings showed that adopters of the internet at Kuwait University were more likely to be males. In the college of engineering young and those who had more than average computing skills and fewer problems with English, were found to have more technical skills, and greater access to the internet for its advantages. Analysis indicated that gratification factors play an important role in internet service selection and time spent online. It has been found that internet applications and gratification were better predictions of time spent online than background and demographic characteristics.

**Lazinger et al. (1998)** in their study “Internet use by faculty members in various disciplines: a comparative case study” examined and compared the use of the internet among various sectors of the faculty. Questionnaires were sent to all the departments and professional school of the Hebrew University of Jerusalem. The results indicated that internet is used consistently higher among faculty members in the science and agriculture than among those in the humanities or social sciences.

**Ray and Day (1998)** conducted their study to determine the level of use of electronic resources and how students feel about various issues surrounding electronic resources. In their paper titled, "Student Attitude towards Electronic Information Resources", they used questionnaire method. The findings of their study are that 91 per cent of respondents acknowledged access to a networked computer via university, and also that more internet access is from work place than from home. The most popular electronic resources used were CD-ROM and the internet. Only 37.5 per cent of the sample population used electronic journals as an information tool.

**Woodward et al. (1998)** took the “Cafe ‘Jus’: An Electronic Journals User Survey” to study the critical mass of electronic journals for user study as the numbers of scholarly periodicals available in electronic form are increasing rapidly. The data was collected

through a questionnaire from postgraduate students and staff in various disciplines at Southborough. The findings of this study show that low level technical problems are still a deterrent to the use of electronic journals and people prefer not to read at length on screen.

**Lenares (1999)** in his research study titled “Use of electronic journals at research institution” found that there was rapidly growing acceptance of electronic journals by faculty within the scholarly community. The increase in electronic journals usage is accompanied by a decrease in the frequent use of print journals. Print journal usage, however, continues to dominate electronic journal usage. Only 14 per cent of respondents used electronic journals frequently as compared to 65 per cent using print journals frequently. Questionnaire was sent through e-mail to randomly selected faculty members from the university directory.

**Rusch-Feja and Siebeky (1999)** carried out research at the Max Planck Society in Germany to study about the use and acceptance of electronic journals in their paper titled “Evaluation of Usage and Acceptance of Electronic Journals.” They used electronic questionnaire for the survey. Major findings of the survey show a significantly high acceptance of electronic journals and an unwillingness to return to print versions only. Use of Elsevier journals was on higher side. The researchers also rated the advantages and disadvantages of electronic journals. The advantages listed are, the direct accessibility from the researchers’ desktop, easy downloading (or printing out) of articles directly etc. The disadvantages are, the lack of long term access, network dependency, difficulty in reading from monitor, loss of important attributes of the paper version, lack of citation status and standards.

**Zhang (1999)** surveyed 114 U.S. doctoral students at A & M University in Commerce, Texas. In his research work titled “Using the Internet for Research: Factors that affect its Adoption and Utilization by Doctoral Students (Diffusion of Innovation, Graduate Students),” he found that the user group of students welcomed the adoption and use of the internet for research. He concluded that students in the user group perceived the internet positively in four of the five measured innovation attributes: as providing good relative advantage and high compatibility for research work, and positive tradability and absorbability.

**Abdullah (2000)** in his doctoral research work titled, “Factors Affecting International Students Use of the Online Catalog and Other Information Sources” collected a sample of 300 international graduate students at Florida State University (FSU) in Tallahassee. The

findings of the study show that the students preferred using impersonal information sources such as the online catalogue, references, and the internet. The top three factors regarding use were: 1) availability of the source, 2) quality of the data, and 3) ease of use. The most influential factors on student search behaviors were: (1) gender, (2) stage of study, and 3) field of study. The barriers for international graduate's student search behaviors, such as computer experiences and cultural proximity had only "minimum affect on their use of online catalog and other information sources".

**Crawford and Daye (2000)** studied "A Survey of the Use of Electronic Services Glasgow Caledonian University library". The survey used observational and questionnaire based method. The questionnaire was administered both on paper and electronically. The results show that most of the respondents were full time students and were using PC rather than Mac, 18 per cent used CD-ROMs and only 13 per cent used online databases. About one-third of the respondents had problem in using the electronic information floor (elf). Information searching restricted to bulk of the work is the same as that done in other parts of the university.

**Liew et al. (2000)** studied to identify the users' usage of print and online journals. To know the users preferred medium, associated factors users expectations and concerns with regard to future e-journals in the paper titled "A Study of Graduate Student end-users' Use and Perception of Electronic Journals". The data was collected through a questionnaire in the electronic format and the study was conducted in two main sessions. The findings show a significantly high acceptance of e-journals by graduate students and growing interest in e-journals among end-users. There was strong acceptance, high expectations and enthusiasm for future e-journals.

**Miller (2000)** in his article titled "Electronic Resources and Academic Libraries, 1980-2000: Historical Perspective" described how collection has to be developed in an electronic environment. Over the past twenty years, academic collection development specialists have dealt with dramatic changes, brought about by decreasing purchasing power and the growing importance of electronic resources. The collection managers have rethought their efforts and revised criteria for the selection of materials in new formats while also maintaining traditional collections.

**Rogers (2001)** described in his article "Electronic Journal Usage at Ohio State University" the impact of making available "critical mass" of electronic journals. The computer-assisted telephone interviewing operating cases software and e-mail solicitation were used for collecting the survey data via a website. The research shows an increased

use of e-journals and decreased use of printed journals by faculty and graduate students as the number of available e-journals increased from 200 to 3000 titles. A majority of frequent users of all these three types of resources were from the departments in sciences.

**Schanffner (2001)** examined in his paper titled “Electronic Resources: A Wolf in Sheep Clothing?” the impact of electronic technology on libraries, and focused on some of the challenges of using electronic resources in research libraries. Also, he explored how electronic media has changed the ways students and scholars conduct research. He illustrated that electronic technology is simply one tool, for searching information.

**Simmonds (2001)** discussed the role of academic libraries in today’s competitive pressures from different information providers, and new technologies. In “Usage of Academic Libraries: The Role of Service Quality, Resources and User Characteristics” potential library users raise questions about the role of academic libraries in present times, the expectations of library users to provide the appropriate kind and levels of service and also to provide satisfaction and service quality. This study proposes and tests a model to explain the use of academic libraries. The students in three academic libraries were surveyed in Erie Pennsylvania over a period of three semesters. In all, 210 questionnaires were distributed and 188 were returned. The findings show that the use of academic libraries is influenced most by users perceived familiarity with the library and its resources; those who are more familiarity with the library are more likely to use academic libraries. Females use the library more than males.

**Zhang (2001)** in his the paper titled “Scholarly Use of Internet-based Electronic Resources,” made an attempt to know how scholars use, cite, and evaluate e-resources during the research. Three approaches were used to collect data for the investigation (a) a longitudinal analysis of e-journals from 1991 through 1998, (b) a survey of editors of the eight journals; and (c) a survey of 201 authors with articles to be published in the eight journals. The results of this study shows that there has been a notable increase in the number and proportion of authors who cite e-resources in their research articles over an eight year period but e-sources were still cited much less frequently than print sources. E-resources are increasingly used among scholars and also becoming an important component in their research.

**Herring (2002)** in the paper titled “Use of Electronic Resources in Scholarly Electronic Journals: A Citation Analysis” studied through citation analysis of research articles from scholarly electronic journals published in 1999-2002, to know the scholars using electronic resources and the type /subject area of online resources that are being

referenced. The researcher brought out that online resources are increasingly important for today's scholars and researchers. There is change in information seeking behavior. The use of information resources is greater as scholars and researchers feel comfortable and familiar with the resources available through the web.

**Monopli et al. (2002)** in their study titled "A User-oriented Evaluation of Digital Libraries: Case Study the 'electronic journals' Service of the Library and Information Service of the University of Patras Greece." An online questionnaire was used to collect the data on electronic use which was made available on the e-journals services website. The findings have brought out that a vast majority of respondents were regular internet users, 64 per cent users faced the problem of "too much networked information" when searching the internet, 85.5 per cent used internet daily and 8.4 per cent weekly. Due to lack of time to search for information, 45 per cent respondent failed to find required information. The main users of e-journals service were mostly researchers and academic staff. The e-resources were used more frequently by end-users below 35 years of age, it was also brought out that most of the end-users were men.

**Abdulla (2003)** in his research work examined about the internet use by the Arab students in Egypt. An online survey was administered to 502 students at the American University in Cairo; Egypt. The principal component factor analysis resulted in five motives for using the internet among respondents. These were: information seeking, surveillance, entertainment, personal utility, and social interaction. Several variables were investigated in relation to the five motives, including gender, year in school, type of internet connection, level of internet operational skills, internet exposure, internet affinity, and internet satisfaction. The study showed that gender was a significant factor, as males were more likely to use it for information. Internet affinity was significantly correlated between internet satisfaction and internet use motives of entertainment, surveillance, and information. Internet exposure was positively correlated to personal utility, social interaction, and entertainment. In the study, regression analysis models were utilized to predict internet use.

**Brockington (2003)** in his research work titled "African-American College Students and Internet Use: A Study of uses and Gratifications (Washington D.C.)" examined the uses, motivation, and gratifications of African-American college students who were internet users. The students from Howard University were surveyed through an electronically administered questionnaire. The study was aimed at finding why African-American students go online for longer period of time, what kind of needs they were looking for

satisfaction, and what kind of gratification have been satisfying. The findings of this study showed that African-American students used the internet mainly for communication, followed by cultural sites and entertainment sites. The study also indicated that 86 per cent of the respondents used the internet daily and 13 per cent used the internet weekly and nearly 84 per cent spent between one and four hours per day online.

**Heydet-kirsch (2003)** carried out a case study to examine how high school students used internet as a research tool in the pre-disposition and search stages of collage choice. A questionnaire method was used for collecting the data. The results show that 66 per cent high school students used the internet to verify information provided by the college. Some of the students preferred the internet because they disliked other means of college-student interaction.

**Hickerson (2003)** conducted a research study titled “Instructional Productivity and the Use of E-mail and Websites” to examine the relationship between the instructional use of e-mail and websites by faculty members. The possible relationships were examined using the responses in the 1998 and 1999 National Study of postsecondary faculty from all full-time faculty members who taught credit classes and had the principal duty of instructions. Five statistically significant differences between outputs from faculty members using e-mail and those who are not using e-mail were found in the study. The users of e-mail produced statistically significant fewer classroom credit hours and students contact hours per week. The results of the study for website users revealed that for statistically significant differences between outputs from faculty members using websites and those who are not using websites produced statistically significant fewer classrooms credit hours and taught statistically significant fewer classes.

**Hwong (2003)** conducted a research study titled “Internet Learning: An Assessment of Students Internet Usage in One College in Taiwan (China)” mainly with three objectives. To examine the level of college students' internet usage as a learning tool and to find out the internet literacy and barriers that the college students' in Taiwan had encountered while using the internet. The third was to find the relationship between student' level of internet usage. 166 undergraduate students' were surveyed. The major findings derived from the study include: (1) There were three variables correlated with the level of internet usage (a) internet literacy, (b) years of experience with the internet, and (c) number of access locations. These three variables contributed positively to the level of internet usage in studies. (2) The higher the level of internet literacy students had, the more frequently

they used the internet in their studies. (3) Students who had a higher level of experience with the network had a higher usage of the internet. (4) Students who had a higher level of access to the internet had a higher use of the internet; (5) The holistic level of internet literacy was at an average level, with a mean score of 3.20. (6) The students perceived the internet traffic congestion as the major barrier to its use.

**Kelly and Orr (2003)** in their paper titled “Trends in Distant Student Use of Electronic Recourses: A Survey” made an endeavor 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 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 favor 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 and the students are aware of the library resources and use them for their research.

**Kwon (2003)** conducted a research under the title, “A Proposed Model for Use of the Internet and the World-Wide Web” to find out how and why people used the internet and World-Wide Web. The research covered the internet and web use from two perspectives: (i) psychological and (ii) technological. 309 internet users selected from newsgroups were surveyed by structural equation modeling (SEM) method. The findings of the study indicated that 53.4 per cent of the respondents used internet for searching research materials. The results show that both motivational needs and technologically defined features of the web were stable and interdependent. The internet had a pattern/process that generated expectations, leading to patterns of web selections that resulted in gratifications obtained. As a result, the internet served as a predictable means of acquiring information, a means of communicating with others, a means of finding entertainment, and a means of shopping. The study suggested that the internet altered the relationship between the users and traditional providers of education, information, entertainment, and commerce.

**Momani (2003)** conducted a research under the title, “Evaluation of the Nature, Extent, and Satisfaction with Use of the Internet by Applied Sciences and Technology Faculty Members in Jordon” to investigate the use of internet by the faculty members of applied science and technology in Jordon to find out how and why they used the internet and what

level of satisfaction they obtained from it. The findings of the study indicated that the internet was widely used among faculty members in Jordan and its use was similar to that in any other developed country. The most widely used applications were the web for research and e-mail for communication. The faculty members in Jordan found no discomfort in their use of the internet and they perceived it as a very useful tool for research and communication. Respondents also indicated that lack of time, lack of access, lack of speed, lack of training, and lack of university support were the most important barriers for the effective use of the internet. The study recommended that more training should be provided for the vast majority of faculty members, for all schools, ranks and both the genders.

**Tenopir (2003)** in his research work titled “Use and Users of Electronic Library Resources: An Overview and Analysis of Recent Research Studies” studied the 200 recent research publications that focus on the use of electronic library resources and were published between 1995 and 2003 in the report for the council on library and information resources. The study used a variety of research methods, including observations, surveys, interviews, experiments and transaction log analysis. The findings show that both faculty and students use and like electronic resources and most readily adopt them if the sources are perceived as convenient, relevant, and time saving to their natural work flow. Print medium is still used for some reading and is part of research in almost every discipline.

**Waldman (2003)** studied to know what factors encourage students to seek out the information in the library setting in his paper titled “Freshmen’s Use of Library Electronic Resources and Self-efficacy” at Breach college library, the City University of New York .The questionnaire was used as tool for collecting data. The findings show that students who visit the library more frequently had higher self efficacy scores than those who reported using the library less often. Students who found the library electronic resources easy to use had higher self-efficacy scores as compared to those who found the electronic resources difficult to use and students who report being highly motivated to learn about the library’s electronic resources have higher self-efficacy scores when compared to those who are motivated to learn.

**Yang (2003)** conducted a study titled, “Internet Use by Pre-service Teachers in Elementary Education Instruction” which explored the attitude of pre-service elementary educators towards internet use, internet self-efficacy, and internet anxiety and their relationship. The respondents of this survey were all elementary pre-service students enrolled in Core College of Education courses at Idaho State University during 2003. The

questionnaires were distributed to 98 students' during regularly scheduled class time and a total of 71 responses were obtained. The implications of the findings suggested that an early and frequent use of the internet across the teacher education curricula was useful in promoting students' internet use and self-efficacy.

**Choukhande and Kumar (2004)** have studied the information needs and use pattern in their paper titled “Analytical Study of Information Needs and Use Pattern of Faculty Members and Research Scholars of Amravati University”. They used a questionnaire method with random sampling technique to collect the data. Some of the findings are: users face difficulty in searching information through electronic sources, and they need skill to use the available sources in the library.

**Ibrahim (2004)** in his study titled “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 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.

**Krueger and Ray (2004)** carried a survey “Applying Web Usability Techniques to Assess Student Awareness of Library Web Resources” in the library of the University of the Pacific (UOP). Web usability technique was used to assess the student awareness of their libraries and how much library web-site resources are used. 39 per cent of students were familiar; enough with the libraries web resources to value them for seeking information resources. 6 per cent used library web resources but chose the wrong sort of resources. They concluded that Web usability technique was used to assess the students' awareness of their libraries web site and how much library web-site resources are used. They have reported 45 per cent of students were sufficiently aware of library web resources to use them as first tool of choice.

**Samson et al. (2004)** have critically evaluated the usage of network resources in their paper titled “Networked Resources, Assessment and Collection Development.” The Project was undertaken for study at the University of Montana-Missoula. Usage was measured with the help of vendor's reports, in-house use of web logs, surveys and word of mouth, during the spring semester. The findings show that data collected has impact on

the collection development policy. Based on the data over \$ 40,000 of duplicate print subscriptions were migrated to electronic subscriptions.

**Siebenberg et al. (2004)** studied to determine if the selection of electronic journals in the Owen Science and Engineering Library was changing students' and researchers' choice of journals in the paper titled "Print versus Electronic Journal Use in three Sci./tech Disciplines: What's going on Here?" The statistics available from publishers of the journals from 1998 to 2001 were used as method for study in three Sci/tech disciplines at Washington State University. The results showed that print journals were being used more than electronic journals. Generally, electronic journals were used heavily and the availability of electronic format enhanced the total use of most titles. Some electronic journals were used little or not at all and there were a substantial increase in the use of some print journals.

**Al-Saleh (2004)** carried out his research titled "The Graduate Students' Information Needs from Electronic Information Resources in Saudi Arabia" at university libraries. This study showed that Saudi graduate students' situations are diverse in terms of gender, age, academic degree pursued, academic major, English language proficiency, internet use and university. All of these situational variables affected students' use or non-use of electronic information resources. This study found that half of the Saudi graduate students used electronic information resources despite extensive availability of electronic resources, the graduate students preferred to use printed books and documents, from other the university libraries on their own, rather than electronic databases or the internet, and the electronic information resources purchased by Saudi University libraries appear to be underutilized.

**Ali, Naushad (2005)** 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.

**Dadzie (2005)** studied to investigate the use of electronic resources by students and faculty of Ashesi University, Ghana. He also made an attempt to know the level of use and the type of information accessed by the effectiveness of the library's communication tools for information research in the paper titled "Electronic Resources; Access and Use at Ashesi University College." A questionnaire- based survey was done. The findings show that general computer access was high and also the usage for information access was high due to the university's state-of-the-art infrastructure. Usage of some internet resources was also very high while the usage of scholarly databases was quite low. The low patronage was attributed to inadequate information about the existence of electronic library resources.

**Doraswamy (2005)** studied the use and familiarity of electronic information resources in paper titled "Familiarity and Use of the Available Electronic Information Resources by the Students in U.R Siddhartha Engineering College Library, Vijay Wada: Survey". 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. The 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.

**Robinson (2005)** examined in his research titled "Internet Use among African-American College Students: An Explanatory Study" the internet use among African-American college students. The respondents were surveyed by using the 43-items questionnaire to determine the frequency of use of internet. The results of the study indicated that most of the African-American college students (76 per cent) had used the internet for more than three years. The use of the internet for most African-American college students occurred at school or work place with 49 per cent response or at home with 47 per cent response and they spent on an average two hours per day on-line. A small percentage of the students spent 5-6 hours per day on the internet. 43 per cent of the students used the internet primarily to learn and find school resources.

**Shoham and Roitberg (2005)** studied to measure purpose for visiting the academic library and uses made on its workstations in the paper titled “From Electronic Library to a Learning Centre in the Academic Library: Integrating Traditional and New Uses in the Library Workstation.” Two methods were used to collect the data; questionnaires which were distributed in the sample libraries, and computerized observations which were done in one large library. The findings show that non-library user is the major activity on academic library workstations and that libraries with large number of workstations are more exposed to this trend and the non-library uses support learning.

**Woo (2005)** conducted the survey for users to evaluate the performance of the main library and the branch libraries, to identify performance gaps and to find out user preferences for print and electronics materials in the paper titled “The 2004 User Survey at University of Hong Kong Libraries”. An online users’ survey, with the option to complete in the print format was adopted as a method for study. The results show that 68.8 per cent of the respondents prefer to use online journals as compared to 31.2 per cent who prefer to use print journals, and 71.8 per cent of the respondents prefer to use print books as compared to 28.2 per cent who prefer to use electronic books.

**Huntington, et al. (2006)** used transaction log analysis, a recent method to trace journals usage in the digital environment in their research paper titled “Article Decay in the Digital Environment: An Analysis of Usage of Ohio LINK by Date of Publication, Employing Deep Log Methods.” Deep log analysis (DLA) is a methodology developed by the Centre for Information Behavior and the Evaluation of Research (CIBER) team at UCL (University College London). The finding of the study showed that for different kinds of articles viewed, people who just viewed a table of contents page were far more likely to be current awareness “checkers,” while those who viewed a journal issue and also went on to view an article or abstract were more likely to view older articles.

**Razaand and Upadhyay (2006)** A survey was carried out to examine the usage of e-journals by the researchers at Aligarh Muslim University. They used questionnaire method to find out purpose and place used by research scholars for using e-journals. The survey reveals that all the researchers are aware of e-journals in AMU. Many research scholars are consulting e-journals from their departmental labs and computer centers, not only for research purposes but also to update their own knowledge. Some problems like lack of training and slow downloading has been found and the researchers felt about the need for print journals as well as electronic journals.

**Asefeh and Nosrat (2007)** carried a survey to investigate the relationships between awareness and use of digital resources among students in Isfahan University of Medical Sciences. A questionnaire was design with descriptive method was randomly used for survey. 250 users of the Medical libraries and information centers 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” 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 are faced with problems like low speed connectivity and shortage of hardware facilities.

**Kanwal, Ameen (2008)** studied the “Barriers in Collection Sharing among Libraries of Pakistan: University Library Managers’ Viewpoint”. A survey method was used to explore the barriers to collection sharing among the well-established chartered university libraries situated in the major cities of Pakistan. The survey followed a qualitative design based on an interview technique of data collection. Twenty chief/head librarians from five major cities of Pakistan were interviewed. In-depth, semi-structured interviews were conducted at the librarians’ workplaces during 2003 to 2004. The results of the present study revealed that various technical, procedural, psychological, and behavioral barriers in achieving planned and meaningful collection-sharing (CS) programs still prevail. It suggests analyzing the possibilities, opportunities, and challenges of CS in the emerging paradigm.

## **2.2 Review of Literature on Impact of Electronic Resources**

**Edward et al. (1995)** studied the impact of electronic libraries in their paper titled “IMPACT PROJECT: The Impact on People of Electronic Libraries.” The paper presents some initial findings of the IMPECT Project, at an early stage of analysis. The questionnaire method was used and circulated among all the members of the library and information staff in the academic libraries. The results show that more library assistants in large majority agreed with the use of electronic information, as it reduces their workload

and provides job satisfaction. They also broadly agreed that electronic information resources bring effectiveness in their work. It has been found that library staff felt to have low level of technical expertise.

**Abdul\_Gader (1996)** in his paper titled “Usage Pattern and Productivity Impact of Computer Medicated Communications in a Developing Country: An Explanatory Study” reports the findings of a case study conducted in Saudi Arabia employing computer mediated communication (CMCs). Data from 1326 CMCs users was collected through questionnaire method. Results of the study indicated that the users exhibit high level of use of the CMCs. Generally, users view CMCs as an important business.

**Rao (1997)** has discussed in his article titled “The Impact of Recent Advances in Information Technology on Collection Development” the impact of CD-ROM databases, internet and digital libraries on collection development. He has reported that it is quite significant. It is necessary to conduct a survey of available sources on various networks. Effective techniques are needed to search and store the download data.

**Harter (1998)** studied the effect of e-journals on the scholarly communities, in his paper titled “Scholarly Communication and Electronic Journals: An Impact Study”. Citation analysis was used to conduct several analyses. The study covered the question: To what extent are scholars and researchers aware of, influenced by, using, or building their own work on research published in e-journals. The data showed, with a few possible expectations, that the impact of e-journals on scholarly communication has been minimized.

**Milne (1999)** in his paper titled “Electronic Access to Information and its Impact on Scholarly Communication” examined the effect of electronic access to information on patterns of scholarly communication and focused on the effect of disciplinary culture on academic use of new technologies. He also studied the impact of electronic access to information on academic use of the library and patterns of information seeking. The studies were carried from 1991 to 1994 for which two surveys were conducted. For this purpose two mailed questionnaires were distributed in 1991 and again in 1994. The results showed that disciplinary culture does effect academic adoptions of the new technology, 95 per cent of the academics had a computer at the university and over 90 per cent used it daily, this shows a very high acceptance and use of computer technology. A decrease in the use of printed materials was found during the period of these two surveys. The electronic library service (EIS), a gateway to many services available over the internet was very important and the importance of information stored on CD-ROM has

increased between the two surveys 1991 to 1994. The ability to access online databases from individual workstations was important to almost 70 per cent of academics and scientists.

**Bjork and Turk (2000)** conducted a survey of the authors and the readers of scholarly articles and conference papers. The survey titled “A Survey of the Impact of the Internet on Scientific Publishing in Construction of IT and Construction Management” revealed that the persons of 34-35 age group used the internet more than younger and older groups. The survey showed that professors/teachers used the internet more than the students. The maximum users of internet were the engineers and professors not working at a university, the survey also showed that a strong majority of the respondents (67 per cent) believe that the papers on the web were easier to generate and that these would be read by a more people (59 per cent) than those of printed articles.

**Nicholas (2000)** surveyed 300 Journals and media librarians. The survey entitled “The Impact of the Internet on Information Seeking in the Media” was conducted to know the impact of internet on the British media. The survey showed that 68 per cent journalists and media librarians used the internet. The findings of survey provided that 58 per cent of the student journalists used internet very frequently, 24 per cent sometimes, 15 per cent occasionally and 3 per cent never. All the respondents who used internet are also using e-mail. 18 per cent of the respondents used list serves and were members of discussions groups. 24 per cent of the respondents used newsgroup services of the internet. The survey further revealed that major factors that affected the use of the internet were lack of internet access and lack of printer. The 3 per cent of respondents of the 30-39 age group used internet services and resources more than the other age groups.

**De-Groote (2001)** sought the research to determine the impact of online journals on the use of print journals and inter-library loan (ILL). The statistics regarding the use of print journals collected for the period 1995 to 1999 were used for the study. Also, the request forms of ILL from 1995 to 2000 of UIC-Peoria students, faculty and staff were studied. The paper titled “Online Journals: Impact on Print Journals Usage” shows that print journals usage decreased significantly since the introduction of on-line journals. This decrease occurred where a journal was available in print. The inter-library loan request was decreased due to the introduction of online journals. The decrease in use of print collection was due to preference of use to access on-line journals and the negative impact of on-line journals was that the use of journals’ titles was available only in print. It has also focused that the users may compromise over quality for convenience when selecting

articles from journals.

**Darries (2002)** studied the impact of the internet on reference services in higher education libraries in South Africa. An electronic survey was done using the web and e-mail questionnaire. Interviews were also conducted to collect data. The data was collected from the heads of reference services at large libraries and small libraries of 36 higher education institutions in South Africa. A total number of 90 respondents were sent e-mails, only 26 responses were received. Being the electronic survey the response rate was low. The results showed that all responding libraries have internet access to their users. On an average, users had internet access for three and a half years and reference librarians for five years. The study concluded that libraries lacked adequate computer facilities and cannot provide optimal internet access to students. The study recommended that the bandwidth and number of student computer facilities at the national government level should be addressed; that libraries should develop electronic reference as a core service; and online institution efforts should be made by using e-mail, web tutorials and virtual classroom to reach more and more students.

**Smith (2003)** in his paper titled “Changes in faculty reading behaviors: The Impact of Electronic Journals on the University of Georgia”. A questionnaire method was used to collect a sample from UGA faculty. The survey was conducted through e-mail. The survey explored the role of electronic journals in the faculty and also studied their weekly scholarly reading habits. The results indicated that almost three quarters of respondents reported reading at least one article from an online source every week. Also junior faculty members used electronic resources more than senior faculty members.

### **2.3 Observation Based on the Review of the Literature**

The earlier studies had been based exclusively on the analysis of the access data supplied by the publishers, and many facts to give information on the characteristics, preferences and views of the users. Literature studies also show that in many studies researchers made a comparison between print and electronic journals usage. The user community is becoming more and more familiar with these tools and now they have started using them very regularly. 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. The main aim of this study is to supplement the results obtained in many earlier studies, which had provided interesting general information on the use of the e-journals packages. The present study is to investigate the use of electronic journals, which are available in Indian institutions, and

also to know the impact of use on usage, collection and on library environment. Technical institutions being the first to initiate the use of latest technologies, study of use and impact of electronic resources at these institutions is need of the hour, the results of which will facilitate other academic institutions to follow.

## References

- Abdullah, S.A. (2000), "Factors Affecting International Students' Use of the Online Catalog and Other Information Sources," (Doctoral Dissertation, Florida State University), *Dissertation Abstracts International*, 61, 1663.
- Abdul-Gader, A.H.(1996), "Usage Pattern and Productivity Impact of Computer Medicated Communications in a Developing Country; and Explanatory Study," *International Journal of Information Management*, 16(1), pp.17-22.
- Abdulla, Rasha A. (2003), "The Uses and Gratifications of the Internet Among Arab Students in Egypt," Dissertation, University of Miami, DAI-A 65/01 (2003): 218. 7 July 2004. <http://wwwlib.uni.com/dissertations/fullcit/3119807>.
- Al-Najran, T.N. (1998), "Internet Adoption and Use by Kuwait University Students: New Medium, Same Old Gratifications (Diffusion of Innovation)," (Doctoral Dissertation, Ohio State University), *Dissertation Abstracts International*, 59, 3684.
- Al-Saleh, Yasir Nasser. (2004), "Graduate Students' Information Needs from Electronic Information Resources in Saudi Arabia," Dissertation, Florida State University, Summer 2004.
- Ali, Naushad. (2005), "The Use of Electronic Resources at IIT Delhi Library: A study of Search Behaviors" *The Electronic Library*, 23(6), pp691-700.
- Asefeh,Asemi and Nosrat Riyahiniya. "Awareness and Use of Dgital Resources in the Libraries of Isfahan University of Medical Sciences, Iran." *The Electronic Library*, 25(3), pp316-327.
- Bjork, Chorister Bo.; and Turk, Ziga. (2000), "A Survey of the Impact of the Internet on Scientific Publishing in Construction of it and Construction Management, July, 2 March 2004. <http://www.itan.org/2000/5>
- Brockington, Wanda Goins.(2003), "African-American College Students and Internet Use: A Study of Uses and Gratifications (Washington, D.C.)," *Dissertation, Howard University*, DAI-A, 64, p.111, 7 July 2004. <http://wwwlib.uni.com/dissertations/fullcit/3119615>.
- Choukhande, Vaishali G.; and Kumar P.S.G. (2004), "Analytical Study of Information Needs and Use Pattern of Faculty Members and Research Scholars of Amravati University," *ILA Bulletin*, 40 (3), pp.23-31.
- Crawford, John C.; and Daye, Andrew. (2000), "A Survey of the Use of Electronic Services at Glasgow Caledonia University Library," *The Electronic library*, 18(4), pp. 255-265.
- Dadzie, Perpetua S. (2005), "Electronic Resources: Access and Usage at Ashesi University College," *Campus-wide Information Systems*, 22(5), pp. 290-297.

Darries, Fatima. (2002), "The Impact of the Internet on Reference Services in Higher Education Libraries in South Africa," *ELIS*.

De Groote, Sandra L.; and Dorrech, Josephine L. (2001), "Online Journals: Impact on Print Journals Usage", *Bulletin of Medical Libraries Association*, 89(4), pp.372-378.

Doraswamy, M. (2005), "Familiarity and Use of the Available Electronic Information Resources by the Students in U.R Siddhartha Engineering College Library, Vijay Wada: A Survey," *NACLIN*, pp.234-244.

Edwards, C.E.; Day J.M.; and Walton, G. (1995), "IMPACT Project: The Impact on People of Electronic Libraries," *Aslib Proceedings*, 47 (9), pp.203-208.

Harter, Stephen P. (1998), "Scholarly Communication and Electronic Journals: An Impact Study," *JASIS*, 49(6).

Herring, Susan Davis. (2002), "Use of Electronic Resources in Scholarly Electronic Journals: A Citation Analysis," *College and Research Libraries*, July, pp.334-340.

Heydet-kirsch, Patricia E. (2003), "The Use of the Internet with in the College Search Places of High School Juniors and Seniors," Dissertation University of Miami, DAI-A 65-01 (2003): 96. 8 July 2004. <http://wwwlub.uni.com/dissertatins/fulleit/3119901>.

Hickerson, Corey Allan. (2003), "Instructional Productivity and the Use of E-Mail and Websites," Dissertation University of Virginia, 2003. DAI-A 64/04, 5 July 2004. <http://wwwlib.uni.com/dissertations/fullitct/3097290>

Huntington, P., Nicholas, D., Jamali, H. R. and Tenopir, C. ( 2006), "Article Decay in the Digital Environment: An Analysis of Usage of Ohio LINK by Date of Publication, Employing Deep Log Methods," *Journal of the American Society for Information Science and Technology*, 57(13): 1840–1851.

Hwong, Wei-Long. (2003), "Internet Learning: An Assessment of Students Internet Usage in one College in Taiwan (China)," Dissertation Spalding University, DAI-64/01(2003):121. July 2004, <http://wwwlib.uni.com/dissertations/fullcit/3077707>.

Ibrahim, Ahmed Elhafiz. (2004), "Use and User Perception of Electronic Resources in the United Arab Emirates University (UAEU)," *Libri*, 54, pp.18-29.

Kanwal, Ameen. (2008) "Barriers in Collection Sharing among Libraries of Pakistan: University Library Managers' Viewpoint", *Library and Information Science Research Electronic Journal*, 18 (1), March <http://libres.curtin.edu.au/>

Kelly, Kimberly B.; and Orr, Gloria J. (2003), "Trends in Distant Student Use of Electronic Resources: A Survey," *College and Research Libraries*, May, pp .176-190.

Krueger, Janice.; Ray Ron L.; and Knight, Lorrie. (2004), "Applying Web Usability Techniques to Assess Student Awareness of Library Web Resources," *The Journal of Academic Librarian Ship*, 30(4), July, pp. 285-293.

Kwon, Joec. (2003), "A Proposed Model for Use of the Internet and the World Wide Web," Dissertation University of Alabama, DAI-A 64/12 (2003), 211, 7 July 2004. <http://wwwlib.uni.com/dissertations/fullcit/3115054>.

Lazinger, Susan S; Bar-Ila, Judit; and Peritz, Bluma C. (1998), "Internet Use by Faculty Members in Various Disciplines: A comparative case study," *The Journal of American Society for information science*, 48 (6), Dec., pp. 508-518.

Lenares, Deborah. (1999), "Faculty Use of Electronic Journals at Research Institution," ACRL Ninth National Conferences; Detroit Michigan, April 8-11.

Liew, Chern Li; Foo, Schubert, ; and Chemupati, K.R. (2000), "A Study of Graduate Student End-users: Use and Perception of Electronic Journals," *Online Information Review*, 24(4), pp. 302-315.

Miller, R.H. (2000), "Electronic Resources and Academic Libraries, 1980-2000: A Historical Perspective," *Library Trends*, 48(4), pp. 645-670.

Milne, Patricia.(1999), "Electronic Access to Information and its Impact on Scholarly Communication," *Academic Libraries*.  
<http://www.csu.edu.au/special/online99/proceeding99/305b.htm>.

Momani, Hassan Ahmad. (2003), "Evaluation of the Nature, Extent, and Satisfaction with use of the internet by Applied Science and Technology Faculty Members in Jordon," Dissertation University of Pittsburg, DAI-A 64/12(2003):176.8, July 2004.  
<http://wwwlib.uni.com/dissertations/fullcit/3117789>.

Monopli Maria.; Nicholas David.; Georgiou, Panagiotis.; and Korfiati, Marima. (2002), "A User Oriented Evaluation of Digital Libraries: A Case Study 'The Electronic Journals' services of the library and information service of the University of Petra, Greece," *Aslib Proceedings*, 54 (2), pp. 103-117.

Nicholas David et al. (2000)," The Impact of the Internet on Information Seeking in the Media," *Aslib Proceedings*, 53(3), pp.99-114.

Rao,I.K.Ravichandra. (1997), "Impact of Recent Advancements in Information Technology on Collection Development," *DESIDOC Bulletin of Information Technology*, 17(1), pp.3-6.

Ray, Kathryn and Day, Joan. (1998), "Student Attitudes Towards Electronic Information Resources." *Information Research*, 4(2),October, pp. 1-32.

Razaand, M.M and Upadhyaye A.K. (2006), "Usage of E-journals by Researchers in Aligarh Muslim University: A Study," *The International Information & Library Review*, 38 (3), September 2006, pp. 170-179.

Robinson, Janniew. (2005), "Internet Use Among African-American College Students: An Exploratory Study," *Dissertation*, George Washington University, DAI-A 65/12(2005): 150.9, Aug.2005. <http://wwwub.uni.com/hersertations /fullert/3156015>.

Rogers, Sally A (2001), "Electronic Journal Usage at Ohio State University." *College and Research Libraries*, Jan, pp.25-34.

Rusch-Feja, Dinan and Siebeky, Uta. (1999), "Evaluation of Usage and Acceptance of Electronic Journals," *D-lib. Magazine*, Oct.5, (10).

Samson, Sue.; Derry, Sebastian. ; and Eggleston, Holly. (2004), "Networked Resources, Assessment and Collection Development," *The Journal of Academic Librarianship*. 30(6), Nov, pp.476-481.

Schanffner, B.L.(2001), "Electronic resources: A Wolf in Sheep Clothing?," *College and Research Libraries*, 62 (3), pp. 239-249.

Siebenberg, Tammy R. Galbraith, Betty; and Brady, Eileen E. (2004), "Print versus Electronic Journal Use in three Sci./Tech Disciplines; What's' Going on Here?," *College and Research Libraries*, Sep, pp.427-438.

Smith, Erin T. (2003), "Changes in Faculty Reading Behaviors: The Impact of Electronic Journals on the University of Georgia," *The Journal of Academic Librarianship*, 29(3), May, pp.162-168.

Shoham, Snunith.; and Roitberg, Nurit. (2005), "From Electronic Library to a Learning Centre in the Academic Library: Integrating Traditional and New Use in the Library Work Station," *The Journal of Academic Librarianship*, July, 31(4).

Simmonds, P.L. (2001), "Usage of Academic Libraries: The Role of Service Quality, Sources, and User Characteristics," *Library Trends*, 49(4), Spring, pp.626-634.

Tenopir Carol. (2003), "Use and Users of Electronic Library Resources: An Overview and Analysis of Recent Research Studies," Council on Library and Information Resources, Washington D.C., August.

Waldman, Micaela. (2003), "Freshmen's Use of Library Electronic Resources and Self-efficacy," *Information Research*, 8(2), Jan.

Woo, Helen. (2005), "The 2004 User Survey at the University of Hong-Kong Libraries," *College and Research Libraries*, March. pp.115-135.

Woodward, Hazel.; Rowland Fytton.; Mckinight, Cliff.; Pritihett Carolyn.; and Meadows Jack. (1998), "Cafe 'Jus': An Electronic Journals User Survey." *Journal of Digital Information*, 1(3), <http://jodi.ecs.soton.ac.hik/Articles/uol/103/woodward/>

Yang, Shi-Wen. (2003), "Internet Use by Pre-Service Teachers in Elementary Education Instruction," *Dissertation*, Idaho State University, DAI-A 64/06 (2003):189.7, July 2004 <http://www.ub.uni.com/disertations/fullcit/3094895>

Yasir Naser Al, Saleh. (2004), "The Graduate Student's Information Needs from Electronic Information Resources in Saudi Arabia," *Doctoral Dissertation*, Florida State University School of Information Studies.

Zhang, Yin. (2001), "Scholarly Use of Internet-based Electronic Resources," *Journal of the American society for Information Science and Technology*, 52 (8), April, pp.628-664.

Zhang, D. (1999), "Using the Internet for Research: Factors that affect its Adoption and Utilization by Doctoral Students (Diffusion of Innovation, Graduate Students)," (Doctoral dissertation, Texas A&M Commerce-Commerce) *Dissertation Abstracts International*, 69, 1095.

## **CHAPTER-3**

### **METHODOLOGY**

Research Design

Scope of the Study

Hypothesis

Research Methodology

Pilot Study

Full Study

Research Sample

Data Collection

Data Collection and Sources

Statistical Techniques Used for Data Analysis

Problems Encountered

References

This chapter discusses the sources and methods used for the collection of data. It also details the statistical techniques used for the analysis of data. Further, the scope of the study has also been highlighted in the present chapter.

### **3.1 Research Design**

In the early days of social science research, the positivist model was most commonly used. This model uses quantitative (statistical) data to measure human behavior (Patton, 1990). However, as qualitative research (the interpretive model) grew in use in the 1990s, there occurred a paradigmatic shift toward favoring the qualitative approach or using a mixed-method approach (Lawley, 1999). The strength of quantitative or statistical data is that it reveals the magnitude of a problem, while the value of qualitative data (observations and interviews) is that it tends to reveal the causes of the problem (Dervin and Clark, 1987).

The survey method was selected as the most appropriate design tool to obtain a large sample (Babbie, 1986). The survey method relies on a questionnaire instrument and it is the most common method used in social science research (Babbie, 1995; Ary et al., 1996), and as well as in library and information science research (Barnard, 2000), and for studies of use and gratification (Parker and Richard, 2000). Julien (1996) found that 54 per cent of all researchers have used survey research method for their information user studies. According to Ary et al. (1996) surveys are very important in higher education. Many universities have survey research institutions such as the University of Michigan Institute for Social Research and the UCLA Higher Education Research Institute.

Academic library research has frequently used surveys to collect data because these instruments assess effectiveness, assist in decisions, prioritize services, solve problems, and evaluate user interaction and satisfaction. Surveys also identify user needs and priorities, and define user interests, opinions, attitudes, and characteristics/demographics as well as user priorities in finding information (Verhoeven, 1990). Library research is usually performed as user studies for user characteristics, information seeking for user strategies and behaviors, and information skill to discover user skill (Walster, 1996). Finally, the survey method was considered most appropriate for this study because it can measure graduate students' and faculty background and experience and what they know about electronic information, and it was well-suited to the research questions taken up for this study.

### **3.2 Scope of the Study**

The scope of the present study is limited to the Indian institutions of technology in India. The following institutes have been taken up for collecting the data and to study the use and impact of e-resources by users:

Indian Institute of Technology (IIT), Delhi;

Indian Institute of Technology (IIT), Roorkee;

Thapar University (TU), Patiala; and

Punjab Engineering College (PEC), Deemed University, Chandigarh

These institutions have been taken on the basis that all these are technical institutes located in the northern part of India. As per the categories made by Indian Digital library in Engineering Sciences and Technology (INDEST) Consortium set up by the Ministry of Human Resource Development (MHRD). From this at least one category has been taken as follow:

1. IIT, Delhi: Head Quarter of the INDEST consortium and supported by MHRD
2. IIT, Roorkee: Core member of INDEST consortium supported by MHRD
3. TU, Patiala: Self-supporting institute under INDEST consortium
4. PEC, Chandigarh: Supported by AICTE under INDEST consortium

### **3.3 Hypothesis**

1. Use of library is decreasing due to internet and intranet services provided by institutes at department, hostel and computer centre
2. All the users are not aware about the electronic library services provided by their institute library.
3. Usage of e-resources increases, if users aware and familiar with electronic resources of the library
4. The users are in need of training for handling the electronic resources.
5. Frequency of using internet is more as compared to E-Journals and CD-ROM.
6. The users face difficulties in accessing information through electronic resources.

### **3.4 Research Methodology**

The survey method was considered most appropriate for this study because it can measure students' background, experience and what they know about electronic information, and it was well suited to the research questions taken up for this study. The data has been obtained by using questionnaires; this data has been standardized for comparison. The questionnaire was designed, keeping in view the objectives of the study for collecting

usage data from different users. The questionnaire was distributed to the undergraduates, postgraduates, research scholars and faculty members of all departments at TU, PEC and in both the IIT's. The questionnaire was administered in class rooms, libraries, hostels, departments, computer centers, and other campus locations.

The study was carried out in two phases:

1. Pilot Study
2. Full Study

### 3.4.1 Pilot Study

The pilot study was conducted with 5 per cent of stratified random sample taken from the total population of the TU, Patiala in the month of March 2004. A questionnaire was designed and used to collect the data from undergraduates, postgraduates, research scholars and faculty members. The data was analyzed on the basis of results of the pilot survey. On the basis of pilot study the questionnaire was further improved and standardized.

### 3.4.2 Full Study

Two questionnaires were designed to collect the data (annexure I & II) for the present study, one for the librarian and second questionnaire for the users, i.e., undergraduates, postgraduates, research scholars and faculty.

**Table No. 3.1 Institution wise distribution of Questionnaires**

Level of Institutes	IIT, Delhi	IIT, Roorkee	TU, Patiala	PEC, Chandigarh	Total
Total population of users	4985	3363	2506	2056	12910
Questionnaires distributed	997	772	504	413	2686
Response received	825	623	485	389	2322

The Table No.3.1 shows that the total population of all the four institutes was 12910. The questionnaires distributed to the users were 2686; and response received was 2322. The data indicates that IIT, Delhi population was 4985; the questionnaires were distributed to 997 users; and response received was 825. From the population of 3363 at IIT, Roorkee, the questionnaires were distributed to 772; and response received was 623. The population of TU, Patiala was 2506; questionnaires were distributed to 504; and response received was 485, while at PEC, Chandigarh population was 2056; 413 questionnaires were distributed and response received was 389. The population included both male and female respondents.

**Table No. 3.2 Users wise distribution of Questionnaires**

Total Users taken for Survey	Total Strength	Questionnaire Distributed	Response Received
Undergraduates	7519	1503	1415
Postgraduates	3087	617	535
Research Scholars	1363	373	215
Faculty	941	193	157
Total	12910	2686	2322

Table No.3.2 shows the survey population taken as per users'. There were 7519 undergraduates; 1503 questionnaires were distributed; and response from 1415 was received. Total strength of postgraduates was 3087, questionnaire given to them were 617 and response received was 535. There were 1363 research scholars; 373 questionnaires were distributed; and response from 215 research scholars was received. The strength of faculty was 941; questionnaires distributed were 193; and response received was 157.

### 3.5 Research Sample

**Table No. 3.3 Research Population of the Survey**

Respondents	IIT, Delhi			IIT, Roorkee			TU, Patiala			PEC, Chandigarh		
	Total Strength	Quest. Distributed	Response Received	Total Strength	Quest. Distributed	Response Received	Total Strength	Quest. Distributed	Response Received	Total Strength	Quest. Distributed	Response Received
UG	2192	438	379	1956	391	378	1741	348	348	1630	326	310
PG	1530	306	255	776	155	140	505	101	90	276	55	50
RS	916	183	133	290	158	58	141	28	20	16	04	04
FA	347	69	58	341	68	47	119	27	27	134	28	25
Total	4985	997	825	3363	772	623	2506	504	485	2056	413	389

The sample of the study includes all library users enrolled at the four institutions. An official request was made to the administration of each institute to obtain lists containing number of undergraduates, postgraduates, research scholars and faculty. An attempt was made to ensure that the sample was representative of the academic disciplines by randomly selecting 20 per cent from each institute. Systematized Random samples were used by selecting users from the lists provided.

The sample's percentage of the total population being investigated was less important than obtaining a sample that was large in size (Ary et al., 1996). In other words, the larger the absolute number of participants in the sample, the better the chances of getting a sample that was representative of the population being surveyed.

Many researchers believe they have to select a sample that is at least 10 per cent of the

population, but this is not necessary. Contrary to what is generally believed, the accuracy of the data is determined by absolute size of the sample, rather than by the percentage of the population. The main consideration when deciding on sample size is the degree of accuracy one wants in the estimation of population values (Ary et al., 1996).

Although a certain percentage may not be necessary, it was convenient in this study to use 20% sample population of a total 2687 at four institutes. Further the 20% approach produced large absolute numbers to survey as follows: at IIT Delhi 20% of 4985 was 997; at IIT Roorkee 20% of 3363 was 772; at TU, Patiala 20% of 2506 was 504; and at PEC, Chandigarh 20% of 2056 was 413 as shown in Table No.3.3

### **3.6 Data Collection**

Data collection was made by administering questionnaires to the users in the four institutes. The mail questionnaire has been the most popular form of data collection used in Library and Information Science studies (Palmquist & Kim, 1998). However, the "directly-administered" questionnaire method which is effective when a group of people assemble in one place (i.e. classroom) (Ary et al. 1996). This researcher administered and collected the completed questionnaires in class rooms, libraries, hostels, departments, computer centers, administration buildings and other campus settings.

According to Ary et al., it is easy to reach a large sample of students in a variety of disciplines by administering the survey in classrooms (with permission of professors). The main advantage of the direct administration of questionnaires is the high response rate, which typically reaches 100 per cent. Other advantages are the low cost and the fact that the researcher is present to provide assistance or answer their queries.

**3.7 Data Collection Sources:** To study the use and impact of e-resources the following sources were used to collect the data

1. Institutes library websites/home page
2. Library resources and services given to users
3. Annual reports and brochures of the institutes
4. Questionnaire filled by the librarian and users.

### **3.8 Statistical Techniques used for Data Analysis**

The collected data has been analyzed with the help of statistical package for social sciences (SPSS). Statistical methods like percentage and Chi- Square were used.

**Chi-square ( $\chi^2$ ):** Chi-square ( $\chi^2$ ) has been used to complete the differences in regard to non-metric data like sex-wise, age-wise, status-wise and institutes wise distribution of

data. The formula for calculating Chi-Square ( $\chi^2$ ) is:

$$\chi^2 = \sum \frac{(fo - fe)^2}{fe}$$

Here **fo** is frequency of occurrence of observed facts. **fe** is expected frequency **fo** occurrence on independent hypothesis. The difference between the observed and the expected frequencies are squared and divided by the expected number in each case, and the some of these quotients is Chi- Square ( $\chi^2$ ) and the closer the agreement between the observed data and the hypothesis being tested. Contra wise, the larger the Chi-Square ( $\chi^2$ ), greater is the probability of real difference of experimentally observed expected results.

The degrees of freedom (**df**) refer to the number of independent pieces of data used to calculate each statistical variable and are obtained from the number of rows and columns in the frequency distribution table. The formula for calculating degrees of freedom (**df**) is:  
**df = (r-1) (c-1)**

**Where, df = Degrees of Freedom**

**r = Number of rows in which data tabulated**

**c = Number of column rows in which data tabulated**

The probability (**p**) indicates the level of statistical significance. The significance level is **p** equal to 0.01 or 0.05 and less than 0.01 or 0.05. Lesser the probability (**p**) higher would be the significance. The results of analysis are presented under the different headings. The Chi- Square ( $\chi^2$ ) value, degrees of freedom (**df**) and probability (**p**) are shown in each table.

### **3.9 Problems Encountered**

A numbers of problems were faced in collecting the survey data. The respondents from the faculty often showed reluctance to fill up the questionnaire and demanded the prior permission of their higher authorities. The faculty also had shortage of time due to their teaching and academic work responsibilities. After the distribution of the questionnaires two or three visits had to be done for getting the questionnaire filled. In many cases, the questionnaire had to be read and explanation was given to the users. The undergraduate students showed interest in filling up the questionnaire and were keen to give their suggestion regarding the library. Postgraduates and research scholars they considered it an unnecessary work. They wanted to leave the questionnaire with them to be filled in by them at free time. However, the librarians of all the institutes under study extended in providing the required information.

## References

- Ary, D.; Jacobs, L.; and Razauieh, A. (1996), *Introduction to Research in Education*, New York: Harcourt Brace College Publisher, 5<sup>th</sup> Edition.
- Babbie, E. (1986), *The Practice of Social Research*, Belmont CA: Wadsworth.
- Babbie, E. (1995), *The Practice of Social Research*, Belmont CA: Wadsworth, 7<sup>th</sup> Edition.
- Barnard, J.P. (2000), A Study of Internet and Library Use in an Academic Setting, Doctoral Dissertation, Arizona State University, *Dissertation Abstracts International*, 61 (021), 577. UMI no. 9962600).
- Dervin, B.; and Clark, K. (1987), "Asking Significant Questions: Alternative Tools for Information Need and Accountability Assessments (ERIC Document Reproduction Service ED 286519)," Belmont, CA, Peninsula Library System.
- Gupta, S.P. (2002), "Statistical Methods," New Delhi, Sultan Chand and sons, Education Publishers, 31<sup>st</sup> Edition.
- Hawkins, Clifford.; and Sorgi, Marco. (1993), "*Research: How to plan, Speak and Write About It*," New Delhi, Narosa Publishing House.
- Julien, H. (1996), "A Content Analysis of the Recent Information Needs and Uses Literature," *Library and Information Science Research*, 18, pp.171-191.
- Kazmier, Leonard. J. (1988), "*Schaum's Outline Series: Theory and Problems of Business Statistics with Computer Application*," New York: McGraw-Hill book Company, 2<sup>nd</sup> Edition, pp.200-202.
- Kothari, C.R. (2004), "*Research Methods and Technique*," New Delhi, New age international, 2<sup>nd</sup> Edition.
- Kumar, Krishan. (1992), "*Research Methods in library and information science*," New Delhi, Har-Anand Publication
- Lawley, E.L. (1999), "Making Sense of doctoral Student Attrition in Library and Information Science," Doctoral Dissertation, The University of Alabama, *Dissertation Abstracts International*, 61, no. OIA.
- Palmquist, R.; and Kim, K. (1998), "Modeling the Users of Information Systems: Some Theories and Methods," *The Reference Librarian*, 60, pp.3-25.
- Parker, Betty., Plank, Richard E. (2000), "A uses and gratification perspective on the Internet as a new information. *American Business Review* 18 (2), pp. 43-49
- Patton, M. (1990), *Qualitative Evaluation and Research Methods*, Newbury Park, CA; SAGE Publications.

Verhoeven, S.M. (1990), Users' Surveys, *Encyclopedia of Library and Information Science*, 45, pp.373-399.

Walster, D. (1996), "Technologies for information access in library and information centers," In D.H. Jonassen (Ed.), *Handbook of research for educational communications and Technology*, New York: Simon and Schuster Macmillan. pp. 720-752.

**PROFILE OF THE INSTITUTIONS**

Growth and Development of Engineering and Technology Institutions of India

Indian Institute of Technology (IIT), Delhi

Indian Institute of Technology (IIT), Roorkee

Thapar University (TU), Patiala

Punjab Engineering College (PEC) (Deemed University), Chandigarh

This chapter presents a brief history and growth of engineering and technical education in India. The profile of the four institutes has been discussed along with their library resources and services.

#### **4.0 Growth and Development of Engineering and Technology Institutions of India**

The new oxford dictionary of English (1999) defines “Engineering” as the branch of science and technology related with the design, building and use of technology “as the application of scientific knowledge for practical purposes especially in industry”. The word “engineering” is derived from the Latin " ingeniare" word “means to design”.

The engineering and technology education in India has been developing faster than anywhere else in the world since the early eighties, due to rapid industrialization and economic growth, now India has the second largest number of engineering students in the world. “Recent Indian Scientific Industrial and Technology development, particularly in space, nuclear and missiles technology, computer engineering and information science have earned India world recognition as an emerging global power.” (Patit, Sayal K.1998) The history of engineering education in India started with first engineering university in the country which was established in 1949.

- Thomason College Civil Engineering at Roorkee (1847), later it become Roorkee University (1949).
- College of Engineering, Pune (COEP) was established in 1854, which is still in existence.
- Civil Engineering College in Howrah came up in 1856. It was renamed in 1921, as the Bengal engineering college. It got the status of deemed university in 1992.
- Mumbai Victoria Technological Institute was setup in 1887. Now it is known as Veer Mata Jijabai Technological Institute
- In 1905-06 during the nationalist movement the National College of Education (Calcutta) was establishment in 1908. It was established for imparting education in engineering and technology in 1919. Through a State Act, the College became the Jadavpur University in 1955. The university is now consisting of Faculties of Arts, Science, and Engineering & Technology.
- Indian Institute of Science at Bangalore was established in 1909, which owes its existence to the late Sh. J.N. Tata.
- College of Textile Technology, Sera pore and West Bengal Government Central Institute, Kanpur were established in 1908 and 1914 respectively.

- Harcourt Butler Technological Institute, Kanpur came into existence in 1921,
- University of Bombay (1934), which now enjoys autonomous status, and Laxmi Narayan Institute of Technology (1942) were also established in the pre-independent days.

After Independence the engineering and technical education has developed and technical education has made many achievements in the post-independence period. The creation of the All-India Council of Technical Education (AICTE) in 1945 and the Report of the scientific manpower Committee (1947) has a far reaching influence in this development. The reports Engineering Personnel Committee (1956), and the Committee for Postgraduate Engineering Education Research (1961) gave an impetus to higher level technical education.

“The growth in engineering doubled within a span of 10 years from about 30,000 in 1987 to 60,000 in 1996. During the same period, the out turn of polytechnic diploma holders increased from 56,560 to 95, 283. Comprehensive account of the progress of technical education since Independence is available in Technical Education in Independent India (1947-1997) published by the All India Council for Technical Education in 1999” Palit, S.K. (1998) as shown in the table No.1

An apex organization the All India Council for Technical Education (AICTE) is charged with the responsibility for planning and coordinating development of technical education in India. The AICTE is responsible for the accreditation of both state and private engineering colleges. AICTE monitors the qualitative growth of technical education in relation to planned quantitative growth and proper maintenance of norms and standards. The Ministry of Human Resources Development (MHRD) funds a large number of engineering and technical institutions, including IITs.

**Table No. 4.1: Regional distributions of AICTE approved engineering colleges and polytechnic institutions in India (1997)**

Region	States/Union Territories	No. of Engineering Colleges	Total sanctioned intake	No. of Polytechnics	Total sanctioned intake
Central	Madhya Pradesh, Orissa	46	8,315	74	11,124
East	Meghalaya, Arunachal Pradesh, Andaman and Nicobar, West Bengal, Assam, Manipur, Mizoram, Nagaland, Tripura, Sikkim	22	3,862	61	9,660
North	Bihar and Uttar Pradesh	52	8,597	136	15,250
North-West	Chandigarh, Haryana, Jammu-Kashmir, New Delhi, Punjab, Rajasthan, Himachal Pradesh	65	11,294	145	20,160
South	Andhra Pradesh, Pondicherry, Tamil Nadu	166	40,884	261	50,461
South-West	Karnataka and Kerala	87	28,869	243	39,920
West	Gujarat, Maharashtra; Goa, Daman & Diu	133	33,074	214	39,660
<b>TOTAL</b>		<b>571</b>	<b>1,34,795</b>	<b>1,134</b>	<b>1,86,235</b>

As per Wiki-pedia, the free encyclopedia “currently, there are 1,346 engineering colleges in India approved by AICTE with a seat capacity of 4, 40,000”.

## 4.1 Indian Institute of Technology (IIT), Delhi

### History

Indian Institute of Technology (IIT), Delhi is the center of higher training, research and development in science, engineering and technology in India. The institute was first established in 1961 as a College of Engineering and Technology in collaboration with the government of United Kingdom and British Industries. The institute was declared as Institute of National Importance under the “Institutes of Technology (Amendment) Act, 1963”. It was renamed “Indian Institute of Technology (IIT), Delhi”. It was having the status of a deemed university with its own academic policies, to conduct its own examinations and to award its own degrees. The institute is a residential institute; it provides residential facilities to the students and teaching staff of the institute. It is situated in Hauz Khas in South Delhi. Its campus extends to an area of 320 acre. There are 13 departments and 13 centers for interdisciplinary research, various undergraduate, postgraduate, integrated degree programmes, interdisciplinary programmes and PhDs programmes are conducted by IIT Delhi.

**Table No. 4.1.1 Departments and Centers in Indian Institute of Technology, Delhi**

Departments	Centers
Applied Mechanics	Centre for Applied Research in Electronics (CARE)
Biochemical Engineering & Biotechnology	Centre for Atmospheric Sciences (CAS)
Chemical Engineering	Centre for Biomedical Engineering (CBME)
Chemistry	Computer Services Centre (CSE)
Civil Engineering	Centre for Energy Studies (CES)
Computer Science & Engineering	Educational Technology Services Centre (ETSC)
Electrical Engineering	Industrial Tribology, Machine Dynamics & Maintenance Engineering (ITMMEC)
Humanities & Social Sciences	Instrument Design Development Centre (IDDC)
Management Studies	Centre for Polymer Science & Engineering (CPSE)
Mathematics	Centre for Rural Development & Technology (CRDT)
Mechanical Engineering	National Resource Centre for Value Education in Engineering (NRCVEE)
Physics	Centre for Applied Research in Electronics (CARE)
Textile Technology	Centre for Atmospheric Sciences (CAS)

## **Academic Programmes**

At present the following programs are offered

### **Undergraduate Programmes**

Four years program leading to the Bachelors of Technology (B.Tech) in the following areas;

Chemical Engineering

Civil Engineering

Computer Science & Engineering

Electrical Engineering

Electrical Engineering (Power)

Engineering Physics

Mechanical Engineering

Production and Industrial Engineering

Textile Technology

### **Dual Degree Programme**

Five years B.Tech and M.Tech leading to dual degree in the following disciplines;

Biochemical Engineering & Biotechnology

Chemical Engineering and M.Tech in Process Engineering & Design

Chemical Engineering and M.Tech in Computer Applications in Chemical Engineering

Computer Science & Engineering

Electrical Engineering and Information & Communication Technology

### **Integrated Degree Programme (M.Tech.)**

Five years integrated degree programme leading to M.Tech in the following disciplines;

Master of Technology in Mathematics and Computing

### **Interdisciplinary Programmes**

Two years Master of Technology (M.Tech. Interdisciplinary) in the following disciplines;

Computer Applications

Energy Studies

Energy and Environment Management

Industrial Tribology & Maintenance Engineering

Instrument Technology

Opto-Electronics & Optical Communication

Polymer Science and Technology

VLSI Design, Tool & Technology

Power Generation Technology (for Engineers Sponsored by NTPC)

Telecommunication Technology & Management

### **M.Tech. Programmes**

Engineering Mechanics

Design Engineering

Radio Frequency Design & Technology

Process Engineering and Design

Geotechnical & Geo environmental Engineering

Structural Engineering

Water Resources Engineering

Rock Engineering and Underground Structure

Construction Engineering & Management

Environmental Science & Engineering

Transportation Engineering

Computer Science & Engineering

Communication Engineering

Computer Technology

Control & Automation

Integrated Electronics & Circuits

Power Electronics, Electrical Machines & Drives

Power Systems

Thermal Engineering

Production Engineering

Industrial Engineering

Design of Mechanical Equipment

Applied Optics

Solid State Materials

Fiber Science Technology

Textile Engineering

## **Two Years M.Sc. Programmes**

M. Sc. Chemistry

M. Sc. Mathematics

M. Sc. Physics

## **B.A Programmes**

Management Systems (full-time)

Technology Management (Part-time)

## **MBA (with focus on Telecom Systems Management)**

## **Two years M.Des. Programmes**

M. Des Industrial Design

## **Doctor of Philosophy and Doctor of Science**

There is provision for conducting research in all the departments

### **4.1.1 Central library**

Central library was setup in August 1961 in the North East of the textile block of the institute. It shifted to the main building of the institute in 1968 and to its existing premises in 1988. The library is spread over three floors with the total covered area of 60,000 sq. ft. (approx.) and is centrally air-conditioned. The central library of IIT, Delhi has 18 departmental libraries. It collectively supports the teaching, research and extension programmes of the Institute. All the students, faculty members and employees of IIT, Delhi are entitled to use the library services, facilities on token membership. The central library is laying a huge collection of books on engineering, science and humanities.

The library is fully computerized and uses LibSys software package, which supports all the in-house operations of the library. The LibSys consists of modules on acquisition, cataloguing, circulation, serials, articles indexing and OPAC.

The library also houses the headquarters of the “INDEST (Indian National Digital library in Engineering Sciences and Technology) consortium” that provides access to electronic resources to its member institutions comprising of more than 173 members including 38 core member institutions, 44 AICTE-supported institutions and 91 institutions who have joined the consortium under its self support category.

### 4.1.2 Library Working Hours

Monday to Friday - 9:00 A.M. to 9:00 P.M.

Saturday, Sunday - 10:00 A.M. to 6:30 P.M.

During the minor and major examinations, the library keeps open up to 12:00 O'clock (mid night). The reading room is open to users 24 hours a day.

**Table No. 4.1.2 Library Membership and Loan Privileges**

Member	No. of Books issued	Duration of Issue
Faculty ,Scientific & Academic Staff	12	One Semester
Retired/Visiting Faculty	04	One Semester
Emeritus Fellow	06	One Semester
Administrative Staff equivalent to Assistant Registrar and above	05	One month
Technical and Supporting Staff	02	One month
Other Staff of the Institute	02	One month
Research Scholar	02 (I Semester) 08 (Remaining Semester)	14 Days
M.Tech./ M.Sc.	05	14 Days
Undergraduate	05	14 Days
Alumni	02	14 Days

### 4.1.3 Issue and Return Timings

General books are issued/returned on weekdays from 9:00 A.M. to 5:15P.M.

Textbooks can be issued for loan for overnight from 2:00 P.M. to 6:00P.M.

Textbooks should be returned on the next day between 10:00 A.M. to 1:00P.M.

#### 4.1.4 Library Collection

**Table No. 4.1.3 Library Collection Development (as on March 31, 2008)**

<b>Collection</b>	
Books	2,46,918
Bound Volume of Periodicals	98,942
Standards	26,923
Technical Reports	13,430
Theses	3,321
Pamphlets	1,095
Microfilm/Microfiche	2,261
Video Cassettes	1,460
CDs/DVDs	3,000
Total Collection	3,97,869
Current Journals (Printed)	715
<b>Resources through the INDEST-AICTE Consortium</b>	
Full-text Resources	20
Bibliographic Databases	06
Total Number of Electronic Journals	10,000
<b>Online public access catalog (OPAC)</b>	
Total Number of Bibliographic Records	2,40,000
<b>Database Development in house</b>	
Research Articles by Faculty and Researches	12,389
Thesis Databases	3,300

#### 4.1.4 (a) Library Resources (Print Collection)

The library has extensive collection on science, technology, humanities, social sciences and management sciences. Besides general collection, specialised collection in the following;

**Reference Collection:** The library maintains a separate reference collection consisting of encyclopedias, dictionaries, handbooks, technical data, almanacs, atlases, bibliographies, etc.

**Hindi Collection:** The central library has built up a good collection of books in Hindi. Books in Hindi include books on various subjects being taught and researched at the institute. Books in Hindi are prominently kept near the reference area in the library to promote its usage.

**Print journals and bound volumes of Journals:** The library subscribes to 615 current journals in print with back volumes of journals running into 95,510. Several journals that are subscribed in print are also accessible online from the publisher's web site.

#### 4.1.4 (b) Library E-resources (Electronic library)

**CD-ROM Database Service:** The network based CD-ROM search service is available on the campus network the resources can be accessed on the intranet/internet.

**Print Journal and Access to their Electronic Version:** Full text electronic journals are available through the library website which can be accessed online from the publishers' website.

**Electronic Books:** users can access to E- book series through the science direct.

#### Electronic Resources through INDEST-AICTE Consortium

**Video Collection:** The library has a collection of 1,064 video cassettes and facility to view them. Most of the video cassettes in the Library are video recordings of series of class room lectures delivered by the IIT faculty to the undergraduate engineering students.

**Table No. 4.1.4 Growth of collection from 2003-08**

Years	Books	Print journals	Print+E-journals
2003-04	1,44,735	612	6,500
2004-05	1,45,530	615	6,500+
2005-06	1,48,104	657	8,000+
2006-07	1,49,545	715	8,000+
2007-08	1,51,785	714	10,000

#### 4.1.5 Budget

**Table No. 4.1.5 Library Budget allocated and spent on library collection**

Year	Budget allocated Rs.(Lacs)	Books		Print journals		Print+ journals	
		Collection	Spent Rs.(Lacs)	Collection	Spent Rs.(Lacs)	Collection	Spent Rs.(Lacs)
2003-04	320	1775	40,34,658	900	182.80	6,500	Included with print journals
2004-05	345	1805	36,99,038	616	215.00	6,500	
2005-06	380	1305	46,12,152	657	252.09	8,000	
2006-07	400	1441	41,57,009	715	350.00	8,000+	
2007-08	450	2240	74,72,279	714	450.00	10,000	

#### 4.1.6 Sections

Acquisition and processing section

Archival Section

Book Bank Section

Book Binding Section

Circulation Section

Computer Section

Periodical Section  
Reference Book Section  
Reprography Section  
Technical Section  
Textbook and reserved book Section  
Thesis/Dissertation Section

#### **4.1.7 User services**

**Technical service:** The central library is fully computerized. All its activities including acquisition, cataloguing, circulation, serials control and stock verification are carried out by using LibSys software package. The library follows Universal Decimal Classification (UDC) scheme. The Online Public Access Catalogue (OPAC) provides access to intranet and internet search from more than 1,30,000 bibliographic records available in the library database through a web based search interface or with window client of the LibSys.

**Circulation Service:** The central library uses barcode technology for computerized circulation system. Every document in the library bears a barcode and every authorized user has a bar coded patron card which, facilitates their identification in the circulation process.

**Recalling of Loaned out books:** Books and periodicals issued to the users if are needed urgently by any library member, can be recalled through request.

**Textbook and book bank Service:** The library is having separate collection of textbooks for different courses offered at IIT, Delhi. Textbooks can be consulted within the library premises on deposition of identity card at the textbooks counter for limited period.

The Book Bank books are available to the students for the full semester. The books are issued to students from weaker section and for SC/ST students. The book bank scheme is only for undergraduate student.

**Reference Service:** The library provides assistance to users from location of a book to finding specific information.

**Inter Library Loan:** The library arranges to procure books and journals from other libraries in Delhi on inter library loan.

Photo copies of research articles are also arranged from other IITs under a resources sharing agreement by all the IITs.

The JCCC interface made available through the INDEST consortium facilitates inter-library loan and document delivery amongst IITs, IISc and IIMs.

**Bibliographical Services:** Library on demand provides bibliographical service on specialised subject.

**Press Clippings Service:** The press clippings from newspaper namely Business Review Economic Times, Financial Express, Hindustan Times, and Time of India are maintained subject wise, data wise in files.

**Microfilm and Microfiche Service:** There are 1095 microfilm and microfiche available in the library. These can be read or got printed by using microfilm/fiche reader-cum-printer.

**Reprographic Service:** Photocopying facility is provided within the premises of the library through an external agency on payment bases.

**DELNET:** The users can access databases hosted by DELNET.

## 4.2 Indian Institute of Technology (IIT), Roorkee

### History

Engineering education in India has a long tradition, the beginning of which goes back to the year when the Thomason College of Civil Engineering was established in 1847 at Roorkee, later it become Roorkee University (1949).

Indian Institute of Technology, Roorkee is among the seven institutes of national important i.e., in higher technological and applied research. It was established in October 19, 1847 as the first engineering college in British Empire. The college was renamed as the Thomason College of Civil Engineering in 1854, to honor Sir James Thomason, founder of the college. The status of University was given to the college on November, 25, 1949 by Uttar Pradesh Act No IX, 1948. The university was declared institute of national importance and its status changed from University of Roorkee (UOR) to Indian Institute of Technology (IIT), Roorkee in September 21, 2001. The institute is fully residential for staff and students. It offers Bachelors Degree courses in 10 disciplines in Engineering and Architecture, Postgraduate degree in 55 courses is offered in Engineering, Applied Science and Architecture and Planning, and also doctoral work in all department and research centers is carried out.

**Table No. 4.2.1 Departments and Centers in Indian Institute of Technology, Roorkee**

Departments	Centers
Department of Architecture and Planning	Academic Centers Alternate Hydro energy Centre
Department of Biotechnology	Academic Service Centers
Chemical Engineering	Continuing Education Centre (CEC)
Department of Chemistry	Centre of Nanotechnology Centre for Transportation
Civil Engineering	Systems (CTRANS)
Department of Earth Science	Academic Centers Alternate Hydro energy Centre
Electronics and Computer	TIFAC Core
Engineering	Central Library
Electrical Engineering	Institute Instrumentation Centre (IIC)
Earthquake Engineering	Institute Computer Centre (ICC)
Humanities and Social Science	Information Super Highway Centre
Department of Hydrology	Intellectual Property Rights (IPR) Cell
Department of Management	TIFAC Core
Studies	Central Library
Department of Mathematics	Institute Instrumentation Centre (IIC)
Mechanical and Industrial	
Engineering Department of Physic	
Department of Paper Technology	
Water Resources Development and Management	
Department of Paper Technology	



## **Academic Programmes**

At present the university offers following undergraduate programmes;

### **Undergraduate Programmes**

Four years programmes leading to the Bachelors of Technology (B.Tech) in the following areas;

Architecture

Biotechnology

Chemical Engineering

Civil Engineering

Electrical Engineering

Electronics & Communication Engineering

Computer Science Engineering

Mechanical Engineering

Production & Industrial Engineering

Metallurgical & Material Engineering

Pulp & Paper Engineering

### **Postgraduate Programmes**

Architecture Planning

Alternate Hydro Energy Centre

Chemical Engineering

Civil Engineering

### **PG. Diploma**

### **Dual Degree Programmes**

Chemical Engineering

Electrical Engineering

Electronics & Computer Engineering

Electrical Engineering Paper Technology

### **Doctoral Programmes**

Research programmes leading to the degree of Doctor of Philosophy (Ph.D.) are available in all academic department of the institute.

### **4.2.1 Central Library**

The IIT, Roorkee central library was established with the start of the institute in 1847. Besides central library every academic department/center has its own departmental library which contains good collection required by the concerned departmental/ centre. The library is well-equipped with all facilities and resources in CD-ROM, online database, audio–video cassettes, books, for standards, fictions, thesis, reports etc. It has total collection of more than 320,000 documents which includes about 55,000 bound volumes of periodicals. The collection is mainly in sciences and technology.

There are networked information resources for providing latest and west comprehensive accesses to e-journals, e-books, e-patents and other e-references resources to the students, staff, faculty, industries, and alumnus under intranet and internet environments.

The library during 2004-05 in addition to print resources provided electronic resources. The access to online full text resources is available through INDEST, consortium.

The library is providing digital information through five servers and more than 70 user terminals. Users can access to more than 8000 electronic journals which are available throughout the campus wide fiber-optic network to all computers in the institute. At present the library is in the process of digitization of its archival collection of theses and dissertations.

#### **History of Library**

The growing need of the institution has increased as strength of students has also increased. Therefore, necessity of a new library building was felt after the college became the University and therefore the foundation stone for a new library building was laid on 25<sup>th</sup> November 1949 and it was occupied only in 1960.

In 2001 University became Indian Institute of Technology, it was felt that in this building necessary expansions were required, therefore, a new state of art building was planned. The foundation stone of the present building was laid on 19<sup>th</sup> June 2004 and it was completed in June 2007. The Central Library started functioning from the new building w.e.f. 12<sup>th</sup> July 2007. It has started providing the best possible environment and facilitates to the students and faculty of the institution. It occupies a total area of more than 90,000 Sq.ft. Which is completely air conditioned. A small cafeteria, ample sunlight through dome and skylight provision, state of art cabling for internet and telephone and light, fire services, Cyber ROM, Online Catalogue, Internet and wi-fi environment are some of the main features of the new building.

## 4.2.2 Library working Hours

Circulation remains open between 9:00 A.M. to 6:00 P.M. on week days.

On Sunday and holidays, only reading room and periodical remains open.

There is no issue return of books on the easy days.

**Table No. 4.2.2 Library Membership and loan privilege for the general section**

Membership	Loan Privilege	No. of Cards	Loan Period
Faculty	General Issue	8	One Year
	Journal/Reference	1	Two Days
Staff	General Issue	3	One Year
	Reference Issue	1	Two Days
Pool Officer/ Research Associate	General Issue	3	One Year
	Reference Issue	1	Two Days
Research Scholar	General Issue	5	14 Days
	Reference Issue	1	Over Night
Post Graduate	General Issue	5	14 Days
	Reference Issue	1	Over Night
Under Graduate	General Issue	3	14 Days
	Reference Issue	1	Over Night

**Table No. 4.2.3 Library Membership and loan privilege for the Special Section**

Membership	Loan Privilege	No. of Cards	Loan Period
Large Scale Industries	General Issue	9	One Year
	Reference Issue	1	Two Days
Small Scale Industries	General Issue	4	One Year
	Reference Issue	1	Two Days
Tiny Industries	One Card	1	
Outside Professionals	Reference Issue	2	One Year
	General Issue	1	Two Days
Retired Teachers	Reference Issue	2	One Year
	General Issue	1	

## 4.2.3 Issue and Return Timings

Books	Book issue hours	Book return hours
General Books	10:30 A.M. to 7:00 P.M.	10:30 A.M. to 7:00 P.M.
Text books and reference books for consultation inside the library	8:30 A.M. to 10:00 P.M.	8:30 A.M. to 12:00 midnight
Text books (over night issue)	5:00 A.M. to 7:00 P.M.	9:00 A.M. to 2:00 P.M.
Loose and bound journals	5:00 A.M. to 7:00 P.M.	9:00 A.M. to 2:00 P.M.

#### 4.2.4 Library Collection

**Table No. 4.2.4 Library Collection Development (as on March 31, 2008)**

<b>Collection</b>	
Bound Volume of Periodicals	2,394
Books	2,69,363
Standards	
Technical Reports	
Theses	
Pamphlets	
Microfilm/Microfiche	2,322
Video Cassettes	575
CDs/DVDs	NA
Total Collection	4,00,000
Current Journals (Printed)	856
<b>Resources through the INDEST-AICTE Consortium</b>	
Full-text Resources	-
Bibliographic Databases	-
Total Number of Electronic Journals	10,000
<b>Online public access catalog (OPAC)</b>	
Total Number of Bibliographic Records	3,28,859
<b>Database Development in house</b>	
Research Articles by Faculty and Researches	12,000
Thesis Databases	-

#### 4.2.4 (a) Library Resources (Print Collection)

Library provides the print collection as mentioned above in the table no. 4.2.4

#### 4.2.4(b) Library E-Resources (Electronic Library)

**Electronic Library Services:** The access to online full text resources are available through is available through five server and more than 70 user terminals.

**CD-ROM Database Service:** The library is well-equipped with all facilities and resources in CD-ROM, online database

**Print Journal and Access to their Electronic Version:** Full text electronic journals are available through the library website which can be accessed online from the publishers' website.

**Electronic Books:** users can access to E- book series through the science direct.

**Electronic Resources through INDEST-AICTE Consortium:** The access to on-line full text resources is available through INDEST, consortium and digital information. Users can access to more than 8000 electronic journals which are available throughout the campus wide fiber-optic network to all computers in the institute.

**Video Collection:** Audio–video cassettes also maintain four video stations for screening of technical video films. It has more than 400 video films available with the library.

**Archival Collection of Theses:** At present the library is in the process of digitization its archival collection of theses and dissertation.

**Library Home Page:**

The library also provides consultancy to the other libraries and information centers for automation, establishment of local area network, CD-ROM searching and networking, Internet services, retrospective conversion, bar coding etc.

**Table No. 4.2.5 Growth of collection from 2003-08**

Years	Books	Print journals	E-journals
2003-04	6609	773	-
2004-05	5988	905	8,000
2005-06	4169	814	8,000+
2006-07	7638	856	8,000+
2007-08	8220	782	10,000

**4.2.5 Budget**

**Table No. 4.2.6 Library Budget allocated and spent on library collection**

Year	Budget allocated Rs.(Lacs)	Books		Print journals		E- journals	
		Collection	Spent Rs.(Lacs)	Collection	Spent Rs.(Lacs)	Collection	Spent Rs.(Lacs)
2003-04	523.76	6609	15,04,500	773	Amount included with e-journals	-	2.675
2004-05	589.33	5988	1,55,53,000	905		8000	389.6
2005-06	486.00	4169	93,35,000	814		8000+	332.18
2006-07	582.18	7638	16,04,000	856		8000+	445.56
2007-08	585.70	8220	17,03,000	782		10,000	329.58

**4.2.6 Sections**

Acquisition and processing section

Archival Section

Book Bank Section

Book Binding Section

Circulation Section

Computer Section

Periodical Section

Reference Book Section

Reprography Section

Technical Section

Textbook and reserved book Section

Thesis/Dissertation Section

#### **4.2.7 Users Services**

The following services are available at the Central Library;

**Circulation:** The Circulation Section remains open between 9.00 AM to 6.00 PM on weekdays. On Sundays and holidays, only reading room and periodical section remains open. There is no issue and return of books on these days.

**CD-ROM and Online Database Search Services:** A CD-ROM network comprising of 2 Axis Store point CD-Servers with 14 CD-towers, 1 DVD tower and four Pioneer CD-ROM exchangers have been established. The CD Net is integrated with library network.

**E-Journals:** Library subscribes to more than 8000 e-journals through INDEST and its own arrangement.

**Internet Search Services:** The Central Library has made arrangements to provide latest information to its users. Users can use internet search/ access with the help of 50 user systems. Users can also access 7000+ journals online.

**Video Information Services:** The Central Library has four Video Work Stations for screening of technical video films. Presently the collection is more than 400 video films.

**Xeroxing:** Photo copy facilities is available in the library

**Reference:** The Research Reference & Information Services Section contains research and reference tools such as Atlases, Bibliographies, Biographical Dictionaries, Data books, Dictionaries (General and Special), Directories, Encyclopedias, Gazetteers, Guides to literature, Handbooks, Maps, Thesauri etc.

**Text Book Loan Scheme:** The Text Book Loan Scheme section contains 30,000(approx.) recent editions of text books prescribed for study at the Undergraduate and M.Sc/M.Tech level. A student may become member of the scheme on payment of prescribed fee. One may get three text books issued for semester duration. Text books may be exchanged on all working Wednesdays and Saturdays.

**Inter Library Loan Scheme:** The Library also provides materials that are not available in library, and the same can be procured from neighborhood libraries or sister institutions on Inter Library Loan for meeting the special needs of all potential readers.

**Consultancy:** Library provides consultancy to the other libraries and information centers for automation, establishment of local area networks, CD-ROM searching and networking, Internet services, retrospective conversion, bar coding etc.

## 4.3 Thapar University (TU), Patiala

### History

The Thapar University (formerly known as Thaper Institute of Engineering and Technology (TIET)) is one of three organizations located in the 250 acre campus. The Thapar Technology Campus (TTC), with its three institutions viz, TU.TP and TCIRD, is today a unique campus in the Country, situated in the historic city of Patiala. It came into existence in 1956 through an imaginative collaboration between the then State of Patiala and East Punjab States Union (PEPSU), the Central Government and the Patiala Technical Education Trust (PTET) founded by the great captain of Indian Industry, the Late Lala Karam Chand Thapar. Thapar University was granted full autonomy and the status of a Deemed University in 1985 by UGC. It has become full fledged university, Thapar University since 2007

**Table No. 4.3.1 Departments and Centers in Thapar University**

<b>Departments</b>	<b>Centers</b>
Biotechnology & Environment Sciences(BTESD)	Central Library
Chemical Engineering (CHED)	Central Workshop
Civil Engineering(CED)	Center for Industrial Liaison &Placement (CILP)
Computer Science & Engineering (CSED)	Centre of Relevance & Excellence in Agro & (CORE)
Electrical & Instrumentation Engineering (EIED)	Computer Center
Electronics & Communication Engineering(ECED)	Centre for Information Super Highway (CISH)
Mechanical Engineering (MED)	University Science Instrumentation Centre(USIC)
Distance Education(DDE)	Science & Technology Entrepreneurship Park (STEP)
Civil Engineering(CED)	
Computer Science & Engineering (CSED)	

### Academic Programmes

At present the university offers following programmes

#### Undergraduate Programme

Four year Programme leading to the degree of Bachelor of Engineering

#### B.Tech

Biotechnology

#### BE Programme

Chemical Engineering

Civil Engineering

Computer Engineering  
Electrical Engineering  
Electronics & Communication Engineering  
Electronics (Instrumentation & Control) Engineering  
Mechanical Engineering  
Industrial Engineering

The duration of the course for students admitted in BE (Industrial Engineering) is five years and they will be awarded two degrees (BE & MBA) at the successful completion of their five year programmes.

### **Postgraduate Programme**

Production & Industrial Engineering  
Software Engineering  
Instrumentation & Control Engineering  
Computer Science & Engineering  
Power Systems & Electric Drives

### **ME Programme (Part-time)**

Civil (Structures) Engineering  
Production & Industrial Engineering

### **M.Tech Programme (Regular)**

Materials Science & Engineering  
Environmental Science & Technology  
VLSI Design & CAD  
Chemical Engineering

### **Two years duration M. Sc Programme**

M Sc (Biotechnology)  
M Sc (Chemistry)  
M Sc (Mathematics)  
M Sc (Physics)

### **BE-MBA**

### **Doctor of Philosophy (PhD)**

PhD programmes in all the specializations of Engineering, Technology, Management and Sciences in the departments/Schools of the University

### 4.3.1 Nava Nalanda Central Library

The library exists from the time the institute was established initially the library was setup in a room in B-block, and then it was shifted to the right hand side of A-block As the collection grew, the model room was merged with the library area by puncturing the walls of the middle gallery. In January 2007 library shifted to the TCIRD building. Library building is fully air conditioned and it has been named as Nava Nalanda Central library. This is housed in a glass building with ample sunlight, a small cafeteria, state of art cabling for internet and telephone and light, fire services, Cyber ROM, Online Catalogue, Internet, wi-fi environment are some of the main features of this building.

### 4.3.2 Library Working Hours

Library remains open for 24 hours Monday through Saturday, and on Sundays up to 5 PM and the library remain closed on all the institute holidays During Summer and Winter vacations library remains open from 8:00 A.M. to 8:30 P.M.

**Table No. 4.3.3 Library Membership**

Categories	Eligibility
Undergraduate	Undergraduate students
Post graduate	Postgraduate students
Research Scholars	Research Scholars
Faculty	Regular Teaching staff of the TU (including visiting faculty) of the rank of lecturer and above, Director and Deans
Associates	Teaching and Research staff at Thapar Polytechnic and TCIRD of the rank of lecturer or its equivalent and above, Non-teaching staff of TU the rank of assistant registrar and above.
Junior Associates	Teaching Assistants, Demonstrators, Laboratory superintendents, assistant scientists, assistant engineers and equivalent posts at TCIRD and TP.
Staff	Administrative and Technical staff of TU, Thapar Polytechnic and TCIRD of class C and above, not covered under the Faculty, Associate and Junior Associate categories
Paid	Engineering, Science, Technology and Management professionals, including TU alumni residing in and around Patiala, who have applied for the membership and paid the prescribed annual fee and security.
Corporate	Institutions and companies in the region.
Honorary	Professional and people of distinctions who have been invited by TU to become members

**Table No. 4.3.4 Book Loan Privilege**

Collection →	General Books		Text Books		Book Bank		Short-loan	
	Book Issued	Months	Books Issued	Months	Books Issued	Duration	Books Issued	Days
UG	4	1	0	1	SC/ST:6 Gen:2	1 Semester	1	2
PG	6	1	2	-	SC/ST:4 Gen:2	1 Semester	1	2
RS	8	1	0	-	None	1 Semester	1*	2
Faculty	10	2	0	-	None	1 Semester	2*	2
Associates	3	2	0	-	None	1 Semester	1*	2
J. Associates	3	1	0	-	None	1 Semester	1*	2
Staff	2	1	0	-	None	1 Semester	1*	2
Paid & Honorary	2	1	0	-	None	1 Semester	1*	2
Corporate	10	1	0	-	None	1 Semester	5*	2

\*(Short loan textbooks (TxON)), Restricted Collection, material, Career help books, Video, Audio CD, VCD, DVD)

### 4.3.3 Issue and Return Timings

Monday to Saturdays                      8:00 A.M. to 08:30 P.M.

Sunday    08:00A.M. to 08:30 P.M  
(during major and minor examination)

### 4.3.4 Library collection

**Table No. 4.3.5 Library Collection Development (as on March 31, 2008)**

Collection	
Books	51735
Bound Volume of Periodicals	3427
Standards	5165
Technical Reports/Deletions	156
Theses	2097
Pamphlets	-
Microfilm/Microfiche	-
Video Cassettes	1500
CDs/DVDs	1500
Total Collection other than books	11561
Current Journals (Printed)	124
<b>Resources through the INDEST/UGC-INFONET Consortium</b>	
Full-text Resources	
Bibliographic Databases	10
Total Number of Electronic Journals	5586
<b>Online public access catalog (OPAC)</b>	
Total Number of Bibliographic Records	-
<b>Database Development in house</b>	
Research Articles by Faculty and Researches	-
Electronic Thesis/ Dissertation/ Databases	717

#### **4.3.4(a) Library Resources (Print Collection)**

The Library has a total collection about 50,000 printed volumes including books, textbooks, standards and theses & dissertations. Books are organized on open access shelves in various collections.

**General Collection:** This is the largest collection of books in the library. Books for professional reading, research and supplementary texts are kept in this collection.

**Reference Collection:** Books are not available for loan books in Reference Section, Theses & Dissertations, Periodicals and Standards can be consulted within the library.

**Textbooks Collection:** Textbooks for undergraduate/postgraduate courses are kept in a separate collection. Since only a limited number of copies of each title are available, students are encouraged to buy their own textbooks.

**Book Bank:** Students can also avail of Book Bank facility which is maintained with the grant from the Central and State Government. The facility is meant primarily for students of weaker sections. Books from this collection are issued books for the whole semester.

**Light Reading Collection:** While the strength of collection lies in technical subjects, an impressive light reading (leisure, sports, fiction, self-development) collection is available for loan.

**Course Material:** Course material in a large number of subjects, prepared by experts under the sponsorships of agencies such as All India Technical Education are very good help for studies. You may find these course materials in the General Books section.

**Journals and Magazines:** Only journals with professional and research orientation are subscribed by the Central library. General magazines etc are mostly subscribed by hostel libraries. Library subscribes to several daily newspapers including one each in Hindi and Punjabi.

#### **4.3.4(b) Library E-resources (Electronic library)**

The library has established access to a large number of online and CD-ROM based electronic information resources, such as bibliographic databases and electronic journals. Theses and dissertations submitted to the Institute in electronic format since 2003 are also now available at TU website <http://CL.Thaper.edu>.

**Question Papers:** Question papers of past years are available at TU library website.

**Table No. 4.3.6 Growth of collection from 2003-08**

Years	Books	Print journals	E-journals
2003-04	36950	138	580 (free)
2004-05	38546	134	3704
2005-06	40385	111	3901
2006-07	42270	111	3790
2007-08	51735	124	5586

### 4.3.5 Budget

**Table No. 4.3.7 Library Budget allocated and spent on library collection**

Year	Budget allocated Rs.(Lacs)	Books		Print journals		E- journals	
		Collection	Spent Rs.(Lacs)	Collection	Spent Rs.(Lacs)	Collection	Spent Rs.(Lacs)
2003-04	13.00	1991	3.37	138	9.07	580 (free)	0
2004-05	40.78	1518	25.00	134	5.00	3570	10.78
2005-06	37.88	2184	15.48	111	1.04	3790	21.00
2006-07	47.55	2307	17.55	111	1.05	3790	28.05
2007-08	57.00	9621	22.00	124	5.00	5586	30.00

### 4.3.6 Sections

The library has following sections;

Acquisition and processing section

Archival Section

Book Bank Section

Book Binding Section

Circulation Section

Computer Section

Periodical Section

Reference Book Section

Reprography Section

Technical Section

Text book Section

Thesis/Dissertation Section

Back volumes (Bound journal Section)

Light reading books section

Conference proceedings section

Digital resource laboratory

Coffee Shop

### 4.3.7 Users Services

**Reference** - The Reference Desk is located in the Scholars zone on first floor. Queries related to availability of books, fine collection and issue of Bar-coded Library cards are handled by the person in charge.

**Photocopying** - Five photocopying machines, one in the ground floor and three on first floor cater to the photocopying needs of the Institute. The machine on ground floor is meant exclusively for the usage of staff,

**Bibliography compilation** - Select bibliography i.e. availability of Information sources on any topic can be obtained on demand.

**News week (Newspaper clippings from daily Newspapers)** - Daily Newspapers including The Times of India, The Hindu, Indian Express, The Tribune, Hindustan Times, Economic Times, Ajit, and Amarujala, are scanned for articles of interest and are filed under Broad Subject categories. Booklet of these is compiled weekly and circulated to all the departments. These are also displayed with Current Periodicals.

**Newscaster Compilation** - The quarterly newsletter reporting the happenings in Thapar Technology campus is being compiled and edited by Central Library. It is also available online

**Inter Library Loan (ILL)** - Books not available in the Library can be procured on Loan from other Libraries.

**Reservation of books** - Books available in the Library but issued to other members can be reserved by using this service.

**Document supply** - Photocopy of research papers not available in the Library can be procured using the DDS (Document Delivery Service). Central Library has tie up with major Libraries like J.R.D. Tata Memorial Library at Indian Institute of Science (IISc) Bangalore, Punjab University, Chandigarh, Banaras Hindu University, Varanasi, University of Hyderabad, Hyderabad, Jawaharlal Nehru University, New Delhi and Tata Institute of Social Sciences, Mumbai.

**Services from INFLIBNET** - Central Library is a member of INFLIBNET (Information and Library Network), a UGC Inter-University Centre. The Centre is involved in Library Automation, Database development, Resource sharing and Networking of Libraries. It subscribes to several Bibliographic databases which can be used free of charge.

**UGC-Info net Programme:** The University Grants Commission (UGC) provides online access to scholarly e-journals by forming a consortium of Universities and taking group subscription to e-journals.

**Community Library:** Library has started this collection for the families of the staff and faculty members. Books and magazines of interest for all the categories of age from 2-3 years to grown ups up to 18 and above, as well as ladies are available for reading as well as issue.

## 4.4 Punjab Engineering College (PEC), Chandigarh

### History

The Punjab Engineering College (Deemed University) Chandigarh came into existence prior to independence. It is one of the pioneer institutions of India. It was established as Mugalpura Engineering College at Lahore (now in Pakistan) on November 9, 1921. The name of the college was later changed to Maclagan Engineering College and it started functioning under the name on March 19, 1924. The college got affiliated in the year 1931, to Punjab University, Lahore. After partition in 1947, the college was shifted in the year 1950 to Roorkee (India) and was renamed as East Punjab College of Engineering. The word East was dropped and became- Punjab Engineering College in December 1953, the college shifted to its present campus in Chandigarh to function under Govt. of Punjab. In 1966 with the formation of Union Territory of Chandigarh, the college came in control of Government of India through Chandigarh Administration. In October 2003, the Govt. of India notified the Punjab Engineering College as a Deemed to be University. It occupies an area of 146 acres. In 1994 this institution was adjudged the best technical college in India by the National Foundation of Engineers. PEC has been conferred the Deemed University status in 2004

Presently there are eleven post-graduate courses leading to Masters of Engineering. Facilities for post-graduate studies exist for regular as well as for part time students. It provides consultancy services in different disciplines. There are facilities for research work leading to the award of Ph.D. degree in engineering in certain selected fields of different disciplines.

**Table No.4.4.1 Departments and Centers in Punjab Engineering College (PEC), Chandigarh**

Departments	Centers
Aeronautical Engineering	Computer Center
Applied Science	Central Library
Civil Engineering	Central Workshop
Computer Science Engineering	Health Center
Electrical Engineering	
Electrical & Electronic Engineering IT	
Mechanical Engineering	
Metallurgy Engineering	
Production Engineering	

## **Academic Programmes**

At present the university offers following undergraduate programmes;

### **Bachelors of Engineering**

Four year under graduate programme leading to the degrees of Bachelor of Engineering are offered in the following disciplines

Aeronautical Engineering

Civil Engineering

Computer Engineering

Electrical Engineering

Electronics Communication Engineering

Information Technology Engineering

Mechanical Engineering

Metallurgical Engineering

Production Engineering

### **Masters of Engineering (ME)**

Two year programme leading to the degree of Master of Engineering are offered in the following disciplines:

Civil Engineering (Highways)

Civil Engineering (Irrigation & Hydraulics)

Civil Engineering (Structures)

Environmental Engineering (Inter disciplinary)

A special provision exists for 6 semesters part-time ME courses for the candidates sponsored by the industry and the various Government organizations.

### **PhD Programme**

Facilities for doctoral research are available in all departments.

#### **4.4.1 Central Library**

The central library is housed in an area of about 27,000 sq. feet and organized into various sections. With a collection of about 1, 08,028 volumes in science and technology and is catering to the needs of about 2000 members (both staff and students). To keep its readers abreast with the latest developments in Engineering & Technology, the library is subscribing to 72 foreign and 18 Indian technical journals in the print form.

Having centrally air-conditioning facility with 250 seats in two spacious reading halls for

its readers, with an open access system to maximize the use of library resources.

The database of Circulation Section, Reference Section and Theses Section has been prepared using LibSys Software. The same are accessible through library webpage in the campus.

#### 4.4.2 Library Working Hours

Week Days                      Monday to Friday      9:00 A.M. to 8:00 P.M.

   Saturday                      9:00 A.M. to 5:00 P.M.

During Mid Term I, II and End-Semester exam

   Monday to Friday      9:00 A.M. to 11:00 P.M.

   Institute Holiday              Closed

**Table No. 4.4.2              Memberships and Loan Privilege**

<b>Members</b>	<b>No. Books</b>	<b>Duration</b>
Faculty Members	10 Books	Five Months
College Staff	3 Books	One Months
Research Scholar	5 Books	One Months
M.E. Students	4 Books	10 Days
B.E. Students	3 Books	10 Days
<b>Loan Privileges (Book Band SC/ST &amp; General)</b>		
M.E. Students (SC/ST)	6 Books	1 Semester
M.E. Students (General)	3 Books	1 Semester
B.E. Students (SC/ST)	6 Books	1 Semester
B.E. Students (General)	3 Books	1 Semester

#### 4.4.3 Issue and Return Timings

Monday to Friday      9:00 A.M. to 8:00 P.M.

#### 4.4.4 Library Collection

**Table No. 4.4.3 Library Collection Development (as on March 31, 2008)**

<b>Collection</b>	
Books	10,9,032
Bound Volume of Periodicals	4,432
Standards	11,000
Technical Reports/conference proceeding	149
Theses	1,387
Pamphlets	-
Microfilm/Microfiche	-
Video Cassettes	697
CDs/DVDs/Floppies	450/91
Total Collection	-
Current Journals (Printed)	108
<b>Resources through the INDEST-AICTE Consortium</b>	
Full-text Resources	887
Bibliographic Databases	-
Total Number of Electronic Journals	4453+
<b>Online public access catalog (OPAC)</b>	
Total Number of Bibliographic Records	60,000
<b>Database Development in house</b>	
Research Articles by Faculty and Researches	-
Thesis Databases	-

##### 4.4.4(a) Library Resources (Print Collection)

The Library is well equipped with modern facilities & resources in the form of Books technical Journals, Standards, Conference Proceedings, Theses, Reports etc.

##### 4.4.4(b) Library E-resources (Electronic Library)

The library is members of INDEST Consortium under the MHRD. This Consortium offers online access to a number of technical journals through the under-mentioned portals.

IEL online

ASCE Journals

ASME Journals

Free access to following journals of Engineering & Technology

Directory of Open Access journals

BSU Journals in Chemistry

EEVL (engineering, math, and computer science)

Online Public Access Catalogue

##### **CD-ROM services**

Engineering Index & Encyclopedia Britannica

The Library uses LS Ease which is a scaled down version of Libssys software package. It is an integrated multi-user library management system that supports all in house operations of the Library. The Libsys consists of modules on acquisition cataloguing, circulation, serials, and OPAC. Retrospective conversion of bibliographic records is under process and more than 60,000 bibliographic records of documents available in the Library can now be accessed through the LibSys OPAC.

**Table No. 4.4.4 Growth of collection from 2003-08**

Years	Books	Print journals	E-journals
2003-04	+574	84	290
2004-05	+926	108	290
2005-06	+661	110	290
2006-07	+698	106	290
2007-08	+825	90	290

#### 4.4.5 Budget

**Table No. 4.4.5 Library Budget allocated and spent on library collection**

Year	Budget allocated Rs.(Lacs)	Books		Print journals		E- journals	
		Collection	Spent (Lacs)	Collection	Spent (Lacs)	Collection	Spent (Lacs)
2003-04	90,0,000	574	2,00,000	84	7,00,000	290	AICET Supported
2004-05	90,0,000	926	2,00,000	108	7,00,000	290	
2005-06	10,50,000	661	2,50,000	110	8,59,370	290	
2006-07	20,00,000	698	4,00,000	106	15,18,730	290	
2007-08	20,00,000	825	5,00,000	90	17,30,823	290	

#### 4.4.6 Sections

Circulation Section

Periodical Section

Reference Section

Text Book Section

Multimedia Section

Newspaper/ Magazine Section

Technical Section

Book Bank Section

Binding Section

#### **4.4.7 Users Services**

**Reference:** The library provides assistance to users in activities ranging from location of a book to finding specific information required by users

**Photocopying Service:** Photocopying facility is provided within the premises of the library through an external agency on payment bases.

**Video Viewing Service:** The Central Library is also having Multimedia Section to make use of popular mode of education i.e. Electronic Media, with the following equipment and collections. One LCD projector ,Two Computers with Internet facility ,One overhead projector, One VCR ,One Slide Projector ,App. 450 CDs and 50 Video Cassettes

**CD-ROM database Service:** Users can use CD-ROM on Engineering Index & Encyclopedia Britannica

#### **Bibliography Compilation**

Library on demand provides bibliographical service on speclised subject.

**Inter Library Loan:** The library is also member of British Library and is entitled to draw 10 books and 5 back issues of the periodicals.

#### **Reservation of Books**

If needed reservation of the books is done on demand.

#### **Services from INDEST consortium**

The library is member of INDEST Consortium under the Ministry of MHRD .Users can access the e-journals in the library and computer centre.

## Reference

<http://www.aicte.com/policiesprog.html>

<http://www.scholarshipsindia.com/engineering.html>

<http://www.iitd.ac.in/library>

<http://www.iitr.ac.in/library>

<http://www.tu.ac.in/library>

<http://www.pec.ac.in/library>

[http:// en.wikipedia.org/wiki/All\\_India\\_Council\\_for\\_Technical\\_Education](http://en.wikipedia.org/wiki/All_India_Council_for_Technical_Education).

Palit, S.K. (1997) "Electronic Engineering Education in India" Proceedings of first Asia-Pacific forum on Engineering and Technology Education, Monash University, Clayton, Melbourne, Australia. pp. 50-54.

Palit, Sajal.K. (1998), "The Development of Engineering and Technical Education in India," *Global Journal of Engineering Education*, 2(3), pp317-326.

Verma, Rama ( 2002) "Collection evaluation of engineering and technology libraries : A study of Indian Institute of Technology, New Delhi; University Of Roorkee, Roorkee, Thapar Institute of Engineering and Technology, Patiala." PhD Dissertation, Punjabi University, Patiala.

### ANAYSIS AND INTERPRETATION OF DATA

#### **Part-A Use of Electronic Resources**

Indian Institute of Technology, Delhi: Case Study-1

Indian Institute of Technology, Roorkee: Case Study-2

Thapar University, Patiala: Case Study-3

Punjab Engineering College, (Deemed University) Chandigarh:Case Study-4

#### **Part-B Comparative Study**

Comparison Among the Institutes

Comparison Among the Users

#### **Part-C Impact of Electronic Resources**

Collection Development of E-resources

Statistics of Use of E-resources

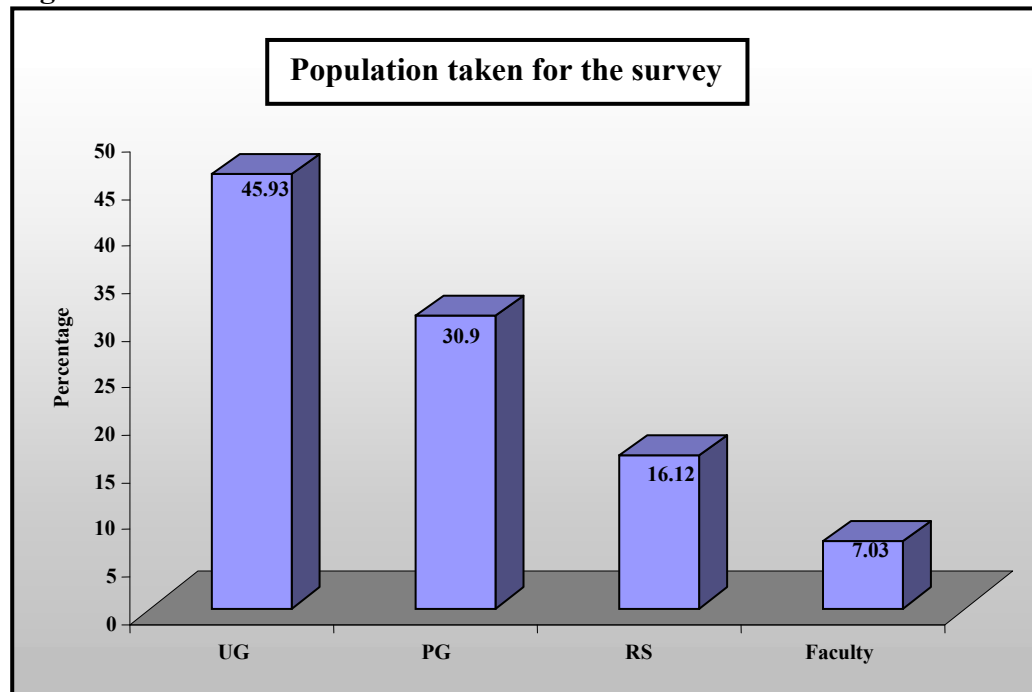
## 5.1 Indian Institute of Technology (IIT), Delhi: Case Study-1

**Table No. 5.1.1 Population taken for the survey**

Respondents	Total Strength	Questionnaires Distributed	Response Received
Undergraduates	2192	439	379 (45.93)
Postgraduates	1530	306	255 ( 30.90)
Research Scholars	916	183	133 (16.12)
Faculty	347	69	58 ( 07.03)
Total	4985	997	825 (100)

The figures given in the parentheses indicate percentage in all the tables

**Figure No. 5.1.1**



The data collection from the different categories of users has been shown in the Table No. 5.1.1. The total population of the survey was 4985. This population includes 2192 undergraduates, 1530 postgraduates, 916 research scholars and 347 faculty members. About 20 per cent population of the institute, users wise categories were taken for the survey. The questionnaire was given to 997 users. There were 439 undergraduates, 306, postgraduates, 183 research scholars and 69 faculty members. The total response received was 825 (100%) respondents belonging to IIT, Delhi. The response received from undergraduates 379 (45.93%), postgraduates 255 (30.90%), research scholars 133 (16.12%) and faculty 58 (7.03%) has also been shown in the Figure No. 5.1.1

**Table No.5.1.2 Use of Institute library**

Respondents	Response		Total N (%)	Chi <sup>2</sup> (df;C)
	Yes N (%)	No N (%)		
Undergraduates	376 (99.20)	3 (0.80)	379 (100)	47.473** (3 ;0.233)
Postgraduates	231 (90.59)	24 (9.41)	255 (100)	
Research Scholars	115 (86.47)	18 (13.53)	133 (100)	
Faculty	47 (81.03)	11 (18.97)	58 (100)	
Total	769 (93.21)	56 (6.79)	825 (100)	

\*\* Significant at the 0.01 level

**Figure No. 5.1.2**

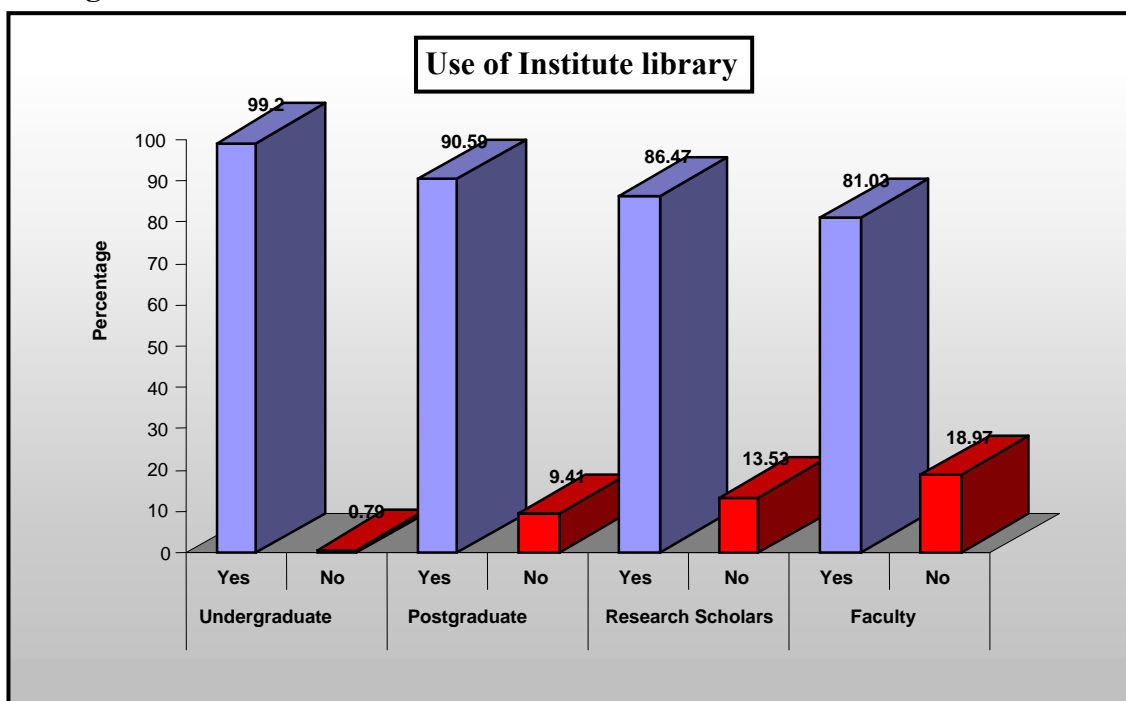


Figure No 5.1.2 highlights the response of respondents regarding the use of library. In response to the question whether they used the library of their institute, 99.20% of undergraduate respondents replied in the affirmative, while the remaining 0.80% replied in the negative. A similar response was given by postgraduates. Research scholars and faculty as a large majority of them, i.e., 90.59%, 86.47% and 81.03% respectively used the library of their institute. However, the remaining 9.41%, 13.35% and 18.97% respectively did not use the library of their institute. It is evident from the data that undergraduates used the library most in comparison to other users. Further, the faculty

used the library less as compared to the users from all other categories.

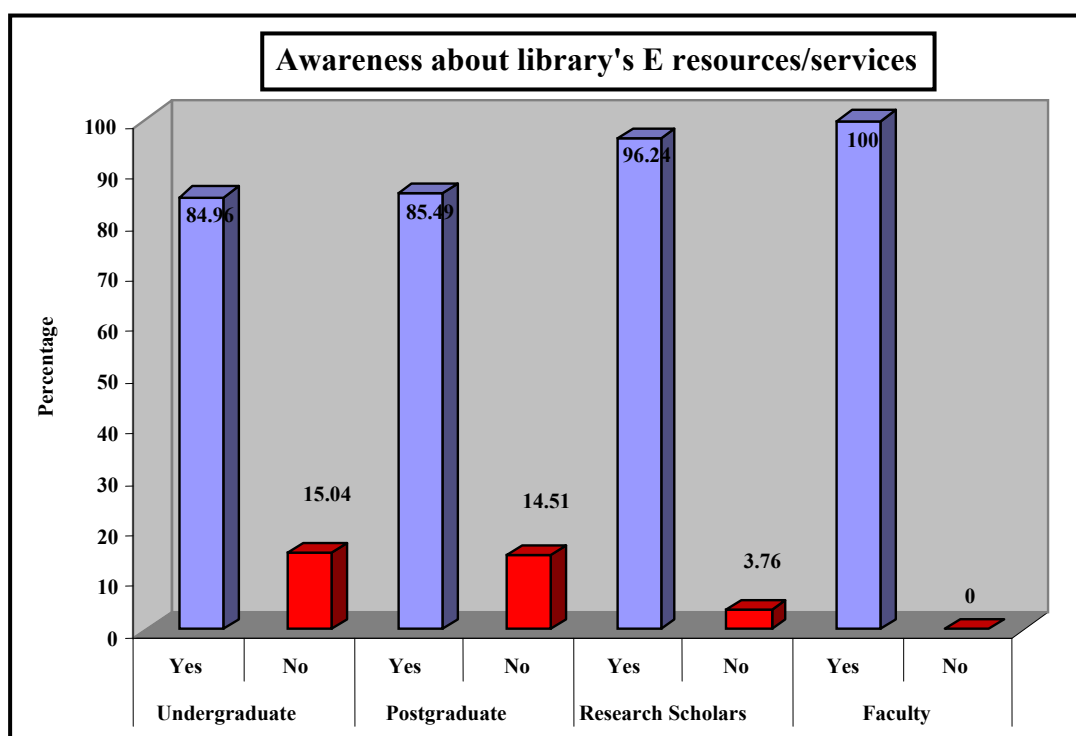
Table No.5.1.2 shows that Chi-Square test for independence is significant at 1 per cent level of significance. The value of  $\chi^2$  is 47.473 and the degrees of freedom (df) is 3. The value of p shows statistically significant ( $p \leq 0.01$ ). This implies that there is a significant variation among the users as far as the use of the institutes' library is concerned. Thus from the total population of 825 users, maximum number of users, i.e., 769(93.21%) use the library and where as the remaining users 56(6.79%) don't use the library.

**Table No. 5.1.3 Awareness about library's E-resources/ services**

Respondents	Response		Total N (%)	Chi <sup>2</sup> (df;C)	
	Yes	N (%)			No
Undergraduates	322	(84.96)	57	(15.04)	21.299* (3 ;0.159)
Postgraduates	218	(85.49)	37	(14.51)	
Research Scholars	128	(96.24)	5	(3.76)	
Faculty	58	(100)	-		
Total	726	(88.00)	99	(12.00)	

\* Significant at the 0.05 level

**Figure No. 5.1.3**



In response to the question whether they were aware of their library electronic resources/services, 322 (84.96%) undergraduates response was yes and the remaining 57 (15.04%) replied in the negative. 218(85.49%) postgraduates were aware of the e-resource and the rest 37(14.51%) were not. The response of 128(96.24%) research scholars was positive and that of the remaining 5(3.76%) was in negative. The faculty members of IIT, Delhi were fully aware of the e-resources/services provided by the library and their response was 100%. It has been found from the data as compared to undergraduates, postgraduates and research scholars, the faculty were fully aware of their library e-resources/services.

Table No. 5.1.3 shows that the Chi-Square test for independence is significant at 1 per cent level of significance. The value of  $\chi^2$  is 21.299 and the degrees of freedom (df) is 3. The value of p shows statistically significant ( $p \leq 0.05$ ). This implies that there is a significant variation among the users as far as the awareness of e-resources/services provided by the library is concerned. Thus from 825 respondents, 726(88%) users were aware of the e-resources/services provided by their institute and the remaining 99(12%) were not aware of it.

**TableNo.5.1.4 Users visiting the library's website/homepage**

Respondents	Response		Total	Chi <sup>2</sup> (df;C)
	Yes	No	N (%)	
Undergraduates	239 (63.06)	140 (36.94)	379 (100)	39.089** (3 ;0.213)
Postgraduates	194 (76.08)	61 (23.92)	255 (100)	
Research Scholars	88 (66.17)	45 (33.83)	133 (100)	
Faculty	58 (100)	-	58 (100)	
Total	579 (70.18)	246 (29.82)	825 (100)	

\*\* Significant at the 0.01 level

Figure No.5.1.4

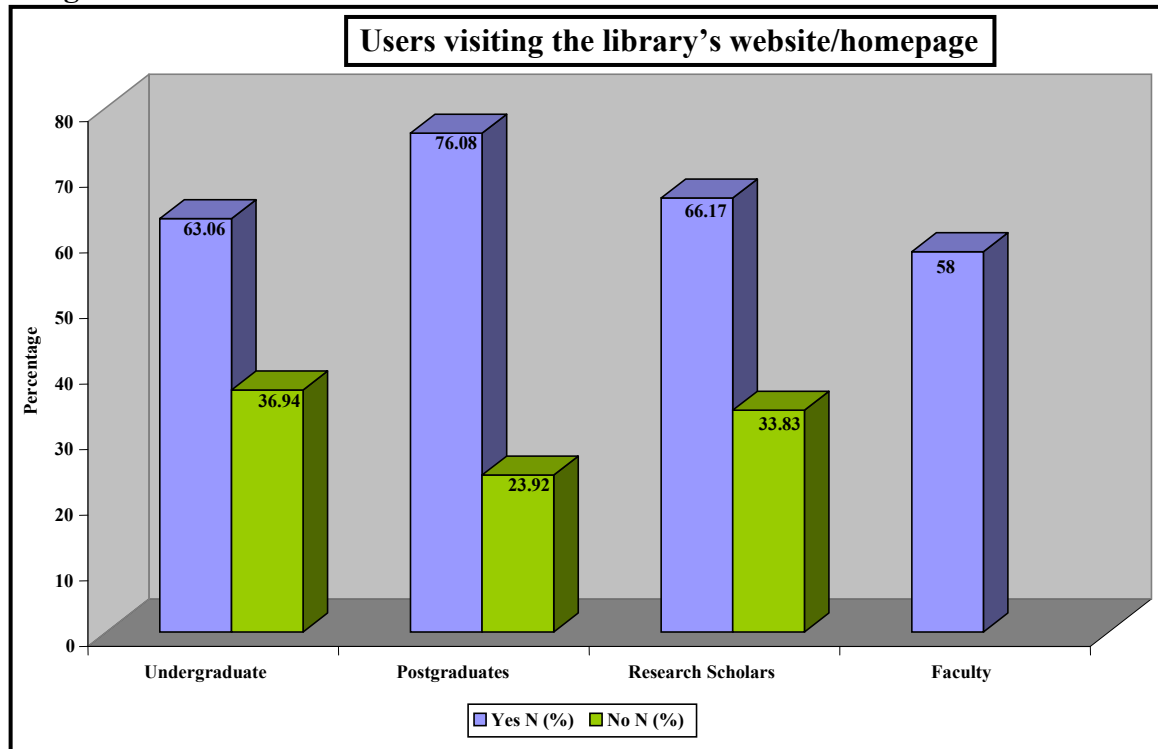


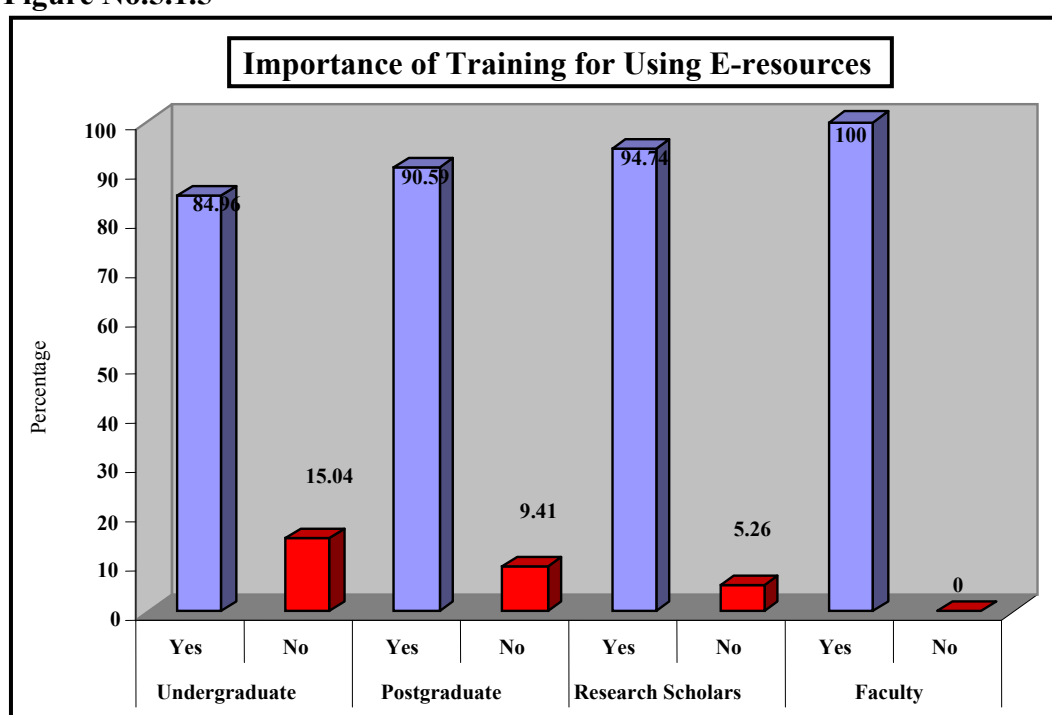
Figure No.5.1.4 reveals that 63.06% undergraduates 76.08%, postgraduates, and 66.17% research scholars visited the library website, where as the remaining 36.94%, 23.92% and 33.83% respondents respectively from these categories never visited the library website/homepage. However, each and every one (100%) among the faculty visited the library website/homepage and this percentage is the highest among all the categories. The percentages for different categories of users who visited the library website/home page have been highlighted in the above figure. The Table No.5.1.4 further shows that the Chi-Square test for independence is significant at 1 per cent level of significance. The value of  $\chi^2$  is 39.089 and the degrees of freedom (df) is 3. The value of p shows statistically significant ( $p \leq 0.01$ ). This implies that there is a significant variation among the users as far as the visiting of their library website/home page is concerned. The result shows that from 825 users, 579(70.18%) responded and have visited library website/home page, where as the remaining 246(29.82 %) did not avail this facility.

**Table No. 5.1.5 Importance of training for using E-resources**

Respondents	Response		Total N (%)	Chi <sup>2</sup> (df;C)
	Yes N (%)	No N (%)		
Undergraduates	322 (84.96)	57 (15.04)	379 (100)	19.028** (3;0.150)
Postgraduates	231 (90.59)	24 (9.41)	255 (100)	
Research Scholars	126 (94.74)	7 (5.26)	133 (100)	
Faculty	58 (100)	-	58 (100)	
Total	737 (89.33)	88 (10.67)	825 (100)	

\*\* Significant at the 0.01 level

**Figure No.5.1.5**



The users were asked whether training is important to make maximum use of electronic resources. From the total population of the institute 89.33% response was in positive and 10.67% response was that training is not important. A majority of respondents from different categories, i.e., 94.74%, research scholars, 90.59% postgraduates and 84.86% undergraduate responded that training is important to make maximum use of electronic resources, whereas a small proportion of respondents, i.e., 5.26%, 9.41% and 15.04% from the respective categories felt that such a training is not required. However, each and every faculty member felt that training is important for using e-resources. Figure No. 5.1.5 highlights the response of respondents belonging to different categories.

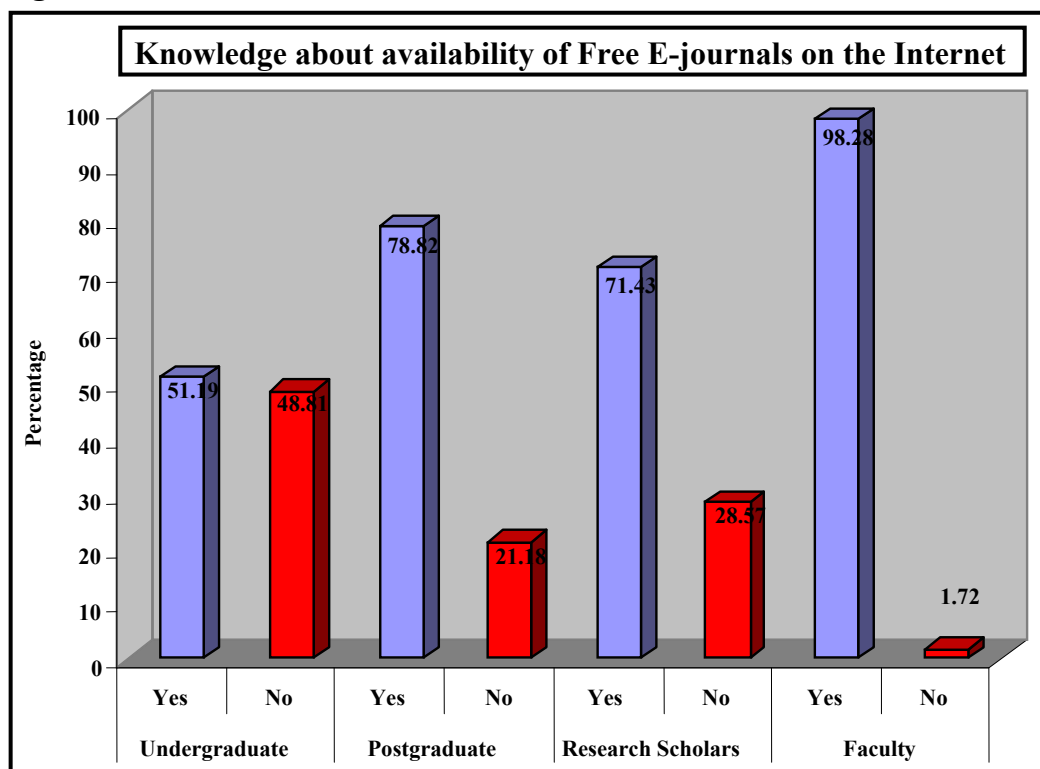
Table No.5.1.5 shows that Chi-Square test for independence is significant at 1 per cent level of significance. The value of  $\chi^2$  is 19.028 and the degrees of freedom (df) is 3. The value of p shows statistically significant ( $p \leq 0.01$ ). This implies that there is a significant variation among the users as far as the importance of training is needed to make maximum use of e-resources is concerned. Thus maximum numbers of users feel that training is important to make maximum use of e-resources.

**Table No. 5.1.6 Knowledge about availability of free E-journals on the Internet**

Respondents	Response		Total N (%)	Chi <sup>2</sup> (df;C)
	Yes	No		
Undergraduates	194 (51.19)	185 (48.81)	379 (100)	84.753** (3 ;0.305)
Postgraduates	201 (78.82)	54 (21.18)	255 (100)	
Research Scholars	95 (71.43)	38 (28.57)	133 (100)	
Faculty	57 (98.28)	1 (1.72)	58 (100)	
Total	547 (66.30)	278 (33.70)	825 (100)	

\*\* Significant at the 0.01 level

**Figure No. 5.1.6**



There are many free electronic journals available on the net. The users were asked whether they knew about the availability of free electronic journals on the net. The response of all the respondents from different categories has been shown in the Table No 5.1.6 & figure 5.1.6. 194(51.19%) undergraduates said yes that they were aware and 185(48.81%) said no. Among the 201 (78.82%) postgraduates responded yes and 34 (21.18%) responded no. Similarly, 95(71.43%) research scholars' response was yes and 38(28.57%) responded in no. The highest proportion of respondents from the faculty 57 (98.28%) responded yes, and the remaining 1.72% responded no. It has been found that faculty was more aware of the availability of free e-journals on the net as compared to other users.

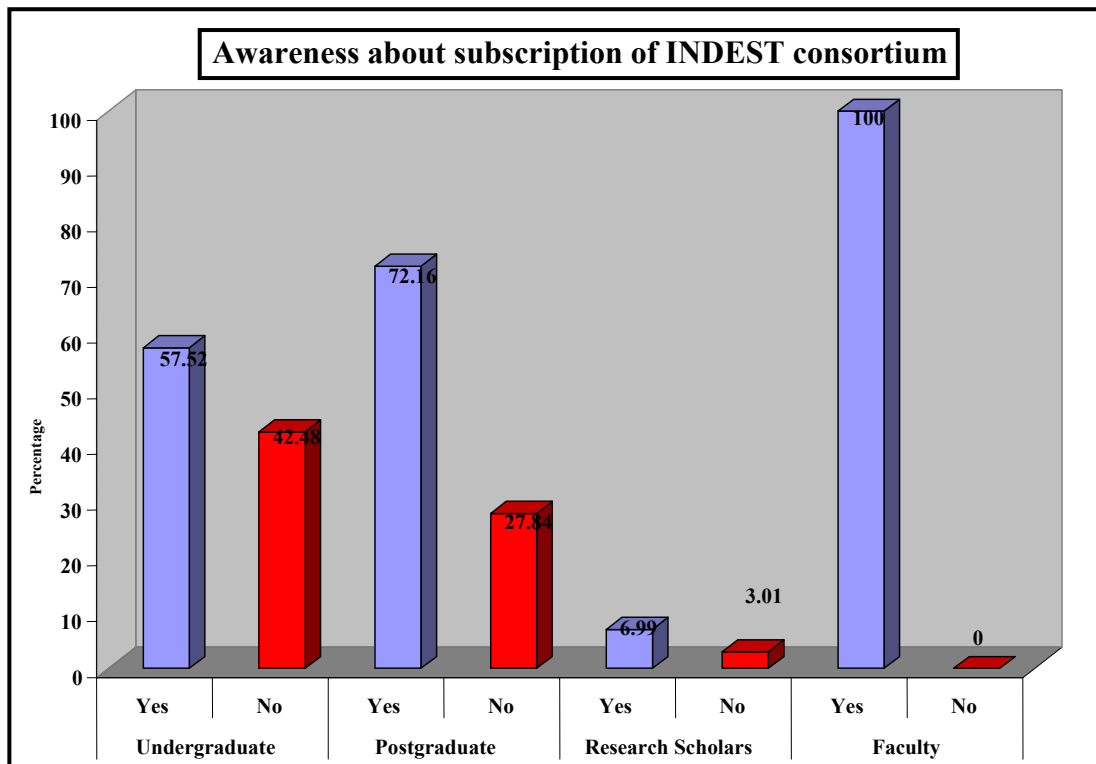
Table No. 5.1.6 shows that for users, Chi-Square test for independence is significant at 1 per cent level of significance. The value of  $\chi^2$  is 84.753 and the degrees of freedom (df) is 3. The value of p shows statistically significant ( $p \leq 0.01$ ). This implies that there is a significant variation among the users as far as the knowledge of availability of free e-journals on the net is concerned. Thus as per data collected from 825 users survey population, 547 (66.30%) users' response was positive and 278 (33.70%) responded negatively.

**Table No. 5.1.7 Awareness about subscription of INDEST consortium**

Respondents	Response		Total	Chi <sup>2</sup> (df;C)		
	Yes	N (%)	No		N (%)	
Undergraduates	218	(57.52)	161	(42.48)	379 (100)	101.708** (3 ;0.331)
Postgraduates	184	(72.16)	71	(27.84)	255 (100)	
Research scholars	129	(96.99)	4	(3.01)	133 (100)	
Faculty	58	(100)	-		58 (100)	
Total	589	(71.39)	236	(28.61)	825 (100)	

\*\* Significant at the 0.01 level

**Figure No. 5.1.7**



The library of IIT, Delhi subscribes to many e-journals/portals for its users under INDEST consortium. So, it is important to know from the users whether they have the knowledge about INDEST consortium. Table No.5.1.7 shows that the response of 218 (57.52%) undergraduates was positive and those of the remaining 161 (42.48%) was negative similarly, 184 (72.16%) postgraduates and 129 (96.99%) research scholars responded positively, where as 71 (27.84%) and 4 (3.01%) respondents from the respective categories responded negatively. However, the response of the faculty was altogether positive in this regard. The data proves that research scholars and faculty were more aware as compared to undergraduates and postgraduates. Figure No. 5.1.7 also highlights the response of respondents belonging to different categories.

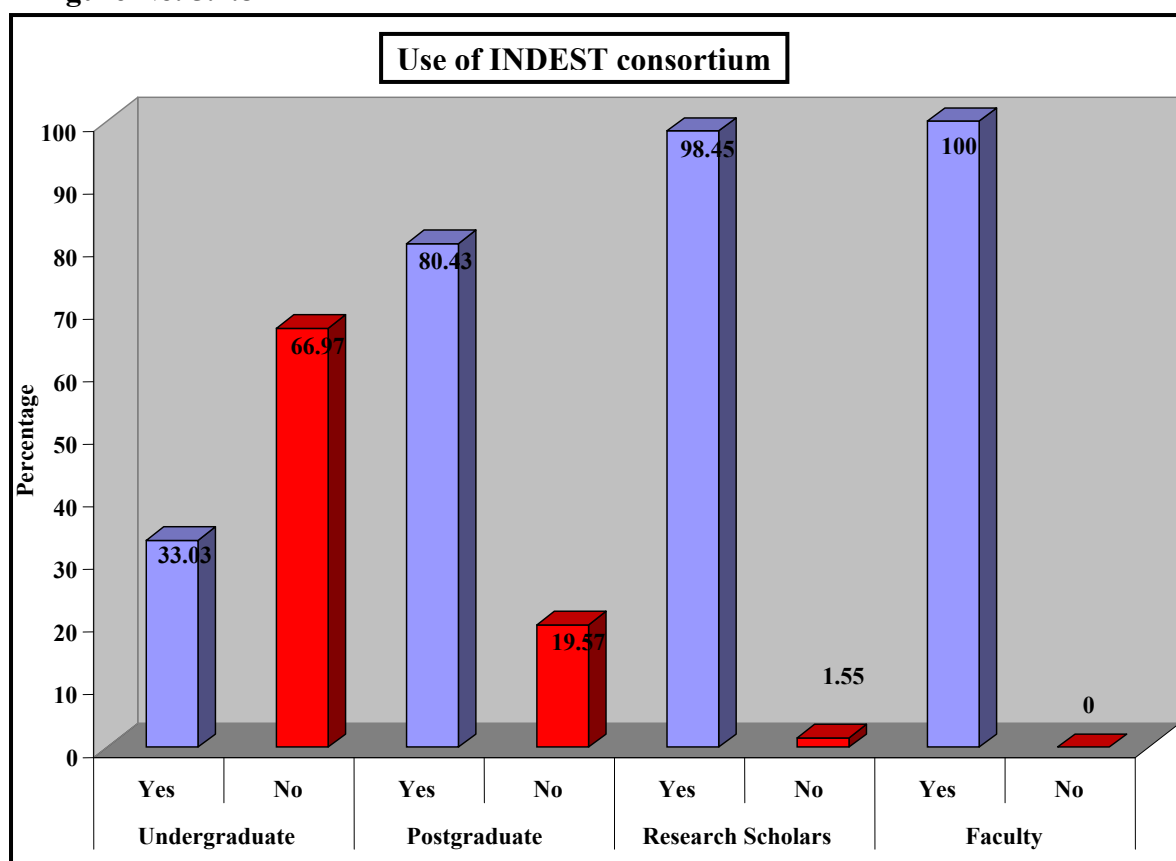
The Table No.5.1.7 shows that the Chi-Square test for independence is significant at 1 per cent level of significance. The value of  $\chi^2$  is 101.708 and the degrees of freedom (df) is 3. The value of p shows statistically significant ( $p \leq 0.01$ ). This implies that there is a significant variation among the users as far as the awareness about the subscription of INDEST consortium is concerned. Thus from 825 users, 589 (71.39%) users are aware of these resources where as remaining do not have knowledge about their institute subscribing towards INDEST consortium.

**Table No.5.1.8 Use of INDEST consortium**

Respondents	Response		Total	Chi <sup>2</sup> (df;C)
	Yes N (%)	No N (%)	N (%)	
Undergraduates	72 (33.03)	146 (66.97)	218 (100)	220.544** (3;0.522)
Postgraduates	148 (80.43)	36 (19.57)	184 (100)	
Research Scholars	127 (98.45)	2 (1.55)	129 (100)	
Faculty	58 (100)	-	58 (100)	
Total	405 (68.76)	184 (31.24)	589 (100)	

\*\* Significant at the 0.01 level

**Figure No. 5.1.8**



The users were asked to give their response whether they used INDEST consortium when they had knowledge about it. Table No. 5.1.8 reveals that 100% faculty members, 98.45% research scholars and 80.43% postgraduates use these e-resources, where as in comparison to other users only 33.03% undergraduates were using such resources. It has been found that the main users of e-journals were faculty members, research scholars and postgraduates only. Figure No. 5.1.8 also highlights the response of all the respondents belonging to different categories.

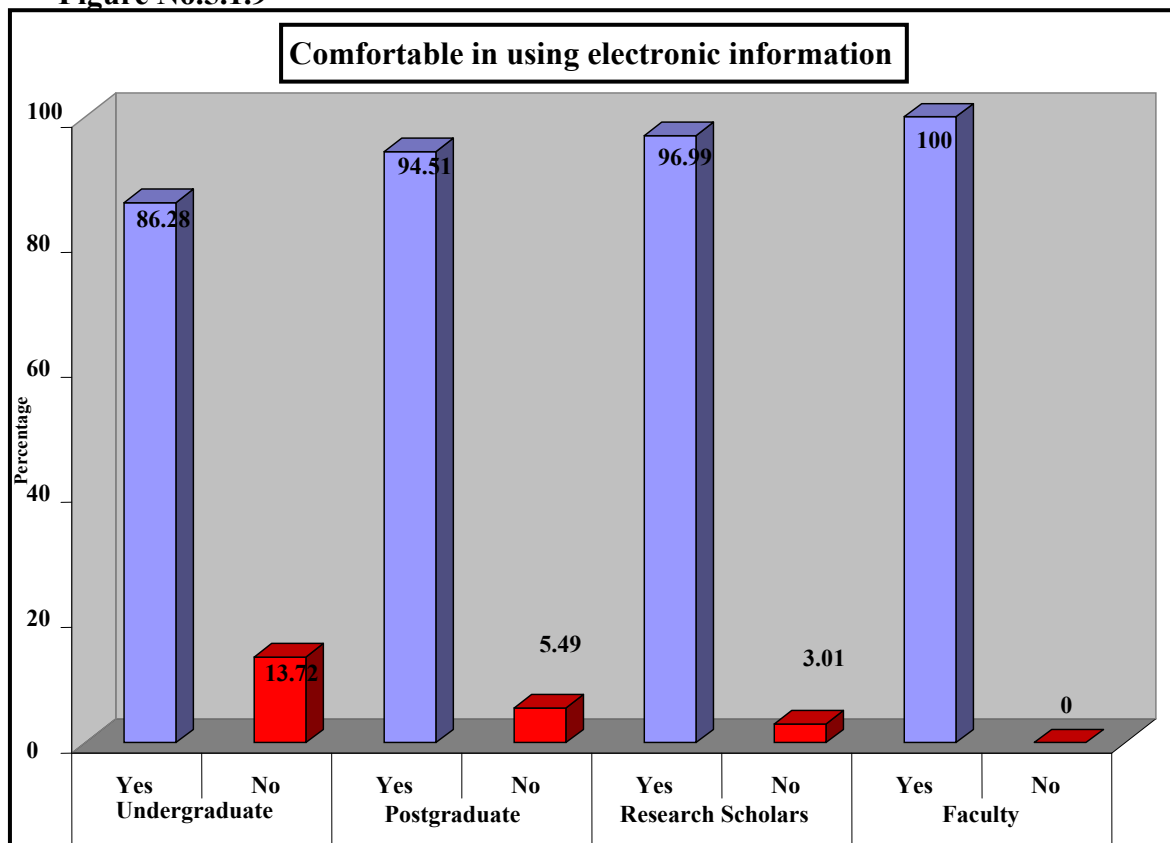
The Table No.5.1.8 further shows that for users, the Chi-Square test for independence is significant at 1 percent level of significance. The value of  $\chi^2$  is 220.544 and the degrees of freedom (df) is 3. The value of p shows statistically significant ( $p \leq 0.01$ ). This implies that there is a significant variation among the users as far as the use of INDEST consortium is concerned. From the total of 589 users who were aware of INDEST consortium only 405 (68.76%) users responded that they use e-resources. Whereas, the remaining 184 (31.24%) users responded that they do not use such resources. 236 respondents didn't answer.

**Table No.5.1.9 Comfortable in using electronic information**

Respondents	Response		Total N (%)	Chi <sup>2</sup> (df;C)
	Yes	No		
Undergraduates	327 (86.28)	52 (13.72)	379 (100)	26.840** (3 ;0.178)
Postgraduates	241 (94.51)	14 (5.49)	255 (100)	
Research Scholars	129 (96.99)	4 (3.01)	133 (100)	
Faculty	58 (100)	-	58 (100)	
Total	755 (91.52)	70 (8.48)	825 (100)	

\*\* Significant at the 0.01 level

**Figure No.5.1.9**



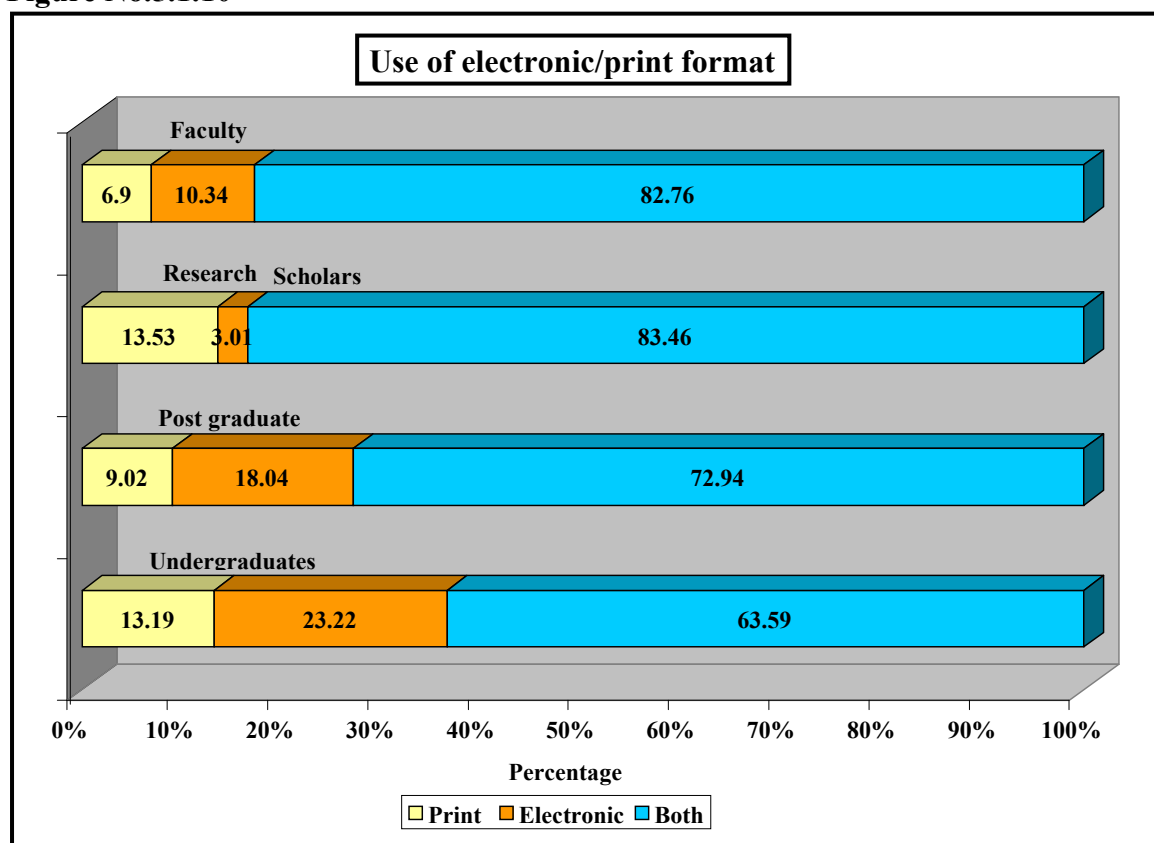
The library provides electronic information services and resources for the users. It is important to know from them if they were comfortable in using electronic information/resources or not. Figure No. 5.1.9 shows that 327 (86.28%) undergraduates responded positively and 52 (13.72%) response was no. Regarding postgraduates 241 (94.51%) responded in yes and 14 (5.49%) in negative, out of these 129(46.99%) research scholars answered in positive merely 4 (3.01%) said no, while 100% faculty responded positively. The Table No.5.1.9 reveals for all the users of various categories, the Chi-Square test for independence is significant at 1 per cent level of significance. The value of  $\chi^2$  is 26.840 and the degrees of freedom (df) is 3 .The value of p shows statistically significant ( $p \leq 0.01$ ). This implies that there is significant variation among the users as far as their comfort is concerned with the use of electronic information. It has been found that maximum number of users was comfortable in using electronic information services. From 825 total respondents, 755(91.52%) of users responded in yes and 70(8.48%) answered no.

**Table No.5.1.10 Use of electronic/print format**

Documents	UG N (%)	PG N (%)	RS N (%)	FA N (%)	Total N (%)	Chi <sup>2</sup> (df;C)
Print	50 (13.19)	23 ( 9.02)	18 (13.53)	4 (6.90)	95 ( 11.52)	35.800** (6 ;0.204)
Electronic	88 ( 23.22)	46 ( 18.04)	4 (3.01)	6 (10.34)	144 ( 17.45)	
Both	241 (63.59)	186 (72.94)	111 ( 83.46)	48 (82.76)	586 (71.03)	
Total	379 (100)	255 (100)	133 (100)	58 (100)	825 (100)	

\*\* Significant at the 0.01 level

**Figure No.5.1.10**



The availability of electronic information resources from the library along with print document is an advantage for the users as they have a choice to use these as per their convenience. The users were asked about their choice in which they would prefer to use and feel convenient. From Figure No.5.1.10 it has been found that the preference for printed and electronic document was less as compared to the choice of using both as the source for getting information. The response for using both the services, response from undergraduates was 241(63.59%), postgraduates 186 (72.94%), research scholars 111 (83.46 %) and faculty 48(82.76%). It has been found that out of 825 users, 95 (11.52%) preferred print only, 144 (17.45%) responded for electronic services, while 586 (71.03%) prefer both the formats i.e. print and electronic.

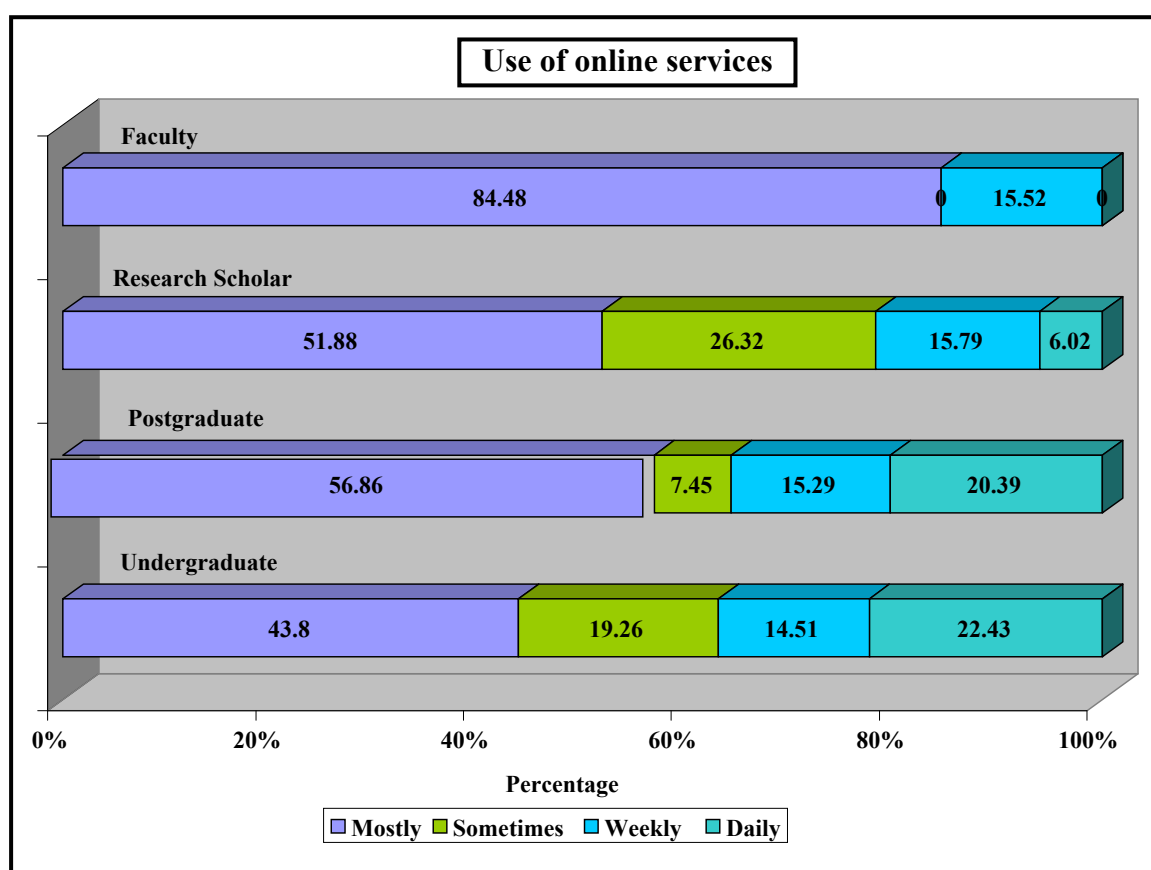
From 825 respondents, the response for using the format of document shows, that the users preference for both the formats (Print and electronic) was more as compared to the printed documents and electronic documents individually. The Table No. 5.1.10 shows that for users the Chi-Square test for independence is significant at 1 per cent level is significance. The value of  $\chi^2$  is 35.800 and the degrees of freedom (df) is 6. The value of p shows statistically significant ( $p \leq 0.01$ ). This implies that there is a significant variation among the users in preference for the use of document.

**Table No.5.1.11 Use of online services**

Respondents	UG N (%)	PG N (%)	RS N (%)	FA N (%)	Total N (%)	Chi <sup>2</sup> (df;C)
Mostly	166 (43.80)	145 (56.86)	69 (51.88)	49 (84.48)	429 (52.00)	77.872** (9;0.294)
Sometimes	73 (19.26)	19 (7.45)	35 (26.32)	-	127 (15.39)	
Weekly	55 (14.51)	39 (15.29)	21 (15.79)	9 (15.520)	124 (15.03)	
Daily	85 (22.43)	52 (20.39)	8 (6.02)	-	145 (77.58)	
Total	379 (100)	255 (100)	133 (100)	58 (100)	825 (100)	

\*\* Significant at the 0.01 level

**Figure No.5.1.11**



The internet provides the information to users and also saves their time. The users were asked how often they go online for accessing the information they need. From Figure No.5.1.11 it has been revealed that 166(43.80%) undergraduates, 145(56.86%) postgraduates, 69(51.88%) research scholars and 49(84.48%) faculty make use of on-line services mostly. The users who used online services at times were 73(19.26%) undergraduates, 19(7.45%) postgraduates, 35(26.32%) research scholars and faculty didn't give response to it. Users who use online services weekly were 55(14.51%)

undergraduates, 39(15.29%) postgraduates, 21(15.79%) research scholars and 9(15.52%) faculty. Daily online services were used by 85(22.43%) undergraduates, 52(20.39%) postgraduates, 8 (6.02%) research scholars and faculty did not respond.

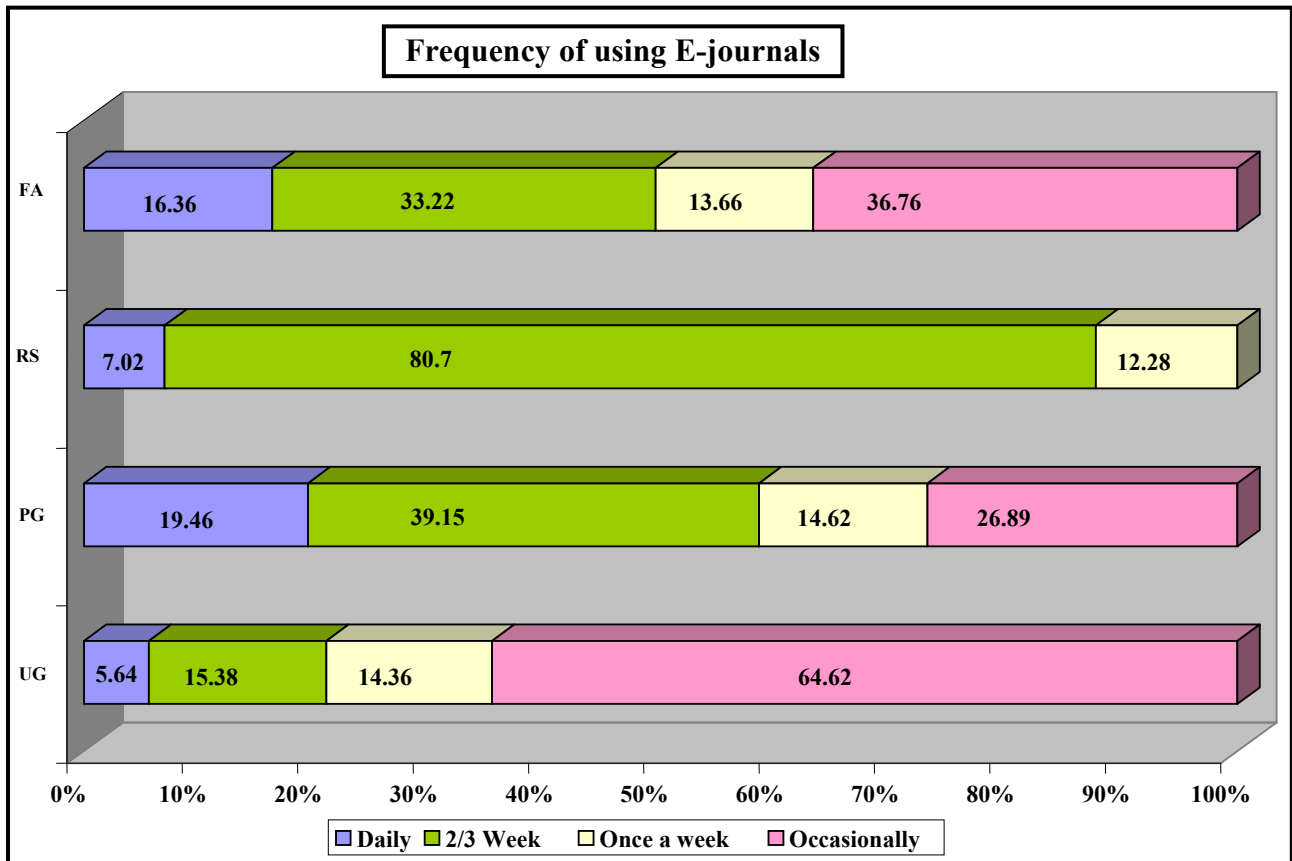
From 825 respondents, the data indicates that 429 users go on-line mostly which is more as compared to the use of on-line services sometimes, weekly and daily. The Table No.5.1.11.shows for users the Chi-Square test for independence is significant at 1 per cent level of significance. The value of  $\chi^2$  is 77.872 and the degrees of freedom (df) is 9.The value of p shows statistically significant ( $p \leq 0.01$ ).This implies that there is a significant variations among the users as much as using online e-services.

**Table No. 5.1.12 Frequency of using E-journals**

Using E-journals	UG (N %)	PG (N %)	RS (N %)	FA (N %)	Chi <sup>2</sup> (df;C)
Daily	11 (5.64)	41 (19.34)	4 (7.02)	97 (16.36)	168.464** (9;0.470) NR: 232 (28.12%)
2/3 Week	30 (15.38)	83 (39.15)	46 (80.70)	197 (33.22)	
Once a week	28 (14.36)	31 (14.62)	7 (12.28)	81 (13.66)	
Occasionally	126 (64.62)	57 (26.89)	-	218 (36.76)	
Total	195 (100)	212 (100)	57 (100)	593 (100)	

\*\* Significant at the 0.01 level

**Figure No. 5.1.12**



The Table No.5.1.12 indicates that out of 825 respondents, only 232 (28.12%) responded. The use of electronic journals was by 11(5.64%) undergraduates daily, 30 (15.38%) 2/3 time a week, 28 (14.36%) once in a week and 126 (64.62%) occasionally. Thus undergraduates use electronic journals occasionally more. 41 (19.34%) postgraduates use electronic journals daily, 83 (39.15%) 2/3 time a week 31 (14.62%) once in a week and 35 (27.13%) occasionally. The results show that postgraduates use electronic journals more 2/3 times a week. 41 (31.78%) research scholars response use of e-journals daily, 38 (29.46%) 2/3 time a week, 15 (11.63%) once in a week and 35 (27.13%) occasionally. Research scholars use e-journals daily more. 46 (80.70%) faculty use e-journals more 2/3 time a week, followed by 7 (12.28%) once in a week and 4 (7.02%) daily.

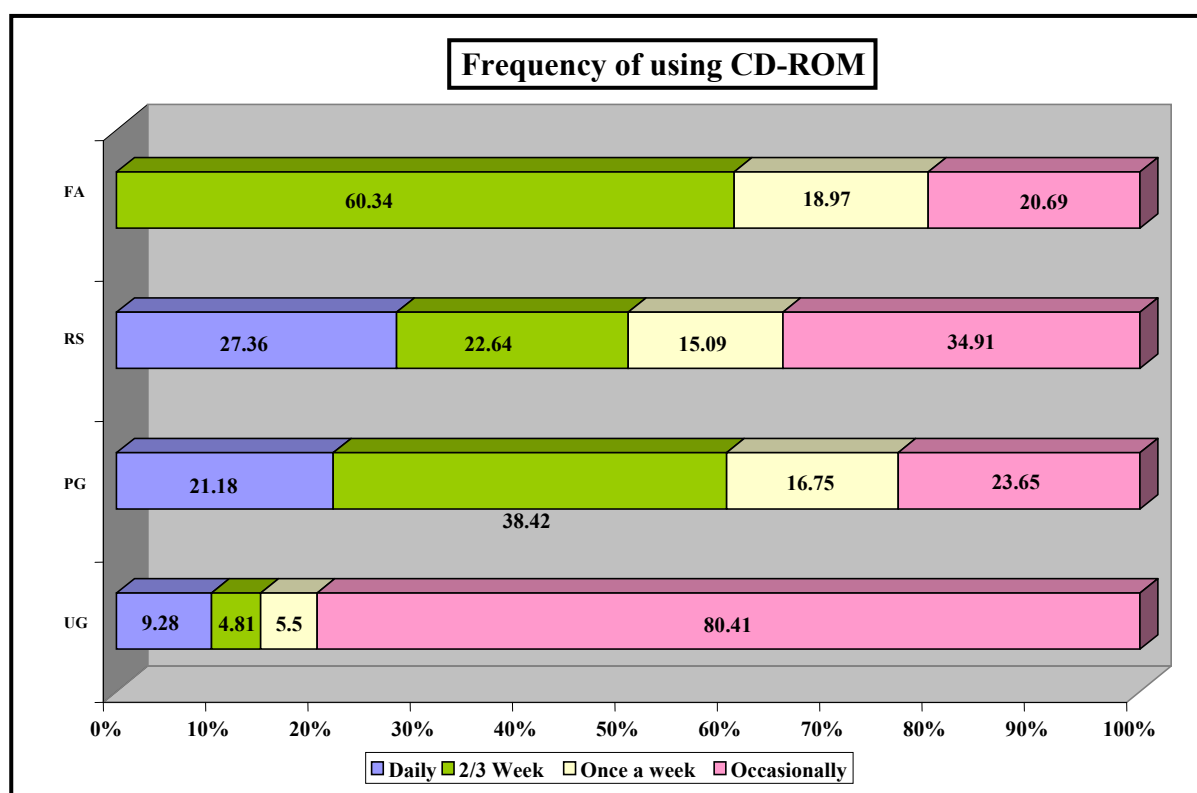
The Chi-Square test for independence is significant at 1 per cent level of significance. The value of  $\chi^2$  is 168.464 and the degree of freedom (df) is 9. The value of p shows highly significant ( $p \leq 0.01$ ). This implies that there is a significant variation among users. It has been found that maximum numbers of users are using electronic journals occasionally more i.e. 218 (36.76%) followed by 197 (33.22%) 2/3 time a week, 97 (16.36%) daily and 81 (13.66%) once a week.

**Table No.5.1.13 Frequency of using CD-ROM**

Using CD-ROM	UG N (%)	PG N (%)	RS N (%)	FA N (%)	Total N (%)	Chi <sup>2</sup> (df;C)
Daily	27 (9.28)	43 (21.18)	29 (27.36)	-	99 (15.05)	243.045** (9;0.519) NR: 167 (20.24%)
2/3 Week	14 (4.81)	78 (38.42)	24 (22.64)	35 (60.34)	151 (22.95)	
Once a week	16 (5.50)	34 (16.75)	16 (15.09)	11 (18.97)	77 (11.70)	
Occasionally	234 (80.41)	48 (23.65)	37 (34.91)	12 (20.69)	331 (50.30)	
Total	291(100)	203 (100)	106 (100)	58 (100)	658 (100)	

\*\* Significant at the 0.01 level

**Figure No.5.1.13**



The Table No.5.1.13 shows the frequency of using CD-ROM service by the users in IIT, Delhi library. The outcome indicates that 27 (9.28%) undergraduates use CD-ROM daily, 14 (4.81%) 2/3 time a week, 16 (5.50%) once in a week and 234 (80.41%) occasionally. Maximum number of undergraduates used CD-ROM service daily as compared to other timings. Response from postgraduates shows, that CD-ROM is used more 78 (.38.42%) 2/3 time a week, followed by 48 (23.65%) occasionally, 43 (21.18%) daily and 34 (16.75%) once a week. 37 (34.91%) research scholars used CD-ROM occasionally more as compared to 39 (27.36%) daily, 24 (22.64%) 2/3 time a week and 16 (15.09%) once a week. Where as 35 (60.34%) faculty members used CD-ROM 2/3 time a week, 12 (20.69%) occasionally and 11 (18.97%) once a week.

The Chi-Square test for independence is significant at 1 per cent level of significance. The value of  $\chi^2$  is 244.045 and the degree of freedom (df) are 9. The value p shows highly significant ( $p > 0.01$ ). This implies that there is a significant variation among users as far using the CD-ROM services from 825 respondents, 167 (20.24%) did not answered while 99 (15.05%) responded for using CD-ROM daily, 151 (22.95%) 2/3 times a week 77 (11.70%) once in a week and 331 (50.30%) responded for using occasionally. Thus

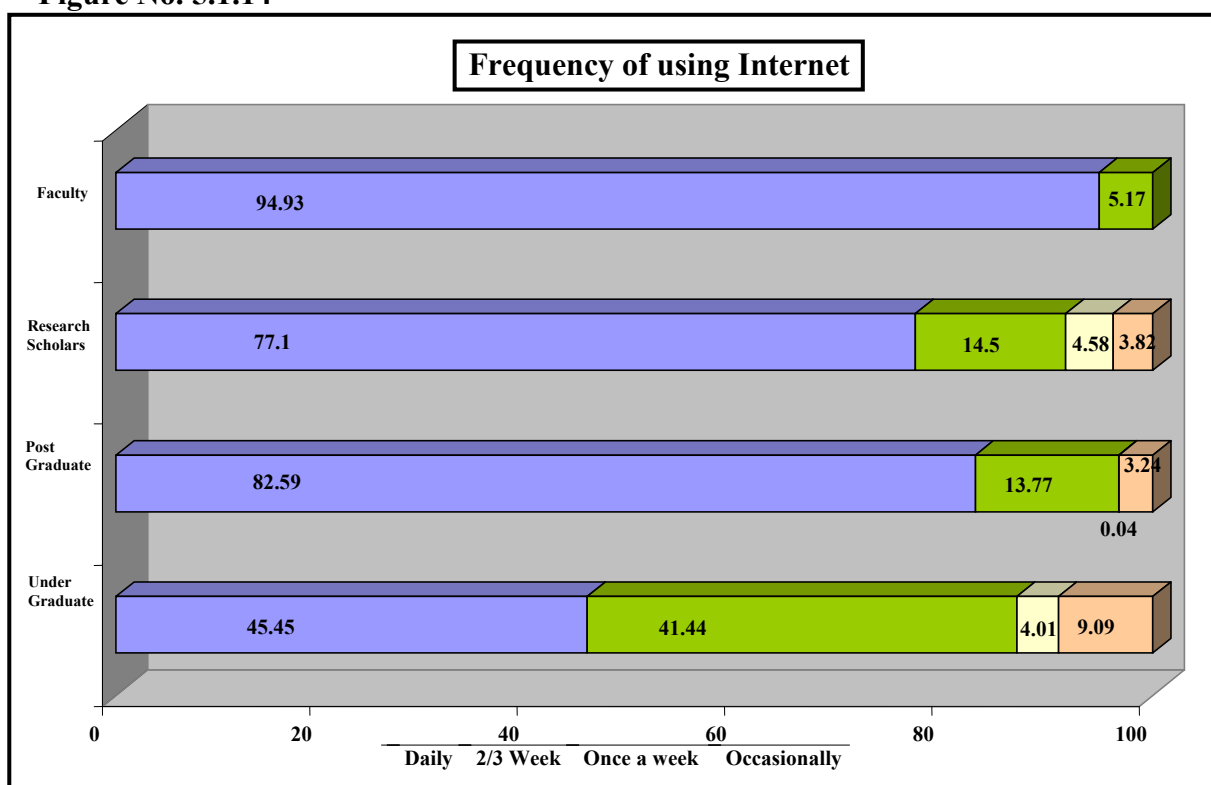
maximum numbers of users are making use of CD-ROM services occasionally.

**Table No. 5.1.14 Frequency of using Internet**

Using Internet	UG N (%)	PG N (%)	RS N (%)	FA N (%)	Total N (%)	Chi <sup>2</sup> (df;C)
Daily	170 (45.45)	204 (82.59)	101 (77.10)	55 (94.93)	530 (65.43)	133.493** (9;0.376) NR: 15(1.82)
2/3 Week	155 (41.44)	34 (13.77)	19 (14.50)	3 (5.17)	211( 26.05)	
Once a week	15 (4.01)	1 (0.04)	6 (4.58)		22 (2.72)	
Occasionally	34 (9.09)	8 (3.24)	5 (3.82)		47 (5.80)	
Total	374 (100)	247 (100)	131 (100)	58 (100)	810 (100)	

\*\* Significant at the 0.01 level

**Figure No. 5.1.14**



The response shows from Table No.5.1.14 that maximum respondents use internet daily followed by 2/3 time a week. 170 (45.45%) undergraduates use internet services daily 155 (41.44%), 2/3 time a week, 15 (4.01%) once a week and 34 (9.09%) occasionally. 204 (82.59%) postgraduates responded for daily use of internet services, 34(13.77%) 2/3 time a week, 1 (0.40%) once a week and 8 (3.24%) occasionally same way 101 research scholars (77.10%) use internet daily, 19 (14.50%) occasionally. Faculty's response in using internet was daily 55 (94.83%) and 3(5.17%) for 2/3 time a week.

The Chi-Square test for independence is significant at 1 per cent level of significance. The value of  $\chi^2$  is 133.493 and the degree of freedom (df) are 9. The value p shows highly significant ( $p \leq 0.01$ ). This implies that there is a significant variation among users using from 825 respondents, 15 (1.82%) did not give any response where as 530 (65.43%) users responded for daily, 211 (26.05%) for 2/3 time a week, 22 (2.72%) for once in a week and 47 (5.80%) for occasionally. It has been found that maximum users make use of internet services daily.

**Table No. 5.1.15 Place used for accessing E-resources**

Place used	UG N (%)		PG N (%)		RS N (%)		Faculty N (%)		Total N (%)	
	Yes	No	Yes	No	Yes	No	Yes	No	Yes	No
Department	50 (13.19)	329 (86.81)	173 (67.84)	82 (32.16)	128 (96.24)	5 (3.76)	55 (94.83)	3 (5.17)	406 (49.21)	419 (50.79)
Library	71 (18.73)	308 (81.27)	72 (28.24)	183 (71.76)	51 (38.35)	82 (61.65)	2 (3.45)	56 (96.55)	196 (23.76)	629 (76.24)
Hostel	221 (58.31)	158 (41.69)	85 (33.33)	170 (66.67)	20 (15.04)	113 (84.96)	-	58 (100)	326 (39.52)	499 (60.48)
Computer center	160 (42.33)	218 (57.67)	43 (30.71)	97 (69.29)	7 (12.07)	51 (87.93)	-	47 (100)	210 (33.71)	413 (66.29)

Figure No.5.1.15

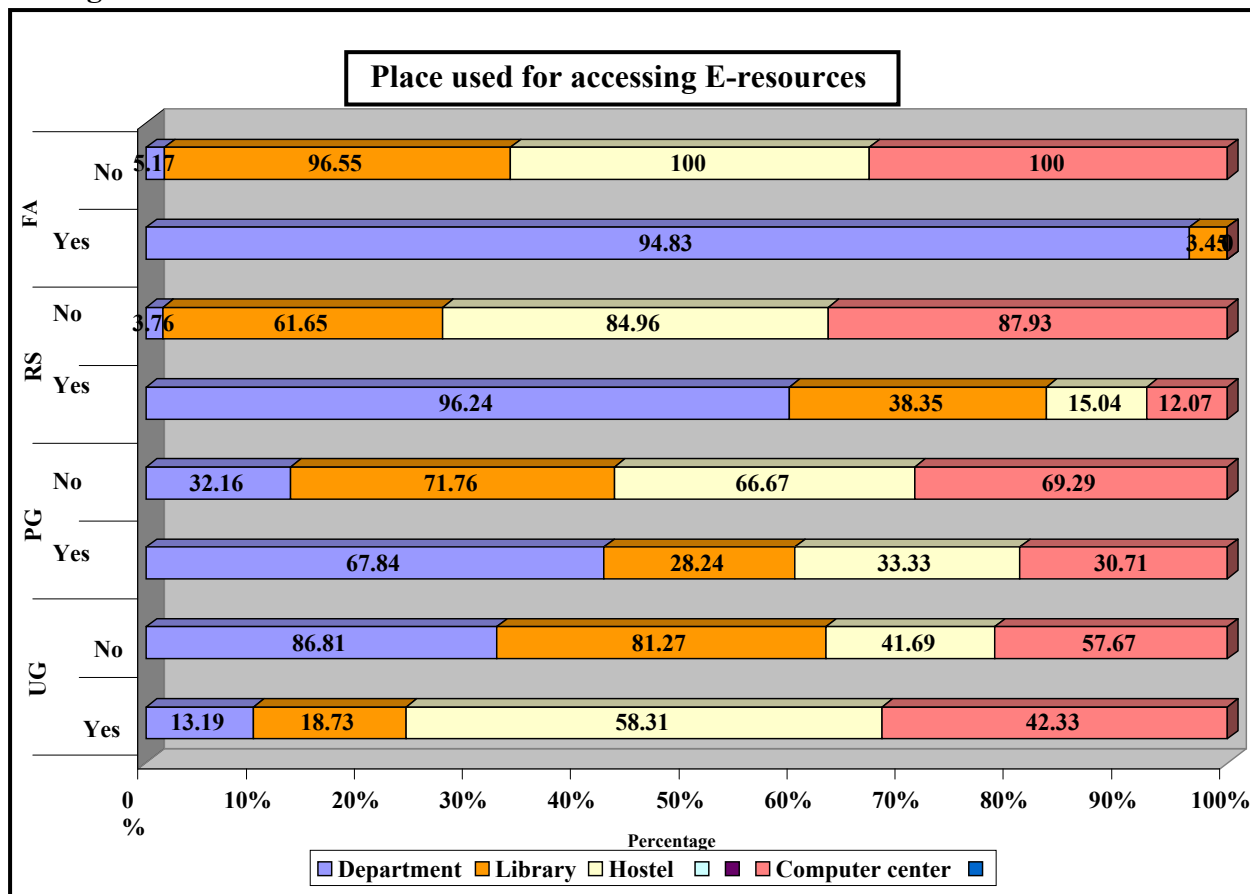


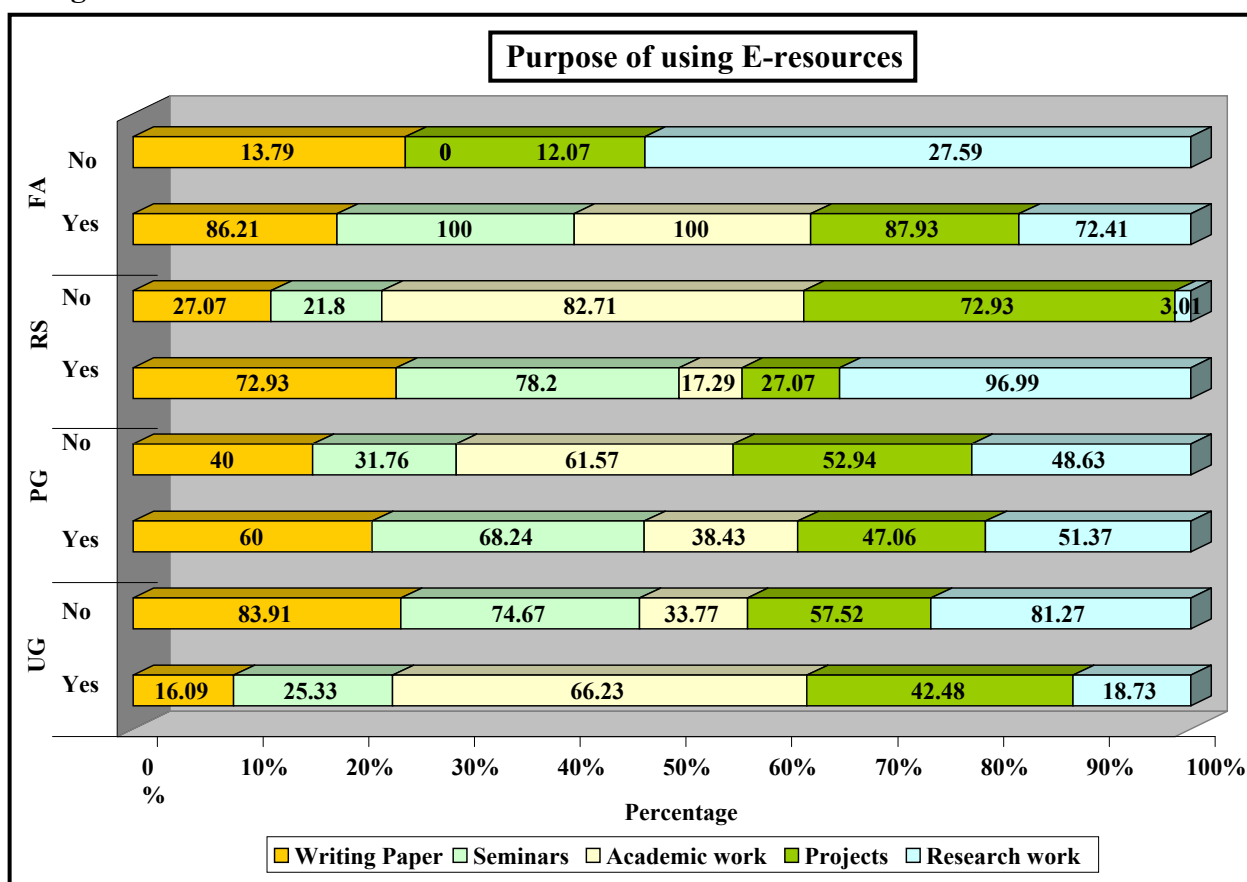
Figure No.5.1.15 shows the use of e-resources and services provided by the library through internet and intranet, which can be accessed at various places within the institute. It can be revealed by the evaluation of the services from the department, library, hostel and computer centre. From the data it has been found that the e-resources were used more in the departments by research scholars. 55(94.83%) faculty, 128(96.24%) research scholars, 173(67.84%) postgraduates and 50(13.19%) undergraduates responded positively. Faculty makes very less use of e-resources in the library as compared to other users. The response indicates in positive for using e-resources in library by 71(18.73%) undergraduates, 72(28.24%) postgraduates, 51(38.55%) research scholars and 2(3.45%) faculty. The hostel is used for accessing e-resources by 221(58.3%) undergraduates, 85 (33.33%) postgraduates, and 20(15.04%) research scholars. The computer centre is used for accessing e-resources by 160(41.95%) undergraduates, 43 (46.67%) postgraduates, 6(12.07%) research scholars and faculty do not make use of it. The Table No. 5.1.15 shows that from total 825 respondents, e-resources are used at the highest in the departments as compared to other places. The response of users in going to the

departments for the above purpose was 49.21%, hostel 39.52%, computer centre 36.48% and use of library is 23.76%. The results depict that library is used less in accessing the e-resources as compared to other places.

**Table No.5.1.16 Purpose of using E-resources**

Purposes	UG N (%)		PG N (%)		RS N (%)		Faculty N (%)		Total N (%)	
	Yes	No	Yes	No	Yes	No	Yes	No	Yes	No
Writing Paper	61 (16.09)	318 (83.91)	153 (60.0)	102 (40.0)	97 (72.93)	36 (27.07)	50 (86.21)	8 (13.79)	361 (43.76)	464 (56.24)
Seminars	96 (25.33)	283 (74.67)	174 (68.24)	81 (31.76)	104 (78.20)	29 (21.80)	58 (100)	-	432 (52.36)	393 (47.64)
Academic work	251 (66.23)	128 (33.77)	98 (38.43)	157 (61.57)	23 (17.29)	110 (82.71)	58 (100)	-	430 (52.12)	395 (47.88)
Projects	161 (42.48)	218 (57.52)	120 (47.06)	135 (52.94)	36 (27.07)	97 (72.93)	51 (87.93)	7 (12.07)	368 (44.61)	457 (55.39)
Research work	71 (18.73)	308 (81.27)	131 (51.37)	124 (48.63)	129 (96.99)	4 (3.01)	42 (72.41)	16 (27.59)	373 (45.21)	452 (54.79)

**Figure No.5.1.16**

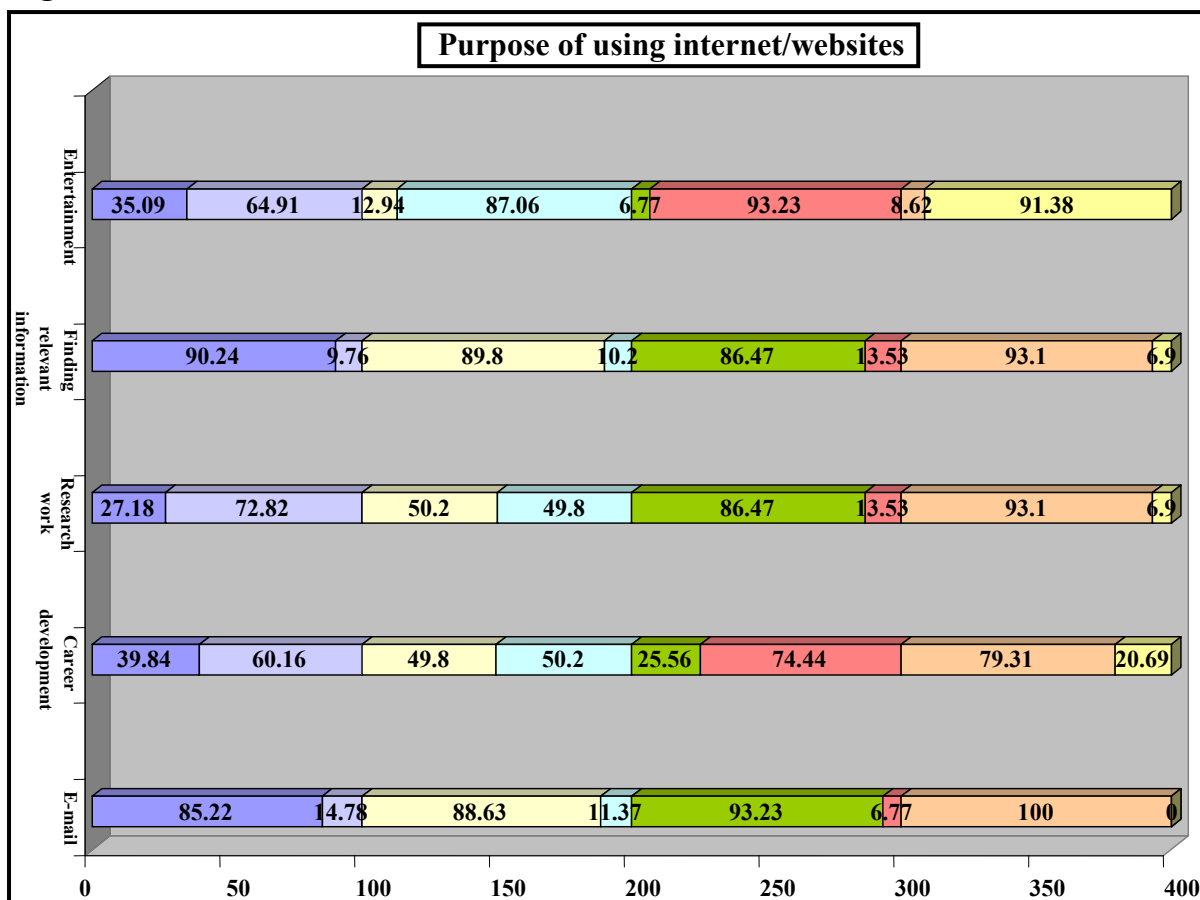


The library provided electronic resources/services to its users. It is important to know from the users that for what purpose they are using e-recourses. It has been found from Table No.5.1.16 that for writing paper, 50(86.21%) faculty's response was yes, 97(72.93%) research scholars, 153 (60%) postgraduates, 6 undergraduates make very less use of these resources, their response was 16.09% only. For the purpose of seminars, faculty response was 100% positive. 104(78.20%) research scholars, 174(68.24%) postgraduates and 96 (25.33%) undergraduates responded in positive. The e-resources are used maximum by faculty for academic work i.e.100%, where as postgraduates and research scholars do not use e-resources for academic work. For this purpose the response from 157 (61.57%) postgraduate and 110 (82.71%) research scholars response was in negative. 66.23% undergraduates responded in affirmative and 33.71% to no. The faculty using e-resources for projects work was 51 (87.93%) and 7 (12.07%) didn't use these services. Therefore, the data clearly reveals that 42.48% undergraduates, 47.06% postgraduates and 27.07% research scholars make less use of e-resources as compared to faculty. For research work 71 (18.73%) undergraduates use e-resources and 131 postgraduates (51.37%) answer yes. 129 (96.99%) research scholars' response was yes and 42(72.41%) faculty answered positively. The e-resources are used maximum for research work by faculty and research scholars more as compared to other users. From the data it has been vividly derived that e-resources are used by faculty and research scholars more for writing paper, seminars, academic work, projects and research work as compared to undergraduates and postgraduates.

**Table No. 5.1.17 Purpose of using internet/ websites**

Purpose	UG N (%)		PG N (%)		RS N (%)		Faculty N (%)		Total N (%)	
	Yes	No	Yes	No	Yes	No	Yes	No	Yes	No
E-mail	323 (85.22)	56 (14.78)	226 (88.63)	29 (11.37)	124 (93.23)	9 (6.77)	58 (100)	-	731 (88.61)	94 (11.39)
Career development	151 (39.84)	228 (60.16)	127 (49.80)	128 (50.20)	34 (25.56)	99 (74.44)	46 (79.31)	12 (20.69)	358 (43.39)	467 (56.61)
Research work	103 (27.18)	276 (72.82)	128 (50.20)	127 (49.80)	115 (86.47)	18 (13.53)	54 (93.10)	4 (6.90)	400 (48.48)	425 (51.52)
Finding relevant information	342 (90.24)	37 (9.76)	229 (89.80)	26 (10.20)	115 (86.47)	18 (13.53)	54 (93.10)	4 (6.90)	740 (89.70)	85 (10.30)
Entertainment	133 (35.09)	246 (64.91)	33 (12.94)	222 (87.06)	9 (6.77)	124 (93.23)	5 (8.62)	53 (91.38)	180 (21.82)	645 (78.18)

Figure No. 5.1.17

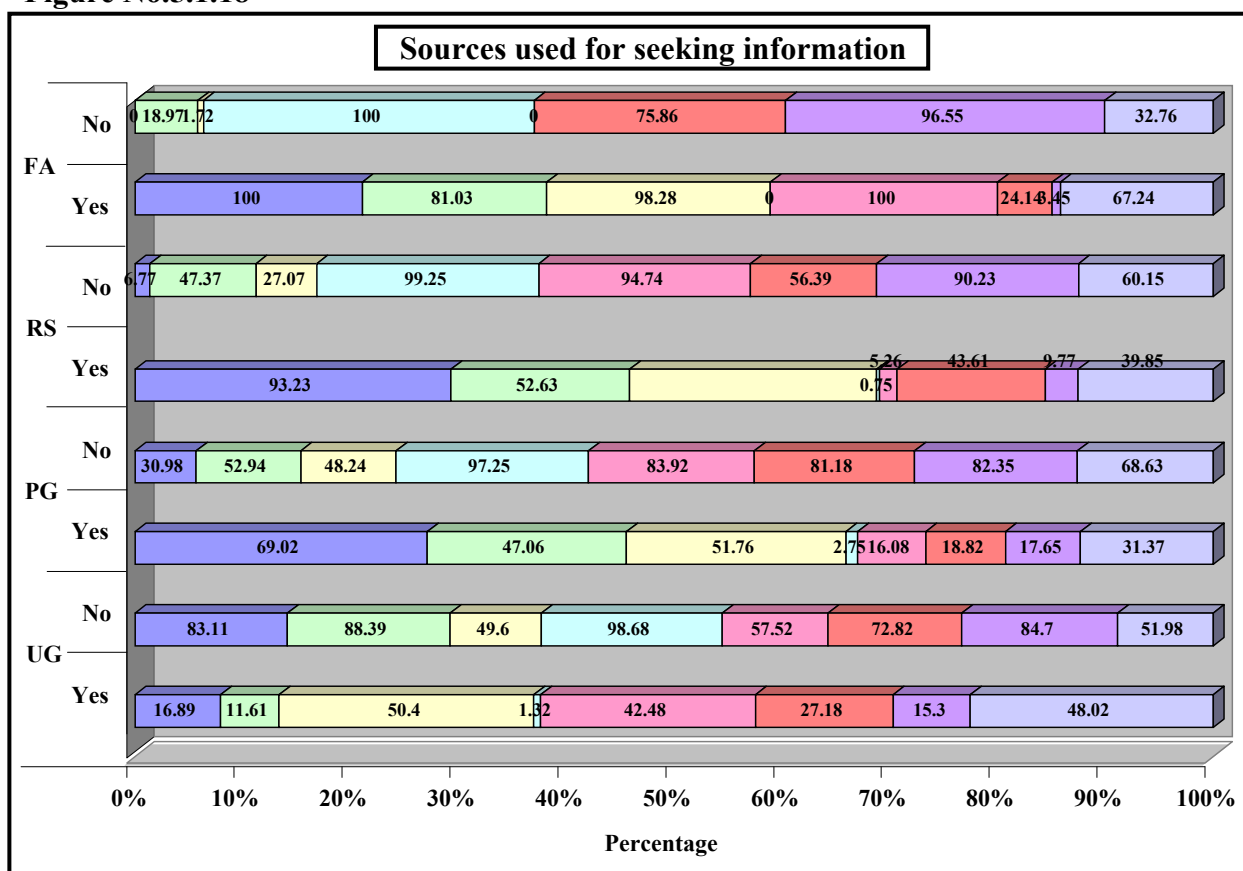


The users are using internet and websites for getting information. The purpose of using the internet and websites are e-mail, for career development, research work, finding relevant information and entertainment. From figure 5.1.17 it has been found that more than 80% of the users use internet for e-mail services. 100% of the faculty responded in positive for using e-mail. For career development response of faculty was 79.31% in affirmative, 25.56% research scholars, 49.80% postgraduates, and 39.84% undergraduates' responded in positive. Using internet and websites for finding relevant information response from faculty was 93.10%, research scholars 86.47%, postgraduates 50.20% and undergraduates 27.18%. For entertainment the users who responded in positive were very less i.e. only 8.62% faculty, 6.77% research scholars, 12.94% postgraduates and 35.09% undergraduates. From the Table No. 5.1.17 the total data of users shows that e-mail is used by 88.61% and use of internet/websites for finding relevant information is 89.70%. Which is more as compared to other purposes? Using internet and website merely for the purpose of entertainment by 21.86% users was very less.

**Table No.5.1.18 Sources used for seeking information**

Information form	UG N (%)		PG N (%)		RS N (%)		Faculty N (%)		Total N (%)	
	Yes	No	Yes	No	Yes	No	Yes	No	Yes	No
Current E-Resources	64 (16.89)	315 (83.11)	176 (69.02)	79 (30.98)	124 (93.23)	9 (6.77)	58 (100)	-	422 (51.15)	403 (48.85)
Back Vol. of E-Resources	44 (11.61)	335 (88.39)	120 (47.06)	135 (52.94)	70 (52.63)	63 (47.37)	47 (81.03)	11 (18.97)	281 (34.06)	544 (65.94)
On-Line Data bases	191 (50.40)	188 (49.60)	132 (51.76)	123 (48.24)	97 (72.93)	36 (27.07)	57 (98.28)	1 (1.72)	477 (57.82)	348 (42.18)
Video Cassettes	5 (1.32)	374 (98.68)	7 (2.75)	248 (97.25)	1 (0.75)	132 (99.25)	-	58 (100)	13 (1.58)	812 (98.42)
Inter net Website	161 (42.48)	218 (57.52)	41 (16.08)	214 (83.92)	7 (5.26)	126 (94.74)	58 (100)	-	267 (32.36)	558 (67.64)
CD Room	103 (27.18)	276 (72.82)	48 (18.82)	207 (81.18)	58 (43.61)	75 (56.39)	14 (24.14)	44 (75.86)	223 (27.03)	602 (72.97)
E-Books	58 (15.30)	321 (84.70)	45 (17.65)	210 (82.35)	13 (9.77)	120 (90.23)	2 (3.45)	56 (96.55)	118 (14.30)	707 (85.70)
On-line Catalogue	182 (48.02)	197 (51.98)	80 (31.37)	175 (68.63)	53 (39.85)	80 (60.15)	39 (67.24)	19 (32.76)	354 (42.91)	471 (57.09)

**Figure No.5.1.18**



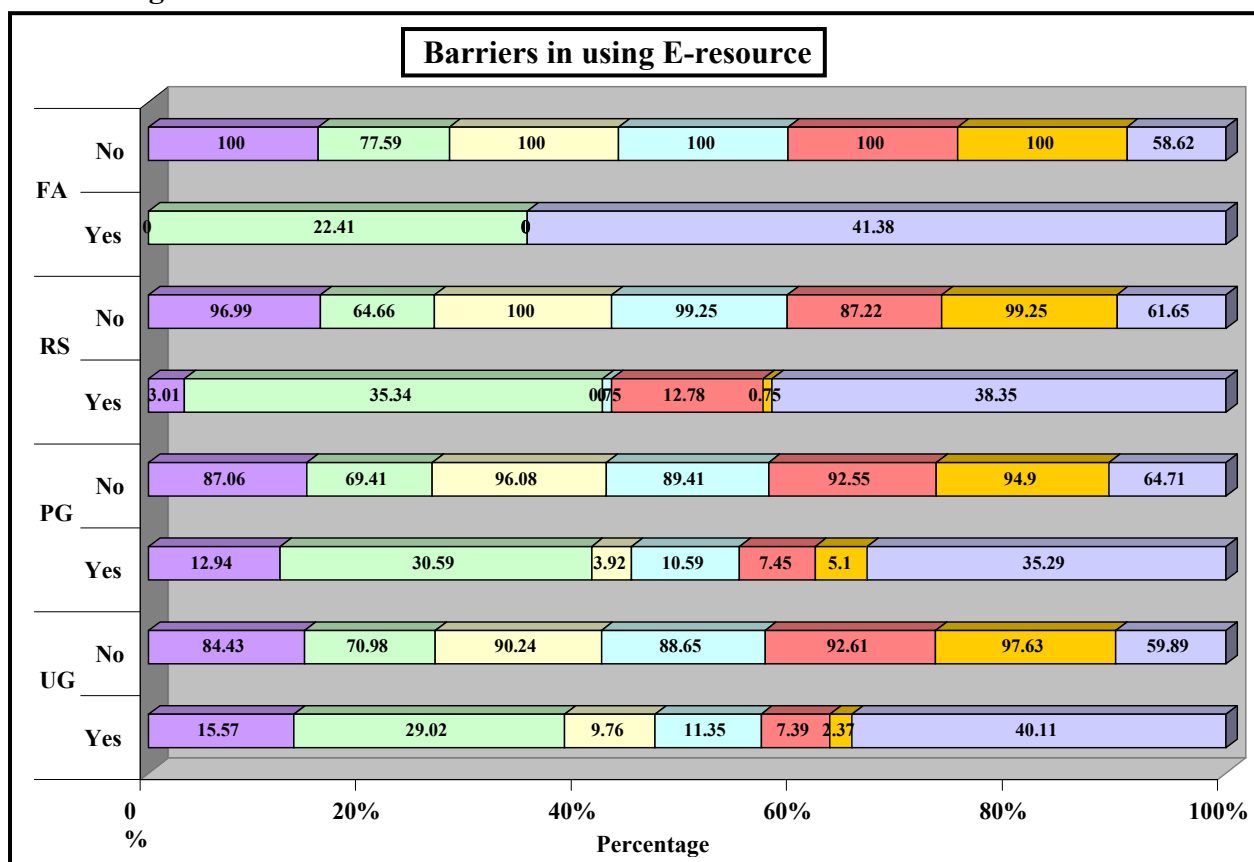
The IIT, Delhi users were asked about the sources from where they find the required information. The data from the Figure No.5.1.18 reveals that response of undergraduates was 16.89%, postgraduates 69.02%, research scholars 93.23% and faculty 100%. The results show that the research scholars and faculty use the current e-resources more as compared to undergraduates and postgraduates for extracting the information.

The back volumes of e-journals are used by 11.16% undergraduates, 47.06% postgraduates, 52.63% research scholars and 81.03% faculty. The results depict that research scholars and faculty use more of back volume of e-journals than undergraduates and postgraduates users. It has also been found that 182 (50.40%) undergraduates, 80(51.76%) postgraduates, 53(72.93%) research scholars and 39 (98.28%) faculty uses online data bases. The results indicate faculty and research scholars use more online data bases as compared to other users. The use of video cassettes for getting information was very less. The response reveals that the response of the users in positive was below 5%. The internet website is used by 42.48% undergraduates, 16.08% postgraduates, 5.26% research scholars and 100% faculty. The result shows that faculty used internet website more than the other users. The CD-ROM is used by 27.18% undergraduates, 18.82% postgraduates, 43.61% research scholars and 24.14% faculty. The result shows that CD-ROM services are used less. The E-books were used by 15.30% undergraduates, 17.65% postgraduates, 9.77% research scholars and 3.45% postgraduates, 9.77% research scholars and 3.45% faculty. It has been found that E-books are very less used. The OPAC was used by 48.02% undergraduates 31.37% postgraduates, 39.85% research scholars and 67.24% faculty. This is used more by faculty as compared to other users. From the total population of the institute it has been found that use of online data bases is 57.82%, current e-journals 51.15%, OPAC 42.91%, internet website 32.36% and back volumes of e-journals 34.06% as compared to video cassettes, CD-ROM and E-books by all the users.

**Table No.5.1.19 Barriers in using E-resources**

Barriers in using E- Resources	UG N (%)		PG N (%)		RS N (%)		FA N (%)		Total N (%)	
	Yes	No	Yes	No	Yes	No	Yes	No	Yes	No
Unorganized	59 (15.57)	320 (84.43)	33 (12.94)	222 (87.06)	4 (3.01)	129 (96.99)	-	58 (100)	96 (11.64)	729 (88.36)
Lack of time	110 (29.02)	269 (70.98)	78 (30.59)	177 (69.41)	47 (35.34)	86 (64.66)	13 (22.41)	45 (77.59)	248 (30.06)	577 (69.94)
Uncomfortable	37 (9.76)	342 (90.24)	10 (3.92)	245 (96.08)	-	133 (100)	-	58 (100)	47 (5.70)	778 (94.30)
What to look for?	43 (11.35)	336 (88.65)	27 (10.59)	228 (89.41)	1 (0.75)	132 (99.25)	-	58 (100)	71 (8.61)	754 (91.39)
Not easy to use	28 (7.39)	351 (92.61)	19 (7.45)	236 (92.55)	17 (12.78)	116 (87.22)	-	58 (100)	64 (7.76)	761 (92.24)
No knowledge of using	9 (2.37)	370 (97.63)	13 (5.10)	242 (94.90)	1 (0.75)	132 (99.25)	-	58 (100)	23 (2.79)	802 (97.21)
Access time is slow	152 (40.11)	227 (59.89)	90 (35.29)	165 (64.710)	51 (38.35)	82 (61.650)	24 (41.38)	34 (58.62)	317 (38.42)	508 (61.58)

**FigureNo.5.1.19**



The users are making use of e-resources provided by their institute library. So they were asked about various types of barriers they face while using e-resources. From Figure No. 5.1.19 it is evident that 15.57% undergraduates, 12.94% postgraduates, 3.01% research scholars feel that the information is not properly organised but the faculty does not hold such view point.

The 9.76% undergraduates, 3.92% postgraduates are uncomfortable while using the e-resources. While the research scholars and faculty members do not share the same feeling. 11.35% undergraduates, 10.59% postgraduates 0.75% research scholars have to think before using the services about what to look for but the faculty remained indifferent. From the results it has been clear that maximum users' response is that e-resources were not easy to use. Very less percentage of users feels that they can use e-resource easily. It has been found that the maximum percentage of users are aware of how to make use of e-resources.

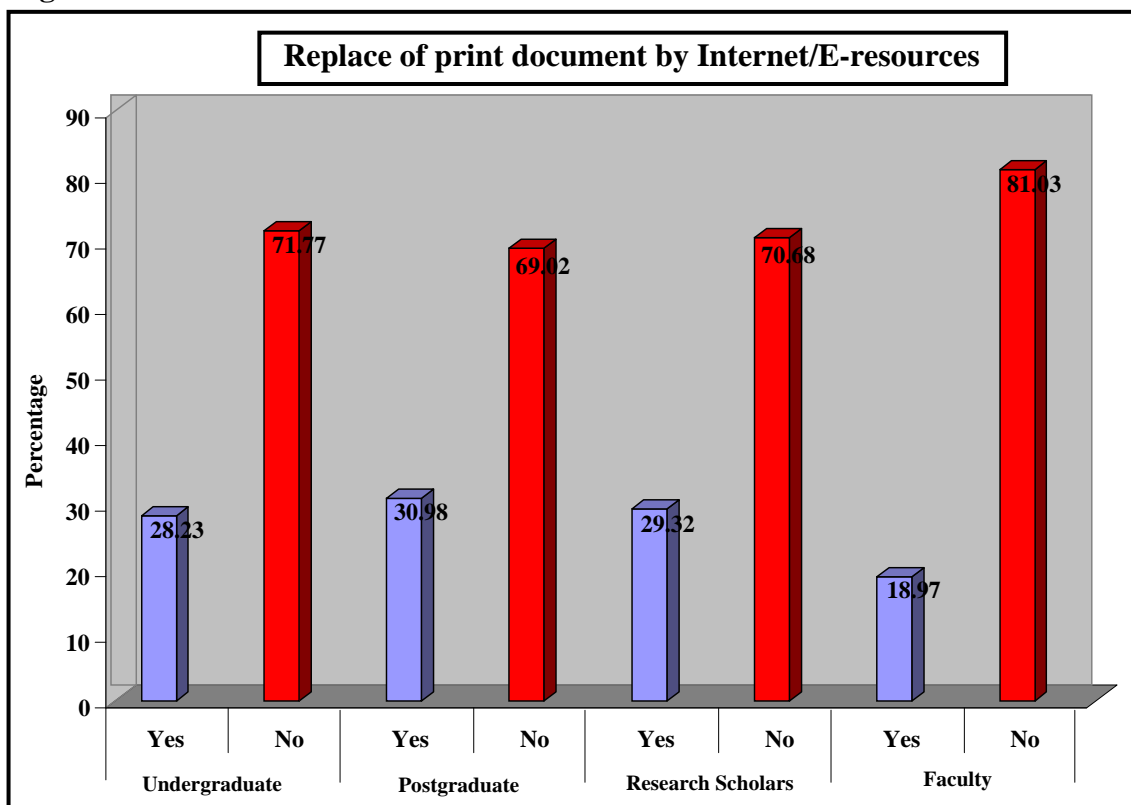
The 40.11% undergraduates, 35.29% postgraduates, 38.35% research scholars and 41.38% faculty admitted that accessing the information from internet is slow. From the total population it has been found that only 38.42% of users find the working of internet slow, 30.06% users feel lack of time as barrier in using e-resources. The data reveals that the total number of users who find barriers in using e-resources is less than 40%

**Table No.5.1.20 Replacement of print document by Internet/E-resources**

Respondents	Response		Total	Chi <sup>2</sup> (df;C)		
	Yes	N (%)	No		N (%)	
Undergraduates	107	(28.23)	272	(71.77)	379 (100)	3.403 ** (3;0.064)
Postgraduates	79	(30.98)	176	(69.02)	255 (100)	
Research Scholars	39	(29.32)	94	(70.68)	133 (100)	
Faculty	11	(18.97)	47	(81.03)	58 (100)	
Total	236	(28.61)	589	(71.39)	825 (100)	

\*\* Significant at the 0.01 level

**Figure No.5.1.20**



The users were asked, can internet/electronic resources replace the print document. Response has been shown in from Figure No.5.1.20 shows that 107 (28.23%) undergraduates responded in yes and 272 (71.77%) in negative, 78 postgraduates (30.98%) response was positive while 176 (69.03%) responded in no, 39 research scholars (29.32%) answered in affirmative and 94 (70.68%) response in vice-versa no. 11 faculty (18.97%) said yes and 47 (81.03%) in no. The data vividly reveals that users don't feel that internet/electronic resources can replace print document as response from 825 users shows, 589 (71.39%) said no and 236 (28.61%) responded in positive.

The Table No.5.1.20 shows that users don't feel that electronic resources can replace print document. The Chi-Square test for independence is significant at 1 per cent level of significance. The value of  $\chi^2$  is 3.403 and the degrees of freedom (df) is 3. The value of p shows statistically significant ( $p \leq 0.01$ ). This implies that there is a significant difference among the users as far as the replacement of internet/electronic resource with the print documents is concerned.

## 5.2 Indian Institute of Technology (IIT), Roorkee: Case study- 2

**Table No. 5.2.1 Population taken for Survey**

Respondents	Total Strength	Questionnaires Distributed	Response Received
Undergraduates	1956	391	378 (60.68)
Postgraduates	776	155	140 (22.48)
Research Scholars	290	158	58 (9.30)
Faculty	341	68	47 (7.54)
Total	3363	772	623 (100)

The figures given in the parentheses indicate percentage in all the tables

**Figure No.5.2.1**

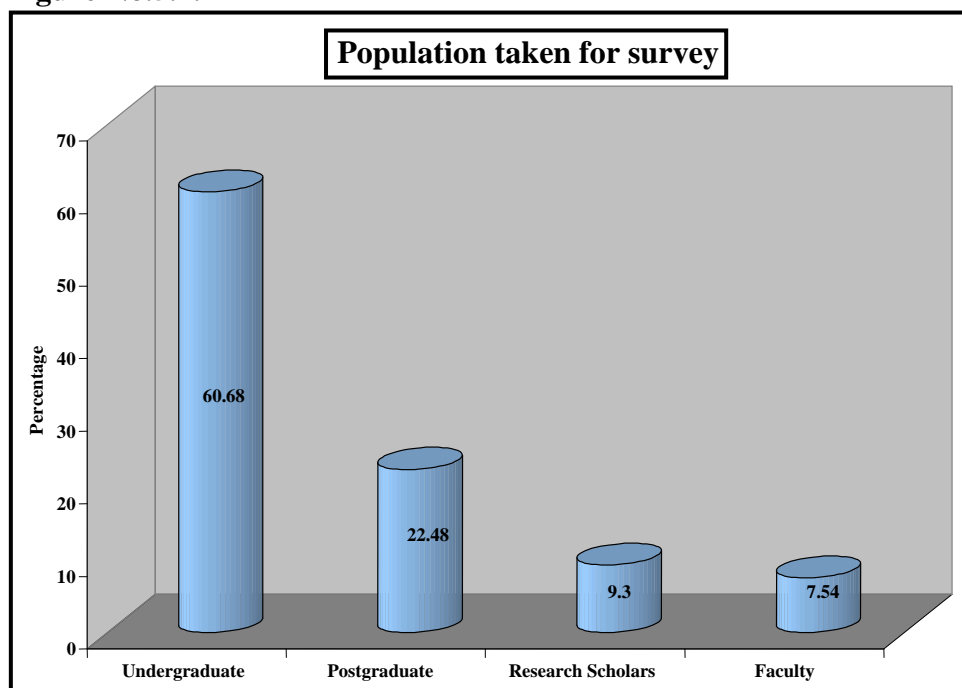


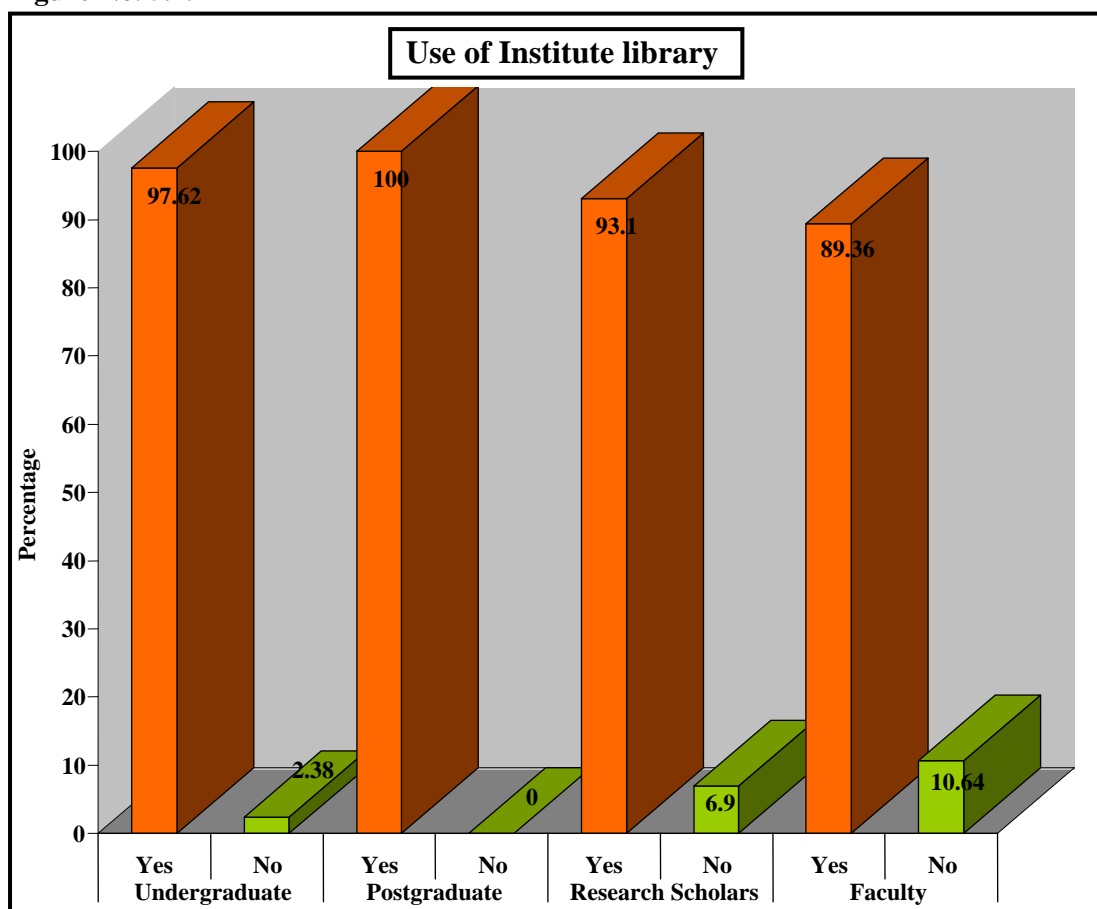
Table No.5.2.1 exhibits that the total population of the users taken up for the survey was 3363 which included undergraduates, postgraduates, research scholars and faculty. 772 questionnaires were distributed and 623 responses were received. The questionnaires distributed to undergraduates were 391 and the response was 378. Similarly, 155 questionnaires were given to postgraduates and the response was received from 140. The questionnaire was given to 158 research scholars and response received was 58, whereas 47 faculty members responded out of 68 to the questionnaire as shown in the Table & Figure No. 5.2.1. The total survey data collected from IIT, Roorkee was 623 (100%).The response received was 378(60.68%) undergraduates, 140(22.48%) postgraduates, 58(9.30%) research scholars and 47(7.54%) faculty.

**Table No.5.2.2 Use of Institute library**

Respondents	Response		Total N (%)	Chi <sup>2</sup> (df;C)
	Yes	No		
Undergraduates	369 (97.62)	9 (2.38)	378(100)	17.892** (3;.167)
Postgraduates	140 (100.0)	-	140(100)	
Research Scholars	54 (93.10)	4(6.90)	58(100)	
Faculty	42 (89.36)	5 (10.64)	47(100)	
Total	605 (97.11)	18(2.89)	623(100)	

\*\*Significant at 0.01

**Figure No. 5.2.2**



The users were asked if they were making use of their institute library. The response from the Figure No.5.2.2 shows that 369 (97.62%) undergraduates 100% postgraduates, 54 (93.10%) research scholars and 42 (89.36%) faculty do make use of the library. The results reveal that maximum users used their institute library, and the percentage of those who did not avail this facility, was less than even 10%. From the total of 623 users of IIT, Roorkee, 605 (97.11%) responded positively in making full use of their institute library while those who responded in the negative were merely 18 (2.89%).

The Table No.5.2.2 shows that the value of  $\chi^2$  is 17.892 and the degrees of freedom (df) is 3. The value of p shows statistically significant ( $p \leq 0.01$ ). The Chi-Square test for independence is significant at 1 per cent level of significance. This implies that there is a significant variation among the users as far as the use of the institute library is concerned.

**Table No. 5.2.3 Awareness about library's E- resources/ services**

Respondents	Response		Total N (%)	Chi <sup>2</sup> (df;C)
	Yes	No		
Undergraduates	369 (97.62)	9 (2.38)	378(100)	2.804** (3; 0.67)
Postgraduates	138 (98.57)	2 (1.43)	140(100)	
Research Scholars	2 (1.43)	58 (100)	58(100)	
Faculty	47 (100)	-	47(100)	
Total	612 (98.23)	11 (1.77)	623(100)	

\*\*Significant at 0.01 level

**Figure No. 5.2.3**

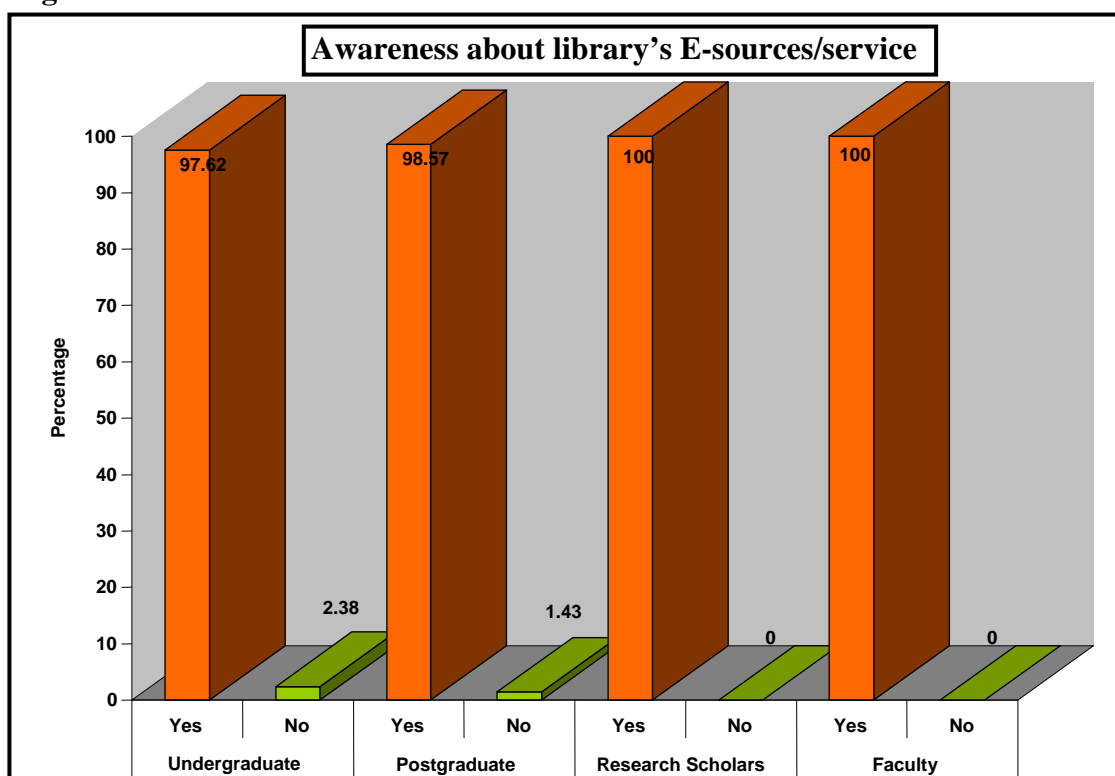


Figure No. 5.2.3 shows that 369(97.62%) of undergraduates, 138(98.57%) of postgraduates, 100% of research scholars and faculty were aware of their library e-resources. The users who were unaware of library e-resources were even blow 3% only. From the total 623 of IIT, Roorkee users, the results show that 612(98.23%) of users were aware of the library e-resources services, while 11(1.77%) did not know. Table No. 5.2.3

shows that the value of  $\chi^2$  is 2.804 and the degrees of freedom (df) is 3. The value of p shows statistically significant ( $p \leq 0.01$ ). The Chi-Square test for independence is significant at 1 per cent level of significance. This implies that there is a significant variation among the users as far as the awareness of library e-resources is concerned.

**Table No. 5.2.4 Users visiting the library's website /homepage**

Respondents	Response		Total N (%)	Chi <sup>2</sup> (df;C)
	Yes	No		
Undergraduates	338 (89.42)	40 (10.58)	378 (100)	122.894** (3 ;0.406)
Postgraduates	81 (57.86)	59 (42.14)	140 (100)	
Research Scholars	24 (41.38)	34 (58.62)	58 (100)	
Faculty	47 (100)	-	47 (100)	
Total	490 (78.65)	133 (21.35)	623 (100)	

\*\*Significant at 0.01 level

**Figure No. 5.2.4**

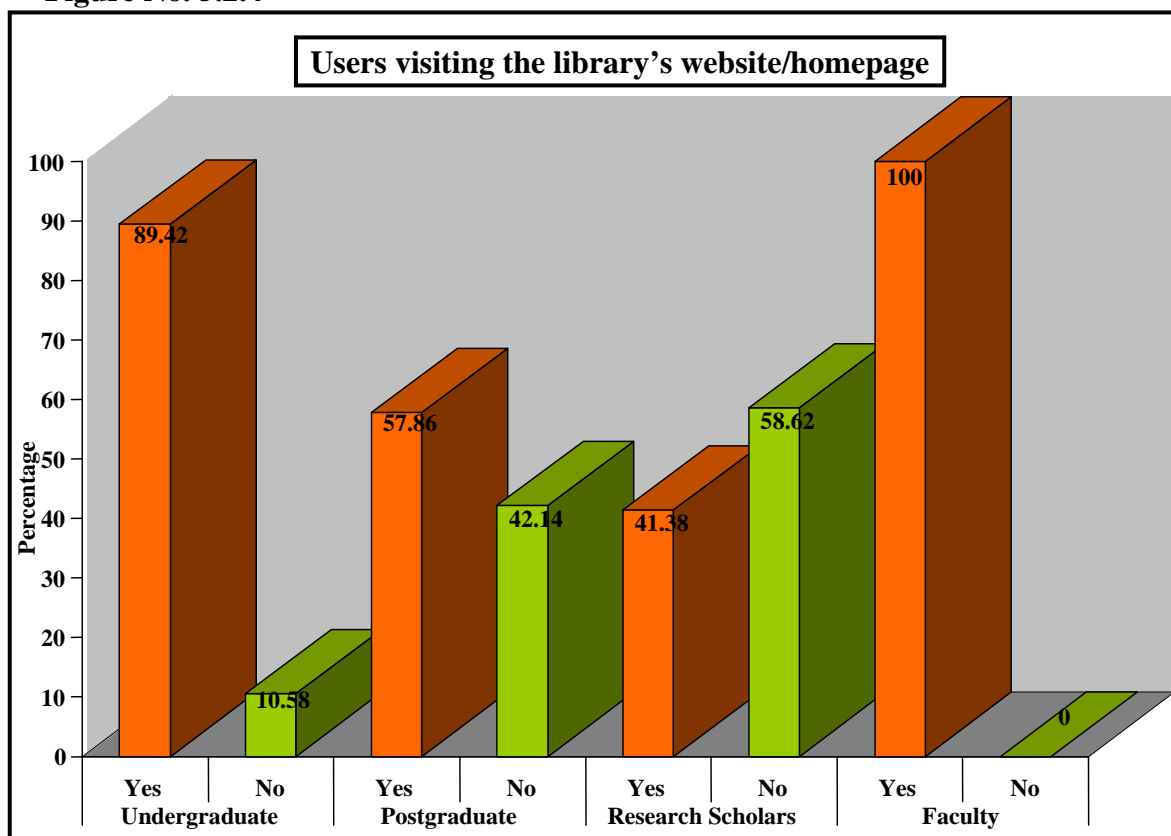


Figure No.5.2.4 depicts that 338(89.42%) of undergraduates, 81(57.86%) of postgraduates, 24(41.38%) of research scholars and 100% of faculty have visited the library website/ home page. The data shows that faculty and undergraduates have visited

their library website/home page more times as compared to postgraduates and research scholars.

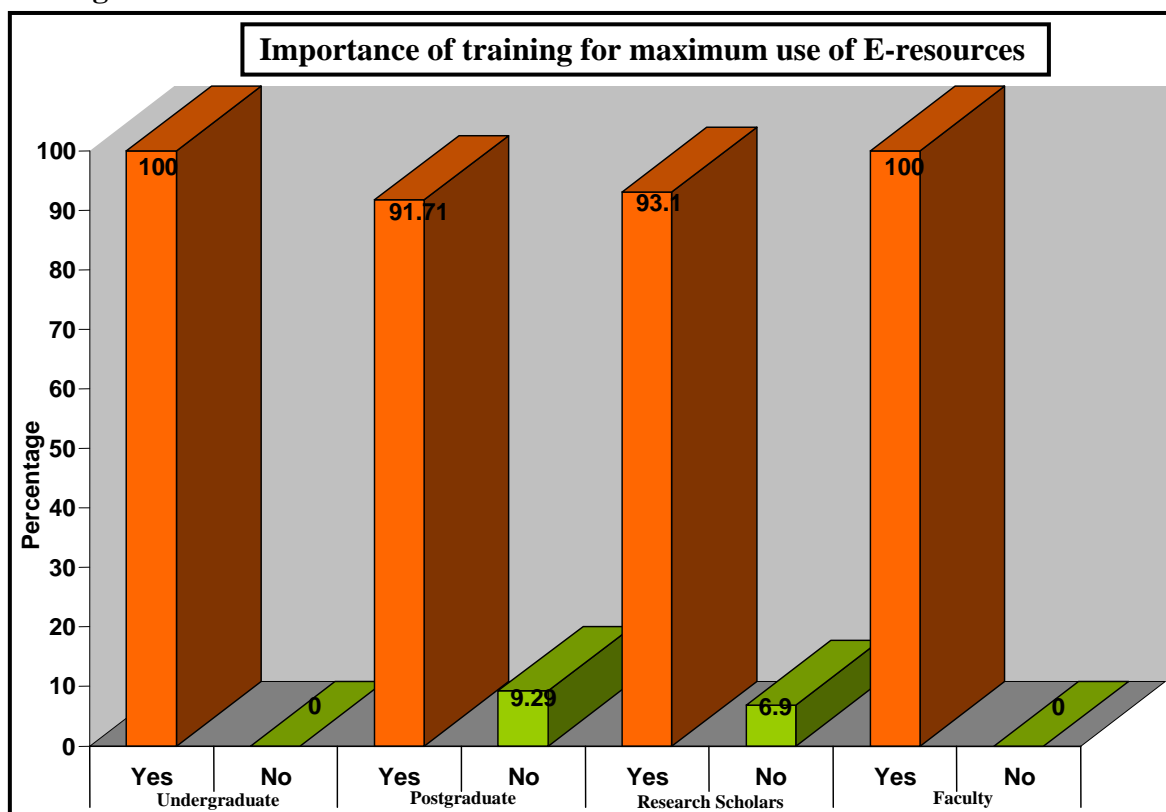
From the total of 623 of respondents, the results reveal that 490 (78.65%) of users have seen their library website/home page and 133(21.35%) users have not. Table No.5.2.4 shows that the value of  $\chi^2$  is 122.894 and the degrees of freedom (df) is 3. The value of p shows statistically significant ( $p \leq 0.01$ ).The Chi-Square test for independence is significant at 1 per cent level of significance .This implies that there is a significant variation among the users as far as the visiting of their library website/homepage is concerned.

**Table No.5.2.5 Importance of training for maximum use of E-resources**

Respondents	Response		Total N (%)	Chi <sup>2</sup> (df;C)
	Yes	N (%)		
Undergraduates	378	(100)	-	
Postgraduates	127	(90.71)	13	(9.29)
Research Scholars	54	(93.10)	4	(6.90)
Faculty	47	(100)	-	
Total	606	(97.27)	17	(2.73)

\*\*Significant at 0.01 level

**Figure No. 5.2.5**



From Figure No. 5.2.5 the results show that almost all the users from the IIT, Roorkee said that training is important to make maximum use of e-resources. The data indicates that 100% of undergraduates, 90.71% of postgraduates, 93.10% of research scholars and 100% of faculty feel that training is important for making proper use of e-resources.

From the 623 respondents, it has been found that 606(97.27%) users feel that training is important and 17(2.73%) do not feel the need for it.

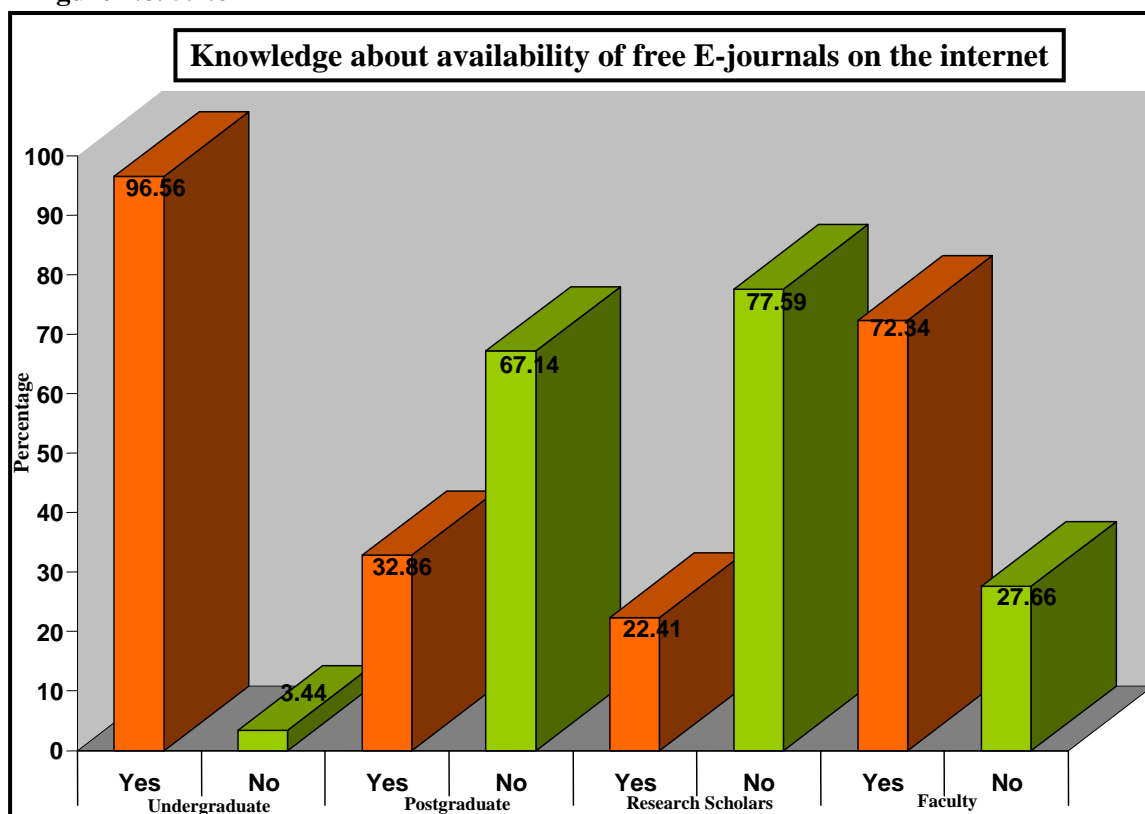
The table 5.2.5 shows that the value of  $\chi^2$  is 38.395 and the degrees of freedom (df) is 3. The value of p shows statistically significant ( $p \leq 0.01$ ). The Chi-Square test for independence is significant at 1 per cent level of significance. This implies that there is a significant variation among the users as far as the importance and need of training to make maximum use of e-resources is concerned.

**Table No.5.2.6 Knowledge about availability of free E-journals on the Internet**

Respondents	Response		Total N (%)	Chi <sup>2</sup> (df;C)
	Yes	No		
Undergraduates	365 (96.56)	13 (3.44)	378(100)	299.795** (3 ;0.570)
Postgraduates	46 (32.86)	94 (67.14)	140(100)	
Research Scholars	13 (22.41)	45 (77.59)	58(100)	
Faculty	34 (72.34)	13 (27.66)	47(100)	
Total	458 (73.52)	165 (26.48)	623(100)	

\*\*Significant at 0.01 level

**Figure No. 5.2.6**



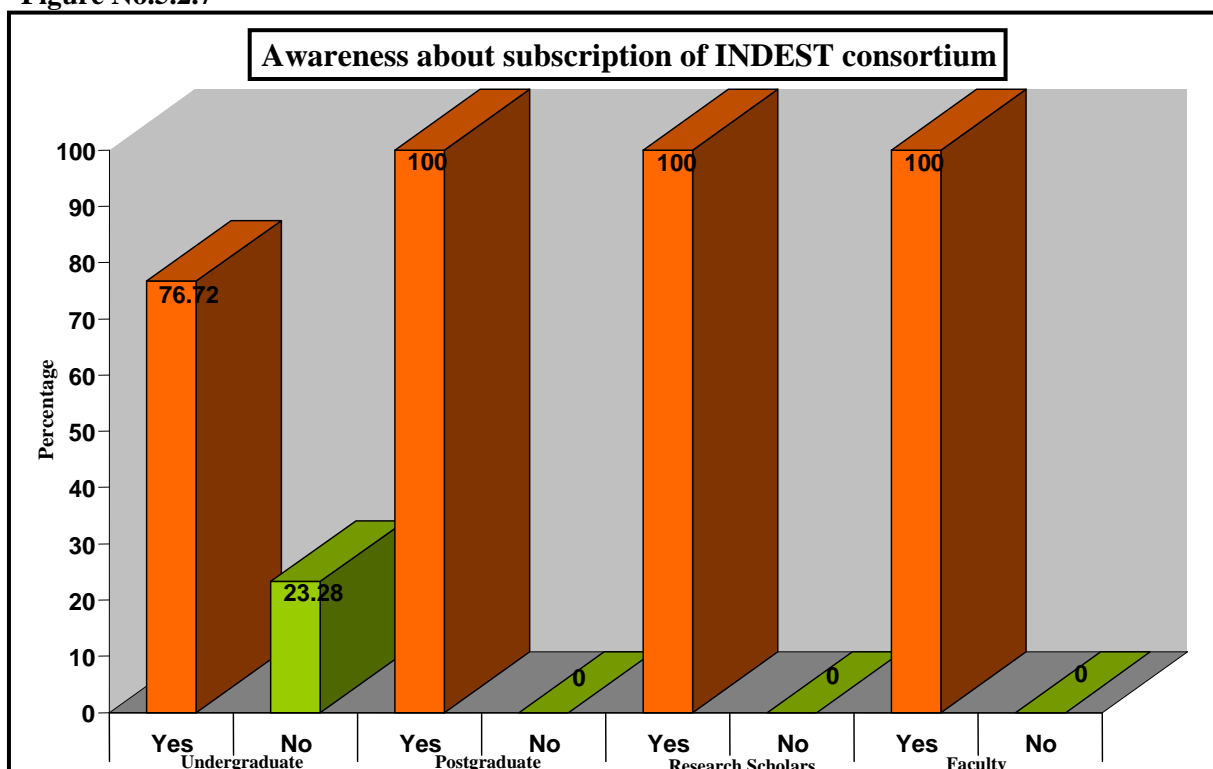
There are many free e-journals/portals available on the net .These resources can freely be used at any time from internet. The response from Figure No.5.2.6 shows that 365 (96.56%) undergraduates, 46 (32.86%) postgraduates, 13 (22.41%) research scholars and 34 (72.34%) faculty were aware of the availability of free e-journal portal on the internet. The results show that undergraduates and faculty were more aware of it as compared to postgraduates and research scholars. From the total population of the institute it has been found that 458 (73.52%) of users were having awareness of free e-journals and 165 (26.48%) of users were ignorant about it. The Table No.5.2.6 shows that the value of  $\chi^2$  is 299.795 and the degrees of freedom (df) is 3. The value of p shows statistically significant ( $p \leq 0.01$ ).The Chi-Square Test for independence is significant at 1 per cent level of significance. This implies that there is a significant variation among the users as far as the knowledge of availability of free e-journal on the internet is concerned.

**Table No. 5.2.7 Awareness about subscription of INDEST consortium**

Respondents	Response		Total	Chi <sup>2</sup> (df;C)	
	Yes	N (%)	No		N (%)
Undergraduates	290	(76.72)	88	(23.28)	66.419** (3 ;0.310)
Postgraduates	140	(100)	-		
Research Scholars	58	(100)	-		
Faculty	47	(100)	-		
Total	535	(85.87)	88	(14.13)	

\*\*Significant at 0.01 level

Figure No.5.2.7



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. It has been found from Figure No. 5.2.7 that 76.72% of undergraduates, 100% of postgraduates, research scholars and faculty were aware of INDEST consortium. The results show that undergraduates were comparatively less aware of INDEST consortium e-journals than other users.

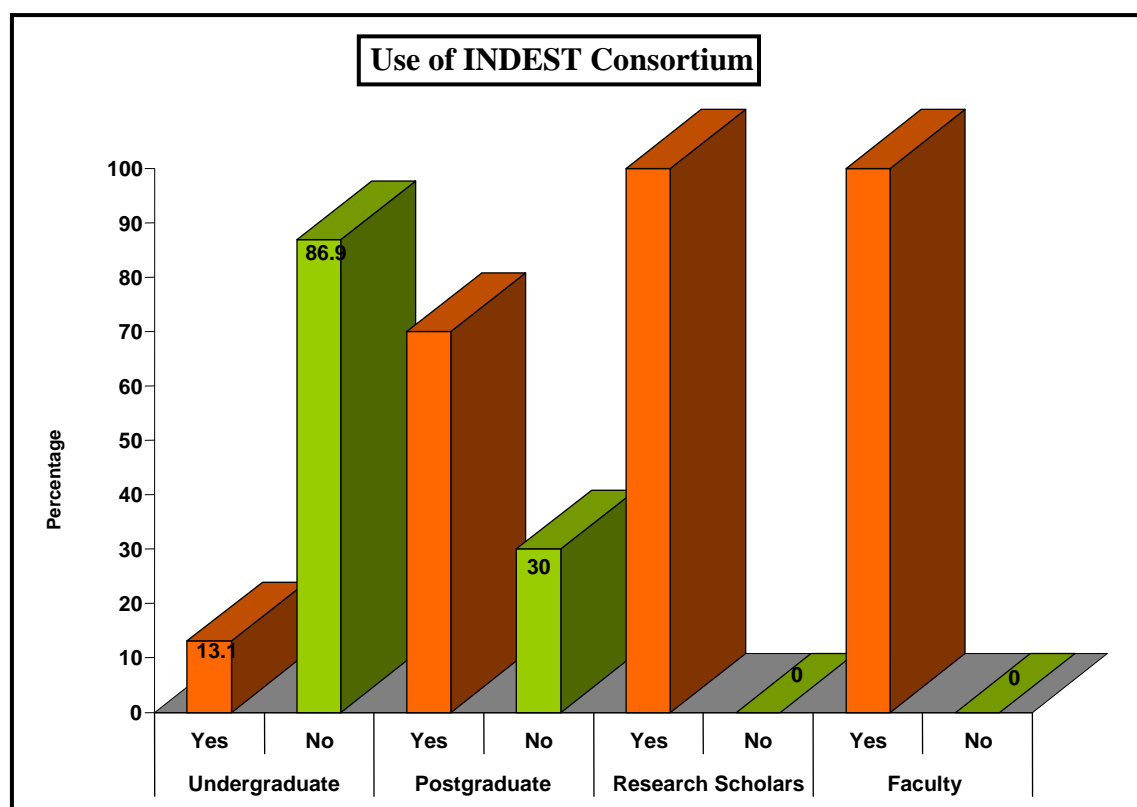
From the total population of IIT, Roorkee users it has been found out that 85.87% of users were well known to INDEST and 14.13% were unaware of INDEST e-resources. Table No.5.2.7 shows that the value of  $\chi^2$  is 66.419 and the degrees of freedom (df) is 3. The value of p shows statistically significant ( $p \leq 0.01$ ). The Chi-Square test for independence is significant at 1 per cent level of significance. This implies that there is a significant variation among the users as far as the awareness of INDEST consortium is concerned.

**Table No. 5.2.8 Use of INDEST Consortium**

Respondents	Response		Total N (%)	Chi <sup>2</sup> (df;C)
	Yes N (%)	No N (%)		
Undergraduates	38 (13.10)	252 (86.90)	378(100)	282.843** (3;0.588)
Postgraduates	98 (70.00)	42 (30.00)	140(100)	
Research Scholars	58(100)	-	58(100)	
Faculty	47 (100)	-	47(100)	
Total	241(45.05)	294 (54.95)	623(100)	

\*\*Significant at 0.01 level

**Figure No.5.2.8**



From Figure No.5.2.8 it is depicted that 13.10% of undergraduates, 70% of postgraduates, 100% of research scholars and 100% of faculty make use of INDEST e-resources. The data shows that research scholars and faculty make more use of e-resources as compared to undergraduates and postgraduates. The results show that from the total number of 623 respondents, 535 users gave response. 241(45.05%) users were aware of INDEST consortium and used INDEST consortium e-resources and 294(54.95%) didn't use it. The Table No. 5.2.8 shows that the value of  $\chi^2$  is 282.843 and the degrees of freedom (df) is 3. The value of p shows statistically significant ( $p \leq 0.01$ ). The Chi-Square test for

independence is significant at 1 per cent level of significance. This implies that there is a significant variation among the users as far as using of INDEST consortium is concerned.

**Table No.5.2.9 Comfortable in using E-resources**

Respondents	Response		Total N (%)	Chi <sup>2</sup> (df;C)	
	Yes	N (%)			No
Undergraduates	375	(99.21)	3	(0.79)	13.923 ** (3;0.0148)
Postgraduates	138	(98.57)	2	(1.43)	
Research Scholars	54	(93.10)	4	(6.90)	
Faculty	47	(100)	-		
Total	614	(98.56)	9	(1.44)	

\*\*Significant at 0.01 level

**Figure No.5.2.9**

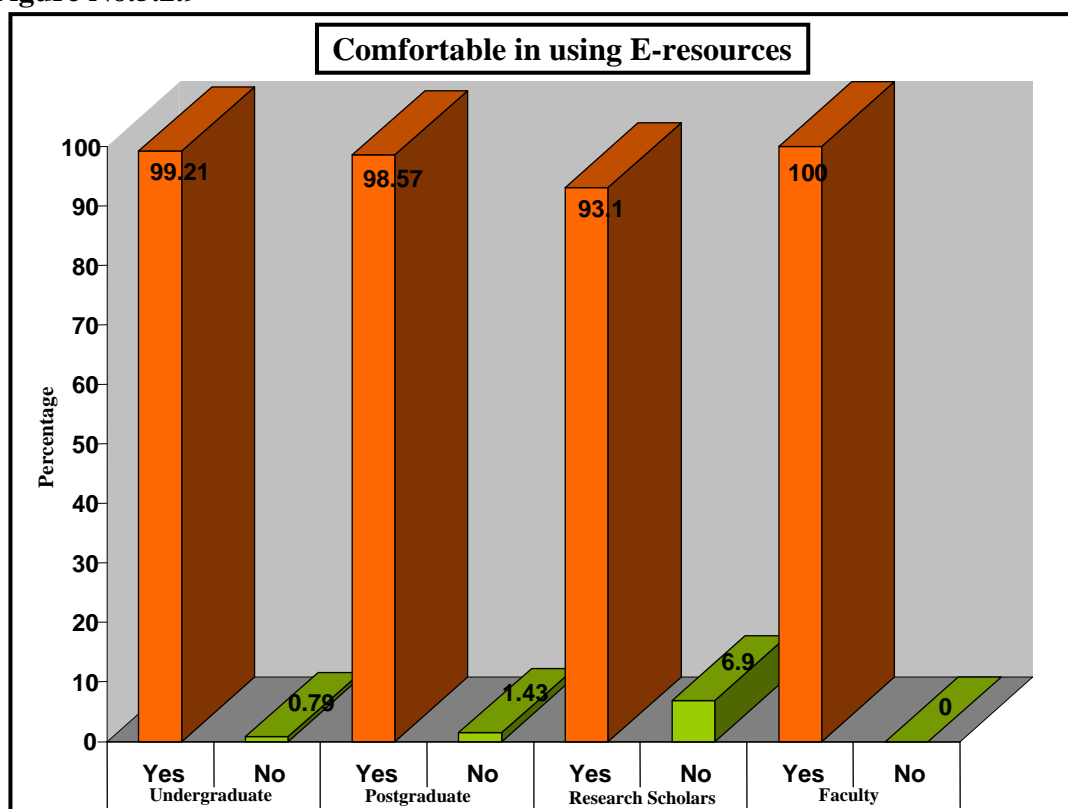


Figure No.5.2.9 shows that 375 (99.21%) undergraduates, 138(98.51%) postgraduates, 54(93.10%) research scholars and 100% faculty responded positive that they were quite satisfied with electronic information. The data indicates that out of 623 respondents of the institute, 614(98.56%) responded in affirmative and 9 (1.44%) responded in negative. Table No.5.2.9 shows that the value of  $\chi^2$  is 13.923 and the degrees of freedom (df) is 3.

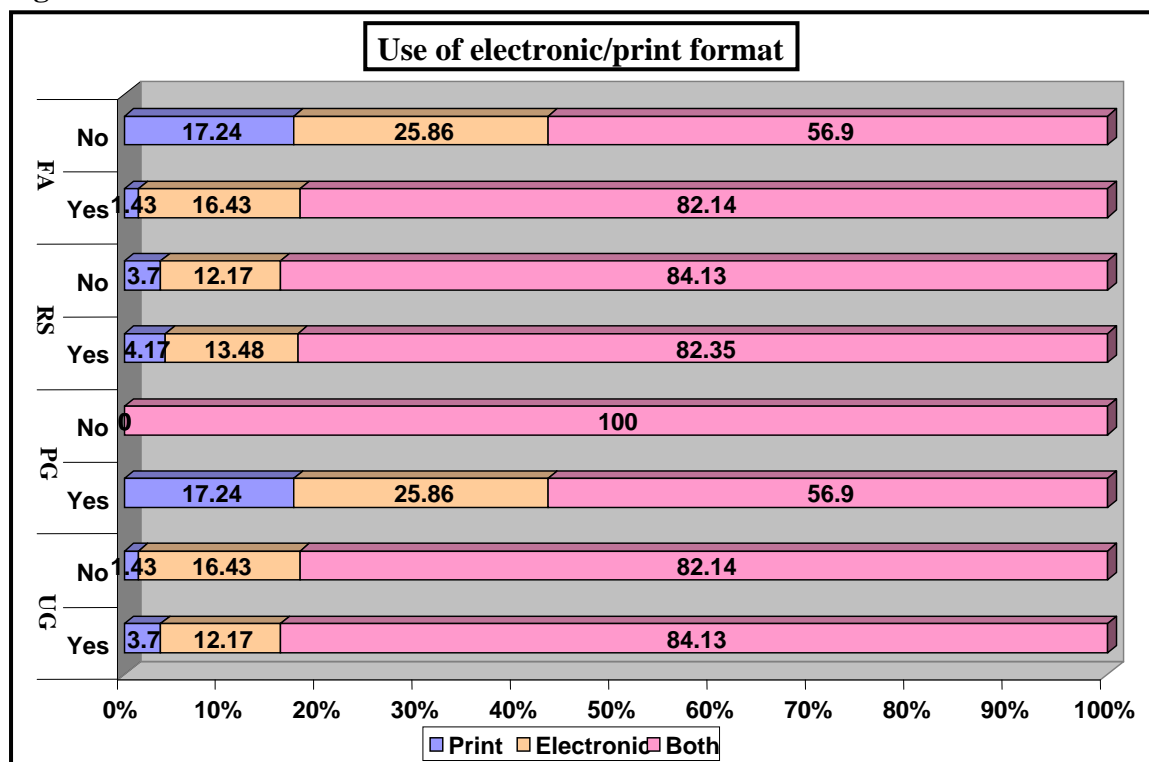
The value of p shows statistically significant ( $p \leq 0.01$ ). The Chi-Square test for independence is significant at 1 per cent level of significance. This implies that there is a significant variation among the users as far as their comfort with electronic information is concerned.

**Table No. 5.2.10 Use of electronic/print format**

Document you prefer to use	UG N (%)	PG N (%)	RS N (%)	FA N (%)	Total N (%)	Chi <sup>2</sup> (df;C)
Print	14 (3.70)	2 (1.43)	10 (17.24)	-	26(4.14)	49.223**(6;0.271)
Electronic	46 (12.17)	23 (16.43)	15 (25.86)	-	84(13.48)	
Both	318 (84.13)	115 (82.14)	33 (56.90)	47 (100)	513(82.34)	
Total	378(100)	140(100)	58(100)	47(100)	623(100)	

\*\*Significant at 0.01 level

**Figure No.5.2.10**



The library provides information to its users in printed as well as in electronic format. The users are using both the formats. They were asked which format they prefer to use. Figure No.5.2.10 shows that undergraduates 14(3.70%), postgraduates 2(1.43%) and research

scholars 10(17.24%) preferred to use printed document, where as faculty's response was negative. The electronic format is used by undergraduates 46(12.17%), postgraduates 23(16.43%) and research scholars 15(25.86%), while faculty do not make use of it.

The response shows that 318(84.13%) undergraduates, 115(82.14%) postgraduates, 33(56.90%) research scholars and 47(100%) faculty preferred to use the document in both the format.

The results reveal that from total of 26(4.17%) users preferred printed document, 84(13.48%) preferred electronic document and 513(82.14%) of them preferred both the formats. Table No. 5.2.10 shows that the value of  $\chi^2$  is 49.223 and the degrees of freedom (df) is 3. The value of p shows statistically significant ( $p \leq 0.01$ ). The Chi-Square test for independence is significant at 1 per cent level of significance. This implies that there is a significant variation among the users as far as the preference for using the documents in print, electronics or in both the formats is concerned.

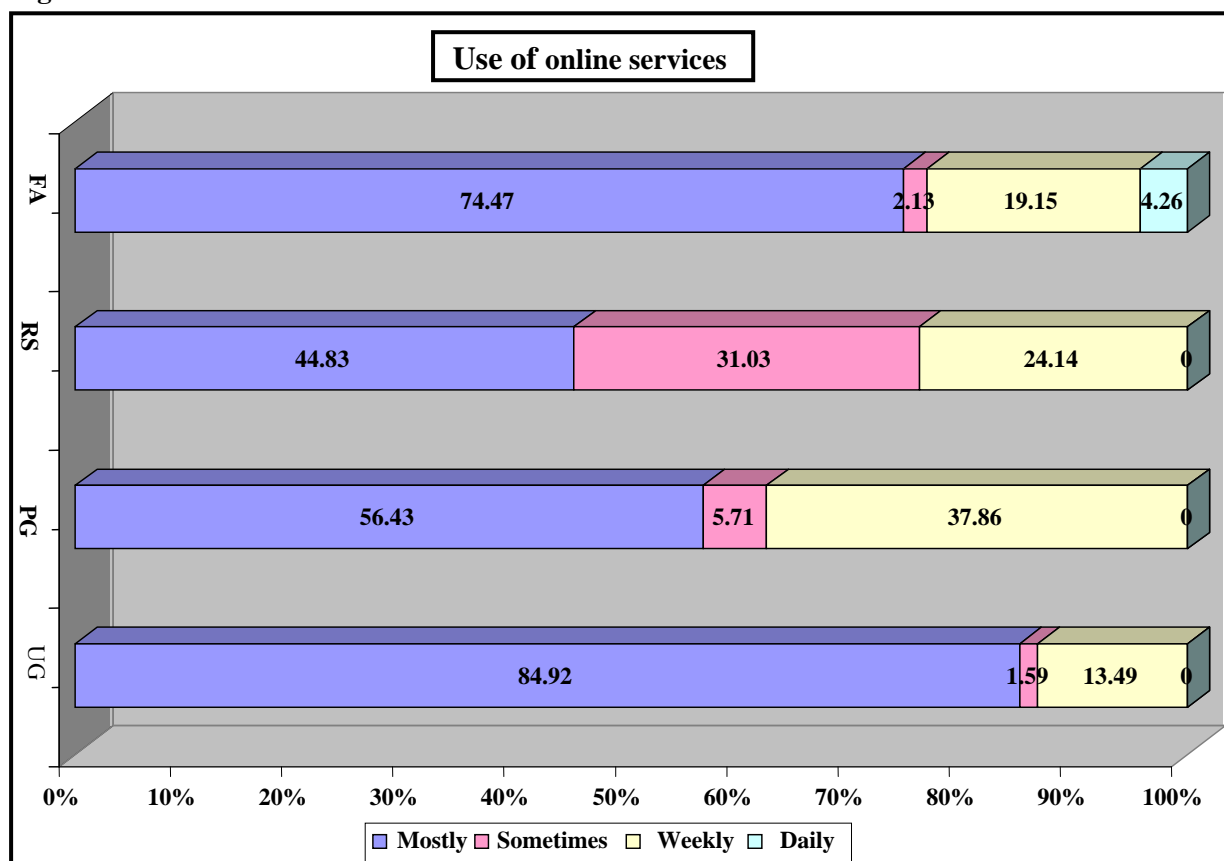
]

**Table No.5.2.11 Use of online services**

Using online services	UG N (%)	PG N (%)	RS N (%)	FA N (%)	Total N (%)	Chi <sup>2</sup> (df;C)
Mostly	321( 84.92)	79 ( 56.43)	26 (44.83)	35 ( 74.47)	461(74.00)	156.619** (9 ;0.448)
Sometimes	6 (1.59)	8 (5.71)	18 (31.03)	1 ( 2.13)	33 (5.30)	
Weekly	51 (13.49)	53 (37.86)	14 (24.14)	9 (19.15)	127(20.39)	
Daily	-	-	-	2 (4.26)	2 (0.32)	
Total	378 (100)	140(100)	58(100)	47(100)	623 (100)	

\*\*Significant at 0.01 level

Figure No.5.2.11



The library has provided on-line services so that users can use for search and getting the information. From Figure No.5.2.11 it has been found that 321 (84.92%) undergraduate users, 79 (56.43%) postgraduates, (44.83%) research scholars, and 35 (74.47%) faculty use online services mostly.

On-line services were used sometimes by 6(1.59%) undergraduates, 8(5.71%) postgraduates, 18(31.03%) research scholars, and 1(2.13%) faculty. The users using online service weekly were 51(13.49%) undergraduates, 53(37.86%) postgraduates, 14(24.14%) research scholars, and 9(19.15%) faculty. The daily online services were used by 2(4.26%) faculty while undergraduates, postgraduates and research scholars did not respond. The data indicates that maximum users 461(74%) were using online service mostly.

Table No. 5.2.11 shows that the value of  $\chi^2$  is 156.619 and the degrees of freedom (df) is 3. The value of p shows statistically significant ( $p \leq 0.01$ ). For users the Chi -Square test for independence is significant at 1 per cent level of significance. This implies that there is a significant variation among the users as far as the frequency of using on line services is concerned.

**Table No. 5.2.12 Frequency of using E- journals**

Frequency Of using E-journals	UG N (%)	PG N (%)	RS N (%)	FA N (%)	Total N (%)	Chi <sup>2</sup> (df;C)
Daily	-	-	4(6.90)	8 (17.78)	12 ( 4.78)	85.003** (9;0.503) NA: 372(59.71%)
2/3 Week	-	57 (43.85)	36(62.07)	30(66.67)	123(49.0)	
Once a week	-	36 (62.07)	10(17.24)	4 (8.89)	32(12.75)	
Occasionally	18 (100)	30(66.67)	08(13.79)	3 (6.67)	84 (53.47)	
Total	18(100)	130(100)	58(100)	45(100)	251(100)	

\*\*Significant at 0.01 level

**Figure No.5.2.12**

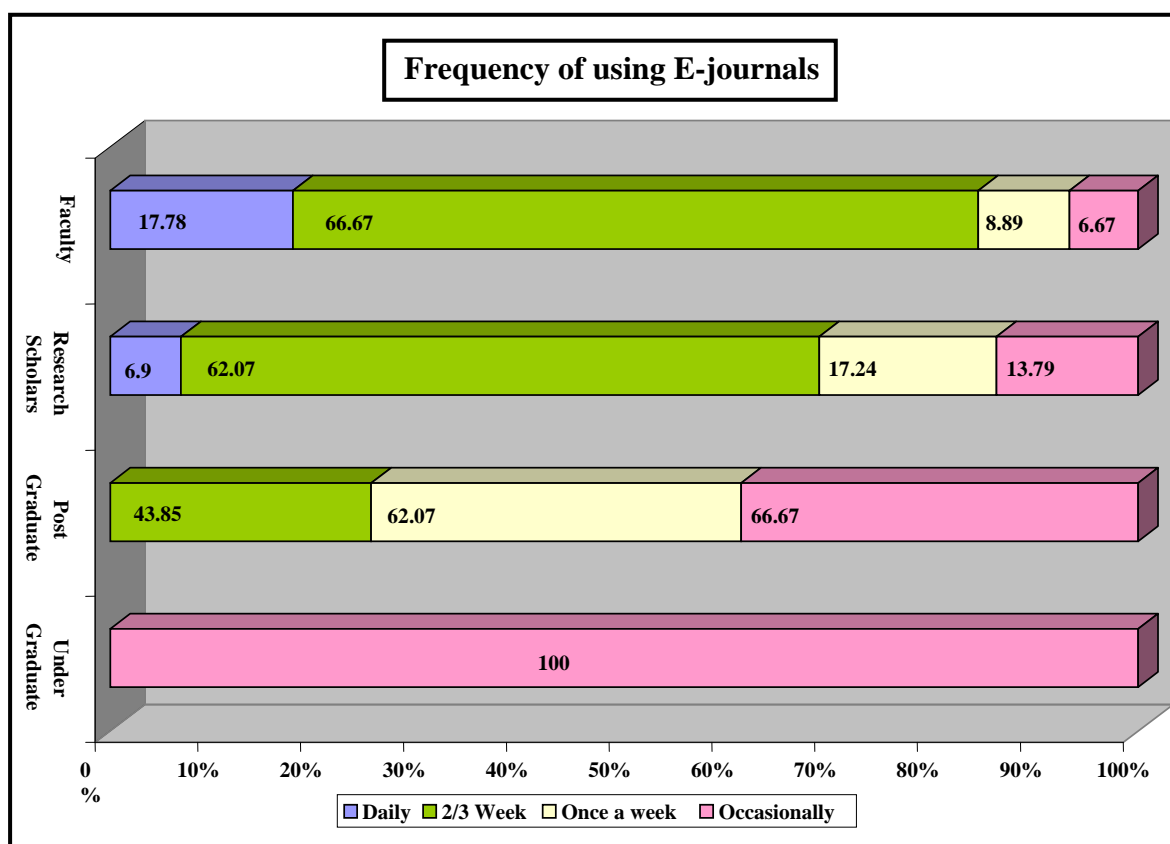


Figure No.5.2.12 shows that e-journals were used daily by 8(17.78%) faculty and 4(6.90%) research scholars while undergraduates and postgraduates do not use it. E-journal were used 2/3 times a week by 57(43.85%) postgraduates,36(62.07%) research scholars and 30(66.67%) faculty members. The response for once a week shows that 36 (62.07%) postgraduates, 10(17.24%) research scholars and 4(8.89%) faculty members. E-journals are used occasionally by 18 (100%) undergraduates and 30(66.67%) postgraduate where as 8(13.79%) research scholars and 3(6.67%) faculty members.

The Table No.5.2.12 indicates that from 623 total respondents, 372 did not respond. From 251 users, 12(4.78%) were using e-journals daily, 123(40.90%) 2/3 times a week, 32 (12.75%) once a week and 48 (53.47%) response for occasionally. Thus Chi-Square for independence is significant at 1 per cent level of significance. The value of  $\chi^2$  is 85.003 and the degrees of freedom (df) is 3. The value of p shows statistically significant ( $p \leq 0.01$ ). This implies that there is a significant variation among the users using e-journals. Thus maximum users were using e-journals occasionally and 2/3 times a week.

**Table No. 5.2.13 Frequency of using CD - ROM**

Use of CD-Rom	UG N (%)	PG N (%)	RS N (%)	FA N (%)	Total N (%)	Chi <sup>2</sup> (df;C)
Daily	-	12 (8.57)	-	-	-	184.775** (6;0.511) NA 101 (16.21%)
2/3 Week	2 (0.72)	-	12(20.69)	21(46.67)	47(9.09)	
Once a week	3 (1.08)	18(12.86)	17 (29.31)	9 (20.00)	47(9.00)	
Occasionally	274(98.21)	110(78.57)	29 (50.0)	15 (33.33)	428(81.99)	
Total	279(100)	140(100)	58(100)	45(100)	522(100)	

\*\*Significant at 0.01 level

**Figure No.5.2.13**

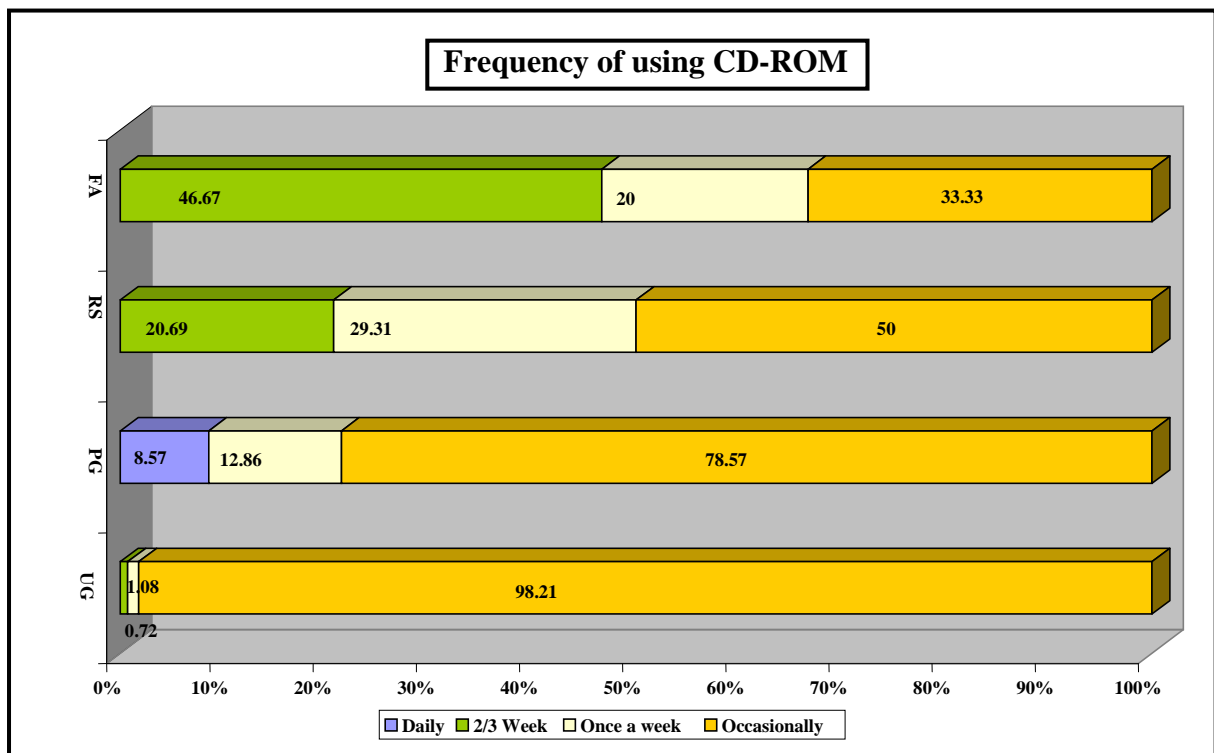


Figure No. 5.2.13 shows the frequency of using CD-ROM by users daily is 12(8.57%) postgraduates, where as other users do not use. The CD-ROM is used 2/3 times a week by 2(0.72%) undergraduates, 12(20.69%) research scholars and 21(46.67%) faculty. Frequency for using CD-ROM once a week by 3(1.08%) undergraduates, 18(12.86%) postgraduates ,17(29.31%) research scholars and 9(20%) faculty members, It has been found that CD-ROM is maximum used occasionally by all the respondents i.e. 274(98.21%) undergraduates,110(78.57%) postgraduates, 29(50%) research scholars and 15(33.33%) faculty.

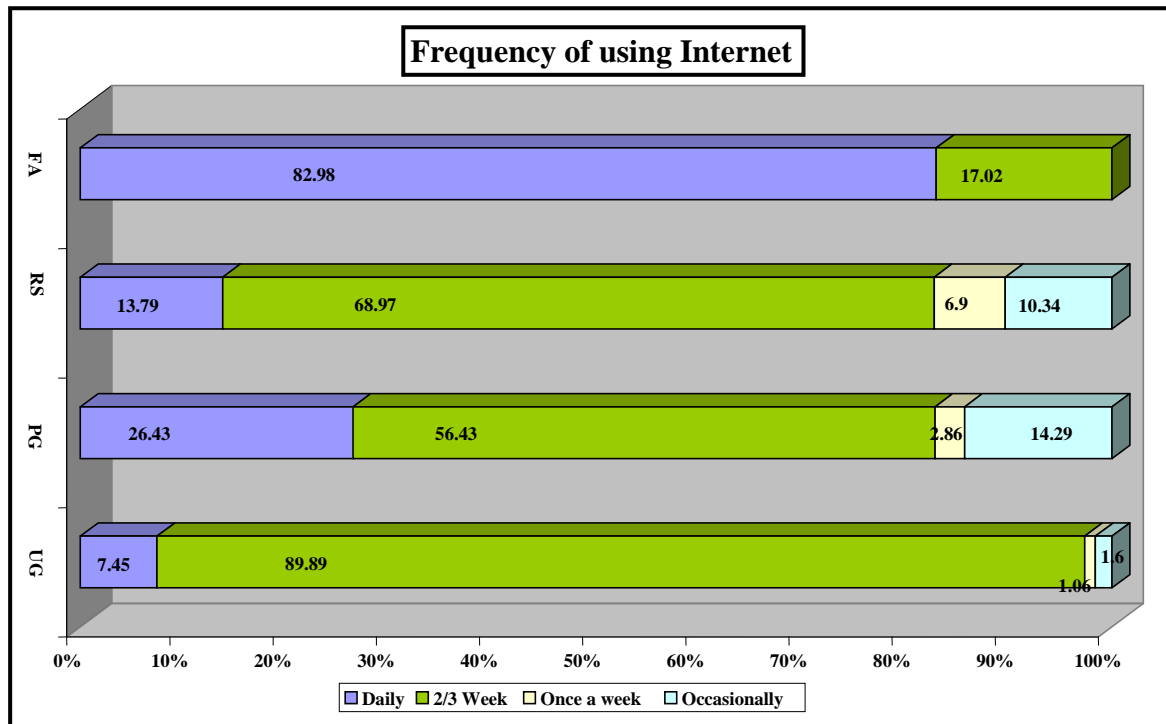
The Table No.5.2.13 shows that from 623 respondents, 101(16.21%) did not respond. From 522 users, 47(9.09%) users used CD-ROM for 2/3 times a week, 47(9.09%) once a week and 428(81.99%) occasionally. The value of  $\chi^2$  is 184.775 and the degrees of freedom (df) is 3. The value of p shows statistically significant ( $p \leq 0.01$ ).The Chi-Square for independence is significant at 1 per cent level of significance .This implies that there is variation among users using CD-ROM. Thus maximum members of users use CD-ROM occasionally.

**Table No. 5.2.14 Frequency of using Internet**

Use of Internet	UG N (%)	PG N (%)	RS N (%)	FA N (%)	Total N (%)	Chi <sup>2</sup> (df;C)
Daily	28 (7.45)	37 (26.43)	8 ( 13.79)	39(82.98)	112 (18.04)	226.042** (9;0.517) NA 2(0.32%)
2/3 Week	238 (89.89)	79 (56.43)	40 ( 68.97)	8 (17.02)	465 (74.88)	
Once a week	4 (1.06)	4 (2.86)	4(6.90)	-	12 ( 1.93)	
Occasionally	6 (1.60)	20( 14.29)	6 10.34)	-	32(5.15)	
Total	376(100)	140(100)	58(100)	47(100)	621(100)	

\*\*Significant at 0.01 level

Figure No.5.2.14



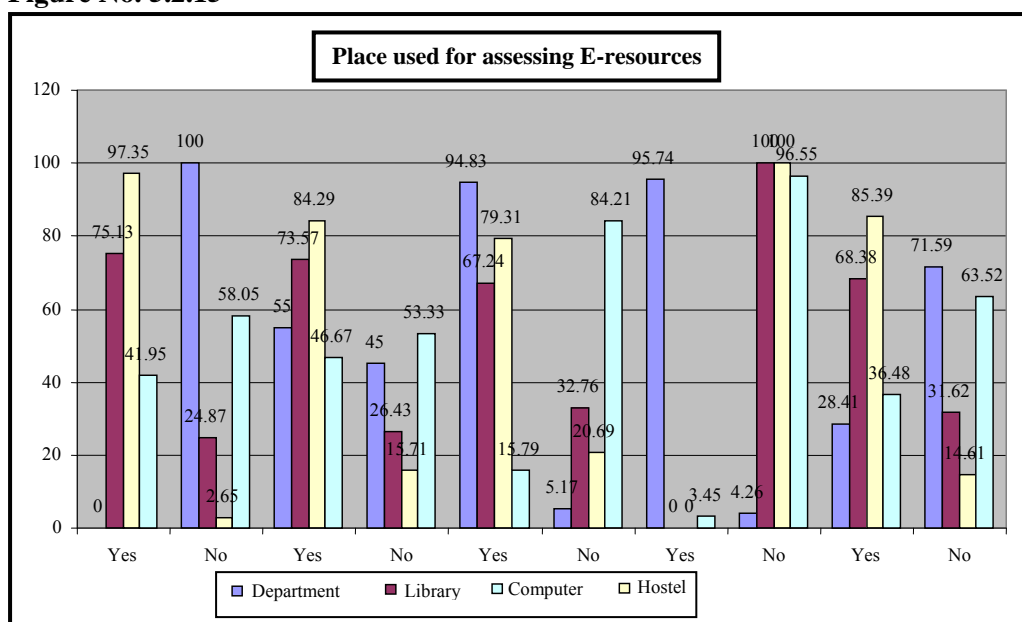
The Figure No.5.2.14 shows that users are using internet maximum for 2/3 times a week. The internet services are used daily by 28(7.45%) undergraduates, 37(26.43%) postgraduates, 8 (13.79%) research scholars and 39(82.98%) faculty members. The frequency of using internet for 2/3 times a week by 234(89.89%) undergraduates, 79(56.43%) postgraduates, 40 (68.97%) research scholars and 8(17.02%) faculty. It has been found that faculty do not use internet once a week or occasionally. The internet is used once a week by undergraduates 4(1.06%), postgraduates 4(2.86%) and research scholars 4(6.90%).The response for using internet occasionally is by 6(1.60%) undergraduates, 20(14.29%) postgraduates and 6(10.34%) research scholars.

The Table No. 5.2.14 shows the Chi-Square test for independence is significant at 1 per cent level of significance. The value of  $\chi^2$  is 226.042 and the degrees of freedom (df) is 9. The value of p shows statistically significant ( $p \leq 0.01$ ). This implies that there is a significant variation among the users using e-journals. Thus maximum users were using internet 2/3 times a week.

**Table No. 5.2.15 Place used for accessing E-resources**

Places	UG N (%)		PG N (%)		RS N (%)		Faculty N (%)		Total N (%)	
	Yes	No	Yes	No	Yes	No	Yes	No	Yes	No
Department	-	378 (100)	77 (55.0)	63 (45.0)	55 (94.83)	3 (5.17)	45 (95.74)	2 (4.26)	177 (28.41)	446 (71.59)
Library	284 (75.13)	94 (24.87)	103 (73.57)	37 (26.43)	39 (67.24)	19 (32.76)	-	47 (100)	426 (68.38)	197 (31.62)
Hostel	368 (97.35)	10 (2.65)	118 (84.29)	22 (15.71)	46 (79.31)	12 (20.69)	-	47 (100)	532 (85.39)	91 (14.61)
Computer center	159 (41.95)	220 (58.05)	119 (46.67)	136 (53.33)	21 (15.79)	112 (84.21)	2 (3.45)	56 (96.55)	301 (36.48)	524 (63.52)

**Figure No. 5.2.15**



As internet and intranet networks are available in the institutes, all the services provided through e-resources are accessible at various places; therefore, it is important to know which place is used most this purpose. From the Table & Figure No.5.2.15 it has been derived that undergraduate users do not access the e-resources from the department. 77(55%) postgraduates, 55 (94.83%) research scholars and 45 (95.75%) faculty use the departments for accessing the e-resources. The results show that faculty and research scholars use the departments as place for accessing the E-resource more as compared to undergraduates and postgraduates. The library is used by 284 (75.13%) undergraduates, 103 (75.57%) postgraduates and 39 (67.24%) research scholars as a place for accessing

the E-resources. The hostels are used by 368 (97.35%) undergraduates, 118 (84.29%) postgraduates, and 46 (79.31%) research scholars. The computer centre was used by 160 (42.33%) undergraduates, 43 (30.71%) postgraduates and 7 (12.07%) research scholars, while faculty did not make use of this place at all. Thus the data shows that departments are used more by faculty while library, hostel and computer centre are used more by undergraduates, postgraduates, and research scholars. The results from total user's data shows that hostels are used by 532 (85.39%), library by 426 (68.38%), the use of department is by 177 (28.41%) and computer centre by 210 (33.71%) of users.

**Table No. 5.2.16 Purpose of using E- resources**

Purpose	UG N (%)		PG N (%)		RS N (%)		Faculty N (%)		Total N (%)	
	Yes	No	Yes	No	Yes	No	Yes	No	Yes	No
Writing Paper	-	378 (100)	114 (81.43)	26 (18.57)	15 (25.86)	43 (74.14)	29 (61.70)	18 (38.30)	158 (25.36)	465 (74.64)
Seminars	81 (21.43)	297 (78.57)	125 (89.29)	15 (10.71)	54 (93.10)	4 (6.90)	43 (91.49)	4 (8.51)	303 (48.64)	320 (51.36)
Academic work	361 (95.50)	17 (4.50)	59 (42.14)	81 (57.86)	35 (60.34)	23 (39.66)	45 (95.74)	2 (4.26)	500 (80.26)	123 (19.74)
Projects	83 (21.96)	295 (78.04)	32 (22.86)	108 (77.14)	8 (13.79)	50 (86.21)	36 (76.60)	11 (23.40)	159 (25.52)	464 (74.48)
Research work	2 (0.53)	376 (99.47)	5 (3.57)	135 (96.43)	56 (96.55)	2 (3.45)	44 (93.62)	3 (6.38)	107 (17.17)	516 (82.83)

**Figure No.5.2.16**

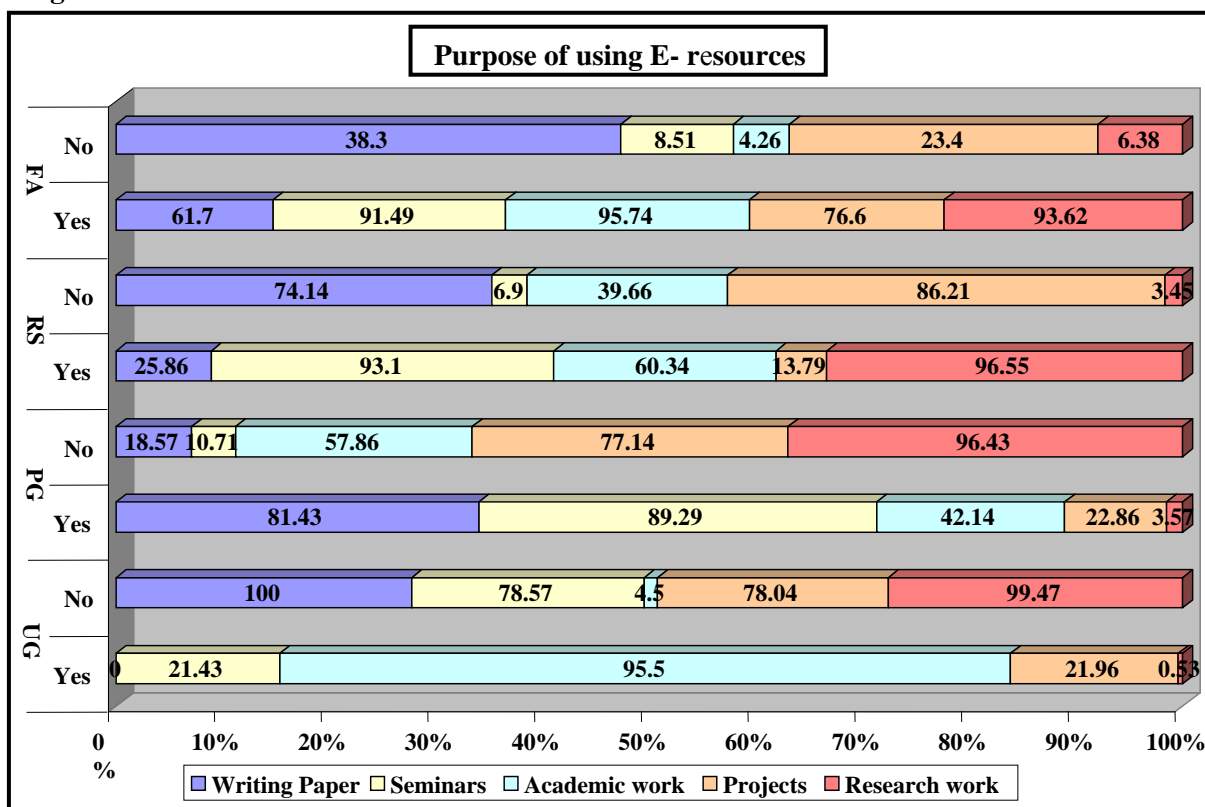


Table & Figure No.5.2.16 shows the percentage of users using e-resources for writing papers, seminars, academic work, project and research work. It has been found that undergraduates do not use e-resources for writing papers. Postgraduates 114 (81.43%) and faculty 29 (61.70%) make use of e-resources more for writing papers as compared to research scholars 15 (25.86%).

For seminars, postgraduates 125 (89.29%), research scholars 54 (93.10%) and faculty 43 (91.49%) use e-resources more as compared to undergraduates 81 (21.43%).

The e-resources were used for academic work by 361 (95.50%) undergraduates, 59 (42.14%) postgraduates, 35 (60.34%) research scholars and 45 (95.74%) faculty. The undergraduates and faculty use e-resources for academic work more as compared to postgraduates and research scholars. For projects 36 (95.74%) faculty use e-resources more as compared to other users.

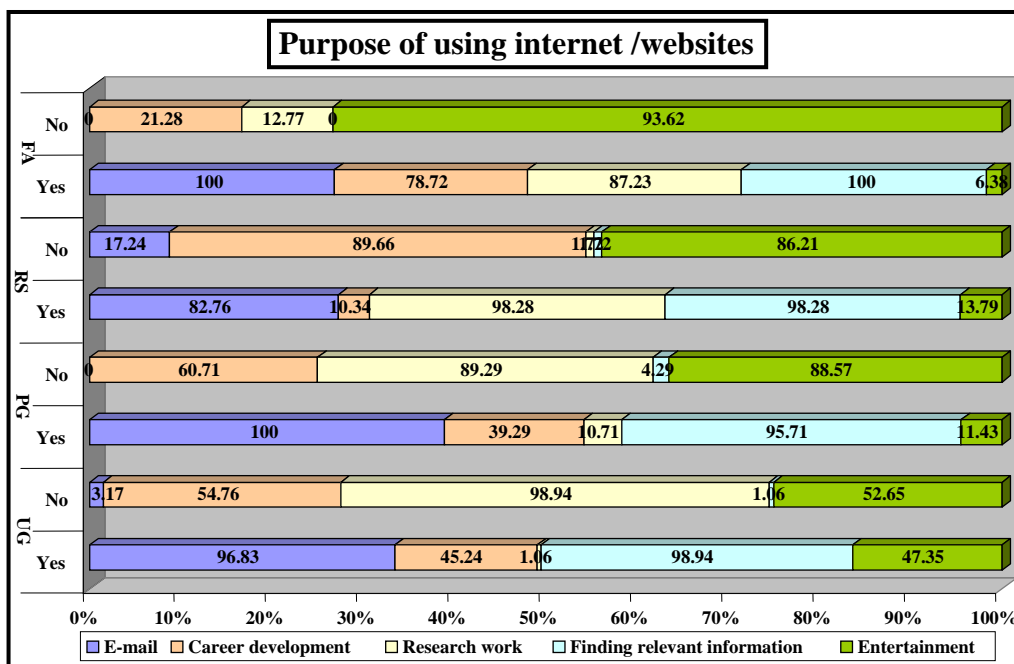
While e-resources for research work were used more by 56 research scholars i.e. 96.55% and 44 faculty members i.e., 93.62% as compared to 2(0.530%) undergraduates and 5(3.57%) postgraduates.

The total users response shows that e-resources were used more 500 (80.26%) for academic work and seminars 303 (48.64%) as compared to other purposes. Figure No. 5.2.16 also highlights the response of respondents belonging to different categories.

**Table No. 5.2.17 Purpose of using internet /websites**

Purpose	UG N (%)		PG N (%)		RS N (%)		Faculty N (%)		Total N (%)	
	Yes	No	Yes	No	Yes	No	Yes	No	Yes	No
E-mail	366 (96.83)	12 (3.17)	140 (100)	-	48 (82.76)	10 (17.24)	47 (100)	-	601 (96.47)	22 (3.53)
Career development	171 (45.24)	207 (54.76)	55 (39.29)	85 (60.71)	6 (10.34)	52 (89.66)	37 (78.72)	10 (21.28)	269 (43.18)	354 (56.82)
Research work	4 (1.06)	374 (98.94)	15 (10.71)	125 (89.29)	57 (98.28)	1 (1.72)	41 (87.23)	6 (12.77)	117 (18.78)	506 (81.22)
Finding relevant information	374 (98.94)	4 (1.06)	134 (95.71)	6 (4.29)	57 (98.28)	1 (1.72)	47 (100)	-	612 (98.23)	417 (66.93)
Entertainment	179 (47.35)	199 (52.65)	16 (11.43)	124 (88.57)	8 (13.79)	50 (86.21)	3 (6.38)	44 (93.62)	206 (33.07)	417 (66.93)

Figure No.5.2.17



The users are making use of internet and its websites for getting information. The other purposes of using the internet and websites are e-mail, career development research work, finding relevant information and entertainment. From the Figure No.5.2.17 it has been found out that internet/websites were used more for the purpose of e-mails by undergraduates 366(96.83%), postgraduates 140(100%), research scholars 48(82.76%) and faculty 407(100%). Use of internet/websites for career development is by 171(45.24%) undergraduates, 55(39.29%) postgraduates, (10.34%) research scholars and 41(87.23%) faculty members. For finding relevant information 374(98.94%) undergraduates, 134(95.71) postgraduates, 57(98.28%) research scholars and 47 (100%) faculty used the internet websites. For entertainment, 179(47.35%) undergraduates users, 16 (11.43) postgraduates, 8(13.79%) research scholars, and 3(6.38%) faculty used the internet website.

The results show that faculty and research scholars used more internet /website for e-mail, career development, research work and finding relevant information. The undergraduates and postgraduates used internet/website more for e-mail, and finding relevant information as compared to other purposes.

From Table No.5.2.17 the total users' data reveals that internet/websites are used more by 601(96.47%) users for e-mail and 612(98.23%) users for finding/tracing relevant information as compared to other purposes.

**Table No. 5.2.18**

**Source used for seeking information**

Information form	UG N (%)		PG N (%)		RS N (%)		Faculty N (%)		Total N (%)	
	Yes	No	Yes	No	Yes	No	Yes	No	Yes	No
Current E-resources	17 (4.50)	361 (95.50)	109 (77.86)	31 (22.14)	55 (94.83)	3 (5.17)	47 (100)	-	228 (36.60)	395 (63.40)
Back Vol. of E-resources	4 (1.06)	374 (98.94)	9 (6.43)	131 (93.57)	22 (37.93)	36 (62.07)	39 (82.98)	8 (17.02)	74 (11.88)	549 (88.12)
On-Line Data bases	101 (26.72)	277 (73.28)	109 (77.86)	31 (22.14)	36 (62.07)	22 (37.93)	44 (93.62)	3 (6.38)	290 (46.55)	333 (53.45)
Video Cassettes	-	378 (100)	-	140 (100)	-	58 (100)	3 (6.38)	44 (93.62)	3 (0.48)	620 (99.52)
Inter net Website	378 (100)	-	126 (90.0)	14 (10.0)	55 (94.83)	3 (5.17)	43 (91.49)	4 (8.51)	602 (96.63)	21 (3.37)
CD-ROM	135 (35.71)	243 (64.29)	17 (12.14)	123 (87.86)	27 (46.55)	31 (53.45)	18 (38.30)	29 (61.70)	197 (31.62)	426 (68.38)
E-Books	-	378 (100)	-	140 (100)	3 (5.17)	55 (94.83)	2 (4.26)	45 (95.74)	5 (0.80)	618 (99.20)
On-line Catalogue	368 (97.35)	10 (2.65)	138 (98.57)	2 (1.43)	57 (98.28)	1 (1.72)	43 (91.49)	4 (8.51)	606 (97.27)	17 (2.73)

**Figure No. 5.2.18**

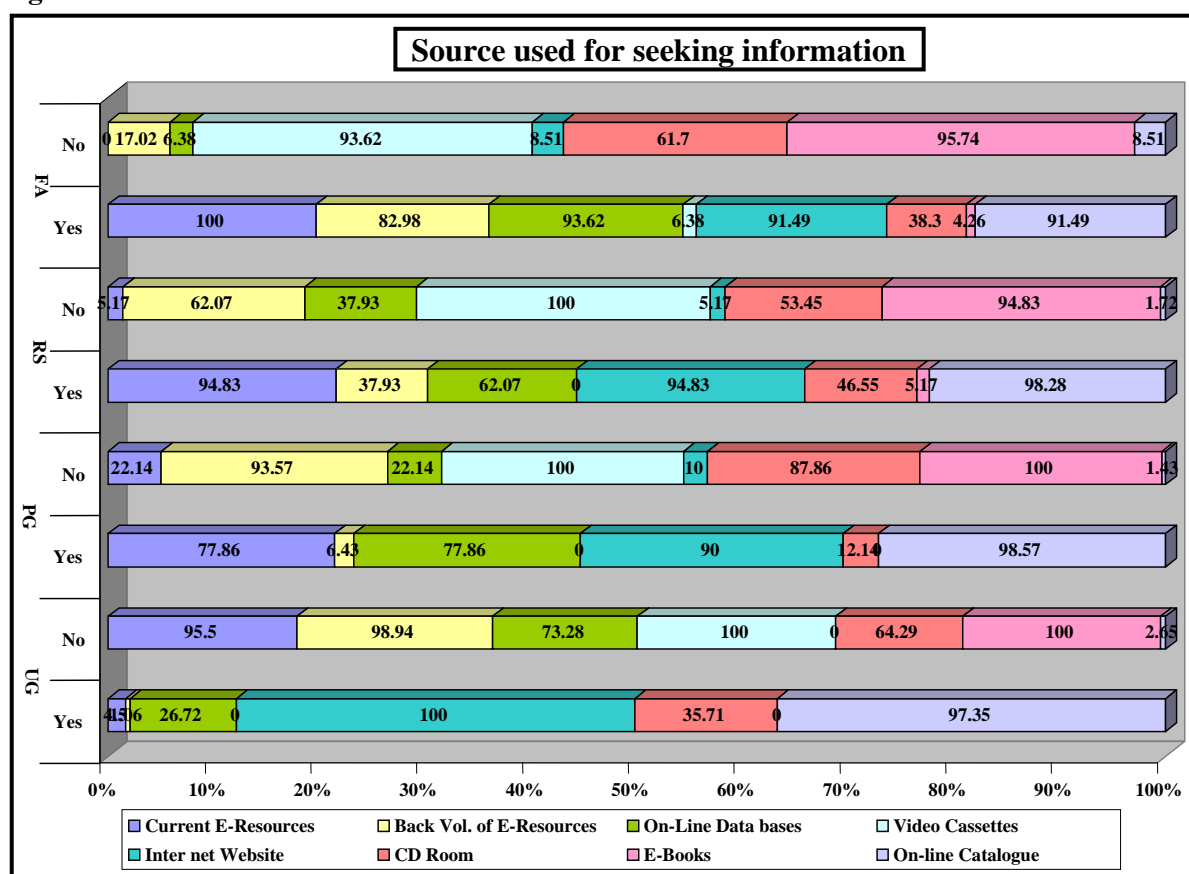


Table & Figure No.5.2.18 shows the percentage of users using various e-resources provided by their library. They are seeking information from current e-journals, back

volumes of e-journals, on-line data bases, video cassettes, internet web-sites, CD-ROM, e-books, and on-line catalogues. It has been found from the data that the **current e-journals** that were used by faculty 47 (100%), research scholars 55 (94.83%) and postgraduates 109 (77.86%) was more as compared to undergraduates which is 17 (4.50%).

39 (82.98%) faculty and 22 (37.93%) research scholars were using **back volumes of e-journals** as compared to 4 (1.06%) undergraduates and 9 (6.43%) postgraduates.

The **on-line data bases** were used by 44 (93.62%) faculty, 36 (62.07%) research scholars, and 109 (7.86%) postgraduates more as compared to 101 (26.72%) undergraduates only.

The use of **video cassettes** was very less. Undergraduates, postgraduates and research scholars did not respond in positive while merely faculty 3 (6.38%) answered positively.

The internet websites were used by 378 (100%) undergraduates 43 (91.49%), faculty 126 (90%), postgraduates and 55 (94.93%) research scholars. The **CD-ROM** was used by 135 (35.71%), undergraduates 27 (46.55%), 111 by research scholars and 18 (38.30%) faculty more as compared to 17 (12.14%) postgraduates.

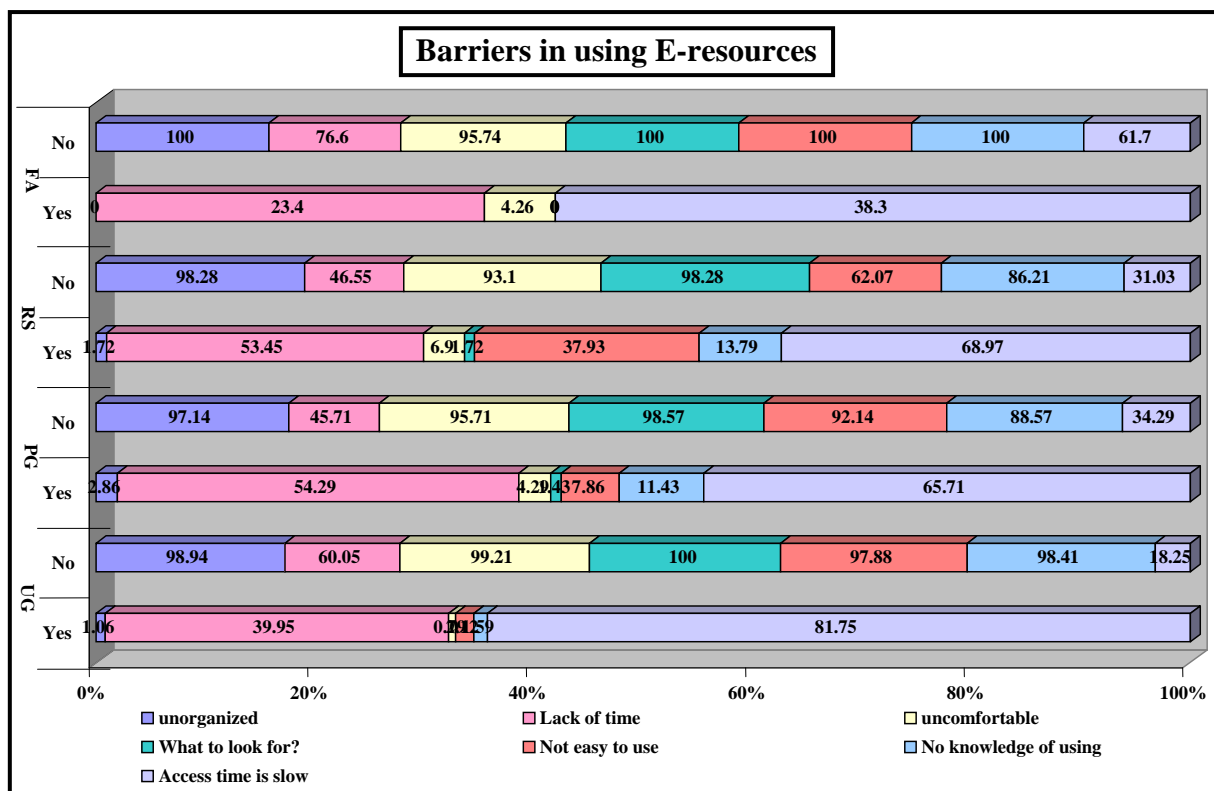
**E-books** are very less used by the entire users i.e. faculty 2 (4.26%) and research scholars 3 (5.17%), while undergraduates and postgraduates did not respond. The **OPAC** is used by undergraduates 368 (97.35%), postgraduates 138 (98.57%), research scholars 57 (98.28%) and faculty 43 (91.49%).

The results indicates that from the total users internet website is used by 602 (96.63%) of users and **OPAC** was used by 606 (97.27%) which is more as compared to other resources.

**Table No. 5.2.19 Barriers in using E-resources**

Barriers in using E-Resources	UG N (%)		PG N (%)		RS N (%)		Faculty N (%)		Total N (%)	
	Yes	No	Yes	No	Yes	No	Yes	No	Yes	No
Unorganized	4 (1.06)	374 (98.94)	4 (2.86)	136 (97.14)	1 (1.72)	57 (98.28)	-	47 (100)	9 (1.44)	614 (98.56)
Lack of time	151 (39.95)	227 (60.05)	76 (54.29)	64 (45.71)	31 (53.45)	27 (46.55)	11 (23.40)	36 (76.60)	269 (43.18)	354 (56.82)
Uncomfortable	3 (0.79)	375 (99.21)	6 (4.29)	134 (95.71)	4 (6.90)	54 (93.10)	2 (4.26)	45 (95.74)	15 (2.41)	608 (97.59)
What to look for?	-	378 (100)	2 (1.43)	138 (98.57)	1 (1.72)	57 (98.28)	-	47 (100)	3 (0.48)	620 (99.52)
Not easy to use	8 (2.12)	370 (97.88)	11 (7.86)	129 (92.14)	22 (37.93)	36 (62.07)	-	47 (100)	41 (6.58)	582 (93.42)
No knowledge of using	6 (1.59)	372 (8.41)	16 (11.43)	124 (88.57)	8 (13.79)	50 (86.21)	-	47 (100)	30 (4.82)	593 (95.18)
Access time is slow	309 (81.75)	69 (18.25)	92 (65.71)	48 (34.29)	40 (68.97)	18 (31.03)	18 (38.30)	29 (61.70)	459 (73.68)	164 (26.32)

Figure No. 5.2.19



The Figure No.5.2.19 shows that users are using e- resources provided by their institute library. The users were asked about the types of barriers they are facing while using the e-resources. From the data it is evident that undergraduates 4 (1.06%), postgraduates 4(2.86%) and research scholars 1(1.72%) feel that information is **unorganized** and the faculty did not share the same view point.

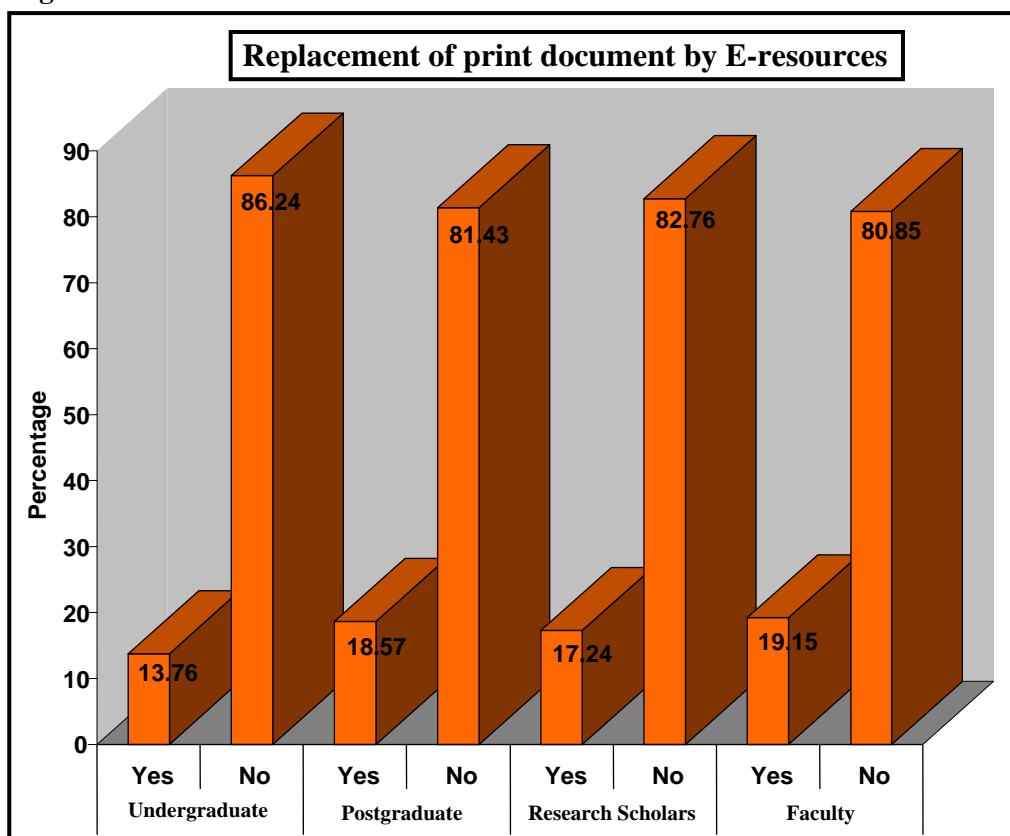
The undergraduates 151 (39.95%), postgraduates (4.29%), research scholars 4 (6.90%) and faculty 2(4.26%) opines that they feel **uncomfortable** while using e-resources. The maximum percentage of users do not feel so, it has been found that users who said that e-resource are **not easy to use** and having **no knowledge to use** were very less in percentage. The undergraduates 309(81.75%), postgraduates 92(65.71), research scholars 40(68.9) and faculty 18 (38.30%) responded in positive that in accessing the information the speed is slow. From the total data of users it has been found that 459(73.68%) of users felt that access **speed is slow** and 269(43.18%) of users felt that due to **lack of time** they can not access the e-resources.

**Table No.5.2.20 Replacement of print document by E-resources**

Respondents	Response		Total	Chi <sup>2</sup> (df;C)
	Yes	No		
Undergraduates	52 (13.76)	326 (86.24)	378(100)	2.486 (3 ;0.063)
Postgraduates	26 (18.57)	114 (81.43)	140(100)	
Research Scholars	10 (17.24)	48 (82.76)	58(100)	
Faculty	9 (19.15)	38 (80.85)	47(100)	
Total	97 (15.57)	526 (84.43)	623(100)	

No significant variation

**Figure No.5.2.20**



The users were asked whether internet/electronic resources can replace print document. The response from Figure No. 5.2.20 shows that 13.76% of undergraduates responded in positive while 326 (86.24%) response was no. 26 (18.57%) postgraduate’s response was yes and 114 (81.43%) response in vice-versa. 10 (17.24%) research scholars said yes and 48 (82.76%) said no. 9 (19.15%) faculty said yes and 38 (80.85%) said no. The results show that maximum numbers of users does not feel that internet/electronic resources can replace print document.

Out of 623 respondents 97(15.57%) of users' answered in affirmative where as 526 (84.43%) in negative. Table No.5.2.20 shows that the value of  $\chi^2$  is 2.486 and the degrees of freedom (df) is 3. The significant Chi-Square test for users' shows there is no significant variation among the users as far as giving their views regarding print document can be replaced by electronic information resources.

### 5.3 Thapar Institute of Engineering and Technology, Patiala: Case study- 3 (Now Thapar University)

**Table No. 5.3.1 Population taken for survey**

Respondents	Total Strength	Questionnaire Distributed	Response Received
Undergraduates	1741	348	348(71.76)
Postgraduates	505	101	90(18.56)
Research Scholars	141	28	20(4.12)
Faculty	119	27	27(5.56)
Total	2506	504	485(100)

**Figure No. 5.3.1**

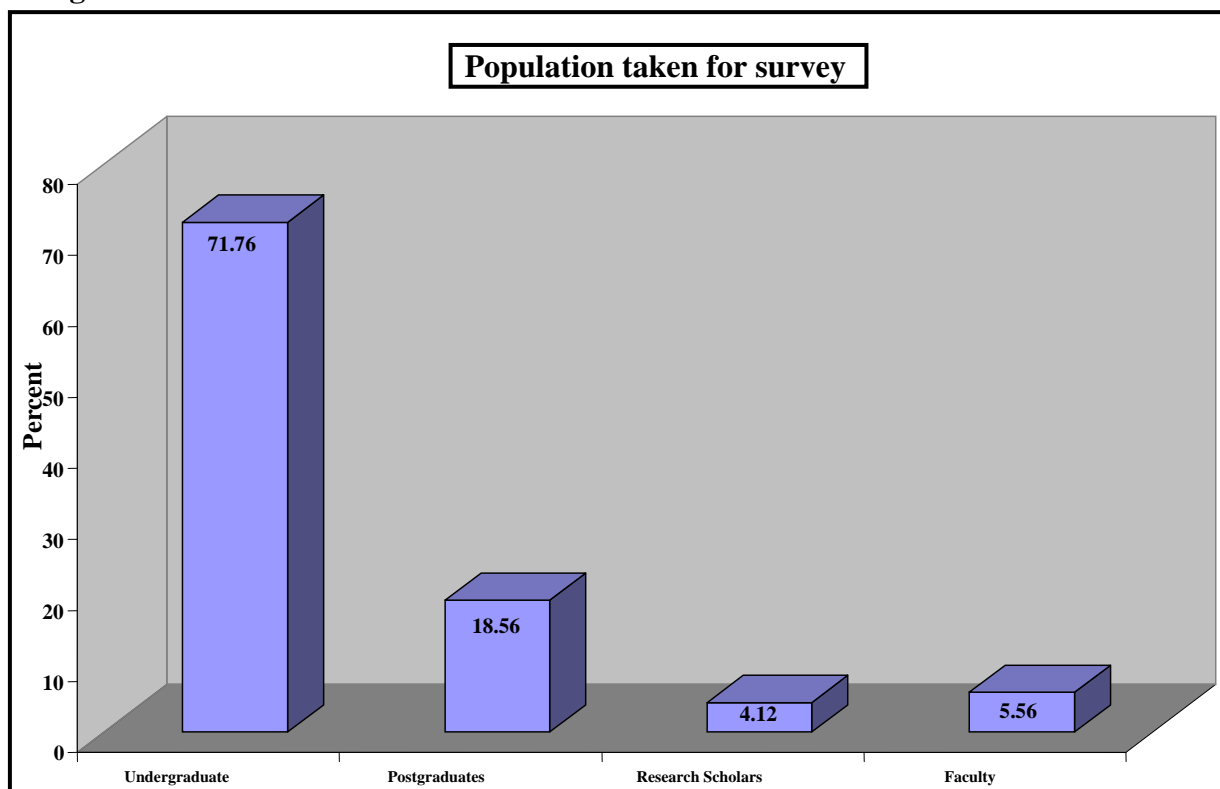


Table No.5.3.1 exhibits that the population from survey investigated was 2506, which included undergraduates, postgraduates, research scholars and faculty. 348 questionnaires were distributed to undergraduates and their response was 100%. The response to the questionnaires distributed to postgraduate was 90 out of 101, followed by 28 research scholars', where response was 20 and that of faculty was 100%. The response received

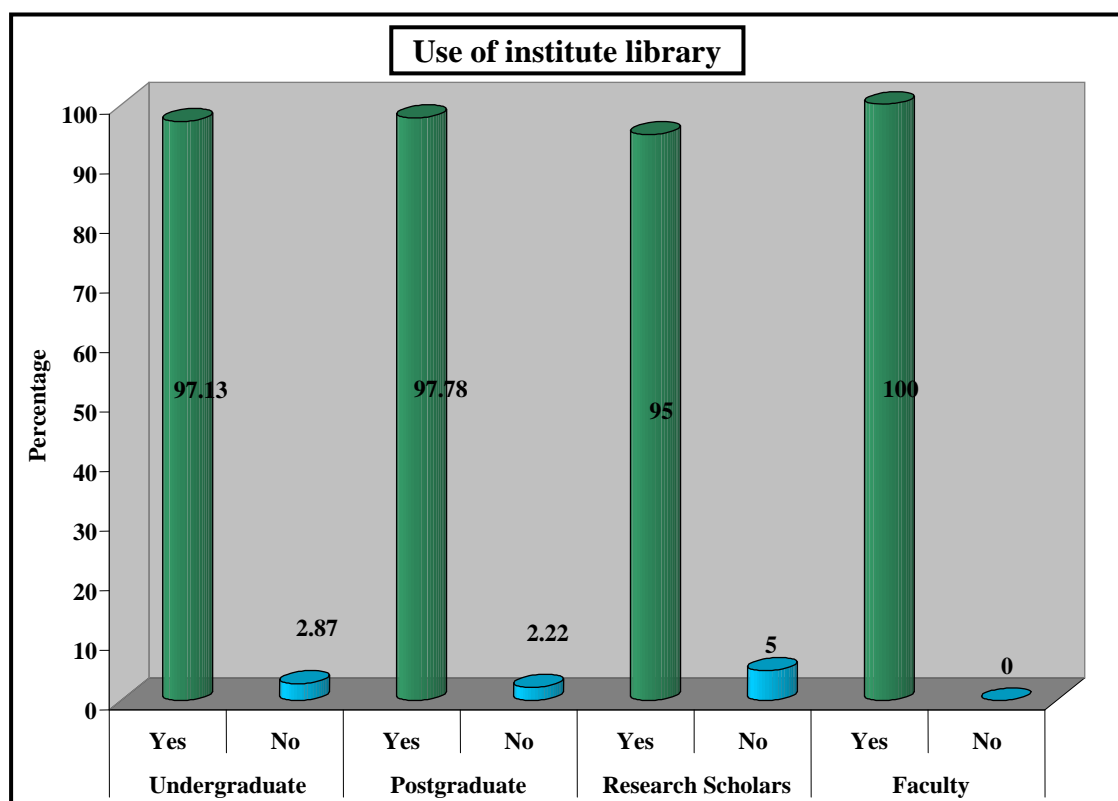
from undergraduates was 348 (71.76%), postgraduates was 90 (18.56%), research scholars was 20 (4.12%) and faculty was 27 (5.56%) as shown in the Figure No.5.3.1

**Table No.5.3.2 Use of institute library**

Respondents	Response		Total N (%)	Chi <sup>2</sup> (df;C)	
	Yes	N (%)			No
Undergraduates	338	(97.13)	10	(2.87)	1.278** (3;0.051)
Postgraduates	88	(97.78)	2	(2.22)	
Research Scholars	19	(95.00)	1	(5.00)	
Faculty	27	(100)	-		
Total	472	(97.32)	13	(2.68)	

\*\*Significant at 0.01

**Figure No. 5.3.2**



The users were asked if they were availing the opportunity of using their institute library. The response as revealed in the Figure No. 5.3.2 shows that 338 (97.13%) undergraduates, answered yes. 88 (97.78%) postgraduates said that they used the library, while 2 (2.22%) responded in negative, 19 (95%) research scholars replied that they use the library while 1(5%) didn't avail the chance. Where as 27 (100%) faculty answered in

positive for making use of the institute library. The result shows that from 485 respondents, 472 (97.32%) were using the library and 13 (2.68%) didn't use it.

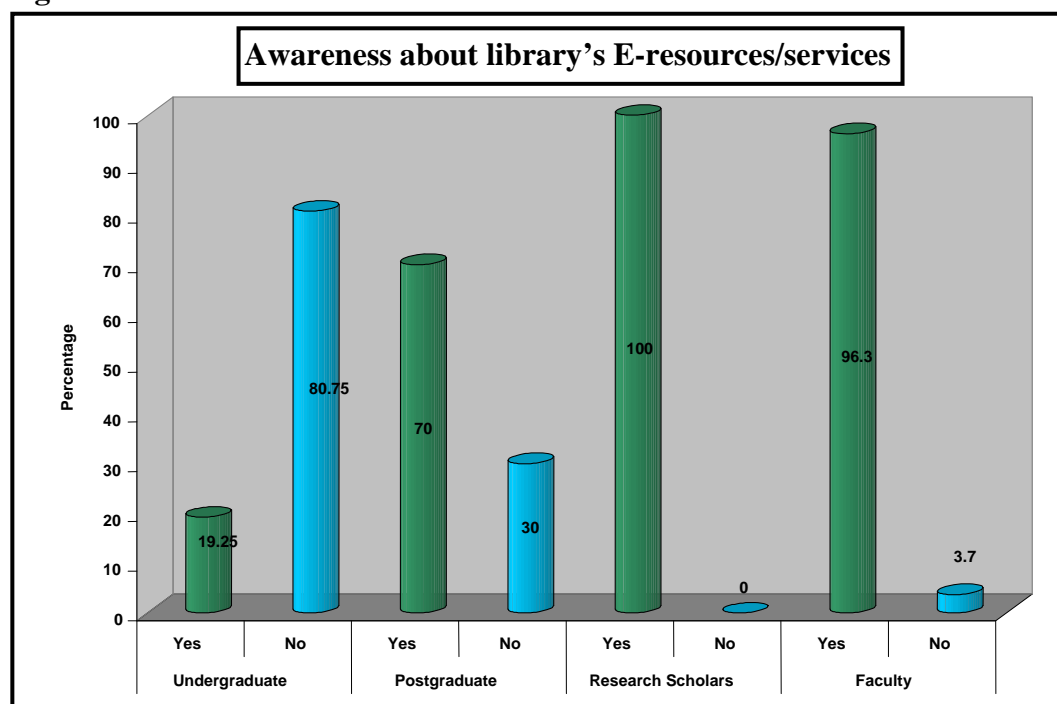
Table No.5.3.2 depicts that for users the Chi-Square test for independence is significant at one percent level of significance. The value of  $\chi^2$  is 1.278 and the degrees of freedom (df) is 3. The value of p shows statistically significant ( $p \leq 0.01$ ). This implies that there is a significant variation among the users as far as the use of the institute library is concerned.

**Table No 5.3.3 Awareness about library's E-resources/services**

Respondents	Response		Total N (%)	Chi <sup>2</sup> (df;C)
	Yes	No		
Undergraduates	67 (19.25)	281 (80.75)	348 (100)	165.088** (3 ;0.504)
Postgraduates	63 (70.00)	27 (30.00)	90 (100)	
Research Scholars	20 (100)	-	20 (100)	
Faculty	26 (96.30)	1 (3.70)	27 (100)	
Total	176 (36.29)	309(63.71)	485 (100)	

\*\*Significant at 0.01

**Figure No 5.3.3**



The users were asked whether they were aware about the electronic resources/services of their library. It is evident from Table No.5.3.3 that the response of 67 (19.25%) undergraduates was yes and that of 281 (80.75%) was no, similarly, 63 (70%) postgraduates were aware about the e-resources and the remaining 27 (30%) were not. The response of all the 20 research scholars was in the affirmative, where as 26 faculty

member were aware and only a single faculty member was not aware of library e-resources. Out of 485 respondents, 176 (36.29%) were aware about the e-resources/services provided by the institute library, and the remaining 309 (63.71%) were not aware of it.

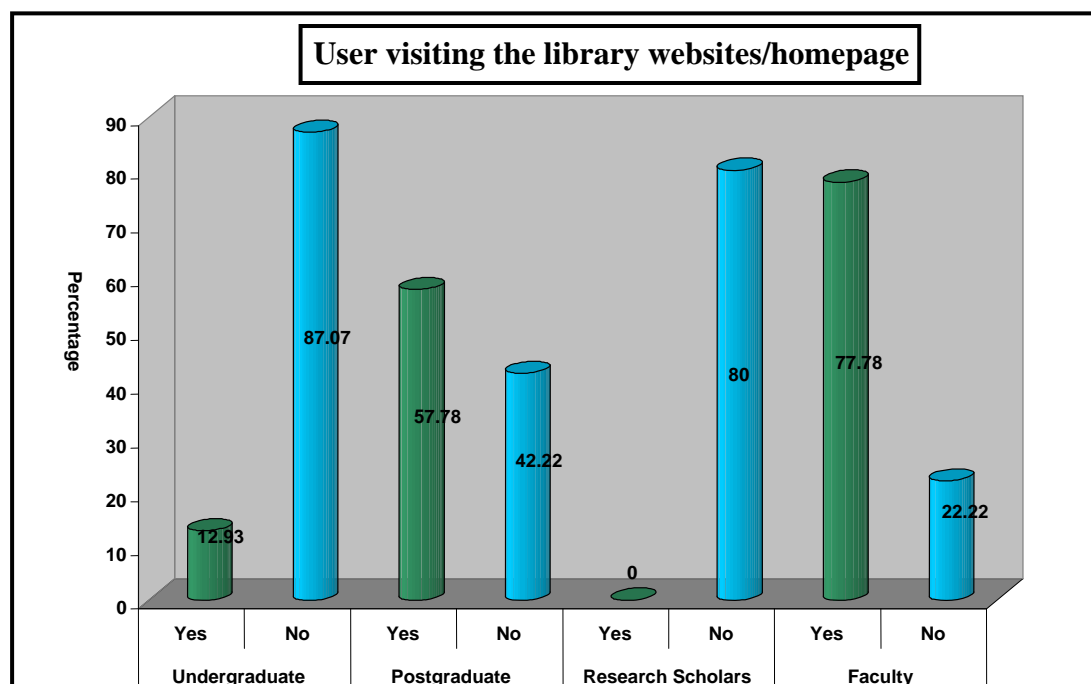
The Table No.5.3.3 shows that from 485 respondents, 176 (36.39%) were aware of the e-resources/services provided by the institute library and 309 (63.71%) were ignorant about it. The Chi-Square test for independence is significant at 1 per cent level of significance. The value of  $\chi^2$  is 165.088 and the degrees of freedom (df) is 3. The value of p shows statistically significant ( $p \leq 0.01$ ). This implies that there is a significant variation among the users as far as the awareness of their library e-resources/services is concerned.

**Table No. 5.3.4 Users visiting the library websites/homepage**

Respondents	Response		Total N (%)	Chi <sup>2</sup> (df;C)
	Yes	No		
Undergraduates	45 (12.93)	303(87.07)	348 (100)	118.489** (3 ;0.443)
Postgraduates	52 (57.78)	38 (42.22)	90 (100)	
Research Scholars	4(20.00)	16 (80.00)	20 (100)	
Faculty	21 (77.78)	6 (22.22)	27 (100)	
Total	122 (25.15)	363(74.85)	485 (100)	

\*\*Significant at 0.01

**Figure No 5.3.4**



From Figure No. 5.3.4 it was found that there in positive response from 45 (12.93%) undergraduates and 303(87.07) was negative, 52 (57.78%) postgraduates response was yes and 38 (42.22%) response was no, while 16 (80%). research scholars' response was negative. 21(77.78%) faculty answered yes and 6(22.22%) answered no. It has been found that undergraduates, postgraduates had visited their library website/home page more as compared to research scholars and faculty.

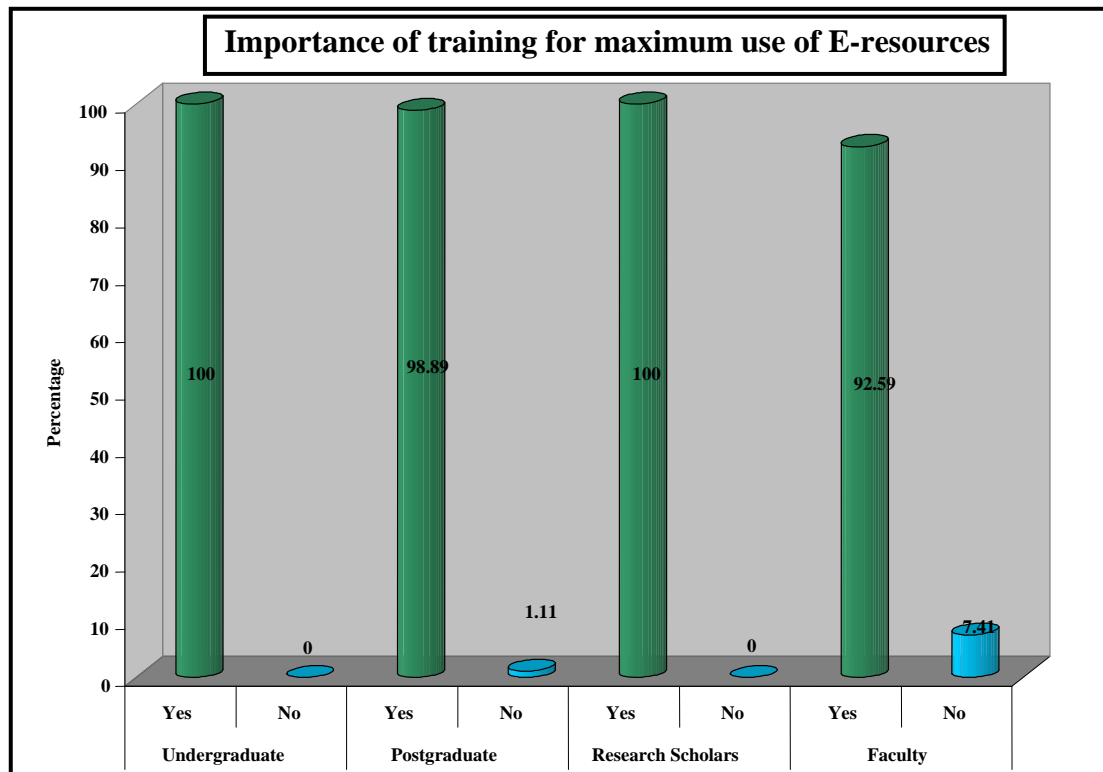
From 485 respondents, it was found that 122 (25.15%) users visited the library websites/home page and 363(74.85%) of users did not visit. The Table No.5.3.4 shows that for users, the Chi-Square test for independence is significant at 1 per cent level of significance. The value of  $\chi^2$  is 118.489 and the degrees of freedom (df) is 3. The value of p shows statistically significant ( $p \leq 0.01$ ). This implies that there is a significant variation among the users as far as visiting of their library website/home page is concerned. Thus maximum number of users had not visited library website/home page.

**Table No 5.3.5 Importance of training for maximum use of E-resources**

Respondents	Response		Total	Chi <sup>2</sup> (df;C)
	Yes N (%)	No N (%)	N (%)	
Undergraduates	348 (100)	-	348 (100)	22.888** (3;0.212)
Postgraduates	89 (98.89)	1 (1.11)	90(100)	
Research Scholars	20 (100)	-	20(100)	
Faculty	25 (92.59)	2 (7.41)	27(100)	
Total	482 (99.38)	3 (0.62)	485(100)	

\*\*Significant at 0.01

**Figure No 5.3.5**



The users were asked if training is important to make maximum use of electronic resources. It has been found that 348 (100%) undergraduates and 89 (98.89%) postgraduates felt that training is important while 1 (1.11%) answered in no. In the same way 20 (100%) research scholars and 25 (92.59%) of the faculty responded positively, while 2 (7.41%) answered in negative. From Figure No.5.3.5 results indicate that all the undergraduates and research scholars felt the need for training to draw maximum advantages of e-resources. Whereas postgraduates and faculty do not share the same view point.

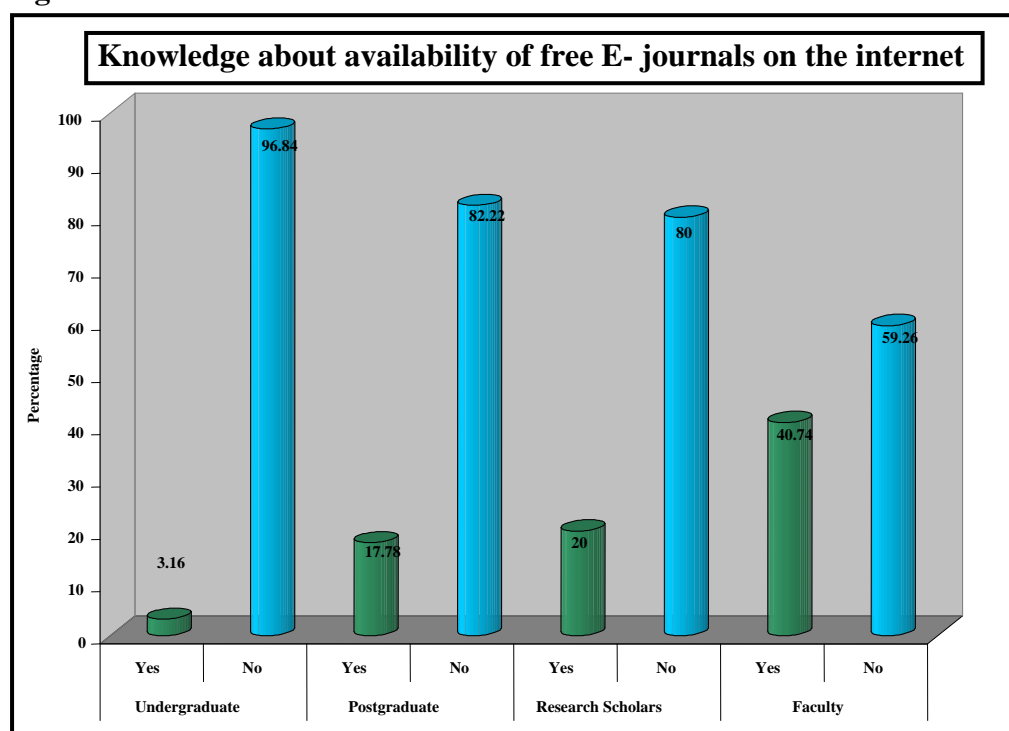
From 482 respondents 99.38% of users said that training is important, whereas 3(0.62%) of users did not share the same feeling. The Table No.5.3.5 shows that for users, the Chi-Square test for independence is significant at one per cent level of significance. The value of  $\chi^2$  is 22.888 and the degrees of freedom (df) is 3. The value of p shows statistically significant ( $p \leq 0.01$ ). This implies that there is a significant variation among the users as far as the views regarding the importance of training to make maximum use of e-resources is concerned. Thus maximum numbers of users felt that training is important to make maximum use of e-resources.

**Table No 5.3.6 Knowledge about availability of free E- journals on the internet**

Respondents	Response		Total N (%)	Chi <sup>2</sup> (df;C)
	Yes	No		
Undergraduates	11 (3.16)	337 (96.84)	348 (100)	61.145** (3;0.335)
Postgraduates	16 (17.78)	74 (82.22)	90 (100)	
Research Scholars	4 (20.00)	16 (80.00)	20 (100)	
Faculty	11 (40.74)	16 (59.26)	27 (100)	
Total	42 (8.66)	443 (91.34)	485 (100)	

\*\*Significant at 0.01

**Figure No 5.3.6**



There were many free electronic journals available on the net. The users were asked whether they know about the availability of free electronic journals on the net. The response from the Figure No. 5.3.6 reveals that 11 (3.16%) of undergraduates, 16 (17.78%) of postgraduates, 4 (20%) of research/scholars was positive, while 337 (96.84%) of undergraduates, 74 (82.22%) of postgraduates, 16 (80%) research scholars and 16 (59.26%) of faculty members answered in negative. It was found that research scholars and faculty were more aware of the availability of free-journals on the net as compared to undergraduates and postgraduates

From 485 respondents, 42(8.66%) users were aware of free e-journals and 443(91.34%) of users were ignorant about it. Table No.5.3.6 shows that for users, the Chi-Square test

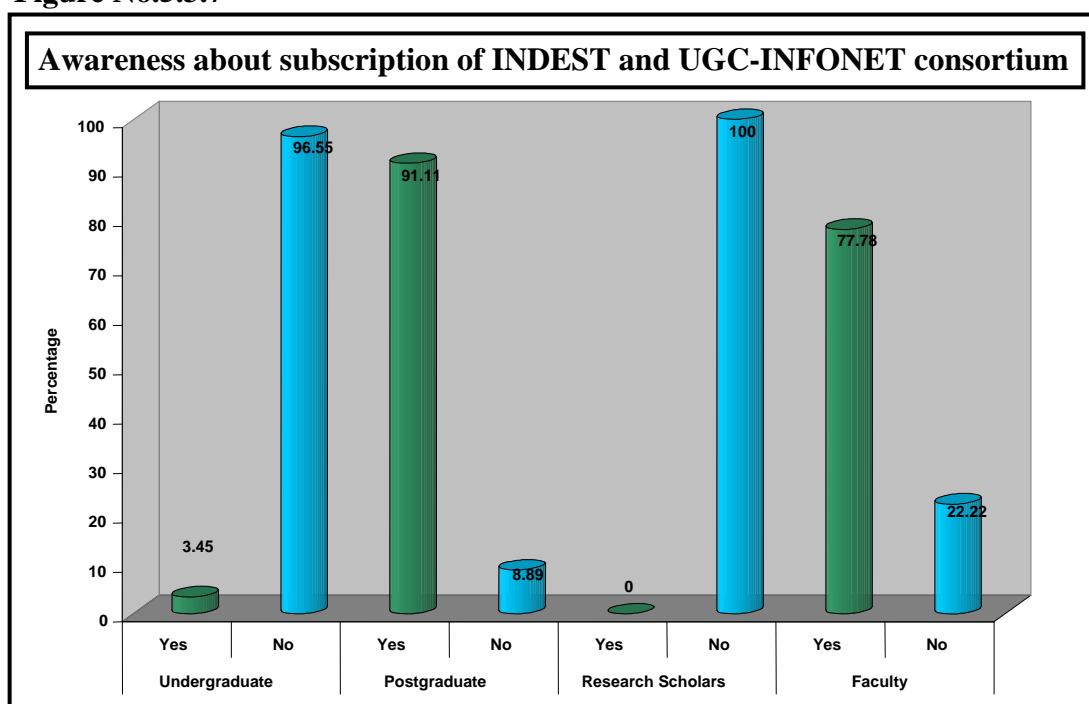
for independence is significant at one per cent level of significance. The value of  $\chi^2$  is 61.145 and the degrees of freedom (df) is 3. The value of p shows statistically significant ( $p \leq 0.01$ ). This implies that there is a significant variation among the users as far as the knowledge of availability of free e-journals on the net is concerned. Thus maximum number of users did not know about free e-journals.

**Table No 5.3.7 Awareness about subscription of INDEST and UGC-INFONET consortium**

Respondents	Response				Total N (%)	Chi <sup>2</sup> (df;C)
	Yes	N (%)	No	N (%)		
Undergraduates	12	(3.45)	336	(96.55)	348 (100)	354.856** (3 ;0.650)
Postgraduates	82	91.11	8	(8.89)	90 (100)	
Research Scholars	-		20	(100)	20 (100)	
Faculty	21	(77.78)	6	(22.22)	27 (100)	
Total	115	(23.71)	370	(76.29)	485 (100)	

\*\*Significant at 0.01

**Figure No.5.3.7**



Thapar University library subscribes to various e-journals/portals for their users under UGC- INFONET and INDEST consortium. The users were asked whether they are aware of the name and working of the UGC-INFONET consortium. The results given in the Figure No.5.3.7 shows that 82 (91.11%) postgraduates were aware of UGC-INFONET and INDEST followed by 21 (77.78%) faculty and 12 (3.45%) undergraduates, while

none of the research scholars were aware of such a consortium. Out of total of 485 respondents 115 (23.71%) were aware and 370 (76.29%) were unaware of UGC-INFONET and INDEST. Thus maximum users were unaware about consortium.

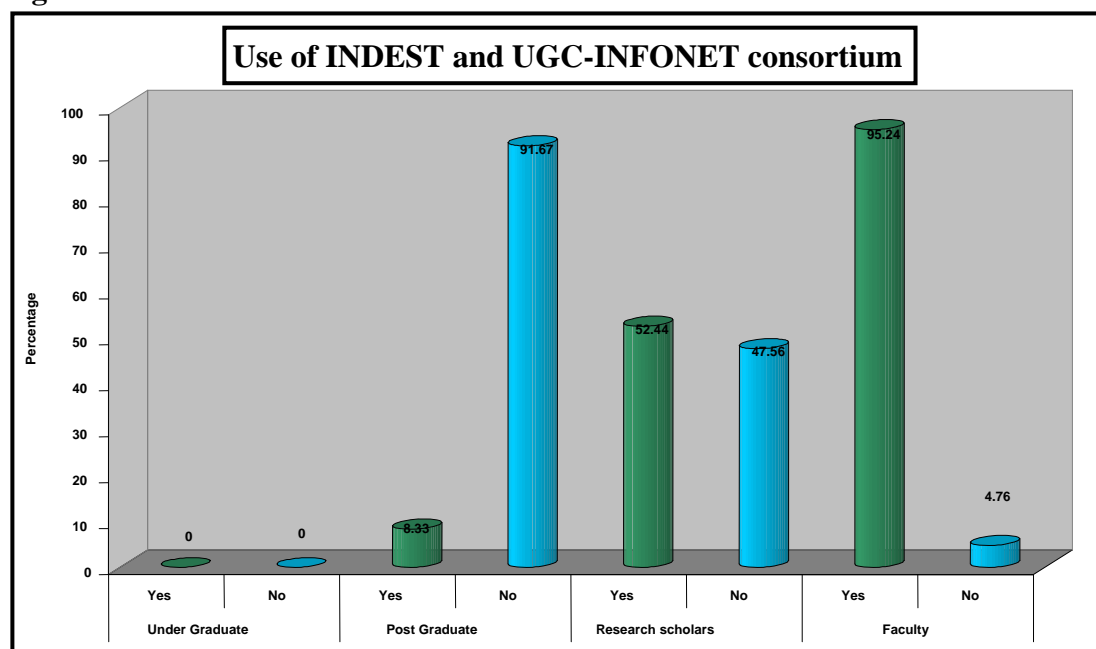
From 485 respondents, 115(23.71%) users were aware of UGC-INFONET and INDEST 370 (76.29%) were unaware about it. The Table No.5.3.7 shows the Chi-Squares test for independence is significant at 1 per cent level of significance. The value of  $\chi^2$  is 354.856 and the degrees of freedom (df) is 3. The value of p shows statistically significant ( $p \leq 0.01$ ). This implies that there is a significant variation among the users as far as the awareness of UGC-INFONET and INDEST consortium is concerned.

**Table No 5.3.8 Use of INDEST and UGC-INFONET consortium**

Respondents	Response		Total	Chi <sup>2</sup> (df;C)
	Yes	N (%)	No N (%)	
Undergraduates	-	-	-	24.563** (3 ;0.420) NR : 370(76.29)
Postgraduates	1 (8.33)	11 (91.67)	12(100)	
Research Scholars	43 (52.44)	39 (47.56)	82(100)	
Faculty	20 (95.24)	1 (4.76)	21(100)	
Total	64 (55.65)	51 (44.35)	115(100)	

\*\*Significant at 0.01

**Figure No 5.3.8**



The Figure No.5.3.8 highlights the response of the respondents whether they were aware about the library electronic resources and were using them or not. The data indicates that none of the undergraduates and a major proportion of respondents, i.e.11 postgraduates

(91.67%) were not using e-journals. Similarly, from the research scholars category the response of 43 (52.44%) respondents was yes and 39 (47.56%) responded no. while among the faculty most of the respondents, i.e., 20 (95.24%) were using it. It has been found that the research scholars and faculty members were using e-journals to the maximum as compared to undergraduates and postgraduates.

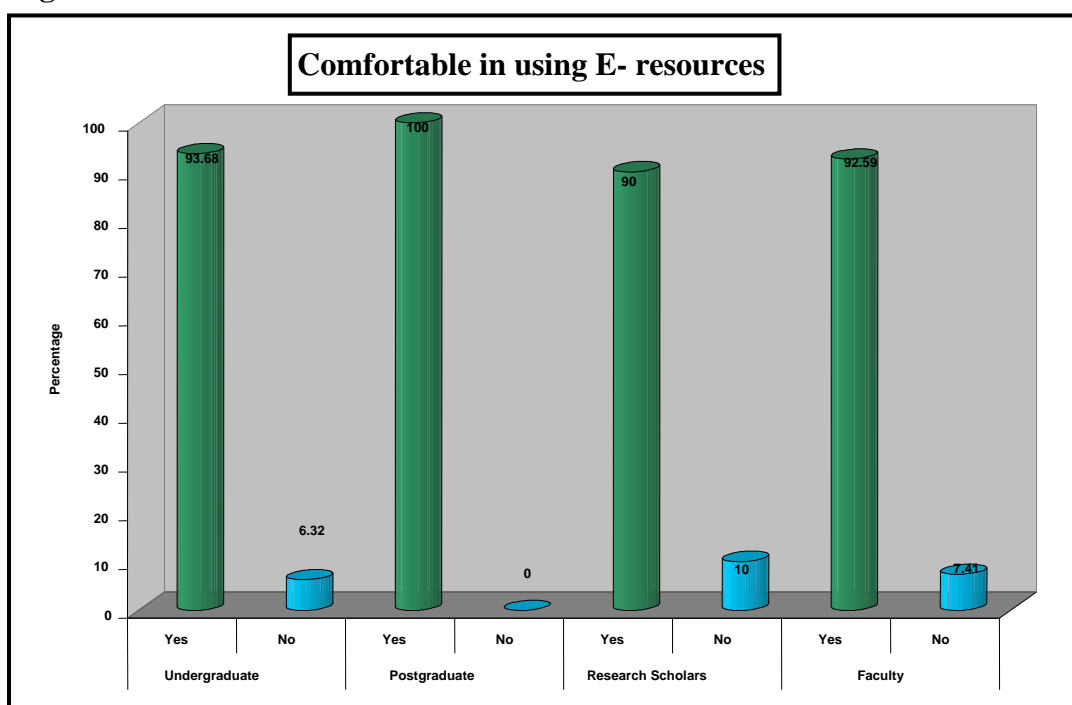
From the Table No 5.3.8, it has been found that 115 respondents answered to question and 370 (76.29%) did not responded. 64 (55.65%) were using e-journals and 51(44.35%) of users did not make use of. The Chi-Square test for independence is significant at 1 per cent level of significance. The value of  $\chi^2$  is 24.563 and the degrees of freedom (df) is 3. The value of p shows statistically significant ( $p \leq 0.01$ ). This implies that there is a significant variation among the users as far as the use of UGC-INFONET and INDEST consortium is concerned.

**Table No 5.3.9 Comfortable in using E- resources**

Respondents	Response		Total	Chi <sup>2</sup> (df;C)
	Yes N (%)	No N (%)	N (%)	
Undergraduates	326 (93.68)	22 (6.32)	348 (100)	6.803** (3;0.118)
Postgraduates	90 (100)	-	90 (100)	
Research Scholars	18 (90.00)	2 (10.0)	20 (100)	
Faculty	25 (92.59)	2 (7.41)	27 (100)	
Total	459 (94.64)	26 (5.36)	485 (100)	

\*\*Significant at 0.01

**Figure No 5.3.9**



The users were asked whether they were comfortable in using electronic information resources or not. The Figure No.5.3.9 clearly reveals that response of 326 (93.68%) undergraduates was yes and 22 (6.32%) was no. Response from postgraduates 99 (100%) was positive where as 18 research scholars said they were comfortable with electronic information and 2 (10%) research scholars responded in negative, while 25 faculty (92.59%) responded in affirmative and 2 (7.41%) in negative.

It has been found that from 485 respondents maximum responded in positive. The Table No.5.3.9 shows that for all the users the Chi-Square test for independence is significant at 1 per cent level of significance. The value of  $\chi^2$  is 6.803 and the degrees of freedom (df) is 3. The value of p shows statistically significant ( $p \leq 0.01$ ). This implies that there is a significant variation among the users as far as comfort in using electronic information in concerned.

**Table No. 5.3.10 Use of electronic/print format**

Document preferred	UG N%	PG N%	RS N%	FA N%	Total N (%)	Chi <sup>2</sup> (df;C)
Print	21 (6.03)	9 (10.00)	6 (30.00)	2 (7.41)	38 (7.84)	22.548** (6;0.211)
Electronic	44(12.64)	14 (15.56)	4 (20.00)	-	62 (12.78)	
Both	283 (81.32)	67(74.44)	10 (50.00)	25 (92.59)	385 (79.38)	
Total	348(100)	90(100)	20(100)	27(100)	485 (100)	

\*\*Significant at 0.01

**Figure No. 5.3.10**

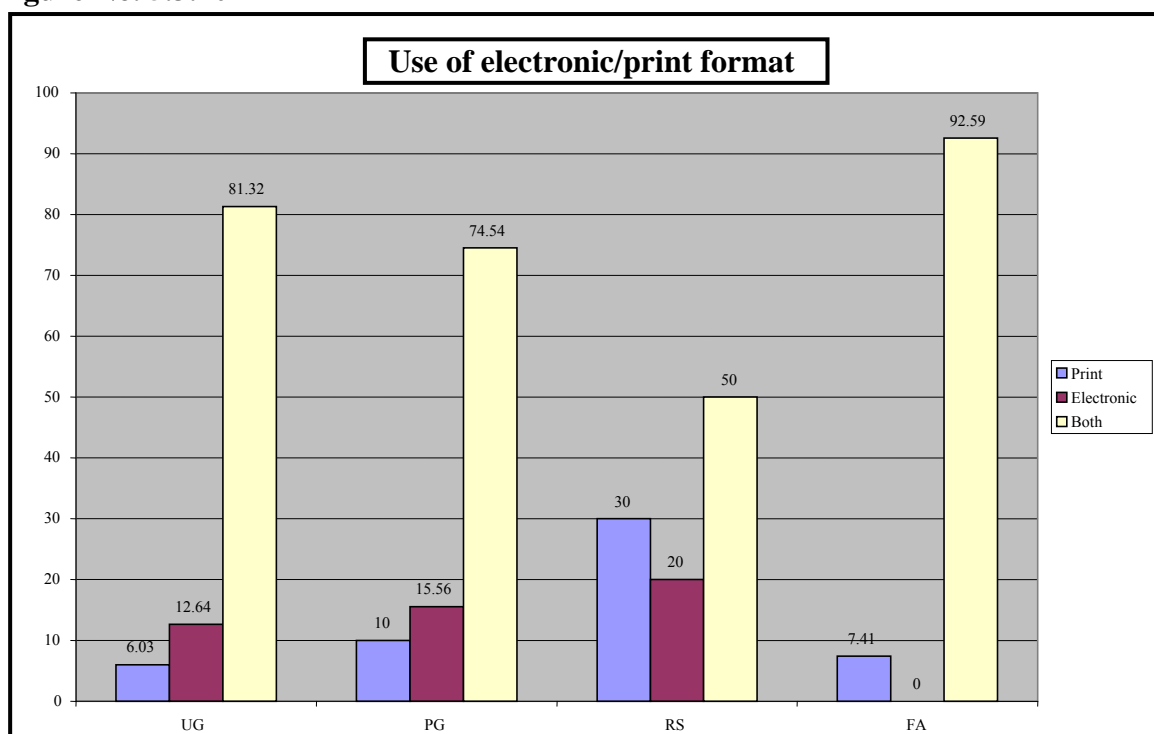


Figure No. 5.3.10 reveals that from 485, only 38 (7.84%) users preferred for using only print format, 62 (12.78%) for electronic format and 385 (79.38%) preferred to use the document in both the formats. Among the users, it has been found that 30% research scholars gave choice for print format followed by 21 (6.03%) undergraduates, 9 (10%) postgraduate and 2 (7.41%) faculty. Similarly, the response for using only electronic format was by 20% research scholars, 12.64% undergraduates and 15.56% postgraduates. Where as none of the faculty replied. The maximum response was in favour of using both the formats, 283 (81.32%) undergraduates, 67 (74.44%) postgraduates and 10 (50%) faculty.

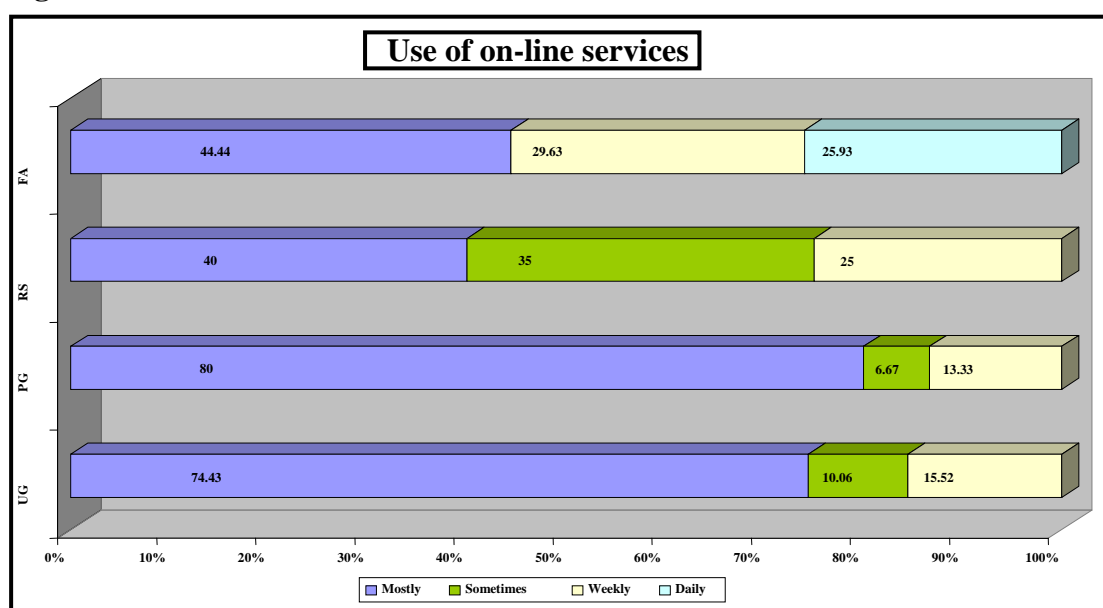
The Table No. 5.3.10 shows that maximum number of users preferred to use both the formats i.e. print and electronic for seeking information. The Chi-Square test for independence is significant at one percent level of significance. The value of  $\chi^2$  is 22.548 and the degrees of freedom (df) is 6. The value of p shows statistically significant ( $p \leq 0.01$ ). This implies that there is a significant variation among the users as far as the preference for format of document is concerned.

**Table No 5.3.11 Use of online services**

Use online	UG N%	PG N%	RS N%	FA N%	Total N (%)	Chi <sup>2</sup> (df;C)
Mostly	259 ( 74.43)	72 (80.00)	8 (40.00)	12 (44.44)	351 (72.37)	146.329** (9 ;0.481)
Sometimes	35 (10.06)	6 ( 6.67)	7 (35.00)	-	48 ( 9.90)	
Weekly	54 (15.52)	12 (13.33)	5 (25.00)	8 (29.63)	79 (16.29)	
Daily	-	-	-	7 (25.93)	7(1.44)	
Total	348 (100)	90 (100)	2 (100)	27 (100)	485 (100)	

\*\*Significant at 0.01

**Figure No 5.3.11**



The respondents were asked how often they use online services. The response shows that on-line service were used most of the time by 259 (74.43%) undergraduates, 72 (80%) postgraduates, 8 (40%) research scholars and 12 (44.44%) faculty members. The on-line services were sometimes used by 35 (10.06%) undergraduates, 6 (6.67%) postgraduates 7 (35%) research scholars and faculty did not answer. Users who go weekly on-line were 54 (15.52%) undergraduates 12 (13.33%) postgraduates, 5 (25%) research scholars and 8 (29.63%) faculty, while on-line services is used daily by 7 (25.93%) faculty and other respondents did not reply. The results show that from 485 users, 351 (72.37%) go on-line mostly, 48 (9.90%) sometimes, 79 (16.29%) weekly and 7 (1.44%) daily.

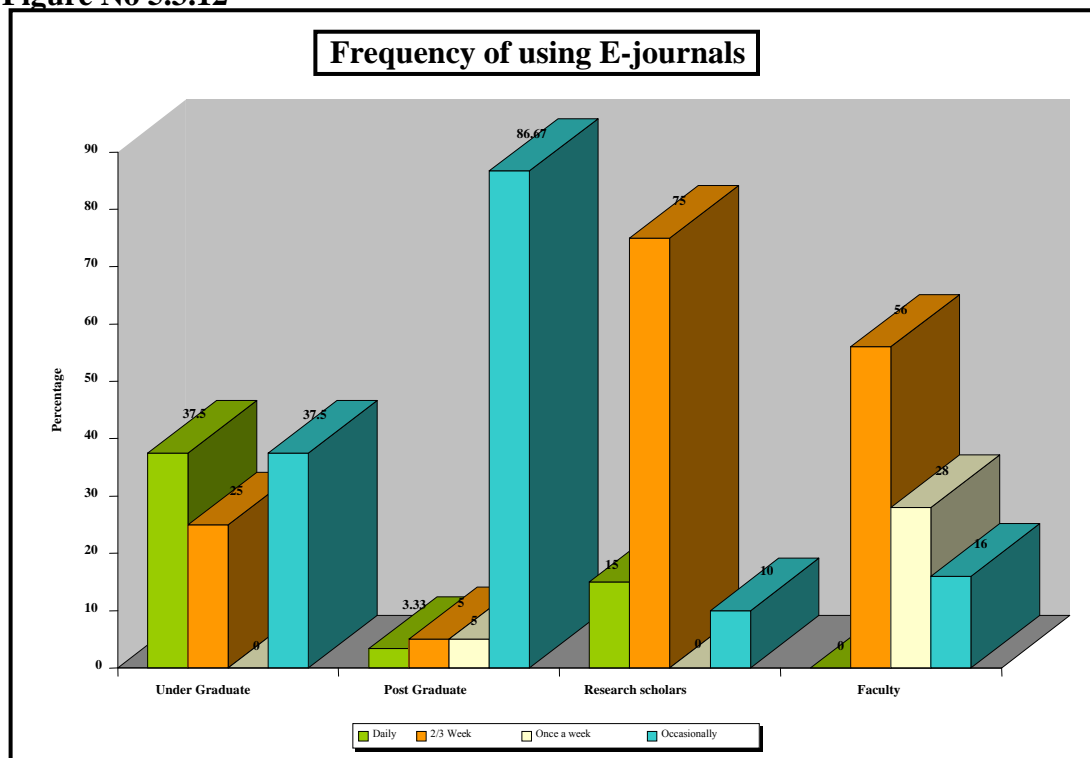
The Table No.5.3.11 shows that the value of  $\chi^2$  is 146.329 and the degrees of freedom (df) is 3. The value of p shows statistically significant ( $p \leq 0.01$ ). The Chi-Square test for independence is significant at 1 per cent level of significance. This implies that there is a significant variation among the users as far as the use of on-line services is concerned.

**Table No. 5.3.12 Frequency of using E-journals**

Using e-journals	UG N%	PG N%	RS N%	FA N%	Total N (%)	Chi <sup>2</sup> (df;C)
Daily	3 (37.50)	2 (3.33)	3 (15.00)	-	8 (7.08)	86.762** (9 ;0.659)
2/3 Week	2 (25.00)	3 (5.00)	15 (75.00)	14 (56.00)	34 (30.09)	
Once a week	-	3 (5.00)	-	7 (28.00)	10 (8.85)	
Occasionally	3 (37.50)	52 (86.67)	2 (10.00)	4 (16.00)	61 (53.98)	
Total	348(100)	90 (100)	20 (100)	27(100)	485 (100)	

\*\*Significant at 0.01

**Figure No 5.3.12**



The users were asked how frequently they used the electronic journals. Figure 5.3.12 reveals that very few users used e-journals daily and once in a week. The e-journals were used maximum by users occasionally and 2/3 times a week. Undergraduates and postgraduates users used e-journals to the minimum as compared to research scholars and faculty. Out of the total 485 respondents 372 (76.70%) did not answer to this question. whereas 8 (7.08%) users used e-journals daily, 10(8.85%) once a week, 34 (30.09%) 2/3 times a week and 61 (53.98%) used occasionally. Thus, maximum number of users used e-journals occasionally. The data reveals that 3 (37.50%) undergraduates used e-journals daily and occasionally, 52 (86.67%) postgraduates used e-journals occasionally which was more as compared to 15 (75%) research scholars who used maximum for 2/3 times a week and 14(56%) faculty members who used e-journals 2/3 times a week more then the categories of other time.

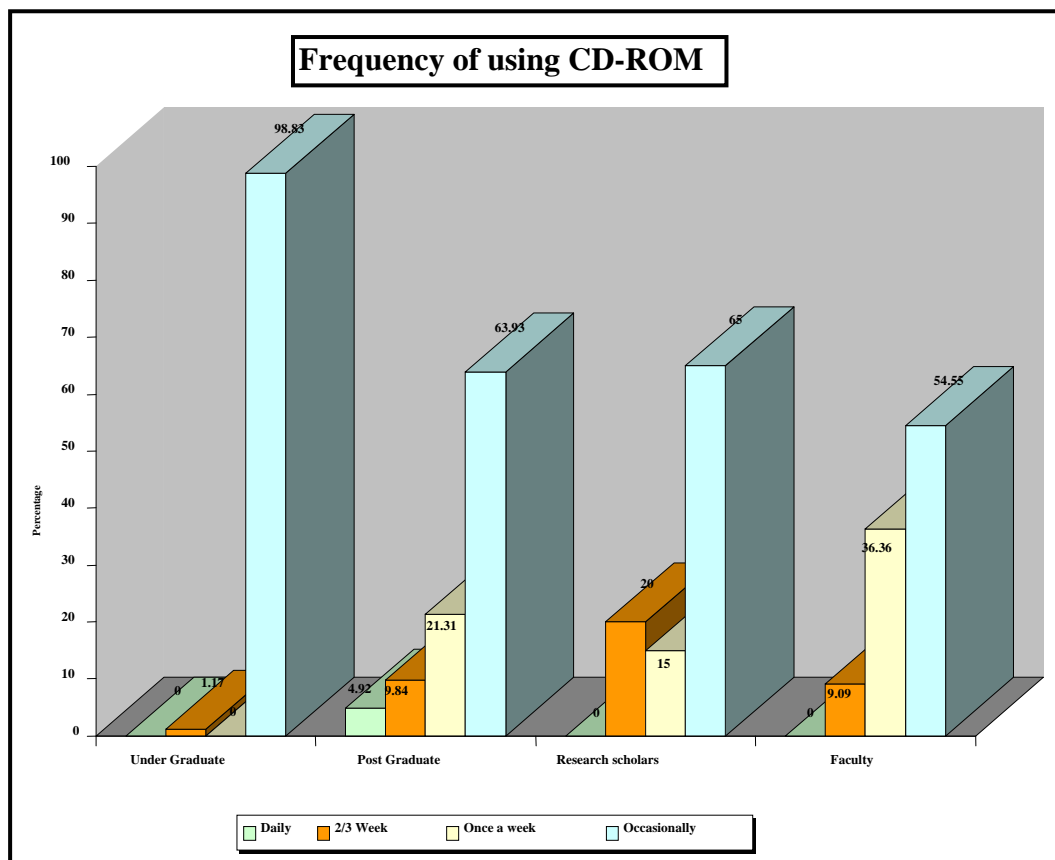
From the Table No.5.3.12 it has been found that the Chi-Square test for independence is significant at 1 per cent level of significance. The value of  $\chi^2$  is 86.762 and the degrees of freedom (df) is 3. The value of p shows statistically significant ( $p \leq 0.01$ ). The variation among the users has been found significant as far as the frequency of using e-journals is concerned.

**Table No 5.3.13 Frequency of using CD-ROM**

Frequency of CD-ROM	UG N%	PG N%	RS N%	FA N%	Total N (%)	Chi <sup>2</sup> (df;C)
Daily	-	3 (4.92)	-	-	3 (0.83)	117.611** (9 ;0.496)
2/3 Week	3 (1.17)	6 (9.84)	4 (20.00)	2 (9.09)	15 (4.17)	
Once a week	-	13 (21.31)	3 (15.00)	8 (36.36)	24 (6.67)	
Occasionally	254 (98.83)	39 (63.93)	13 (65.00)	12 (54.55)	318 (88.33)	
Total	348 (100)	90 (100)	20 (100)	27 (100)	485 (100)	

\*\*Significant at 0.01

**Figure No. 5.3.13**



The Figure No. 5.3.13 shows that CD-ROM is used daily by 3 (4.92%) postgraduates while other users did not respond. The use of CD-ROM 2/3 times a week by 3 (1.17%) undergraduates, 6 (9.84%) postgraduates, 4(20%) research scholars and 2 (9.09%) faculty. Respondents using CD-ROM services once in a week were 13 (21.31%) postgraduates, 3 (15%) research scholars and 8 (36.36%) faculty. CD-ROM was used occasionally by 254 (98.83%) undergraduates, 39 (63.93%) postgraduates, 13 (65%) research scholars and 12 (54.55%) faculty. Thus CD-ROM services were used maximum by users occasionally as compared to other times. From 485 users of total survey 3

(0.83%) used CD-ROM daily, 15 (4.17%) 2/3 a weekly, 24 (6.67%) once a week and 318 (88.33%) occasionally while 125 (25.8%) did not responded to this question. The CD-ROM services were used occasionally more as compared to other times.

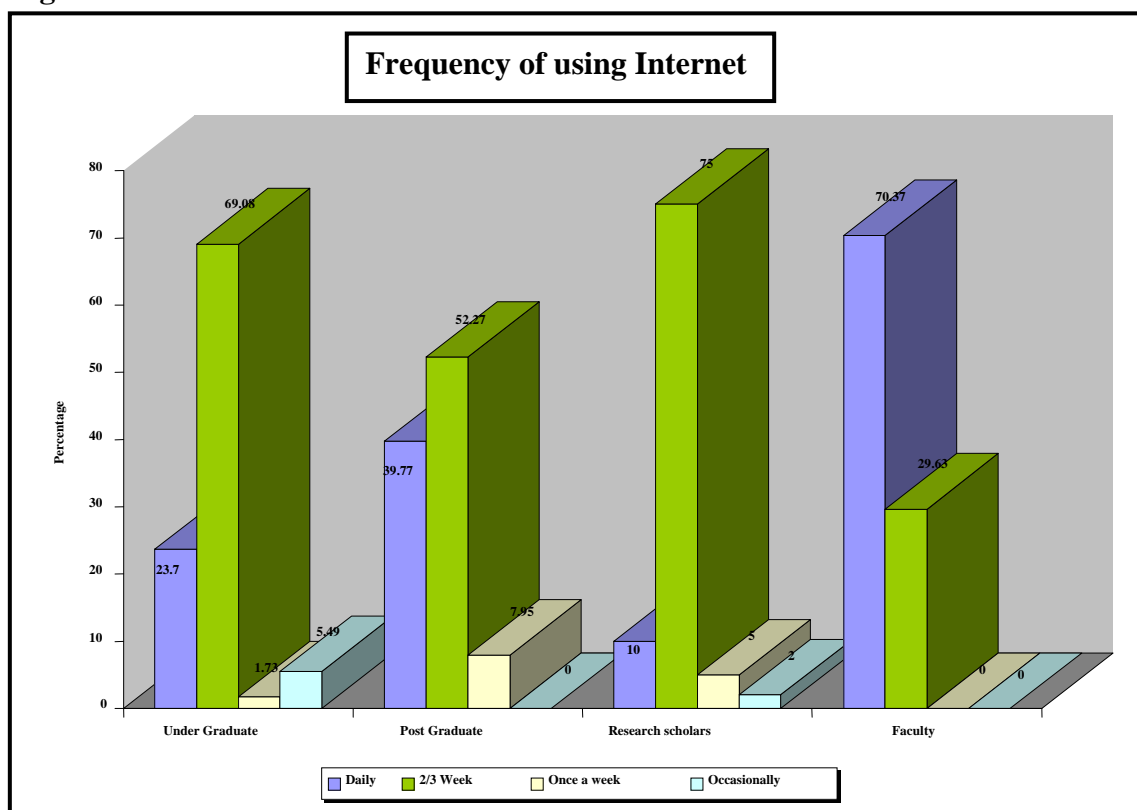
The Table No. 5.3.13 shows the Chi-Square test for independence is significant at 1 per cent level of significance. The value of  $\chi^2$  is 117.611 and the degrees of freedom (df) is 9. The value of p shows statistically significant ( $p \leq 0.01$ ). This implies that there is a significant variation among the users as far as use of the CD-ROM is concerned.

**Table No 5.3.14 Frequency of using Internet**

Using Internet	UG N%	PG N%	RS N%	FA N%	Total N (%)	Chi <sup>2</sup> (df;C)
Daily	82( 23.70)	35 (39.77)	2(10.00)	19 (70.37)	138 (28.6)	52.098** (9 ;0.313)
2/3 Week	239( 69.08)	46 (52.27)	15 ( 75.00)	8 (29.63)	308( 64.03)	
Once a week	6( 1.73)	7( 7.95)	1(5.00)	-	14( 2.91)	
Occasionally	19 (5.49)	-	2	-	21( 4.37)	
Total	348(100)	90(100)	20(100)	27(100)	485(100)	

\*\*Significant at 0.01

**Figure No 5.3.14**



The Table No. 5.3.14 shows how frequently the users were using internet at TU, Patiala, 82 (23.70%) undergraduates, 35 (38.77%) postgraduates, 2 (10%) research scholars and 19

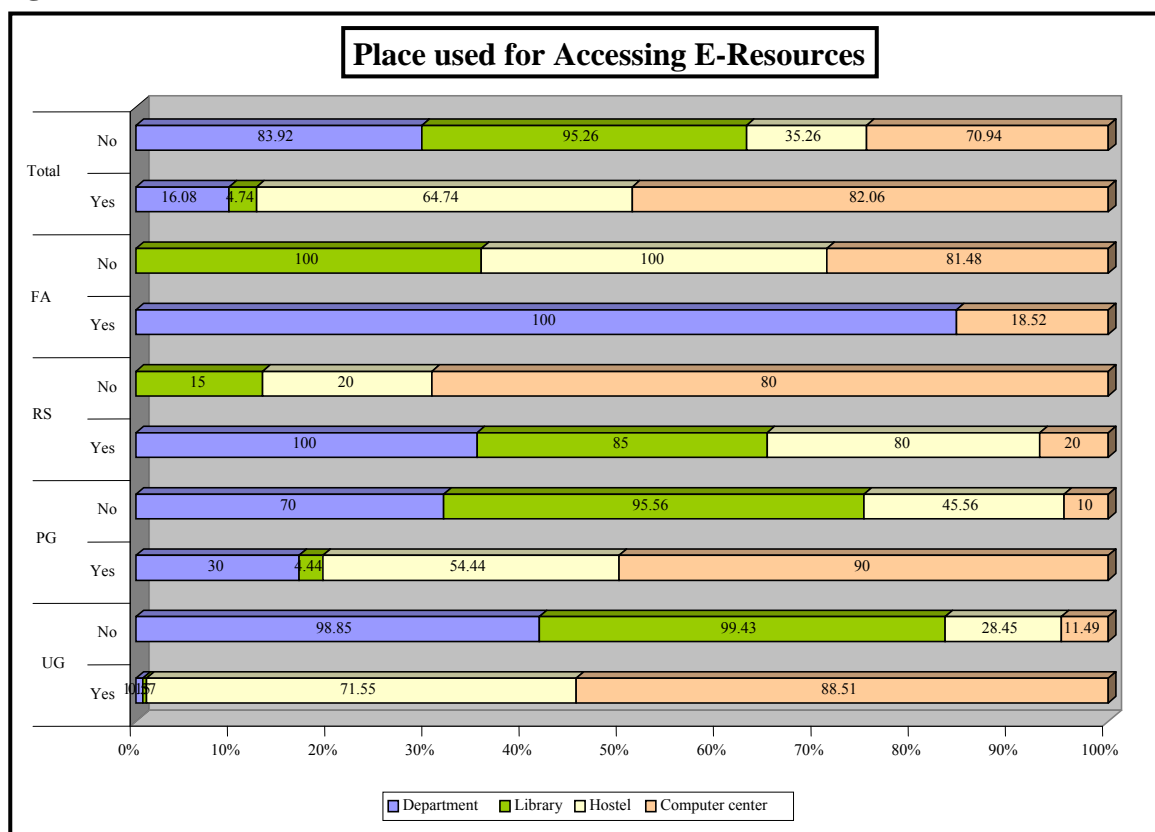
(70.37%) faculty used internet daily. Respondents who are using internet 2/3 times a week were 239 (69.08%) undergraduates, 46 (52.27%) postgraduates, 15 (75%) research scholars and 8 (29.63%) faculty members. Once in a week internet was used by 6 (1.73%) undergraduates, 7 (7.95%) postgraduates, 1 (5%) research scholars and faculty did not answer this part of question. The use of internet occasionally was reported by 19 (5.49%) undergraduates and 2 (10%) research scholars where as postgraduates and faculty did not respond to it. From the data it is evident that from 485 users, 138 (28.69%) used internet daily, 308 (64.03%) 2/3 times a week, 14 (2.91%) once in a week and 21 (4.37%) occasionally, while 4 (0.8%) users did not responded. Thus internet is used maximum 2/3 time a week by all users as compared to other times.

The Table No. 5.3.14 shows the Chi-Square test for independence is significant at 1 per cent level of significance. The value of  $\chi^2$  is 52.098 and the degrees of freedom (df) is 9. The value of p shows statistically significant ( $p \leq 0.01$ ). This implies that there is a significant variation among the users as far as use of the internet is concerned.

**Table No 5.3.15 Place used for Accessing E-Resources**

Place of Accessing	UG		PG		RS		FA		Total	
	Yes	No	Yes	No	Yes	No	Yes	No	Yes	No
Department	4 (1.15)	344 (98.85)	27 (30.00)	63 (70.00)	20 (100)	-	27 (100)	-	78 (16.08)	407 (83.92)
Library	2 (0.57)	346 (99.43)	4 (4.44)	86 (95.56)	17 (85.00)	3 (15.00)	-	27 (100)	23 (4.74)	462 (95.26)
Hostel	249 (71.55)	99 (28.45)	49 (54.44)	41 (45.56)	16 (80.00)	4 (20.00)	-	27 (100)	314 (64.74)	171 (35.26)
Computer center	308 (88.51)	40 (11.49)	81 (90.00)	9 (10.00)	4 (20.00)	16 (80.00)	5 (18.52)	22 (81.48)	398 (82.06)	87 (70.94)

**Figure No.5.3.15**

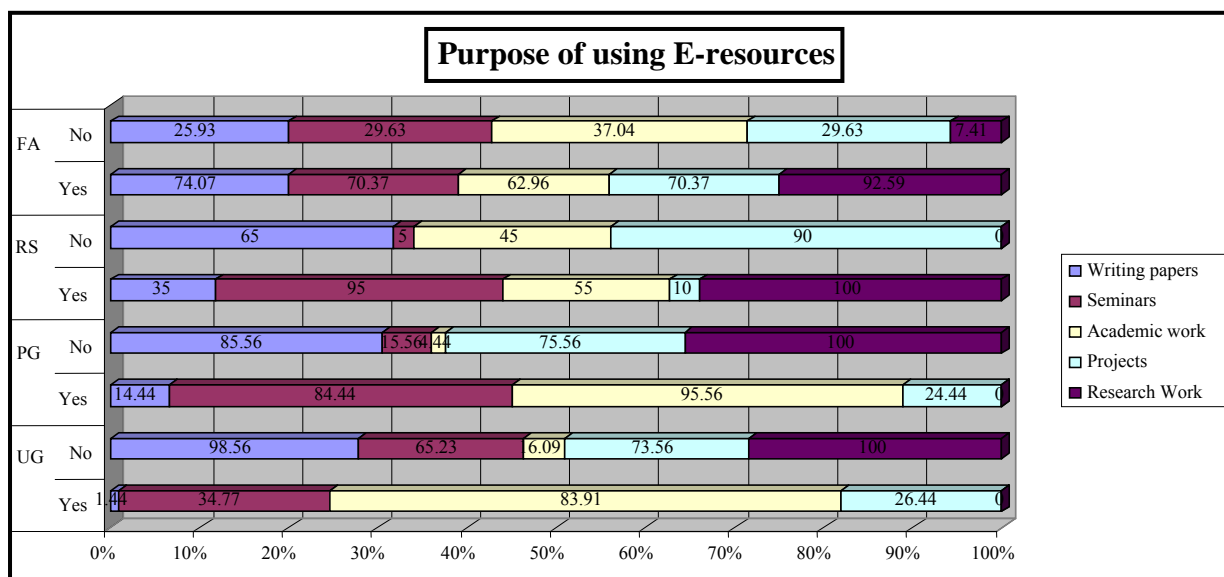


The e-resources and services provided by the library can be accessed at various places within the institute. The users can access the services from their respective departments, library, hostel and computer centre. Table No.5.3.15 shows that all the respondents research scholars and faculty members access e-resources from their respective departments, where as in case of postgraduates this proportion was quite lesser, i.e., 30 and 1.15 per cent respectively. The library is used very less as compared to other places for accessing e-resources. The faculty members do not use library at all for accessing e-resources, where as most of the research scholars (95.56%) used the library for accessing e-resources which is maximum as compared to undergraduates (0.57%) and postgraduates (4.44%). The computer center is used more by 308 (88.51%) undergraduates, 81 (90%) postgraduates, 4 (20%) research scholars and 5 (18.52%) faculty members. The whole data when taken up comparatively provided that computer centre and hostels are used maximum by users for accessing e-resources.

**Table No.5.3.16 Purpose of using E-resources**

Purposes	UG	N (%)	PG	N (%)	RS	N (%)	FA	N (%)	Total	N (%)
	Yes	No	Yes	No	Yes	No	Yes	No	Yes	No
Writing Paper	5 (1.44)	343 (98.56)	13 (14.44)	77 (85.56)	7 (35.0)	13 (65.0)	20 (74.07)	7 (25.93)	45 (9.28)	440 (19.72)
Seminars	121 (34.77)	227 (65.23)	76 (84.44)	14 (15.56)	19 (95.0)	1 (5.0)	19 (70.37)	8 (29.63)	235 (48.45)	250 (51.55)
Academic work	292 (83.91)	56 (16.09)	86 (95.56)	4 (4.44)	11 (55.0)	9 (45.0)	17 (62.96)	10 (37.04)	406 (83.71)	79 (16.29)
Projects	92 (26.44)	256 (73.56)	22 (24.44)	68 (75.56)	2 (10.0)	18 (90.0)	19 (70.37)	8 (29.63)	135 (27.84)	350 (12.16)

**Figure No.5.3.16**



The library provides electronic resources and services to its users. The users were asked for what purpose they are using e-resources. Figure No. 5.3.16 shows that users using e-resources **for writing papers** were 5 undergraduates i.e. 1.44% and 343 (98.56%) did not use it. The positive response was given by 13 (14.44%) postgraduates while 77 (85.56%) answered in negative, 7 (35%) of research scholars said in affirmative, where as 20 faculty i.e. 74.07% responded positively and 7 (25.93%) answered no. The result reveals that faculty and research scholars used e-resources more **for writing papers** as compared to undergraduates and postgraduates. It has been found that e-resources were used more **for seminars** by 19 Faculty members i.e. (70.37%), 19 (95%) research scholars, 76 (84.44%) postgraduates as compared to 121 (34.77%) undergraduates. The e-resources were used for academic work by 282 (83.91%) undergraduates, 86 (95.56%) by

postgraduates, 11 (55%) by research scholars and 17 (62.96%) by faculty.

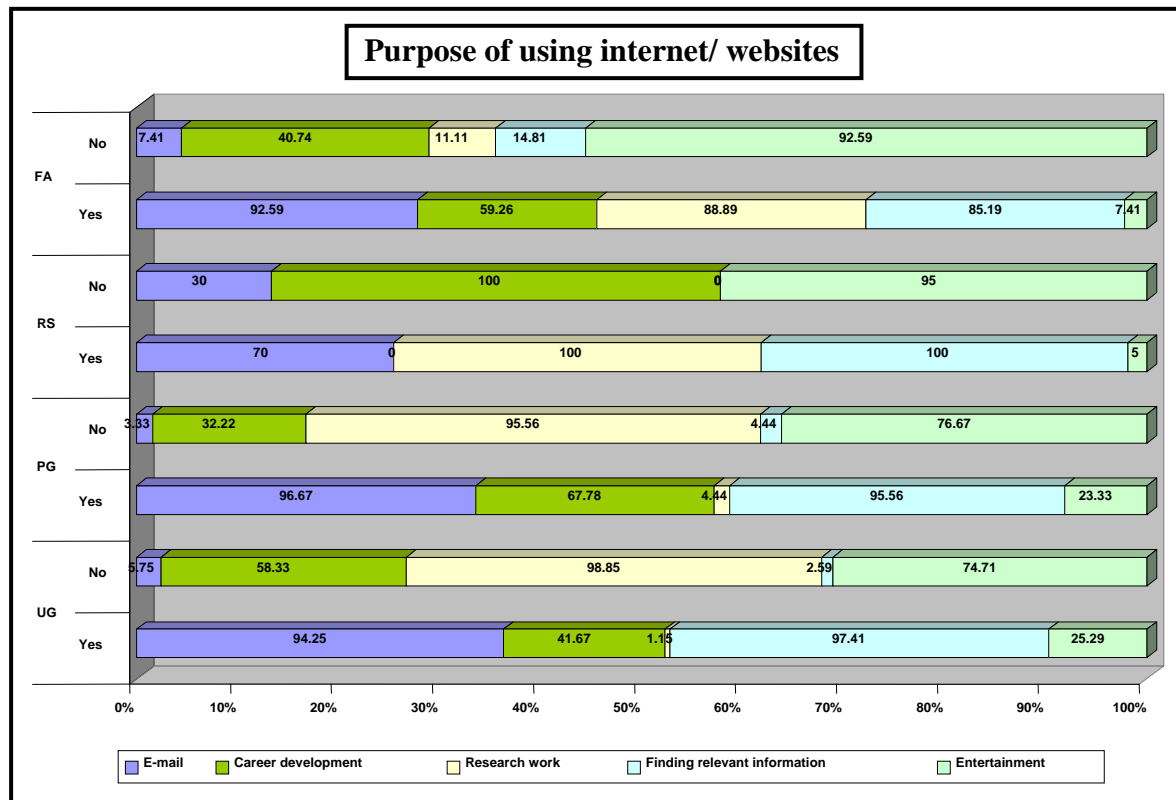
For **project works** 92 (26.44%) of undergraduates, 22 (24.44%) postgraduates, 2 (10%) research scholars and 19(70.37%) faculty used e-resources. It has been found that faculty used e-resources more for project work as compared to other users.

The data indicates that undergraduates and postgraduate do not use e-resources for research work while 20 (100%) research scholars and 25 (92.59%) faculty members used e-resources for research work more as compared to undergraduates and postgraduates. The response shows from the total users' data that e-resources used for seminars were 235 (48.45%), for academic work 406 (83.71%), and for project work 135 (27.84%).

**Table No 5.3.17 Purpose of using internet/websites**

Purpose of using internet/ websites	UG N (%)		PG N (%)		RS N (%)		Faculty N (%)		Total N (%)	
	Yes	No	Yes	No	Yes	No	Yes	No	Yes	No
E-mail	328 (94.25)	20 (5.75)	87 (96.67)	3 (3.33)	14 (70.00)	6 (30.00)	25 (92.59)	2 (7.41)	454 (93.61)	31 (6.39)
Career development	145 (41.67)	203 (58.33)	61 (67.78)	29 (32.22)	-	20 (100)	16 (59.26)	11 (40.74)	222 (54.23)	222 (45.77)
Research work	4 (1.15)	344 (98.85)	4 (4.44)	86 (95.56)	20 (100)	-	24 (88.89)	3 (11.11)	52 (10.72)	433 (89.28)
Finding relevant information	339 (97.41)	9 (2.59)	86 (95.56)	4 (4.44)	20 (100)	-	23 (85.19)	4 (14.81)	468 (96.49)	17 (3.51)
Entertainment	88 (25.29)	260 (74.71)	21 (23.33)	69 (76.67)	1 (5.0)	19 (95.0)	2 (7.41)	25 (92.59)	112 (23.09)	373 (76.91)

Figure No 5.3.17



The purpose of using the internet and websites are e-mail, for career development, research work, finding relevant information and entertainment. The figure No. 5.3.17 indicates that e-mail services were used by 94.25% undergraduate 96.67% postgraduates, 70% research scholars and 92.59% faculty members.

For career development response from postgraduates was more (i.e., 67.78%) followed by 59.26% faculty, 41.67% undergraduates where as, none of the research scholars responded to this question.

The internet/websites were used for research work by 100% research scholars, 88.89% faculty, 1.15% undergraduates and 4.44% postgraduate.

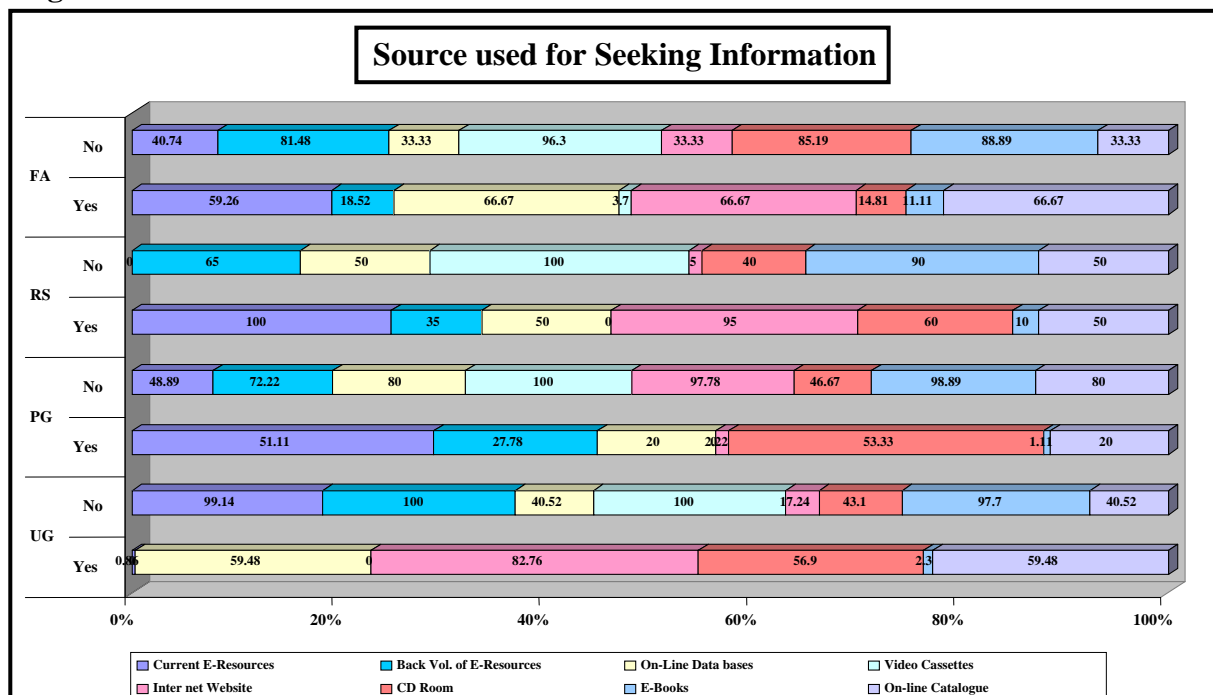
Above 85% respondent answered in positive that they use internet/websites for finding relevant information. For entertainment, positive response was below 30%.

From the Table No. 5.3.17 the total data users showed that 96.49% were using internet/website for finding relevant information, 93.61% for e-mail, 54.23% for career development, 23.09% for entertainment, where as for research work only 10.72% users answered positive.

**Table No 5.3.18 Source used for Seeking Information**

Seeking Information form	UG		PG		RS		FA		Total	
	Yes	No	Yes	No	Yes	No	Yes	No	Yes	No
Current E-Resources	3 (0.86)	345 (99.14)	46 (51.11)	44 (48.89)	20 (100)	-	16 (59.26)	11 (40.74)	85 (17.53)	400 (82.47)
Back Vol. of E-Resources	-	348 (100)	25 (27.78)	65 (72.22)	7 (35.00)	13 (65.00)	5 (18.52)	22 (81.48)	37 (7.63)	448 (92.37)
On-Line Data bases	207 (59.48)	141 (40.52)	18 (20.00)	72 (80.00)	10 (50.00)	10 (50.00)	18 (66.67)	9 (33.33)	253 (52.16)	232 (47.84)
Video Cassettes	-	348 (100)	-	90 (100)	-	20 (100)	1 (3.70)	26 (96.30)	1 (0.21)	484 (99.79)
Inter net Website	288 (82.76)	60 (17.24)	2 (2.22)	88 (97.78)	19 (95.00)	1 (5.00)	18 (66.67)	9 (33.33)	327 (67.42)	158 (32.58)
CD Room	198 (56.90)	150 (43.10)	48 (53.33)	42 (46.67)	12 (60.00)	8 (40.00)	4 (14.81)	23 (85.19)	262 (54.02)	223 (45.98)
E-Books	8 (2.30)	340 (97.70)	1 (1.11)	89 (98.89)	2 (10.00)	18 (90.00)	3 (11.11)	24 (88.89)	14 (2.89)	471 (97.11)
On-line Catalogue	207 (59.48)	141 (40.52)	18 (20.00)	72 (80.00)	10 (50.00)	10 (50.00)	18 (66.67)	9 (33.33)	253 (52.16)	232 (47.84)

**Figure No 5.3.18**



The users were asked about the sources from which they draw information. The data shows that **current e-journals** were used by undergraduates 3 (0.86%) and 345 (99.14%) did not use it, postgraduates 46 (51.11%) users responded for yes and 44 (48.89%) responded no, 20 (100%) research scholars said they used current e-journals while 16 (59.26%) faculty said yes and 11 (40.74%) said they did not use it. It has been found that research scholars, faculty and postgraduates used more current e-journals as compared to undergraduates.

The 348 (100%) undergraduates said that they do not use **back volume of e-journals**, 25(27.78%) postgraduates said they used back volume of e-journals while 65 (72.22%) responded in negative. Research scholars 7(35%) responded positive and 13 (65%) gave negative response, 5 (18.52%) faculty members answered yes and 22 (81.48%) answered no. It has been found that all the users make less use of back volume of e-journals.

The **on-line data bases** were used by 207 (59.48%) undergraduates and 141 (40.52%) did not make use of it, 18 (20%) postgraduates users said they used the on-line data basis, while 72 (80%) did not, 10 (50%) research scholars were using the online data bases. 18 (66.67%) faculty used it and 9(33.33%) didn't. The results indicate that undergraduates, research scholars and faculty members were using online data bases more as compared to postgraduates.

Almost all the users said that they do not use the **video cassettes**, only 1 (3.70%) faculty was using it. The internet websites were used by 288 (82.76%) undergraduates, (2.22%) postgraduates, 19 (95%) researches scholars and 18 (66.67%) faculty members. It has been found from the data that undergraduates, research scholars and faculty used internet website more as compared to postgraduates.

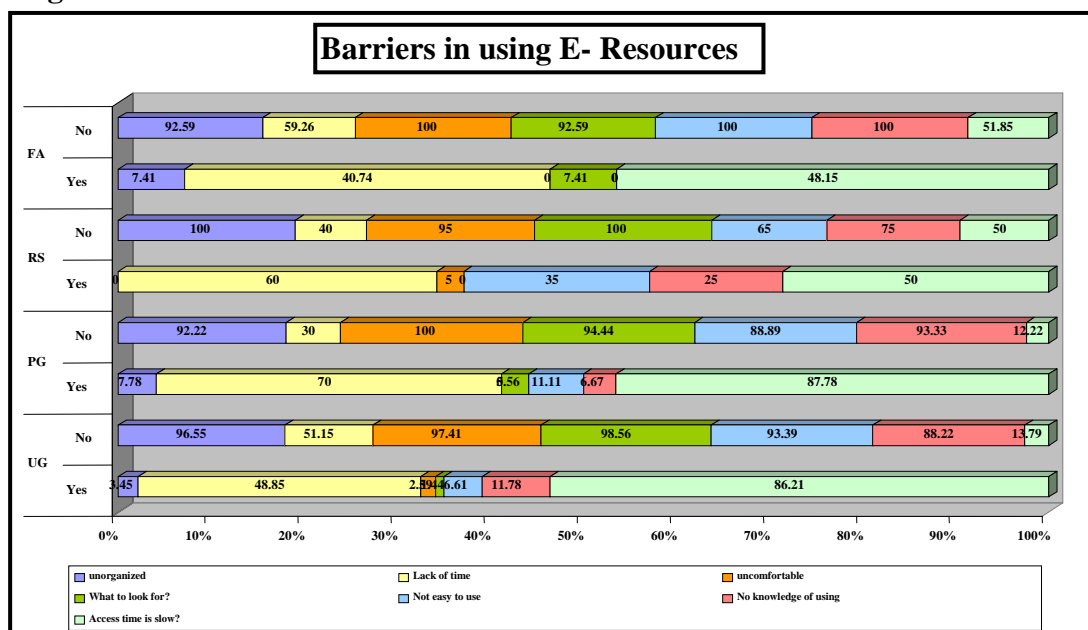
The **CD-ROM** were used by 198 (56%) undergraduates and 12 (60%) research scholars and 4 (14.81%) faculty member. It has been found from the data that undergraduates, postgraduates, research scholars used CD-ROM resources more as compared to faculty, The **OPAC** is used by 207 (59.48%) undergraduates, 18 (20%) postgraduates and, 10 (50%) research scholars, whereas 18 (33.33%) faculty members do not used it. It has been found that undergraduates used OPAC more as compared to others.

From the total population of the users, the results show that 253 (52.16%) users were using online database, 327 (67.42%) internet website, 262 (54.02%) CD-ROM and 253 (52.16%) OPAC.

**Table No 5.3.19 Barriers in using E- Resources**

Barriers in using E- Resources	UG		PG		RS		FA		Total	
	Yes	No	Yes	No	Yes	No	Yes	No	Yes	No
Unorganized	12 (3.45)	336 (96.55)	7 (7.78)	83 (92.220)	-	20 (100)	2 (7.41)	25 (92.59)	21 (4.33)	464 (95.67)
Lack of time	170 (48.85)	178 (51.15)	63 (70.0)	27 (30.0)	12 (60.0)	8 (40.0)	11 (40.74)	16 (59.26)	256 (52.78)	229 (47.22)
Uncomfortable	9 (2.59)	339 (97.41)	-	90 (100)	1 (5.00)	19 (95.0)	-	27 (100)	10 (2.06)	475 (97.94)
What to look for?	5 (1.44)	343 (98.56)	5 (5.56)	85 (94.44)		20 (100)	2 (7.41)	25 (92.59)	12 (2.47)	473 (97.53)
Not easy to use	23 (6.61)	325 (93.39)	10 (11.11)	80 (88.89)	7 (35.0)	13 (65.0)		27 (100)	40 (8.25)	445 (91.75)
No knowledge of using	41 (11.78)	307 (88.22)	6 (6.67)	84 (93.33)	5 (25.0)	15 (75.0)		27 (100)	52 (10.72)	433 (89.28)
Access time is slow?	300 (86.21)	48 (13.79)	79 (87.78)	11 (12.22)	10 (50.0)	10 (50.0)	13 (48.15)	14 (51.85)	402 (82.89)	83 (17.11)

**Figure No 5.3.19**



The users are using e-resources provided by their library, so they were asked what types of barriers they are facing while using e-resources. From figure 5.3.19 it is evident that 12 (3.45%) undergraduate users said that electronic information is **unorganized** and 336 (96.55%) did not agree with this, 7 (7.78%) postgraduates answered in positive and 83 (92.22%) answered no, 20 research scholars (100%) did not accept that e-resources information is unorganized, while 2 (7.41%) faculty response was yes and 25 (92.59) response was no. The results indicate that very less percentage of users felt that e-resources information is unorganized.

The users who said that they have **lack of time** for accessing e-resources were 170 (48.85%) undergraduates, 63 (70%) postgraduates, research scholars 12 (60%) and 11 (40.74%) faculty members. The lack of time is not a barrier for accessing e-resources was felt by 178 (51.15%) undergraduates, 27 (30%) postgraduates, 8 (40%) research scholars and 16 (59.26%) faculty. The data indicates that maximum number of users hold the point of view that they have lack of time for accessing e-resources.

The users who felt that while using e-resources they feel **uncomfortable** were only to 2.06%. Due to vast information sometimes users do **feel that what to look for**, 5 (1.44%) of undergraduates, 5 (5.56%) postgraduates, and 2 (7.41%) faculty felt that they have to think what to look for, but research scholars do not have the same feeling. It has been found that very less percentage of users feel that what kind of information they have to look for.

The data indicates that 23 (6.61%) undergraduates 10 (11.11%) postgraduates, 7 (35%) research scholars felt that electronic resources are **not easy to use** but the faculty shares different point of view. From the results it has been found that 41 (11.78%) undergraduates, 6 (6.67%) postgraduates and 5 (25%) research scholars responded in affirmative that they have **no knowledge of using e-resources** while faculty responded in negative.

Undergraduates 300 (86.21%), postgraduates 79 (87.78%), research scholars 10 (50%) and faculty 13 (48.15%) responded that accessing the information from **internet is slow**.

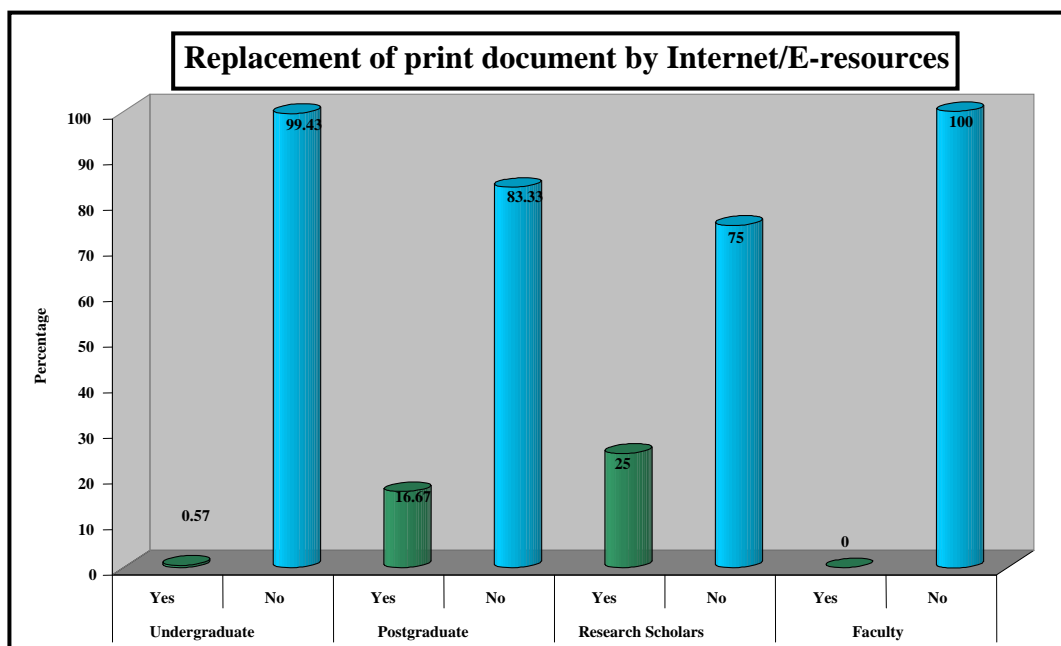
From the total population it has been revealed that 256 (52.78%) of users have lack of time for accessing e-resources and 402 (82.89%) users responded that accessing the information from internet is a slow process as compared to other barriers which is below 10 per cent.

**Table No 5.3.20 Replacement of print document by Internet/E-resources**

Respondents	Response		Total	Chi <sup>2</sup> (df;C)
	Yes N (%)	No N (%)	N (%)	
Undergraduates	2 (0.57)	346(99.43)	348 (100)	63.819** (30.341)
Postgraduates	15 (16.67)	75 (83.33)	90(100)	
Research Scholars	5 (25.00)	15 (75.00)	20(100)	
Faculty	-	27 (100.0)	27(100)	
Total	22 (4.54)	463(95.46)	485(100)	

\*\*Significant at 0.01

**Figurer No 5.3.20**



The users were asked whether internet/electronic resources can replace print documents. The response from the Figure No. 5.3.20 shows that 2(0.57%) of undergraduates response was yes and 346(99.43%) responded no, postgraduates 15(16.67%) answered in affirmative and 75 (83.33%) in negative, response from 15(75%) research scholars was yes, while faculty 27(100%) responded in negative. Thus, maximum numbers of users do not feel that internet/electronic resources can replace printed document.

The Table No. 5.3.20 shows that for users, the Chi-Square test for independence is significant at one per cent level of significance. The value of  $\chi^2$  is 63.819 and the degrees of freedom (df) is 3. The value of p shows statistically significant ( $p \leq 0.01$ ). This implies that there is a significant variation among the users as far as the replacement of internet/electronic with the printed document resources is concerned. The data shows that users don't feel that internet/electronic resources can replace printed document.

## 5.4 Punjab Engineering College, (PEC) (Deemed University) Chandigarh: Case study-4

**Table No. 5.4.1 Population taken for Survey**

Respondents	Total Strength	Questionnaire Distributed	Response Received N (%)
Undergraduates	1630	326	310 (79.69)
Postgraduates	276	55	50 (12.85)
Research Scholars	16	04	04 (1.02)
Faculty	134	28	25 (6.42)
Total	2056	413	389 (100)

**Figure No. 5.4.1**

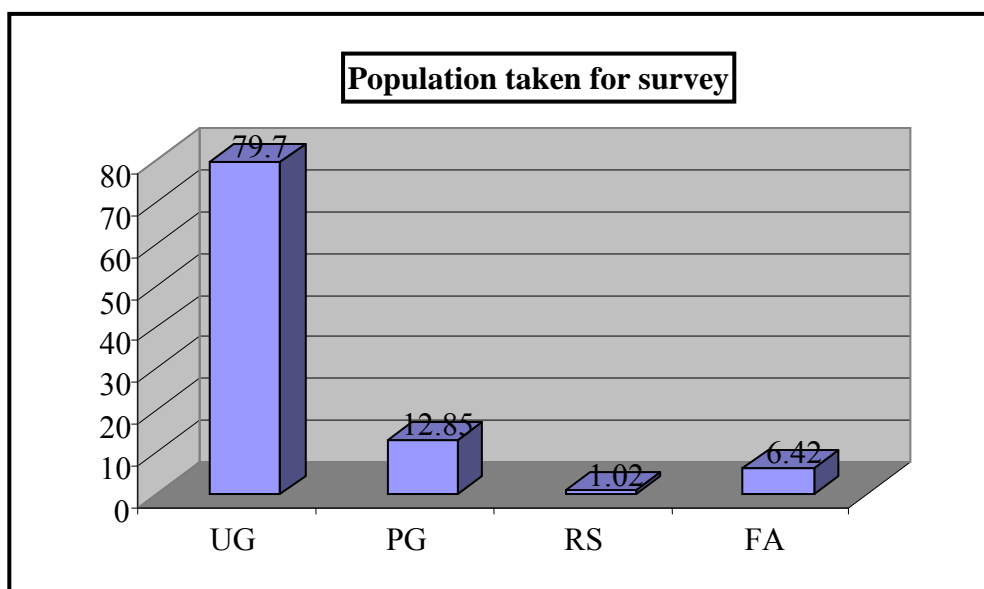


Table No.5.4.1 exhibits that the total population of the users taken up for the survey was 2056 which included undergraduates, postgraduates, research scholars and faculty. 413 questionnaires were distributed and 389 response was received. The questionnaires distributed to undergraduates were 326 and the response was 310. Similarly, 55 questionnaires were given to postgraduates and the response was received from 50. The response received from the research scholars was 100 per cent, whereas 25 faculty members out of 28 responded to the questionnaire.

**Table No. 5.4.2 Use of Institute Library**

Respondents	Response		Total N (%)	Chi <sup>2</sup> (df;C)
	Yes N (%)	No N (%)		
Undergraduates	310 (100)	-	310 (100)	6.797** (3;0.131)
Postgraduates	49 (98.00)	1 (2.00)	50 (100)	
Research Scholars	4 (100)	-	4 (100)	
Faculty	25 (100)	-	25 (100)	
Total	388 (99.74)	1 (0.26)	389 (100)	

\*\*Significant at 0.01

**Figure No. 5.4.2**

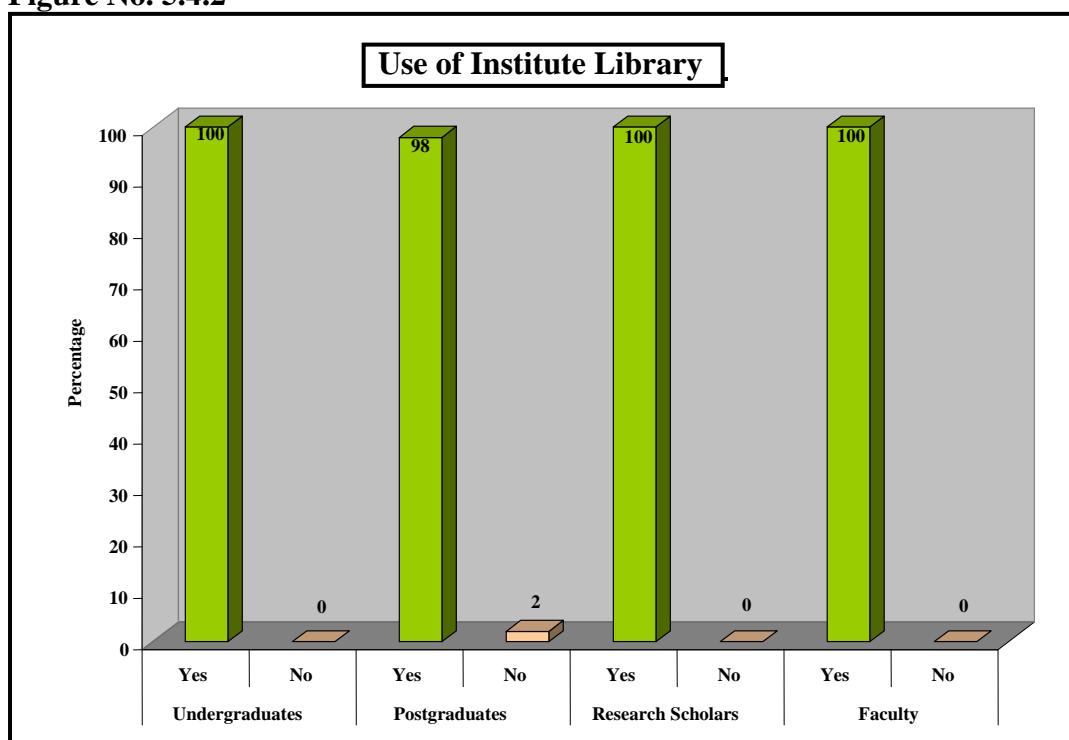


Figure No 5.4.2 shows the percentage of users surveyed. It has been found that undergraduates, research scholars and faculty used their library 100% while 49 (98.00%) postgraduates used the library and 1 (2.00%) did not use the library.

Table No.5.4.2 represents that majority of users 388 (99.74%) used the library. The Chi-Square value is a significant at one per cent level of significance, which indicates that there is a significant relationship among the users as far as the using of the institute library is concerned.

**Table No. 5.4.3 Awareness of library’s E-resources**

Respondents	Response		Total N (%)	Chi <sup>2</sup> (df;C)
	Yes N (%)	No N (%)		
Undergraduates	76 (24.52)	234 (75.48)	310 (100)	49.101** (3 ;0.335)
Postgraduates	19 (38.00)	31 (62.00)	50 (100)	
Research Scholars	4 (100)	-	4 (100)	
Faculty	21 (84.00)	4 (16.00)	25 (100)	
Total	120 (30.85)	269 (69.15)	389 (100)	

\*\*Significant at 0.01

**Figure No. 5.4.3**

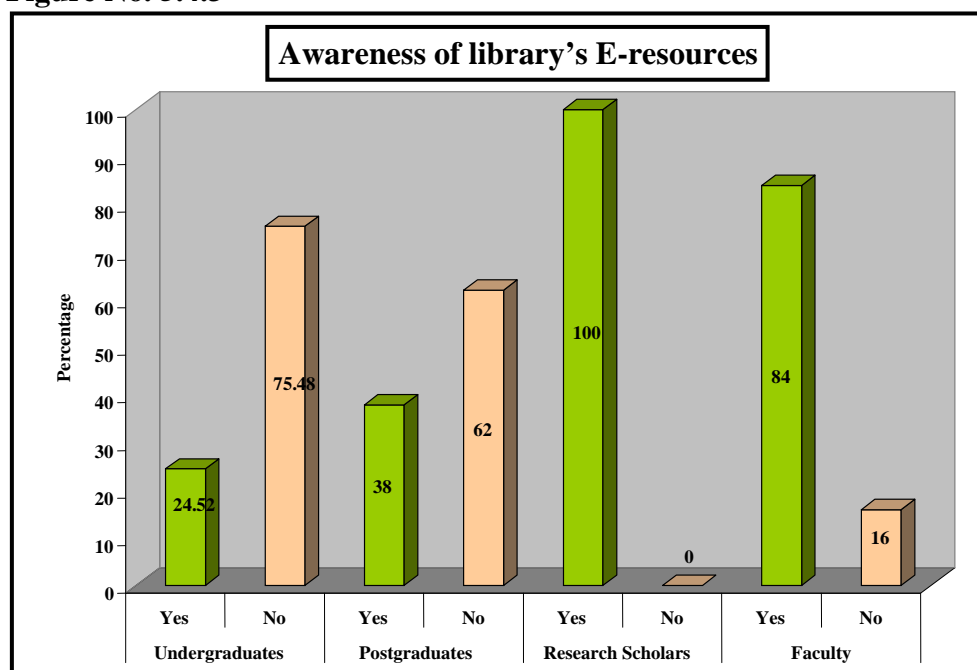


Figure No. 5.4.3 illustrates the response of respondents belonging to different categories with regard to their knowledge about the library’s electronic resources. It was found that a maximum proportion of the undergraduates, i.e., 234 (75.48%) were not aware about their library e-resources; where as the remaining 76 (24.52%) were aware about such resources. Similarly, among the postgraduates, a high proportion of them, i.e. 31(62.00%) were not aware about such resources, remaining 19(38.00%) were aware. On the other hand 100% research scholars were aware about the library e-resources. However, a large proportion of faculty members, i.e., 84.00% were aware about such e-resources, where as the remaining only 4(16.00%) were not aware about them. It is evident that maximum number of research scholars and faculty were aware of library e-resources as compared to undergraduates and postgraduates.

The data from Table No. 5.4.3 shows that from total 389 respondents 120 (30.85%) were aware and 269 (69.15%) were unaware of their library e-resources. Thus, maximum number of users did not have the knowledge about their library e-resources / services. The value of  $\chi^2$  is 49.101 and the degrees of freedom (df) is 3. The value of p is found to be statistically significant ( $P \leq 0.01$ ). The results of Chi-Square test is at significant value at 1 per cent level, shows there is a significant variation among the users as far as the awareness about e-resources/services provided by their library is concerned.

**Table No. 5.4.4 Users visiting library's website/ home page**

Respondents	Response		Total	Chi <sup>2</sup> (df;C)	
	Yes	N (%)	No		N (%)
Undergraduates	121	(39.03)	189	(60.97)	15.565** (3 ;0.196)
Postgraduates	15	(30.00)	35	(70.00)	
Research Scholars	-		4	(100)	
Faculty	18	(72.00)	7	(28.00)	
Total	154	(39.59)	235	(60.41)	

\*\*Significant at 0.01

**Figure No. 5.4.4**

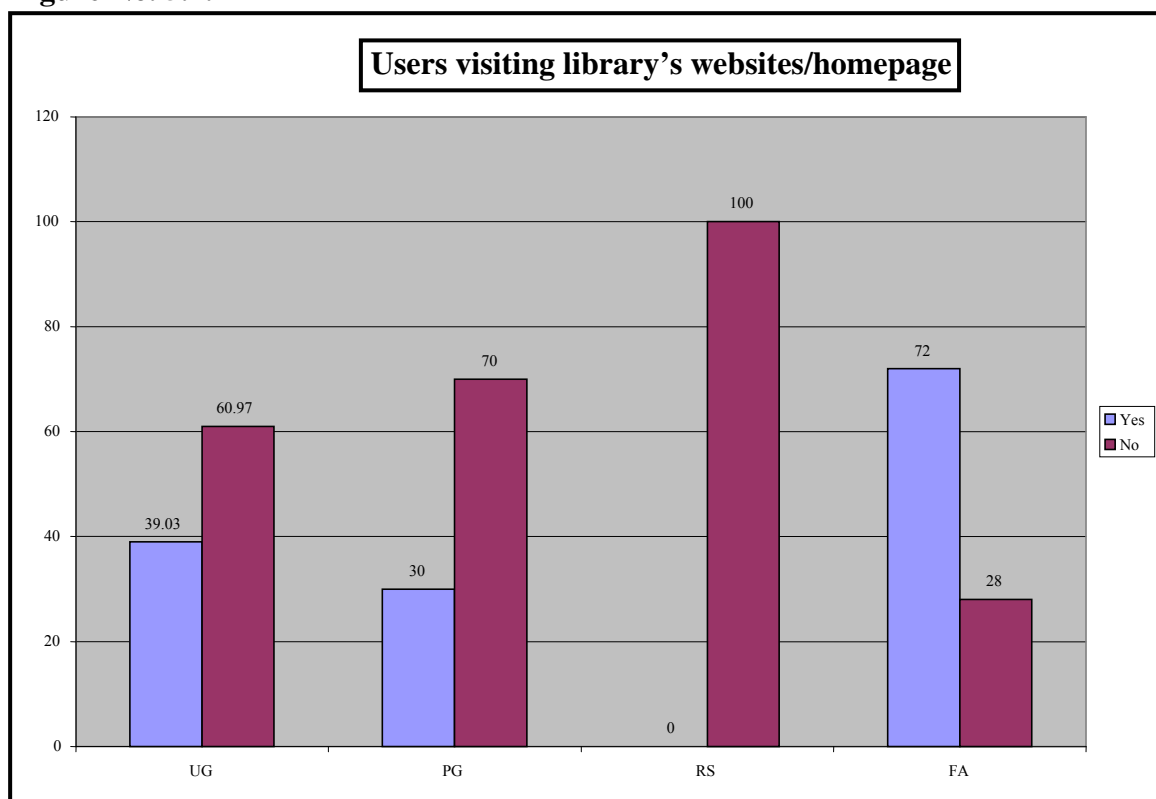


Figure No.5.4.4 shows the percentage of users who have visited their library website/homepage. There were 121 (39.03%) undergraduate respondents who had visited

their library website and 189 (60.97%) replied in negative, 15 (30.00%) postgraduates said yes and 35 (70.00%) responded in negative, while 100% research scholars answered negative, 18(72.00%) faculty answered yes and 7(28.00%) answered in negative. It has been found that faculty knows about website/home page more as compared to other users, on the other side 100% research scholar's response shows that they were totally unaware of this service.

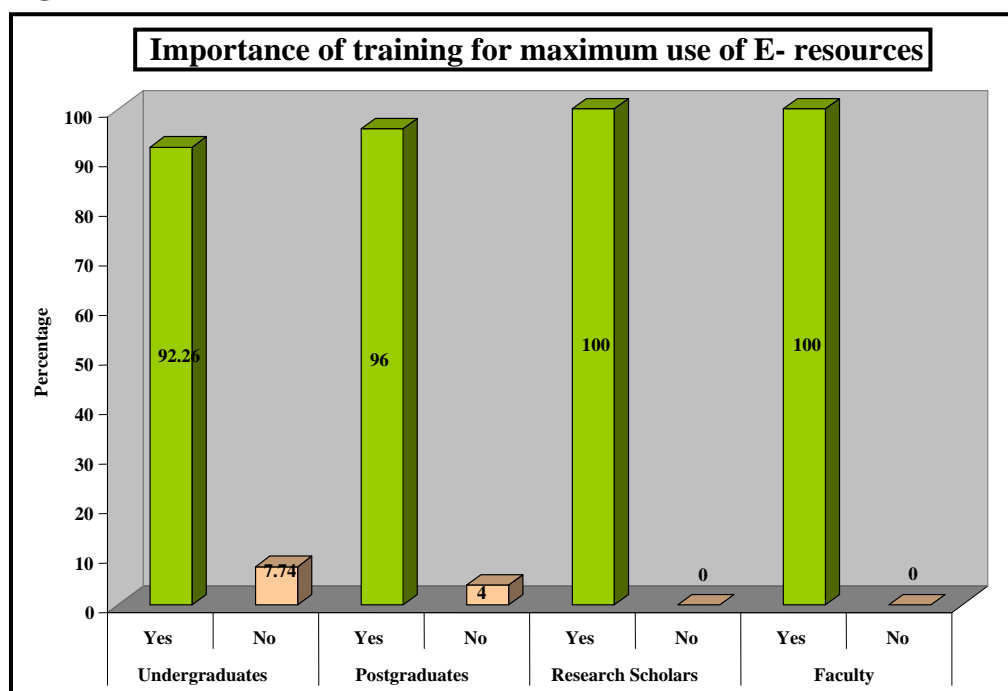
Tables No. 5.4.4 shows that the Chi-Square test for independence is significant at one percent level of significance .This implies that there is a significant variation among the users as far as visiting their library website/homepage is concerned. The results show that from 389 users at PEC institute, 154(39.59%) have visited their library websites and 235(60.41%) have not. Thus maximum numbers of users have not visited their library website/ homepage.

**Table No. 5.4.5 Importance of training for maximum use of E- resources**

Respondents	Response		Total N (%)	Chi <sup>2</sup> (df;C)	
	Yes	N (%)			No
Undergraduates	286	(92.26)	24	(7.74)	3.211** (3;0.090)
Postgraduates	48	(96.00)	2	(4.00)	
Research Scholars	4	(100)	-	-	
Faculty	25	(100)	-	-	
Total	363	(93.32)	26	(6.68)	

\*\*Significant at 0.01

**Figure No.5.4.5**



Respondents in this study were asked whether training is important to make maximum use of e-resources. Figures No. 5.4.5 shows that 286 (92.26%) undergraduates students said yes and 24 (7.74%) no. 48 (96.0%) postgraduates response was yes and that of 2 (4.0%) was no. Where as, the response from research scholars and faculty was 100% in positive. The result shows that maximum users felt that to make maximum use of e-resources institute library must provide training to them.

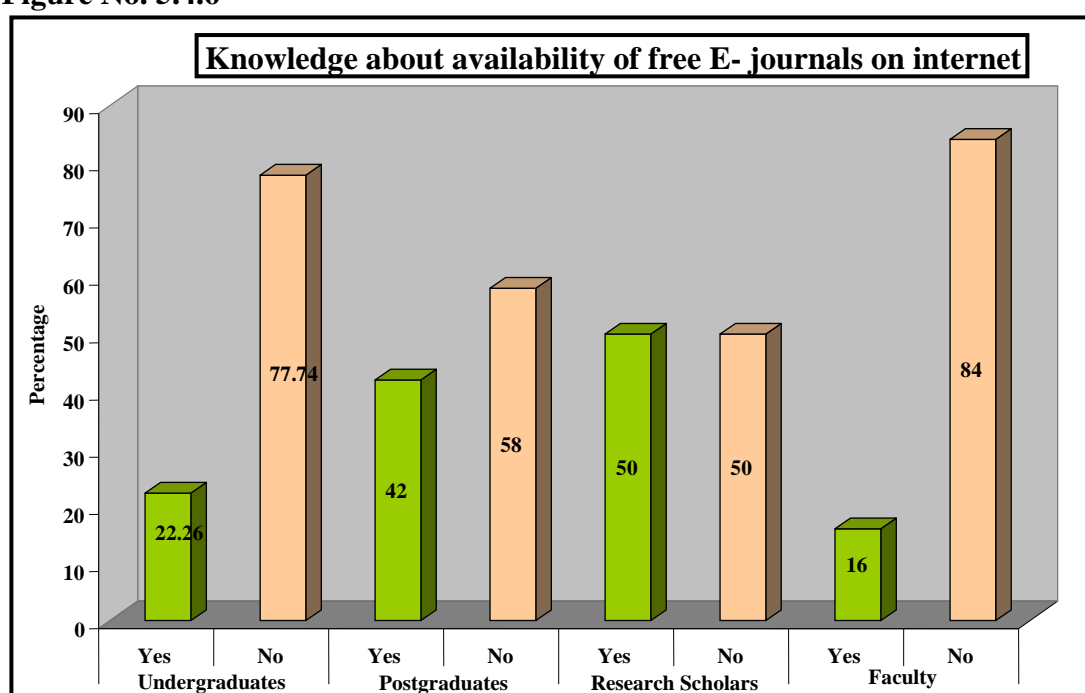
The Table No. 5.4.5 shows the Chi-Square test for independence is significant at 1 per cent level of significance. This implies that there is a significant variation among the users as far as the importance of training is needed for maximum use of e-resources is concerned. From 389 respondents it has been found that 363 (93.32%) responded in favors of training and 26 (6.68%) were not in favor of training to be provided. Thus the majority of the users are in favor of provision of training.

**Table No. 5.4.6 Knowledge about availability of free E- journals on internet**

Respondents	Response		Total N (%)	Chi <sup>2</sup> (df;C)
	Yes N (%)	No N (%)		
Undergraduates	69 (22.26)	241 (77.74)	310(100)	11.440** (3;0.169)
Postgraduates	48 (96.00)	2 (4.00)	50 (100)	
Research Scholars	2 (50.00)	2 (50.00)	4 (100)	
Faculty	4 (16.00)	21 (84.00)	25 (100)	
Total	96 (24.68)	293 (75.32)	389 (100)	

\*\*Significant at 0.01

**Figure No. 5.4.6**



The Figure No. 5.4.6 shows that in response to the question whether the users have the knowledge about availability of free electronic journals on the net, 69 (22.26%) undergraduates were found to have the awareness in this regard, whereas 241 (77.74%) were lacking this awareness. Similarly, 21 (42.0%) postgraduates responded yes and 29 (58.0%) responded no. However, the response of research scholars was 50:50 in this regard, while 4 (16.0%) faculty member's response was yes and 21 (84.00%) responded in no. The awareness about availability of free electronic journals among the research scholars and postgraduates was greater as compared to undergraduates and faculty.

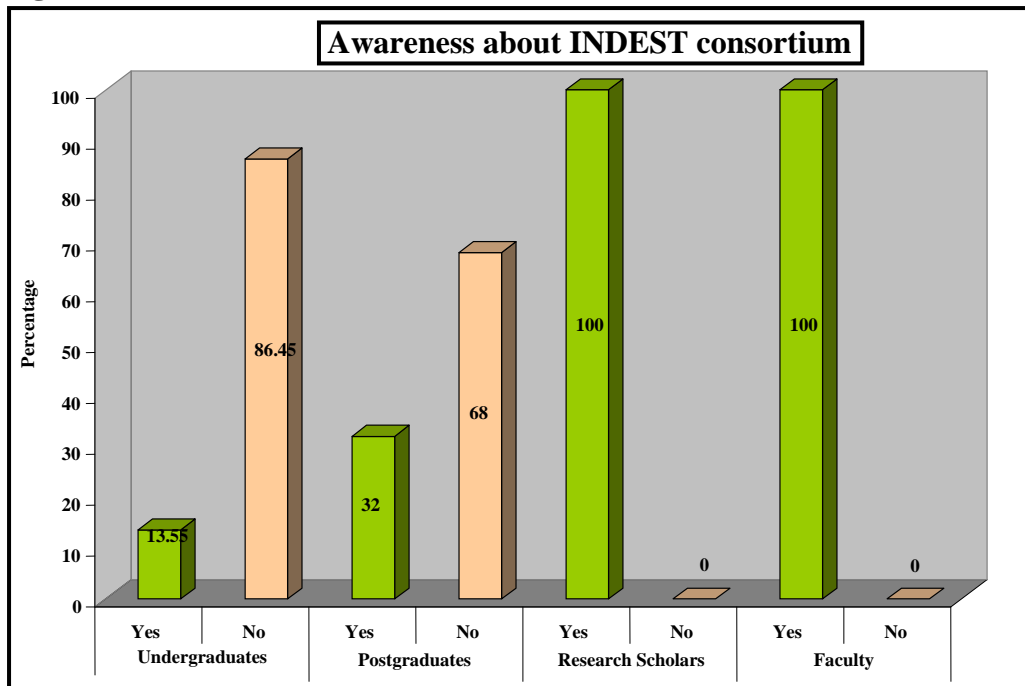
The Table No. 5.4.6 clearly shows that maximum numbers of users did not have the knowledge about availability of free e-journals on the net. The Chi-Square test for independence is significant at 1 per cent level. It implies that there is a significant variation among the users as the knowledge of availability of free e-journals on the net is concerned. The data provides that out of the total 389 respondents, 96 (24.68%) responded positively and 293 (75.32%) responded negatively. This shows that maximum of users were not aware about the free e-journals/portals on the net.

**Table No. 5.4.7 Awareness about INDEST consortium**

Respondents	Response		Total N (%)	Chi <sup>2</sup> (df;C)
	Yes N (%)	No N (%)		
Undergraduates	42 (13.55)	268(86.45)	310 (100)	117.218** (3 ;0.481)
Postgraduates	16 (32.00)	34 (68.00)	50 (100)	
Research Scholars	4 (100)	-	4 (100)	
Faculty	25 (100)	-	25 (100)	
Total	87 (22.37)	302 (77.63)	389 (100)	

\*\*Significant at 0.01

**Figure No. 5.4.7**



The Institute library under study subscribes to various e-journals/portals for its users under INDEST consortium. Figure No.5.4.7 shows that in response to the question whether the respondents have heard the name of INDEST consortium and know about its working. Majority of the undergraduates, i.e., 168 (86.45%) responded negatively, whereas the remaining 42 (13.55%) of them responded positively. Similarly, a high proportion of postgraduates, i.e., 34 (68.00%) responded positively. However, all the research scholars and faculty members responded that they have heard the name of INDEST consortium and know about its working. It has been seen that research scholars and faculty were fully aware about INDEST consortium.

Table No.5.4.7 shows that from 389 users, maximum numbers of users 302 (77.63%) were not aware of INDEST consortium. Only 87 (22.37%) were aware of it. The value of  $\chi^2$  is 117.218 and the degree of freedom (df) is 3. The value of p found to be statistically significant ( $p \leq 0.01$ ). The Chi-Square test of independence is significant at 1 per cent level of significance. This implies that there is a significant variation among the users as far as the awareness of INDEST consortium is concerned.

**Table No. 5.4.8 Use of INDEST Consortium**

Respondents	Response		Total N (%)	Chi <sup>2</sup> (df;C)
	Yes N (%)	No N (%)		
Undergraduates	-	42 (100)	42 (100)	53.605** (3;0.617) NR:302 (77.63%)
Postgraduates	3 (18.75)	13 (81.25)	16 (100)	
Research Scholars	13 (81.25)	4 (100)	17 (100)	
Faculty	19 (76.00)	6 (24.00)	25 (100)	
Total	26 (29.89)	61 (70.11)	87 (100)	

\*\*Significant at 0.01

**Figure No. 5.4.8**

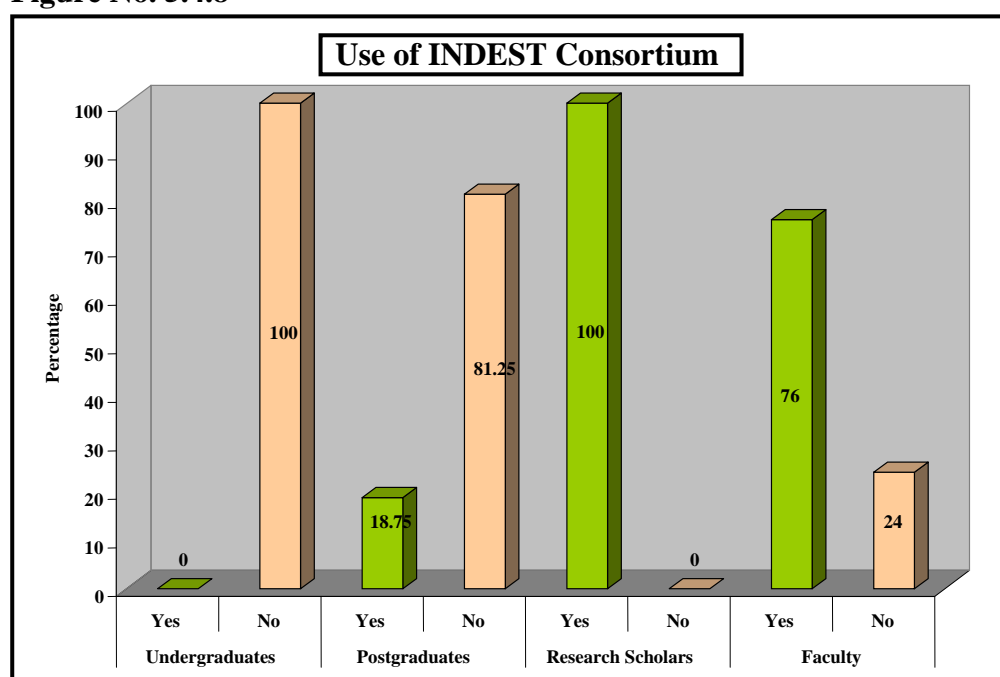


Figure No. 5.4.8 shows the response of users regarding the use of INDEST consortium. It has been found that none of the respondents used the e-resources. Similarly, a high proportion of postgraduates, i.e., 13 (81.25%) did not use such e-resources, whereas the remaining 3(18.75%) used these resources. However, 100 per cent of the research scholars were using e-resources from INDEST consortium. Among the faculty members, 19 (76.0%) of them used the e-resources, whereas the remaining 6 (24.0%) did not use such resources. Further, it has been found that research scholars and faculty used these e-resources more as compared to undergraduates and postgraduates.

Table No.5.4.7 shows that out of total 389 respondents, 302 (77.63%) users said no about awareness of INDEST and 87 responded to this question. From these 87, only 26 (29.89%) respondents were found to be aware about e-resources provided by their library,

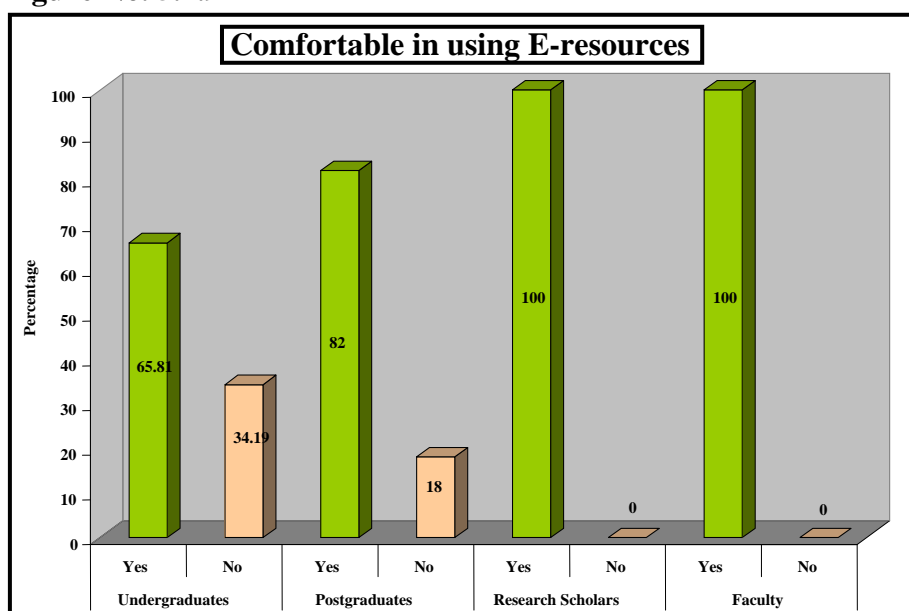
while 61 (70.11%) were not using them. Thus, majority of the users were not using the e-resources. The Chi-Square value is significant at 1 per cent level. This implies that there is a significant variation among the users as far as the use of e-resources is concerned.

**Table No. 5.4.9 Comfortable in using E-resources**

Respondents	Response		Total N (%)	Chi <sup>2</sup> (df;C)	
	Yes	N (%)			No
Undergraduates	204	(65.81)	106	(34.19)	18.574** (3;0.213)
Postgraduates	41	(82.00)	9	(18.00)	
Research Scholars	4	(100)	-		
Faculty	25	(100)	-		
Total	274	(70.44)	115	(29.56)	

\*\*Significant at 0.01

**Figure No. 5.4.9**



The respondents of the survey were asked whether they were comfortable in using electronic information resources or not. Figure No. 5.4.9 shows that 204 undergraduates (65.81%) replied positively and 106 (34.19%) answered in negative, 106 postgraduates (82.0%) said yes and 9 (18.0%) said no, whereas research scholars and faculty members responded 100% in positive. The result shows that research scholars and faculty were comfortable and they feel easy to use electronic information as compared to undergraduate and postgraduate users.

The Table No. 5.4.9 shows that majority of users were comfortable with electronic information i.e. 274 (70.44%) responded positively and 115 (29.56%) answered no. The

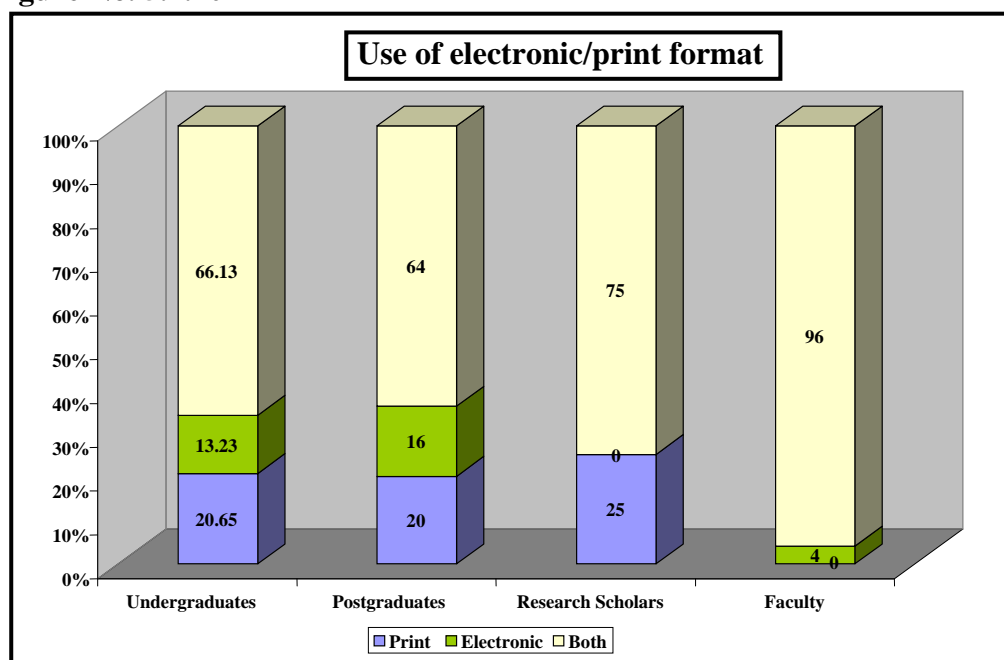
Chi-Square test for independence is significant at 1 per cent level of significance. This implies that there is a significant variation among the users as far as the comfort in using the electronic information is concerned.

**Table No. 5.4.10 Use of electronic/print format**

Document you prefer to use	UG N (%)	PG N (%)	RS N (%)	FA N (%)	Total N (%)	Chi <sup>2</sup> (df;C)
Print	64 (20.65)	10 (20.00)	1 (25.00)	-	75 (19.28)	10.852** (6;0.165)
Electronic	41 (13.23)	8 (16.00)	-	1 (4.00)	50 (12.85)	
Both	205 (66.13)	32 (64.00)	3 (75.00)	24 (96.00)	264 (67.87)	
Total	310 (100)	50 (100)	4 (100)	25 (100)	389 (100)	

\*\*Significant at 0.01

**Figure No. 5.4.10**



The library provides e-resources as well as print document. The availability of electronic information services from the library along with print document is an advantage for the users, as they have a choice to use these as per their convenience. From Figure No.5.4.10 it has been found that preference for only electronic document was less as compared to the choice for using print document and using both the format for getting information. The choice for using printed document by undergraduates was 64 (20.65%), postgraduate was 10 (20.0%) and research scholar was 1 (25.0%), where as faculty did not answered

this question. The response for using the electronic document from undergraduates was 41 (13.23%), postgraduates was 8 (16.0%) and faculty was 4.0% where as research scholars did not replied to it. Similarly the response for using both the formats from undergraduates was 66.13%, postgraduates were 64.0%, research scholar was 75.0% and from faculty it was 96.0%.

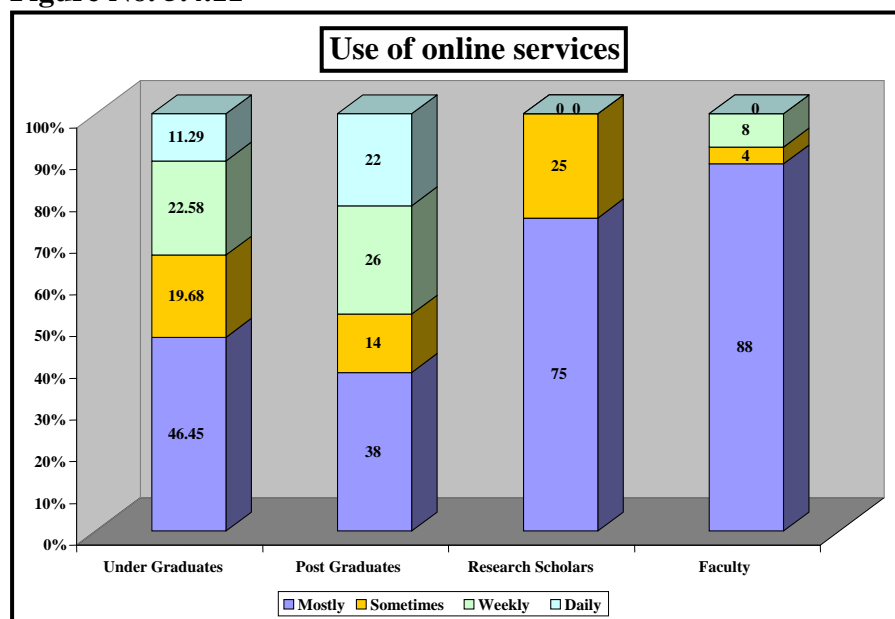
The Table No. 5.4.10 shows that out of 389 users the maximum response was 264 (67.87%) in the favors of document using both the formats as compared to printed and electronic only. The Chi-Square test for independence is significant at 1 per cent level of significance. The value of  $\chi^2$  is 10.852 and the degrees of freedom (df) is 6. The value of p shows statistically significant ( $P \leq 0.01$ ). This implies that there is a significant variation among the users as for the preference for use of the format of document is concerned.

**Table No. 5.4.11 Use of online services**

Using online services	UG N (%)	PG N (%)	RS N (%)	FA N (%)	Total N (%)	Chi <sup>2</sup> (df;C)
Mostly	144 (46.45)	19 (38.00)	3 (75.00)	22 (88.00)	188 (48.33)	25.241** (9 ;0.247)
Sometimes	61 (19.68)	7 (14.00)	1 (25.00)	1 (4.00)	70 (17.99)	
Weekly	70 (22.58)	13 (26.00)	-	2 (8.00)	85 (21.85)	
Daily	35 (11.29)	11 (22.00)	-	-	46 (11.83)	
Total	310 (100)	50 (100)	4 (100)	25 (100)	389 (100)	

\*\*Significant at 0.01

**Figure No. 5.4.11**



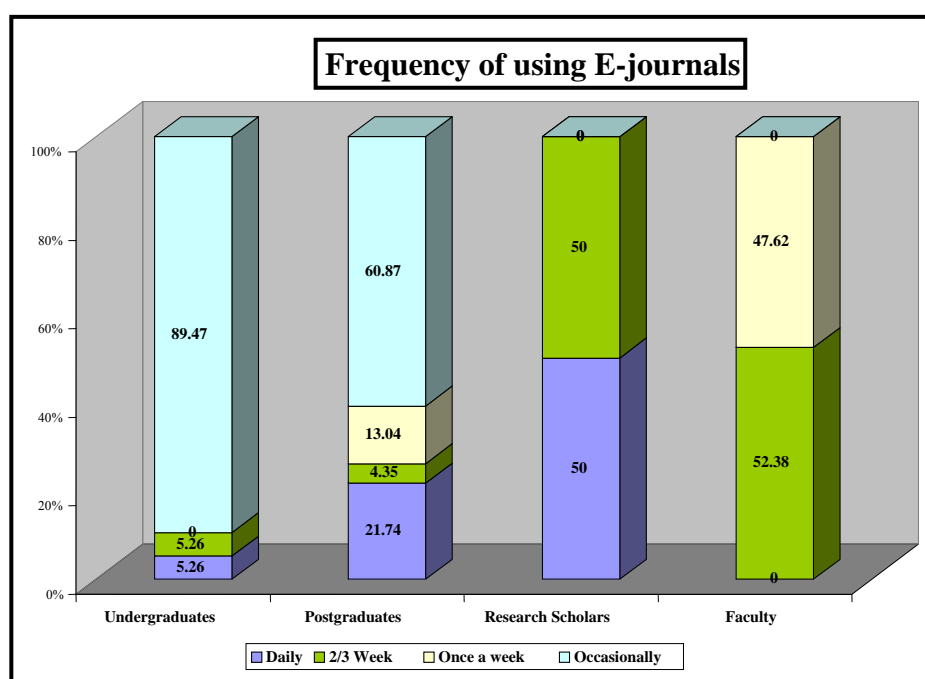
The respondents were asked how often they use on-line services. The response from Table No.5.4.11 shows that, 144 (46.45%) research scholars and 22 (88.00%) faculty members used on-line services mostly. While 61 (19.58%) undergraduates, 7(14.00%) postgraduates, 1(25.00%) research scholars and 1(4.00%) faculty used on-line services sometimes. Where as 70 (22.58%) undergraduates, 13 (26.00%) postgraduates and 3(8.00%) faculty used on-line services weekly. 35 (11.29%) undergraduates and 11(22.00%) postgraduates use on-line services daily. It has been found that maximum users use on-line services most of the time. From the total users survey, 188(48.33%) users use on-line services mostly, 70 (17.99%) sometimes, 85 (21.85%) weekly and 46 (11.83%) daily. The Chi-Square test for independence is significant at 1 per cent level of significance. The value of  $\chi^2$  is 25.241 and the degree of freedom (df) is 9. The value of p shows statistically significant ( $P \leq 0.01$ ). This implies that there is a significant variation among the users as far as the use of on-line services is concerned.

**Table No. 5.4.12 Frequency of using E-journals**

Using E-journals	UG N (%)	PG N (%)	RS N (%)	FA N (%)	Total N (%)	Chi <sup>2</sup> (df;C)
Daily	2 ( 5.26)	5 ( 21.74)	2 (50.00)	-	9 (10.47)	75.956** (9 ;0.685)
2/3 Week	2 (5.26)	1 ( 4.35)	2 (50.00)	11 (52.38)	16 (18.60)	
Once a week	-	3 (13.04)	-	10 (47.62)	13 (15.12)	
Occasionally	34 (89.47)	14 (60.87)	-	-	48 (55.81)	
Total	310 (100)	50 (100)	4 (100)	25 (100)	389 (100)	

\*\*Significant at 0.01

**Figure No. 5.4.12**



The users were asked how frequently they are using the electronic journals. Figure No. 5.4.12 reveals that very few users used e-journals daily and once a week. The e-journals are used maximum by users occasionally and 2/3 times a week. The data reveals that 2 (5.26%) undergraduates, 5 (21.74%) postgraduates, 2 (50.0%) research scholars used e-journals daily, where as 2 (5.26%) undergraduates, 1 (4.35%) postgraduates 2 (50.00%) research scholars and 11 (52.38%) faculty members used e-journals 2/3 times a week. It has been found that 3 (13.04%) postgraduates and 10 (47.62%) faculty members used e-journals once a week. While 34 (89.47%) undergraduates and 14 (60.87%), postgraduates used e-journals occasionally.

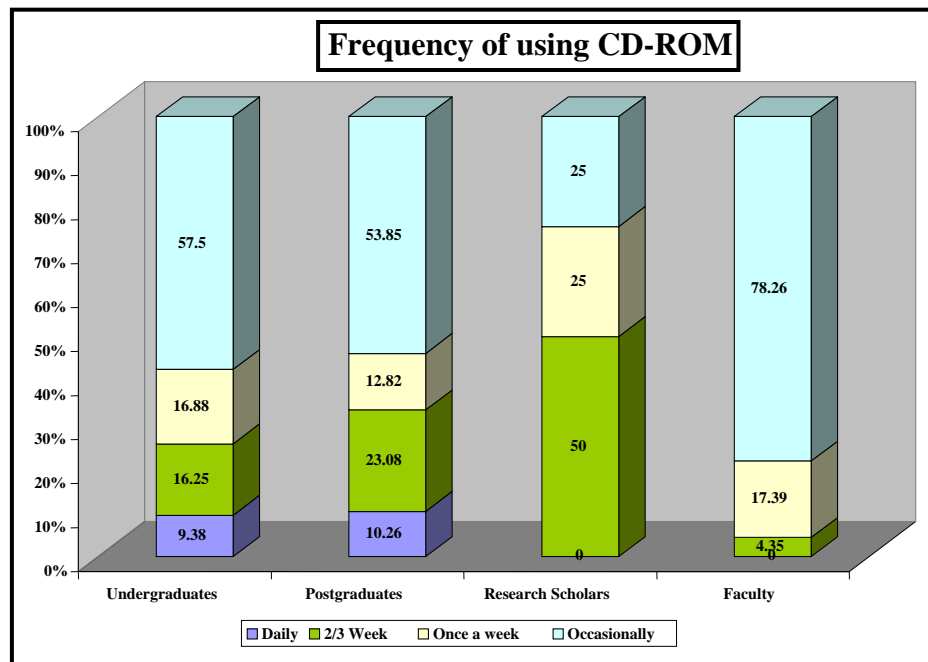
The Table No.5.4.12 shows that maximum no of users used e-journals occasionally and they are undergraduates and postgraduates. It has been found that the Chi-Square test for independence is significant at 1 per cent level of significance. The value of  $\chi^2$  is 75.956 and the degrees of freedom (df) is 9. The value of p shows statistically significant ( $P \leq 0.01$ ). The variation among the users has been found as far as the frequency of use of e-journals is concerned.

**Table No. 5.4.13 Frequency of using CD-ROM**

Using CD-ROM	UG N (%)	PG N (%)	RS N (%)	FA N (%)	Total N (%)	Chi <sup>2</sup> (df;C)
Daily	15 (9.38)	4 (10.26)	-	-	19 (8.41)	11.292** (9 ;0.218)
2/3 Week	26 (16.25)	9 (23.08)	2 (50.00)	1 (4.35)	38 (16.81)	
Once a week	27 (16.88)	5 (12.82)	1 (25.00)	4 (17.39)	37 (16.37)	
Occasionally	92 (57.50)	21 (53.85)	1 (25.00)	18 (78.26)	132 (58.41)	
Total	310 (100)	50 (100)	4 (100)	25 (100)	389 (100)	

\*\*Significant at 0.01

**Figure No. 5.4.13**



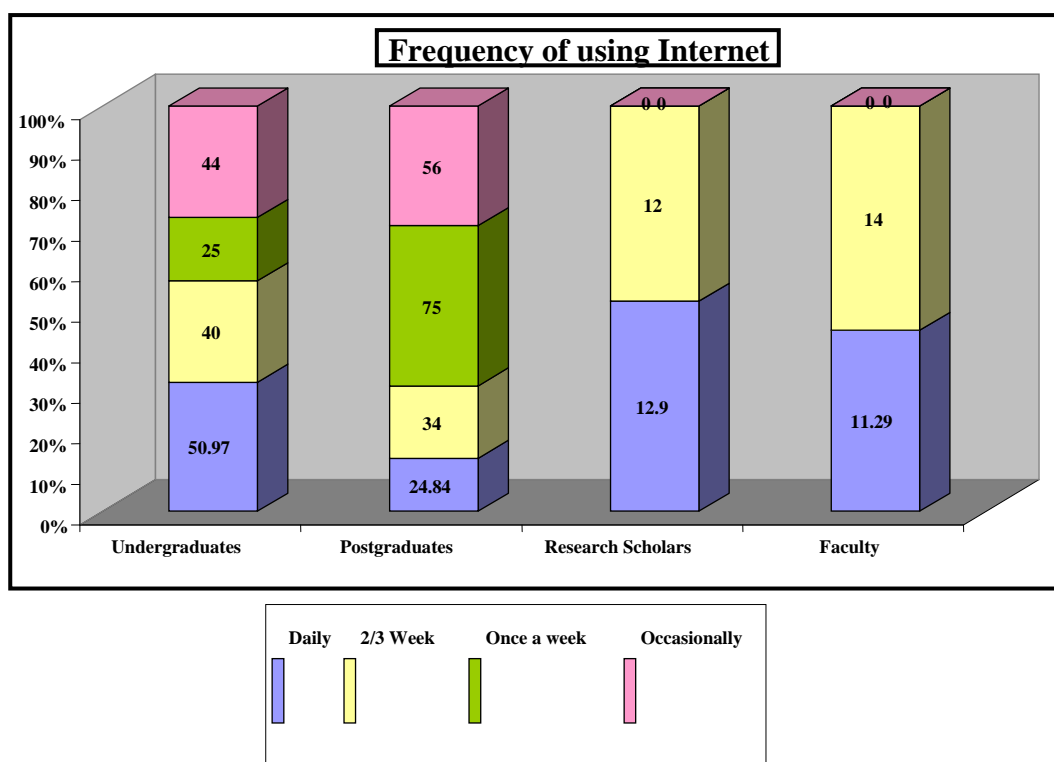
The Figure No.5.4.13 shows that CD-ROM is used daily by 15 (9.38%) undergraduates, 4 (10.26%) postgraduates while research scholars and faculty did not respond. The use of CD-ROM 2/3 times a week by 26 (16.25%) undergraduates, 9 (23.08%) postgraduates, 2(50%) research scholars and 1 (4.35%) faculty member. Respondents who use CD-ROM once a week are 27 (16.88%) undergraduates, 5 (12.82%) postgraduates, 1 (25.00%) research scholars and 4 (17.39%) faculty. 92 (57.50%) undergraduates, 21 (53.85%) postgraduates and 1 (25.00%) research scholars and 18 (78.26%) faculty members use CD-ROM occasionally. Thus CD-ROM services are used maximum by users occasionally as compared to other time. From 389 survey users, 19 (8.41%) use CD-ROM daily, 38 (16.81%) 2/3 times a week, 37(16.37%) once a week and 132 (58.41%) occasionally. The Chi-Square test for independence is significant at 1 per cent level of significance. The value of  $\chi^2$  is 11.292 and the degrees of freedom (df) is 9. The value of p shows statistically significant ( $P \leq 0.01$ ). The variation among the users has been found as far as use of the CD-ROM services is concerned.

**Table No. 5.4.14 Frequency of using Internet**

Using online services	UG N (%)	PG N (%)	RS N (%)	FA N (%)	Total N (%)	Chi <sup>2</sup> (df;C)
Daily	158 (50.97)	77 (24.84)	40 (12.90)	35 (11.29)	190 (48.84)	20.727* (9 ;0.225)
2/3 Week	20 (40.0)	17 (34.00)	6 (12.00)	7 (14.0)	111 (28.53)	
Once a week	1 (25.0)	3 (75.0)	-	-	46 (11.83)	
Occasionally	11 (44.0)	14 (56.0)	-	-	42 (10.80)	
Total	310 (100)	50 (100)	4 (100)	25 (100)	389 (100)	

\*\*Significant at 0.05

**Figure No. 5.4.14**



The users were asked how frequently they use the internet services provided to them. The Table No.5.4.14 shows that 158 (50.97%) undergraduates, 77 (24.84%) postgraduates, 40 (12.90%) research scholars and 35 (11.29%) faculty members use the internet services daily. While the internet is used 2/3 times a week by 20 (40.00%) undergraduates, 17 (34.00%) postgraduates, 6 (12.00%) research scholars and 7 (14.00%) faculty members. It has been found that 1 (25.00%) undergraduates and 3 (75.00%) postgraduates use internet once a week where as 11 (44.00%) of undergraduates and 14 (56.00%) postgraduates use occasionally. From the results it has been found that from the total survey population i.e. 399, the internet is used daily by 190 (48.84%), 2/3 times a week by 111 (28.53%) users 46 (11.83%) once a week and 42(10.80%) occasionally. Thus the result indicates that maximum users use internet services daily. The Chi-Square test for independence is

significant at 1 percent level of significance. The value of  $\chi^2$  is 20.727 and the degrees of freedom (df) is Q. The value of p shows statistically significant ( $P \leq 0.01$ ). This implies that there is a significant variation among the users as far as use of the internet is concerned.

**Table No. 5.4.15 Place used for accessing E-resources**

Place	UG N (%)		PG N (%)		RS N (%)		Faculty N (%)		Total N (%)	
	Yes	No	Yes	No	Yes	No	Yes	No	Yes	No
Department	22 (7.10)	288 (92.90)	7 (14.0)	43 (86.0)	4 (100)	-	25 (100)	-	58 (14.90)	331 (85.09)
Library	10 (3.23)	300 (96.77)	3 (6.0)	47 (94.0)	4 (100)	-	-	25 (100)	17 (4.37)	372 (95.63)
Hostel	19 (6.13)	291 (93.87)	5 (10.0)	45 (90.0)	4 (100)	-	-	25 (100)	28 (7.20)	361 (92.80)
Computer center	280 (90.32)	30 (9.68)	43 (86.0)	7 (14.0)	-	4 (100)	3 (12.0)	22 (88.0)	326 (83.80)	63 (60.20)

**Figure No. 5.4.15**

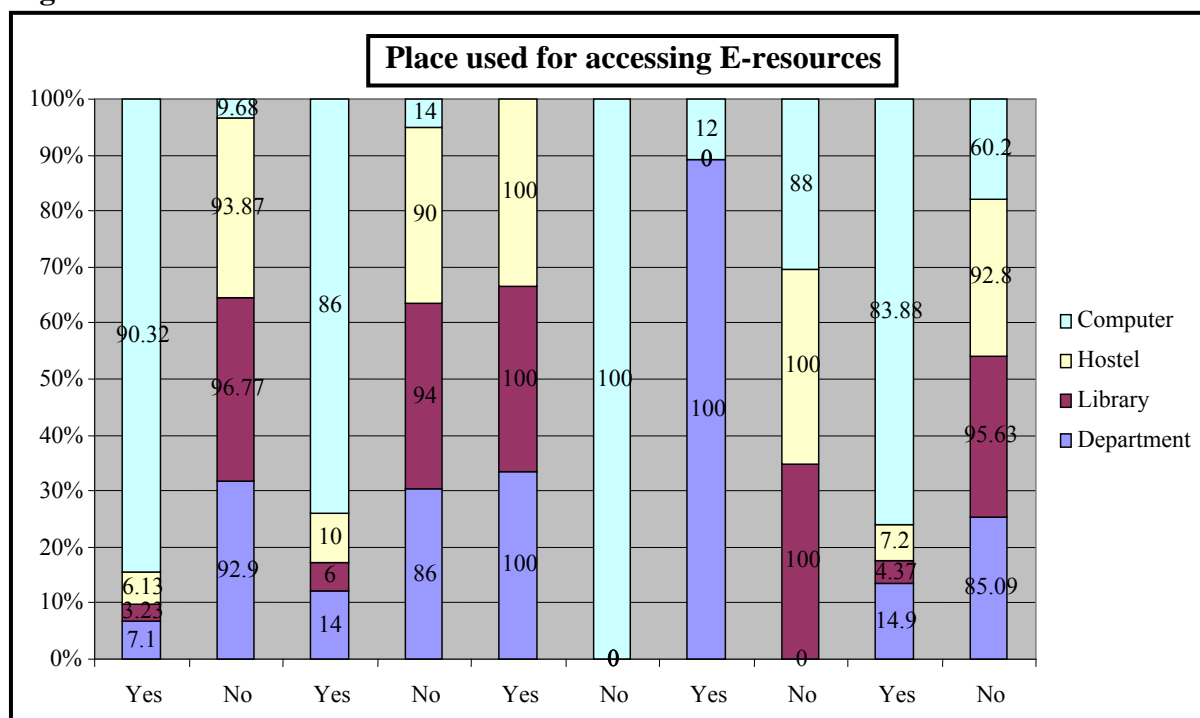


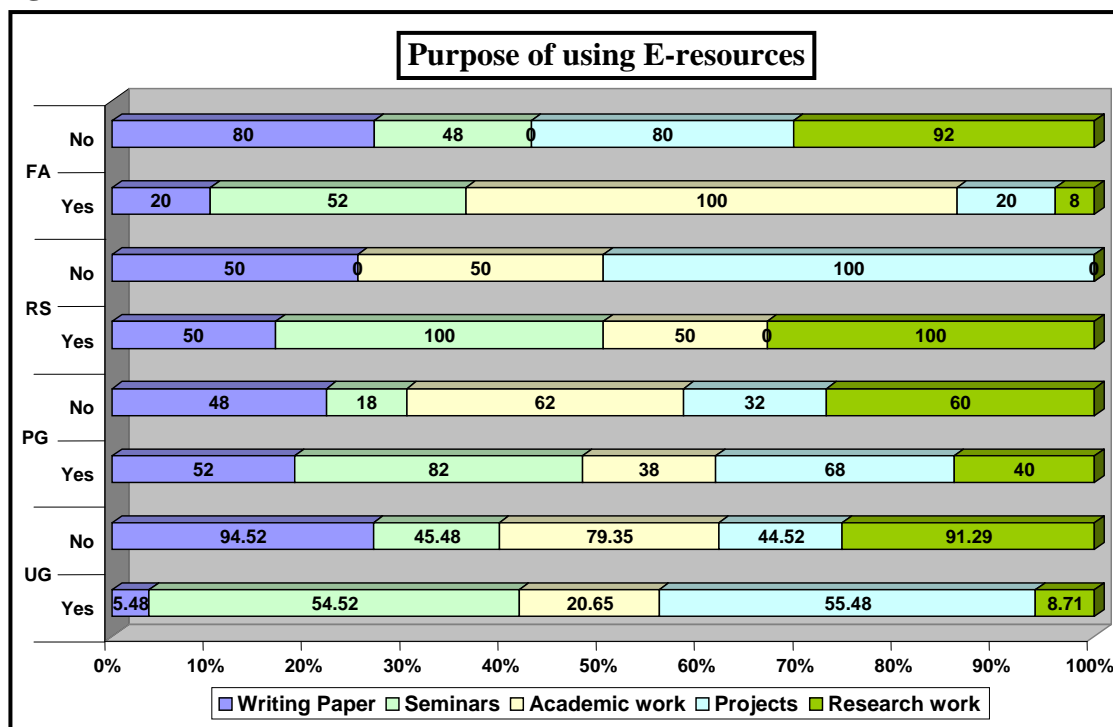
Table No. 5.4.15, it has been derived that users wise department was used by all the research scholars and faculty members. They all responded 100% in positive. Where as, only 7.10% undergraduates and 14% a postgraduate answered in positive. The library was used by only 3.23% undergraduates and 6% postgraduates. All the research scholars said

that they used library while faculty did not answer to the question. Similarly hostels were used for accessing e-resources by 100% research scholars, 10% postgraduate, 6.31% undergraduates. Faculty do not use hostel as a place for searching e-resources. Computer centre was used by 90.32% undergraduates, 86% postgraduates and 12% faculty members. Research scholars do not use computer centre for accessing e-resources. Thus the data of total users shows that 8.38% users used computer centre, 14.90% departments, 7% hostels and 4.37% were using library. It has been found that users from PEC used computer centre more as compared to library for accessing e-resources.

**Table No. 5.4.16 Purpose of using E-resources**

Use of E-Resources	UG N (%)		PG N (%)		RS N (%)		Faculty N (%)		Total N (%)	
	Yes	No	Yes	No	Yes	No	Yes	No	Yes	No
Writing Paper	17 (5.48)	293 (94.52)	26 (52.0)	24 (48.0)	2 (50.0)	2 (50.0)	5 (20.0)	20 (80.0)	50 (12.85)	339 (87.15)
Seminars	169 (54.52)	141 (45.48)	41 (82.0)	9 (18.0)	4 (100)	-	13 (52.0)	12 (48.0)	227 (58.35)	162 (41.65)
Academic work	64 (20.65)	246 (79.35)	19 (38.0)	31 (62.0)	2 (50.0)	2 (50.0)	25 (100)	-	110 (28.28)	279 (71.72)
Projects	172 (55.48)	138 (44.52)	34 (68.0)	16 (32.0)	-	4 (100)	5 (20.0)	20 (80.0)	211 (54.24)	178 (45.76)
Research work	27 (8.71)	283 (91.29)	20 (40.0)	30 (60.0)	4 (100)	-	2 (8.0)	23 (92.0)	53 (13.62)	336 (86.38)

**Figure No. 5.4.16**



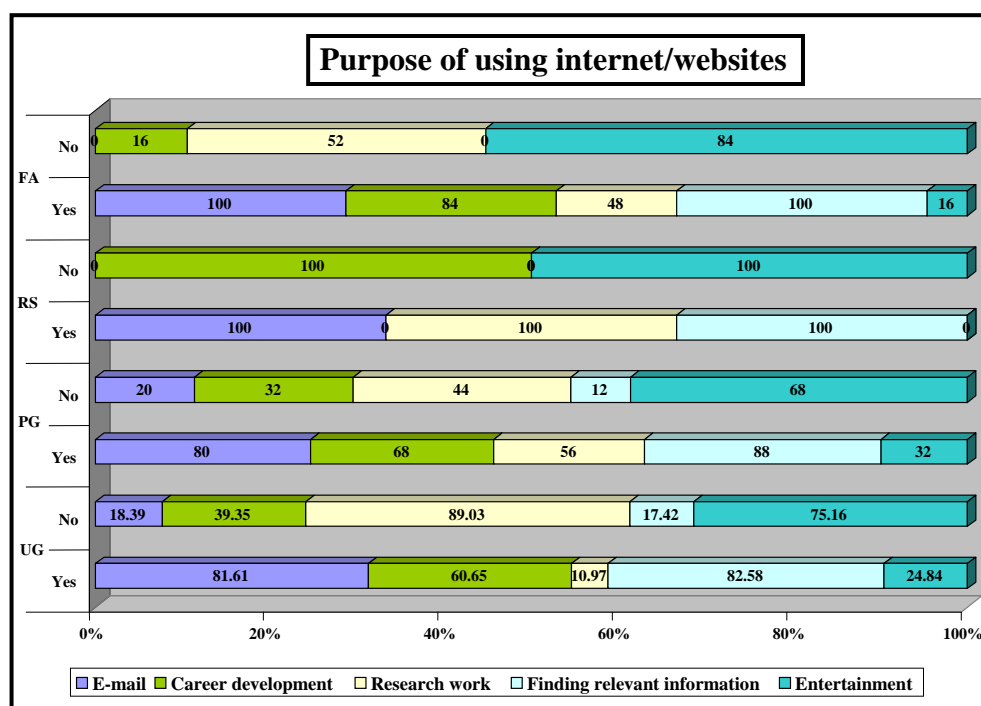
The e-resources are used for various purposes. The users were asked for what purpose they use e-journals and bibliographic database. Table No.5.4.16 shows that of the total respondents, maximum number of them, i.e., 339 (87.15%) did not use these e-resources for writing papers, where as the remaining 50 (12.85%) used for this purpose. As many as 227 (58.35%) used such e-resources for seminars, and the rest 162(41.65%) did not use for this purpose. Similarly, most of the respondents, i.e., 279 (71.72%) did not use e-resources for academic work, whereas the remaining 110 (28.28%) used for this purpose. It has been found that a greater number of respondents, i.e., 211 (54.24%) used library e-resources for the purpose of writing projects, whereas 178 (45.76%) were not using for this purpose. As many as 336 (86.38%) respondents were not using the library e-resources for the purpose of research work and only 53 (13.62%) of them were using these e-resources for research work.

**Table No. 5.4.17**

**Purpose of using internet/websites**

Purpose	UG N (%)		PG N (%)		RS N (%)		FA N (%)		Total N (%)	
	Yes	No	Yes	No	Yes	No	Yes	No	Yes	No
E-mail	253 (81.61)	57 (18.39)	40 (80.0)	10 (20.0)	4 (100)	-	25 (100)	-	322 (82.78)	67 (17.22)
Career development	188 (60.65)	122 (39.35)	34 (68.0)	16 (32.0)	-	4 (100)	21 (84.0)	4 (16.0)	243 (62.47)	146 (37.53)
Research work	34 (10.97)	276 (89.03)	28 (56.0)	22 (44.0)	4 (100)	-	12 (48.0)	13 (52.0)	78 (20.05)	311 (79.95)
Finding relevant information	256 (82.58)	54 (17.42)	44 (88.0)	6 (12.0)	4 (100)	-	25 (100)	-	329 (84.58)	60 (15.42)
Entertainment	77 (24.84)	233 (75.16)	16 (32.0)	34 (68.0)	-	4 (100)	4 (16.0)	21 (84.0)	97 (24.94)	292 (75.06)

**Figure No. 5.4.17**



The purposes of using the internet/website are e-mail, for career development, research work, finding relevant information and entertainment. From the Figure No. 5.4.17 it has been found that all the research scholars and faculty members were using e-mail where as e-mail services are used by 8.61% undergraduates and 80% postgraduates. For career development users answered in positive were 84% faculty member, 60.65% undergraduates and 68% postgraduates. Research scholars did not replied to the question.

For research work, the entire research scholars, 48% faculty, 56% postgraduates and 10.97% undergraduates answered in affirmative.

The use of internet/websites for finding relevant information was more. All the research scholars and faculty replied positive as compared to 82.58% undergraduates, 88% postgraduates. For entertainment, 24.84% of undergraduates 32% of postgraduates, 16% of faculty said yes and research scholars did not replied. From total users' data, it is evident that internet/websites were used by 84.58% for finding relevant information, 82.78% for e-mail, 62.47% for career development, 24.94% for entertainment and 20.05% for research work.

**Table No. 5.4.18 Sources used for seeking information**

Sources for seek information	UG N (%)		PG N (%)		RS N (%)		Faculty N (%)		Total N (%)	
	Yes	No	Yes	No	Yes	No	Yes	No	Yes	No
Current E-resources	8 (2.58)	302 (97.42)	29 (58.0)	21 (42.0)	4 (100)	-	16 (64.0)	9 (36.0)	57 (14.65)	332 (85.35)
Back Vol. of E-Resources	4 (1.29)	306 (98.71)	13 (26.0)	37 (74.0)	-	4 (100)	5 (20.0)	20 (80.0)	22 (5.66)	367 (94.34)
On-Line Data bases	151 (48.71)	159 (51.29)	26 (52.0)	24 (48.0)	3 (75.0)	1 (25.0)	18 (72.0)	7 (28.0)	198 (50.90)	191 (49.10)
Video Cassettes	8 (2.58)	302 (97.42)	-	50 (100)		4 (100)	-	25 (100)	8 (2.06)	381 (97.94)
Inter net Website	14 (4.52)	296 (95.48)	11 (22.0)	39 (78.0)	3 (75.0)	1 (25.0)	24 (96.10)	1 (4.00)	52 (13.37)	337 (86.63)
CD Room	151 (48.71)	159 (51.29)	20 (40.0)	30 (60.0)	3 (75.0)	1 (25.0)	1 (4.00)	24 (96.0)	175 (44.99)	214 (85.01)
E-Books	8 (2.58)	302 (97.42)	7 (14.0)	43 (86.0)		4 (100)	-	25 (100)	15 (3.86)	374 (96.14)
On-line Catalogue	4 (1.29)	306 (98.71)	6 (12.00)	44 (88.0)	4 (100)		1 (4.00)	24 (26.0)	15 (3.86)	374 (96.14)

**Figure No. 5.4.18**

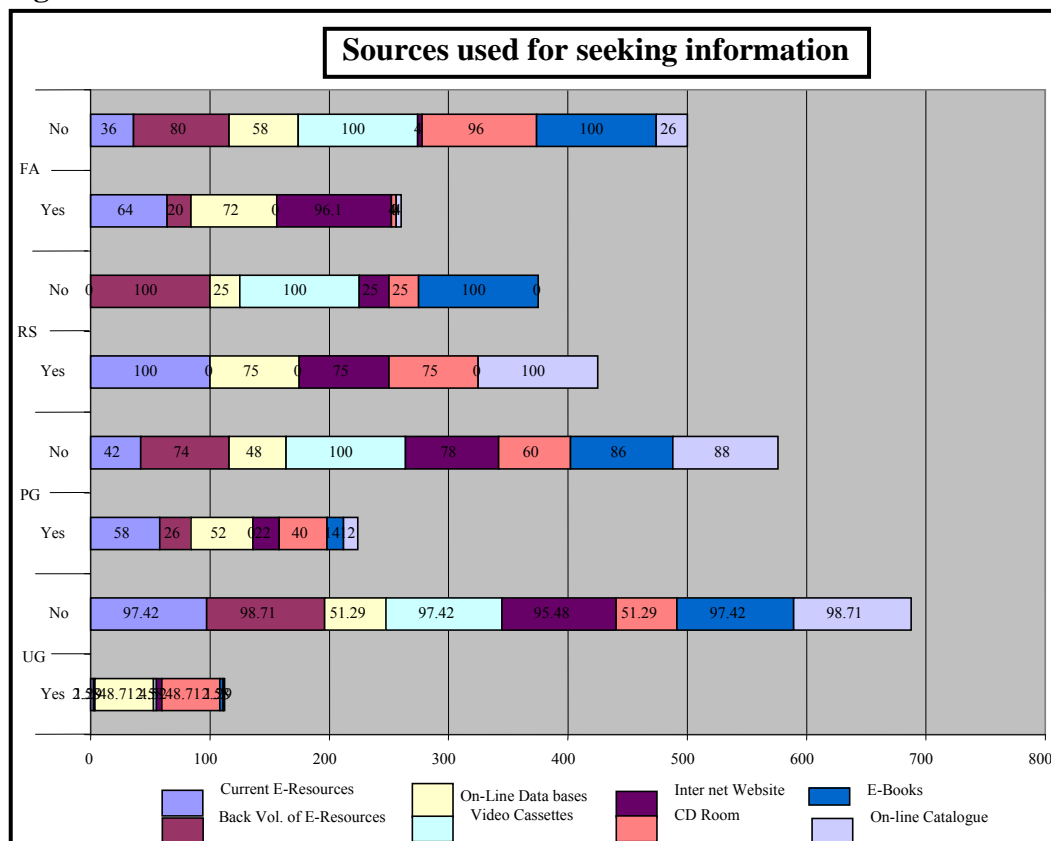


Table No. 5.4.18 shows that electronic sources used for seeking information 8 (2.58%) undergraduates used **current e-journals** as compared to 29 (58%) postgraduates, 16 (64%) faculty and 4 (100%) research scholars. From total response it has been reveals that only 14.65% users are using current e-journals.

The **back volumes of e-journals** are used very less as per the data shown i.e., 4 (1.29%) undergraduates, 26% postgraduates and 20% faculty members answered positive but 100% response was negative from research scholars. From total data it has been found that only 5.66% users are using back volumes of e-journals.

It has been found that 151 (48.71%) undergraduates, 26 (52%) postgraduates, 3 (75%) research scholars and 18 (72%) faculty members are using **online databases**. The results depict that from total users, 50.90% are using on-line databases services provided to them. The use of **video cassettes** for seeking information was 5% only 8(2.58%).

The **internet/websites** are used very less for getting information by users it has been seen from Figure No.5.4.18, that 14 (4.52%) undergraduates, 11 (22%) postgraduates, 3 (75%) research scholars and 24 (96%) faculty members answered positive. From total respondents it has been noted that only 52 (13.37%) users answered yes.

The response reveals that for use of **CD-ROM**, user who answered in positive are 151 (48.71%) undergraduates, 20 (40%) postgraduates, 3 (75%) research scholars and 1 (4%) faculty.

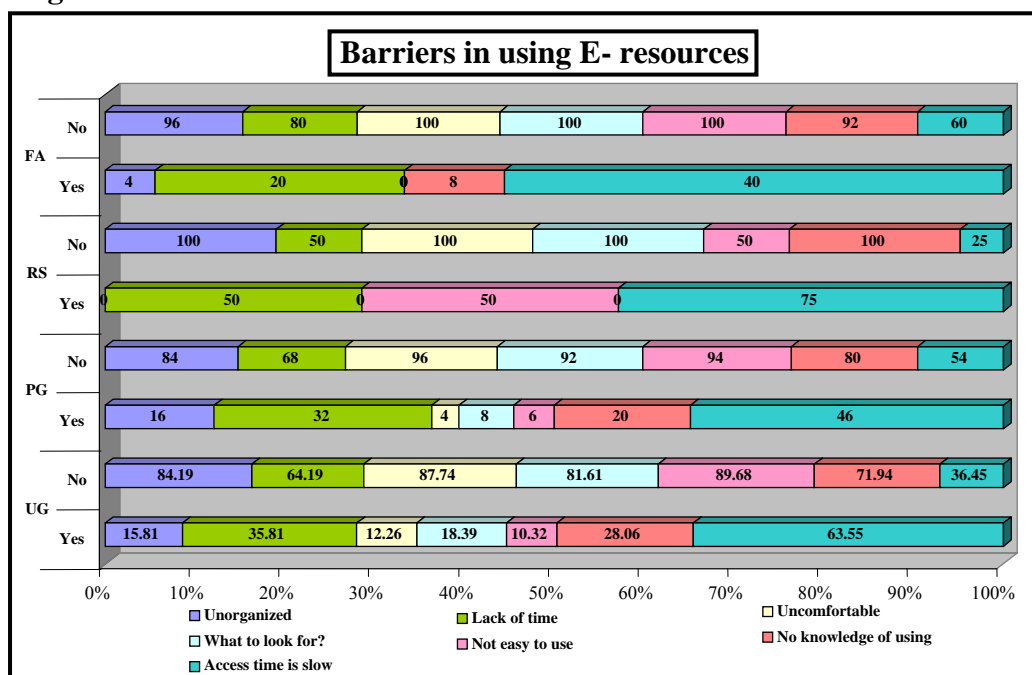
The response for use of **E-books** is very less i.e., below 5% only, 8 (2.58%) undergraduates and 43 (86%) postgraduates answered in positive while, research scholars and 100% faculty answered in negative.

The use of **on-line catalog** was less i.e., below 5%. The results depict that 4 (1.29%) undergraduates, 6 (12%) postgraduates, 1(4%) faculty and 4(100%) research scholars responded in positive.

**Table No. 5.4.19 Barriers in using E- Resources**

Barriers in using E- Resources	UG N (%)		PG N (%)		RS N (%)		FA N (%)		Total N (%)	
	Yes	No	Yes	No	Yes	No	Yes	No	Yes	No
Unorganized	49 (15.81)	261 (84.19)	8 (16.0)	42 (84.0)	- (100)	4 (100)	1 (4.0)	24 (96.0)	58 (14.91)	331 (85.09)
Lack of time	111 (35.81)	199 (64.19)	16 (32.0)	34 (68.0)	2 (50.0)	2 (50.0)	5 (20.0)	20 (80.0)	134 (34.45)	255 (65.55)
Uncomfortable	38 (12.26)	272 (87.74)	2 (4.0)	48 (96.0)	- (100)	4 (100)	- (100)	25 (100)	40 (10.28)	349 (89.72)
What to look for?	57 (18.39)	253 (81.61)	4 (8.0)	46 (92.0)	- (100)	4 (100)	- (100)	25 (100)	61 (15.68)	328 (84.32)
Not easy to use	32 (10.32)	278 (89.68)	3 (6.0)	47 (94.0)	2 (50.0)	2 (50.0)	- (100)	25 (100)	37 (9.51)	352 (90.49)
No knowledge of using	87 (28.06)	223 (71.94)	10 (20.0)	40 (80.0)	- (100)	4 (100)	2 (8.0)	23 (92.0)	99 (25.45)	290 (74.55)
Access time is slow	197 (63.55)	113 (36.45)	23 (46.0)	27 (54.0)	3 (75.0)	1 (25.0)	10 (40.0)	15 (60.0)	233 (59.90)	156 (40.10)

**Figure No. 5.4.19**



The users of Punjab Engineering College, Chandigarh use their library e-resources. While accessing these resources they also face difficulties. So they were asked what type of barriers they are facing while accessing the electronic information resources. From the Figure No.5.4.19 it is evident that 49 (15.81%) undergraduates said that electronic information is **unorganized** and 261 (84.19%) did not agree with this, 8 (16.00%) postgraduates answered in positive and 42 (84.00%) answered no, 4 (100%) research scholars did not agree with this point that e-resources information is unorganized, while 1 (4.00%) faculty members response was yes and 24(96.00%) responded no. The results indicate that very less percentage of users felt that e-resources information is unorganized.

The users who said that they have **lack of time** for accessing e-resources are 111 (35.81%) undergraduates, 16 (32.00%) postgraduates, 2 (50.00%) research scholars and 5 (20.00%) faculty members. The data indicates that maximum number of users hold the point of view that they don't face the problem of lack of time for accessing the information.

The users who said that while using e-resources they felt **uncomfortable** were very less, the result shows that 38 (12.26%) undergraduates, 1 (4.00%) postgraduates answered yes while 100% research scholars and faculty members answered in negative.

Due to vast information users do feel that they are confused and **feel what to look** for, only 51 (18.39%) undergraduates and 498% postgraduates answered in positive. Where as, 100% research scholars and faculty members answered in negative.

The data indicates that only 32 (10.32%) undergraduates, 3(6.00%) postgraduates, 2 (50.00%) research scholars, and the entire faculty said that they do feel easy in using e-resources. The knowledge of using electronic information resources helps users in providing to have maximum access. The users who feel they have **no knowledge of using** e-resources were 87 (28.06%) undergraduates, 10 (20.00%) postgraduates and 2 (8.00%) faculty while research scholars' response was 100% positive. The results of the data show that maximum users feel that **access time is slow**. 197 (63.55%) undergraduates, 23 (46.00%) postgraduates, 3 (75.00%) research scholars and 10 (40.00%) faculty member answered yes from the total population of the survey. It has been revealed that 58 (14.91%) users said e-resources information is unorganized and 331 (85.09%) replied in negative, 134 (34.45%) feel they have lack of time while 255 (65.55%) do not feel so. 40 (10.28%) feel uncomfortable and 349 (89.72%) do not feel so, 61 (15.68%) users said they feel what to look for where 328 (84.32%) answered negative, 37(9.51%) users said

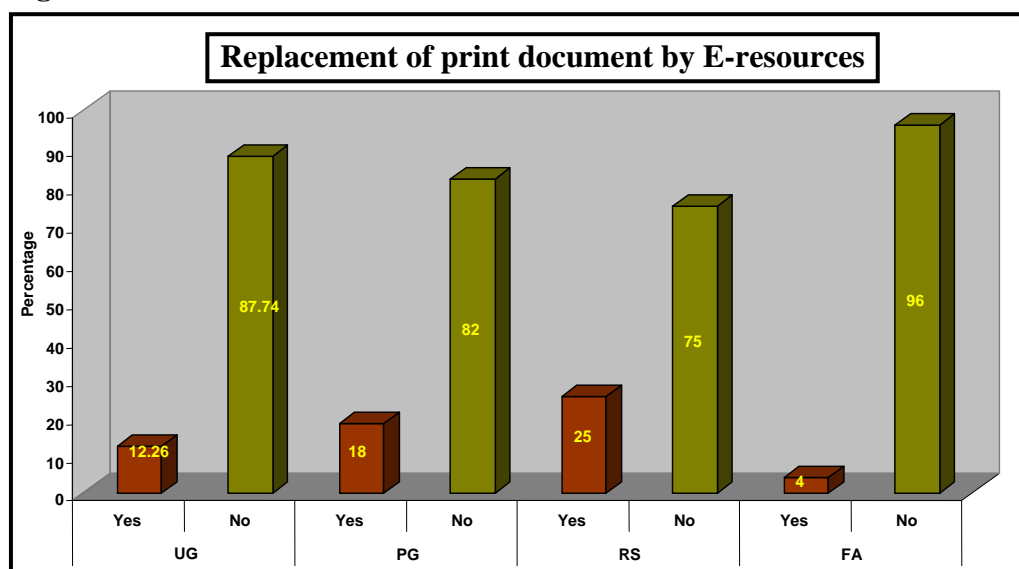
e-resources are not easy to use where as 352 (90.49%) answered they do not have any problem while using electronic information resources. 99 (35.45%) users have no knowledge of using these e-resource but 290 (74.55%) have knowledge of it. It has been seen that 233 (59.90%) users feels that when they access the information the speed is slow where as 156 (40.10%) replied in negative.

**Table No. 5.4.20 Replacement of print document by E-resources**

Respondents	Response		Total N (%)	Chi <sup>2</sup> (df;C)	
	Yes	N (%)			No
Undergraduates	38	(12.26)	272	(87.74)	3.595 (3;0.096)
Postgraduates	9	(18.00)	41	(82.00)	
Research Scholars	1	(25.00)	3	(75.00)	
Faculty	1	(4.00)	24	(96.00)	
Total	59	(100)	304	(100)	

No significant variation

**Figure No. 5.4.20**



To know from the users whether internet/electronic resources can replace print document. The response from the users shows Figure No.5.4.20 that 38 undergraduates (12.26%) response to yes and 272 (87.74%) response to no. The response from 9 postgraduates (18.00%) was yes and 41 (82.00%) was no, where as research scholars response to yes was 1 (25.00%) and 3 (75.00%) was in negative, same way 1 (4.00%) faculty responded for yes and 24 (76.00%) for no. The data shows that maximum numbers of users feel that internet/electronic resources cannot replace print document

Table No.5.4.20 shows that the Chi-Square test for users shows that there is no significant variation among the users as far as the view for replacement of electronic information resources with print document is concerned. From 389 respondents of the survey, 49 (12.60%) answered yes and 340 (87.40%) answered no. Thus maximum numbers of users don't feel that internet/electronic information can replace print document.

**PART-B COMPARATIVE STUDY**

Comparison Among the Institutes

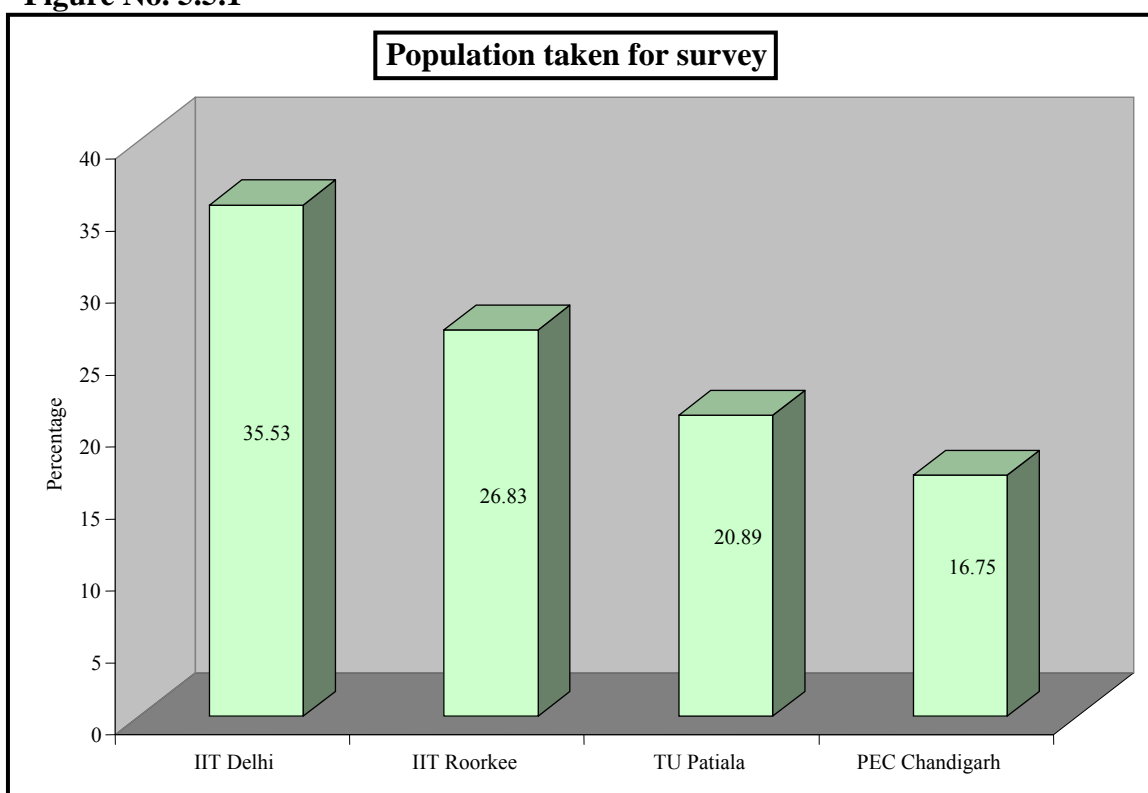
Comparison Among the Users

## 5.5 Comparison among the Institutes

**Table No. 5.5.1** Population taken for survey

Respondents	Total Strength	Questionnaire distributed	Response received
IIT, Delhi	4985	997	825(35.53)
IIT, Roorkee	3363	772	623(26.83)
TU, Patiala	2506	504	485(20.89)
PEC, Chandigarh	2056	413	389(16.75)
Total	12910	2686	2322(100)

**Figure No. 5.5.1**



The Table No.5.5.1 shows that the total population of all the four institutes was 12910. The questionnaires distributed to the users were 2686 and response received 2322. The data indicates that IIT, Delhi population was 4985, the questionnaires were distributed to 997 users and response received was 825. From the population of 3363 at IIT, Roorkee, the questionnaires were distributed to 772 and response received from them was 623. The population of TU, Patiala was 2506, questionnaires were distributed to 504 and response received was 485, while at PEC, Chandigarh population was 2056, 413 questionnaires

were distributed and response received was 389. From the total strength of 12910 at all the four institutes, questioners given were 2686 and response was received from 2322 users.

**Table No.5.5.2 Use of Institute Library**

Respondents	Response		Total N (%)	Chi <sup>2</sup> (df;C)
	Yes N (%)	No N (%)		
IIT, Delhi	769(93.21)	56(6.79)	825 (100)	36.675** (3;0.125)
IIT, Roorkee	605(97.11)	18 (2.89)	623 (100)	
TU, Patiala	472 (97.32)	13(2.68)	485 (100)	
PEC, Chandigarh	388 (99.74)	1(0.26)	389 (100)	
Total	2234 (96.21)	88 (3.79)	2322 (100)	

\*\*Significant at 0.01

**Figure No.5.5.2**

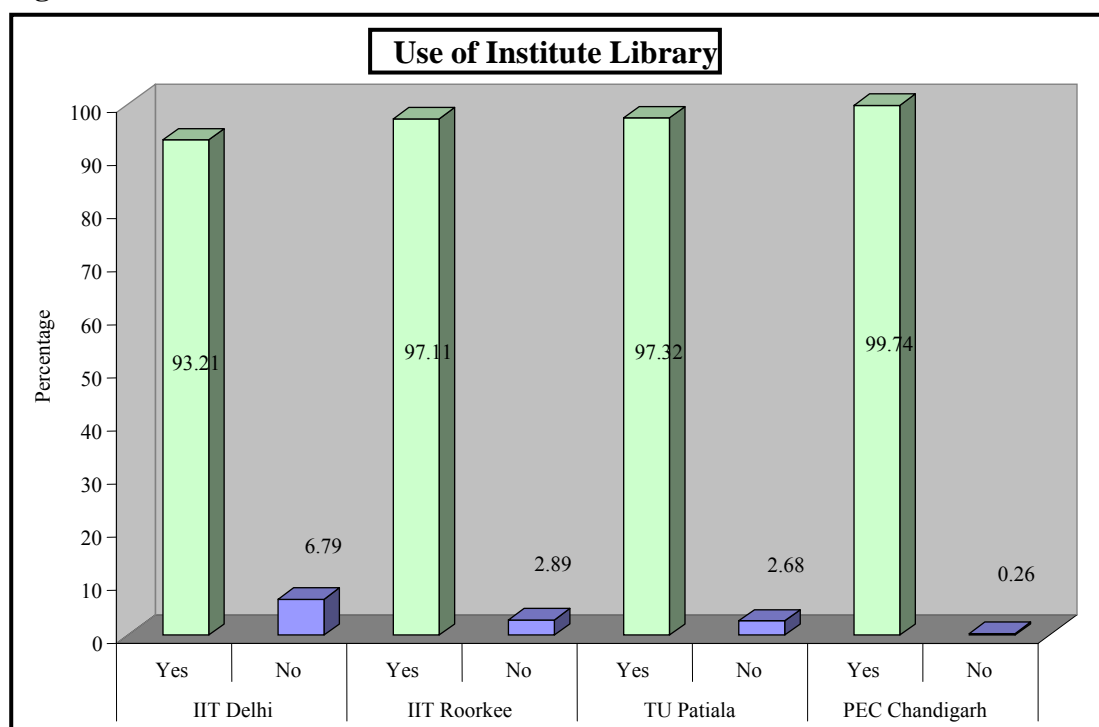


Table No. 5.5.2 shows the use of institute library by respondents in the four institutes. There were 769 (93.21%) respondents from IIT, Delhi using the library and 56 (6.79%) who did not use the library. There were 605 (97.11%) users from IIT, Roorkee who used the library and 18(2.89%) who did not use it. From TU, Patiala 472 (97.32%) users responded positively and 13 (2.68%) responded negatively. While 388(99.74%)

respondents from PEC, Chandigarh said yes and 1 (0.26%) said no. Table shows that out of 2322 respondents, 2234 (96.21%) users of the four institutes were using the library and 88(3.79%) users were not using it.

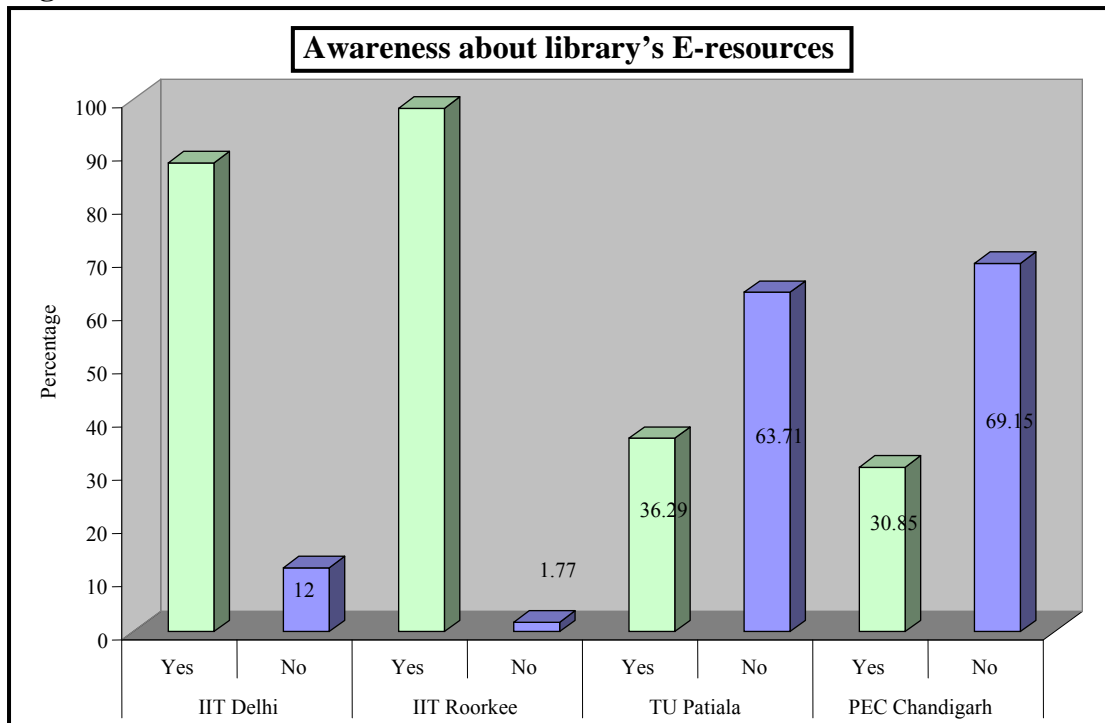
The Chi-Square test for independence is significance at 1 per cent level of significant. The value of  $\chi^2$  is 21.299 and the degree of freedom (df) is 3. The value of p is statistically significant ( $p \leq 0.01$ ). This implies that there is a significant variation among the users as far as use of the library of their institutes is concerned.

**Table No. 5.5.3 Awareness about library’s E-resources**

Respondents	Response		Total	Chi <sup>2</sup> (df;C)	
	Yes	N (%)	No N (%)		N (%)
IIT, Delhi	726	(88.00)	99 (12.00)	825 (100)	916.566** (3 ;0.532)
IIT, Roorkee	612	(98.23)	11 (1.77)	623 (100)	
TU, Patiala	176	(36.29)	309 (63.71)	485 (100)	
PEC, Chandigarh	120	(30.85)	269 (69.15)	389 (100)	
Total	1634	(70.37)	688 (29.63)	2322 (100)	

\*\*Significant at 0.01

**Figure No.5.5.3**



The library provides various-resources/services to its users and for making users aware about these resources services various users’ orientation programmes are organized from

time to time. The data from the survey shows that 726(88%) users from IIT, Delhi were aware and 99(12%) were not aware. 612 users from IIT, Roorkee (98.23%) answered yes and 11(1.77%) answered no, while 176(36.29%) users from TU, Patiala responded yes and 309(63.71%) response was no. 120 (30.85%) users from PEC, Chandigarh said yes and 269(69.15%) said that they were not aware of library e-resources. The result shows from 2322 users 1634(70.37%) were aware of e-resources and 688(29.63%) were not aware of it.

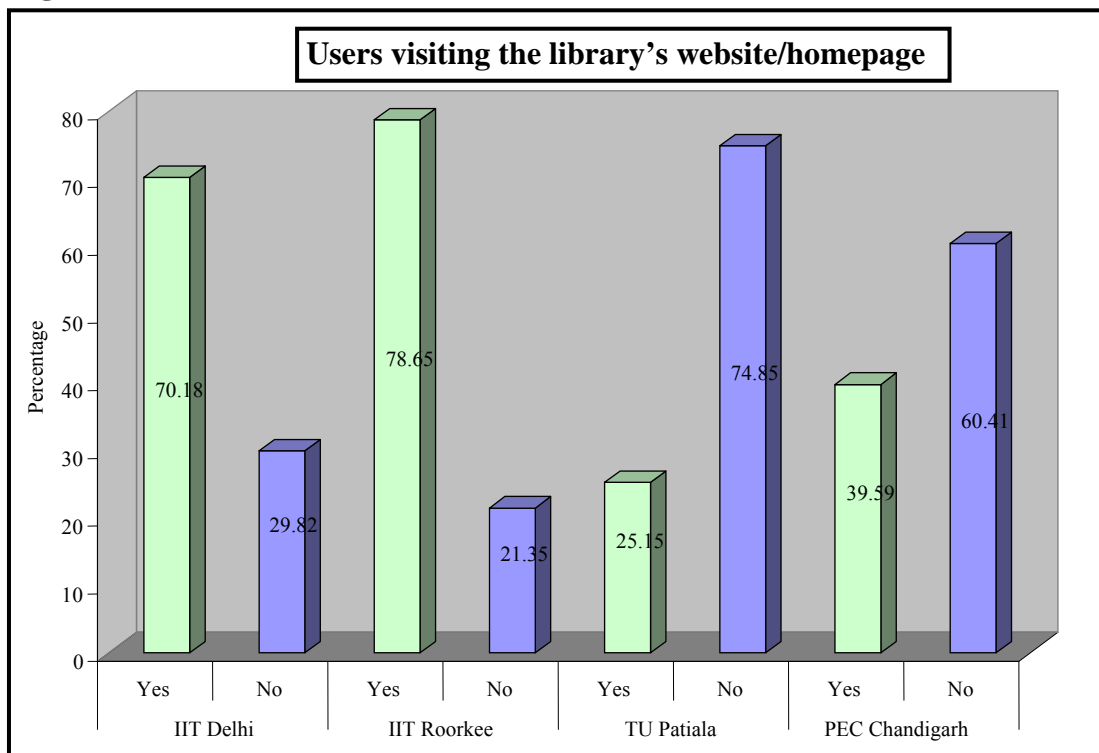
As shown in the table No.5.5.3 the value of  $\chi^2$  is 916.566 and the degrees of freedom (df) is 3. The value of p shows statistically significant ( $p \leq 0.01$ ). The Chi-Square value test for independence is significant at 1 per cent level of significance. This implies that there is a significant variation among users having awareness of e-resources/services provided by their library. Thus the users from IIT, Delhi and IIT, Roorkee were more aware of their library e-resources as compared to TU, Patiala and PEC, Chandigarh.

**Table 5.5.4 Users visiting the library's website/homepage**

Respondents	Response		Total	Chi <sup>2</sup> (df;C)		
	Yes	N (%)	No		N (%)	
IIT, Delhi	579	(70.18)	246	(29.82)	825 (100)	428.034** (3 ;0.395)
IIT, Roorkee	490	(78.65)	133	(21.35)	623 (100)	
TU, Patiala	122	(25.15)	363	(74.85)	485 (100)	
PEC, Chandigarh	154	(39.59)	235	(60.41)	389 (100)	
Total	1345	(57.92)	977	(42.04)	2322 (100)	

\*\*Significant at 0.01

**Figure No.5.5.4**



The libraries are having their home page/websites where information about the e-resources and services to their users is provided. The libraries are also providing current information on new addition to their collection. The users were asked whether they have visited their library websites/homepage. The results indicate that 579(70.18%) users from IIT, Delhi, 490(78.65%) from IIT, Roorkee, 122(25.15%) from TU, Patiala and 154(39.59%) from PEC, Chandigarh responded that they visit the site. It has been found that the users from both the IIT's have visited this library website/homepage as compared to users from TU, Patiala and PEC, Chandigarh. The results show from the Table No. 5.5.4, out of the total population of the four institutions 1345(57.92%) users have visited library website/homepage and 977(42.04%) users have not visited.

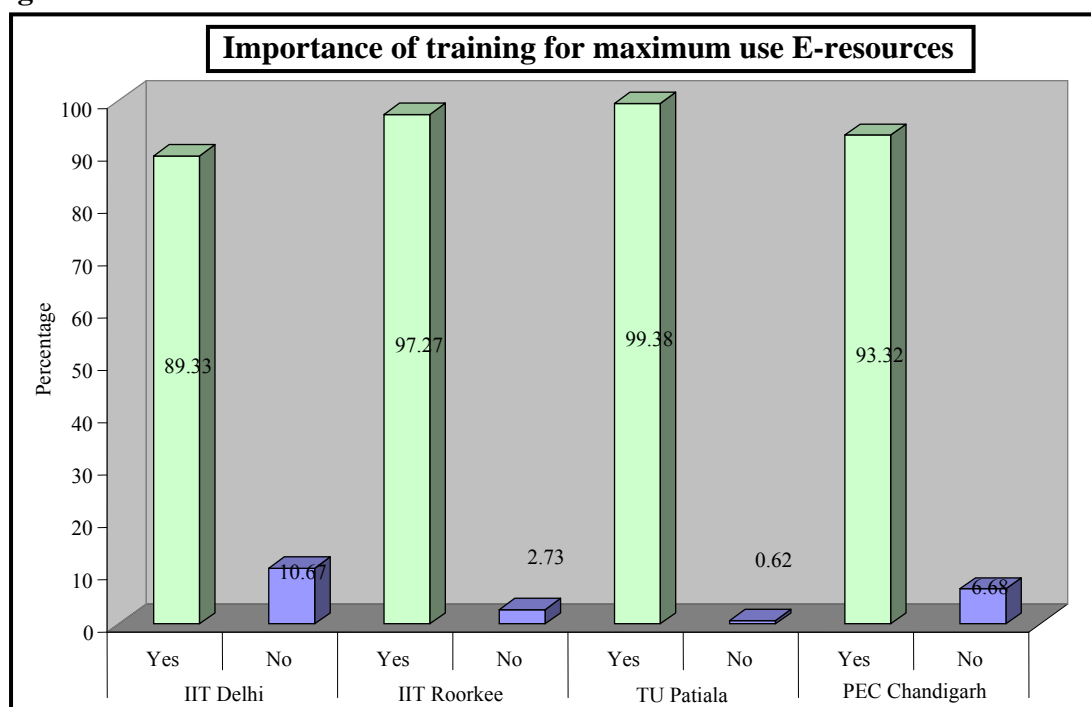
Table No.5.5.4 shows that the value of  $\chi^2$  is 428.034 and the degrees of freedom (df) is 3. The value of p shows statistically significant ( $p \leq 0.01$ ). For users the Chi-Square test for independence is significant at 1 per cent level of significance. This implies that there is a significant variation among the users visiting the library site.

**Table No. 5.5.5 Importance of training for maximum use E-resources**

Respondents	Response		Total	Chi <sup>2</sup> (df;C)	
	Yes	N (%)	No N (%)		N (%)
IIT, Delhi	737	(89.33)	88 (10.67)	825 (100)	71.240** (3;0.173)
IIT, Roorkee	606	(97.27)	17 (2.73)	623 (100)	
TU, Patiala	482	(99.38)	3 (0.62)	485 (100)	
PEC, Chandigarh	363	(93.32)	26 (6.68)	389 (100)	
Total	2123	(94.23)	134 (5.77)	2322 (100)	

\*\*Significant at 0.01

**Figure No.5.5.5**



The Table No 5.5.5 shows the response from the users about the importance of training to make maximum use of e- resources. 737 (89.33%) of users from IIT, Delhi; 606 (97.27%) from IIT, Roorkee; 482(99.38%) from TU, Patiala and 363 (93.32%) users from PEC, Chandigarh were in favor of imparting training. It has been found that maximum numbers of user from all the four institutions feel that training is important to make maximum use of e-resources. The result from the total population of users from all the four institutes indicates that 2123(94.23%) users responded positively for training and 134(5.77%) users response was negative. Table shows that the value of  $\chi^2$  is 71.240 and the degrees of freedom (df) is 3. The value of p shows statistically significant ( $p \leq 0.01$ ).

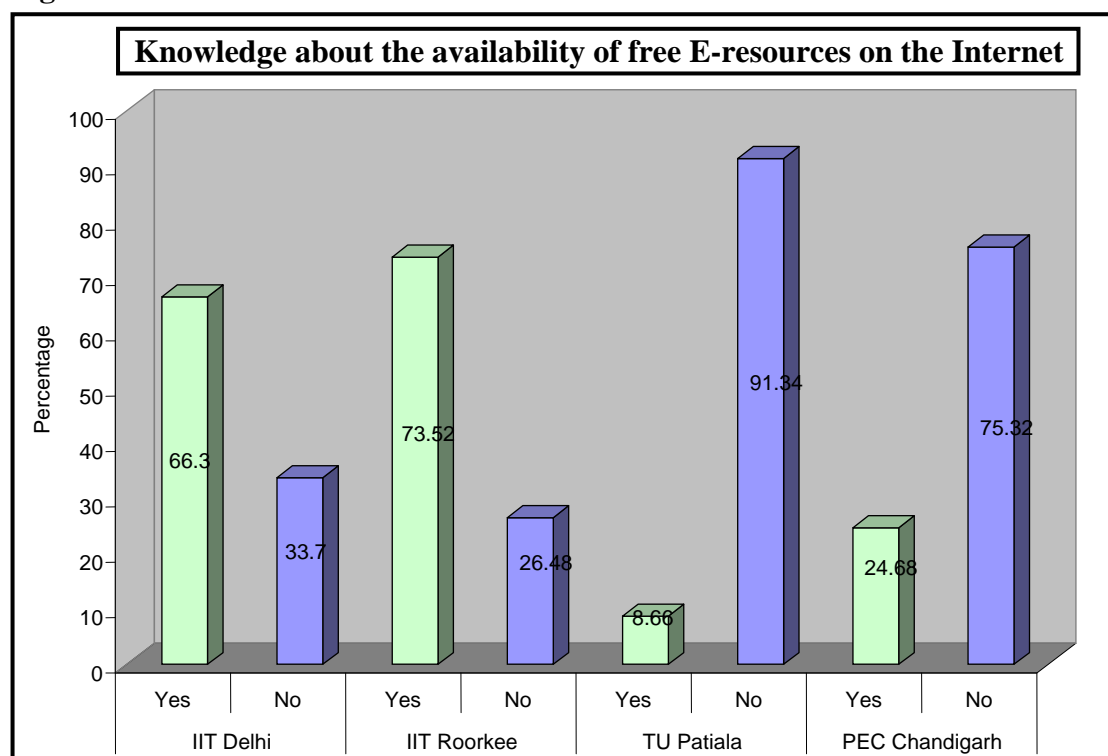
The Chi-Square test for independence is significant at 1 per cent level of significance. This implies that there is a significant variation among the users as far as the importance of training for use of e-resources is concerned.

**Table No. 5.5.6 Knowledge about the availability of free E-resources on the Internet**

Respondents	Response				Total N (%)	Chi <sup>2</sup> (df;C)
	Yes	N (%)	No	N (%)		
IIT, Delhi	547	(66.30)	278	(33.70)	825 (100)	656.424** (3 ;0.469)
IIT, Roorkee	458	(73.52)	165	(26.48)	623 (100)	
TU, Patiala	42	(8.66)	443	(91.34)	485 (100)	
PEC, Chandigarh	96	(24.68)	293	(75.32)	389 (100)	
Total	1143	(49.22)	1179	(50.78)	2322 (100)	

\*\*Significant at 0.01

**Figure No. 5.5.6**



There are several free e-journal portals on the internet which can be browsed any time. 547(66.30%) users from IIT, Delhi were aware of availability of free e-journals on the net and 278(33.70%) were not aware about it. From IIT, Roorkee 458(73.52%) users were aware and 165(26.48%) were not aware about it. 42(8.66%) users from TU, Patiala were aware about free e-journals and 443(91.34%) of users answered in negative. 96 (24.68%)

of users from PEC responded in positive and 293(75.32%) of users response was negative. From the total population, the results show that 1143(49.22%) of the users were aware of free e-journals portals on the net and 1179(50.78%) users were not aware about it.

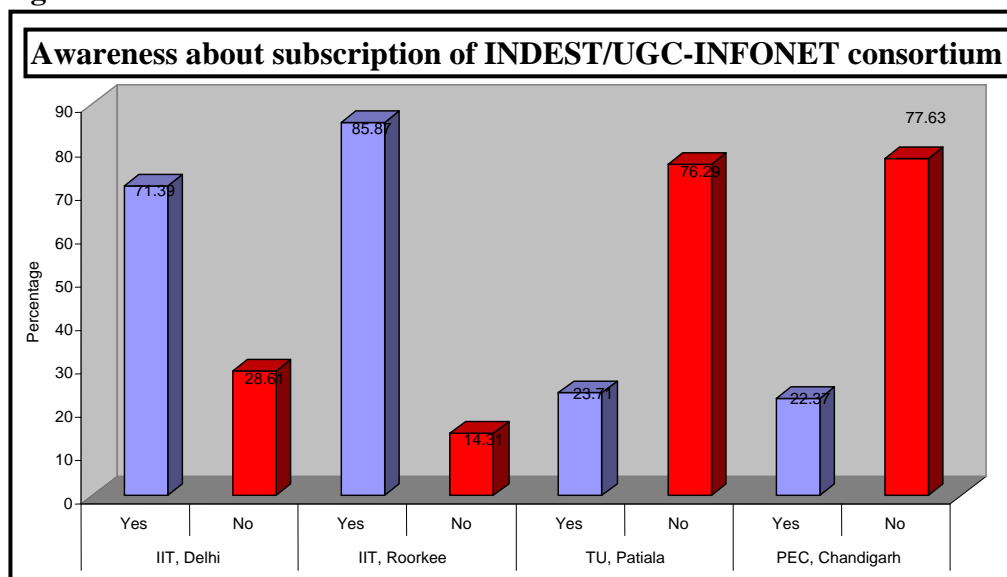
Table No. 5.5.6 shows for users the Chi-Square test for independent is significant at 1 per cent level of significance. The value of  $\chi^2$  is 656.424, degree of freedom (df) is 3, this implies that there is a significant relationship among the users who are aware about the availability of free e-journals portals on the net. Thus users from both the IIT's were more aware of free e-journals portals on the internet as compared to TU Patiala and PEC users.

**Table No. 5.5.7 Awareness about subscription of INDEST/UGC-INFONET consortium**

Respondents	Response		Total N (%)
	Yes N (%)	No N(%)	
IIT, Delhi	589 (71.39)	236 (28.61)	825 (100)
IIT, Roorkee	535 (85.87)	88 (14.13)	623 (100)
TU, Patiala	115 (23.71)	370 (76.29)	485 (100)
PEC, Chandigarh	87 (22.37)	302 (77.63)	389 (100)
Total	1326 (57.10)	996 (42.90)	2322 (100)

\*\*Significant at 0.01

**Figure No.5.5.7**



From the Table No. 5.5.7 data indicates that 589 (71.39%) users from IIT, Delhi , 535 (85.87%) users from IIT, Roorkee and 87(22.37%) from PEC, Chandigarh were aware of

INDEST consortium subscribed by their institute library .The results show that users from both the IIT's were more aware as compared to users from PEC. It has been found from the total users data that 1326(57.10%) of them were aware of INDEST consortium and 996(42.89%) were not were of it. Table shows that for users the Chi-Square test for independence is significant at 1 per cent level of significance. This implies that there is significant variation among the users as far as the awareness of INDEST consortium is concerned. Thus the majority of users from both the IITs were more aware of INDEST consortium as compared to PEC users. The data indicates about the TU, Patiala. Only TU is subscribing to UGC-INFONET. From 485 users, only 115 were aware of UGC e-journals consortia and 370(76.29%) of the users were not aware of it.

**Table No. 5.5.8 Use of INDEST/UGC INFONET consortium**

Respondents	Response		Total N (%)
	Yes N (%)	No N (%)	
IIT, Delhi	405 (68.76)	184 (31.24)	589(100)
IIT, Roorkee	241 (45.05)	294 (54.95)	535(100)
TU, Patiala	64 (55.65)	51 (44.35)	115 (100)
PEC, Chandigarh	26 (29.89)	61 (70.11)	389(100)
Total	736 (55.50)	590 (44.50)	1326 (100)

\*\*Significant at 0.01

**Figure No. 5.5.8**

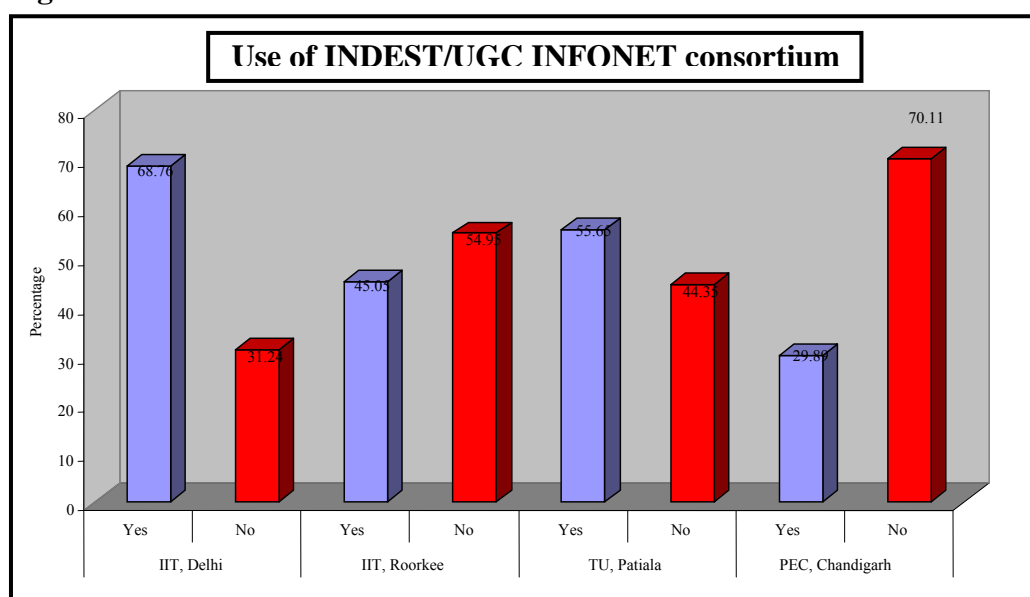


Table and Figure No. 5.5.7 show about the awareness of INDEST/UGC-INFONET Consortium at all the four institutions. Table and Figure No. 5.5.8 shows the respondents

who were aware of INDEST/UGC-INFONET e-resources and the percentage of users using it. Response from 405(68.76%) users from IIT, Delhi was positive and 184(31.24%) negative. Use of INDEST/UGC-INFONET resources was 241 (45.05%) by users at IIT, Roorkee while 26 (29.89%) users from PEC, Chandigarh answered in yes and 61(70.11%) users answered in negative. The Table No. 5.5.8 also shows data about TU, Patiala 115 respondents were aware of UGC-INFONET and INDEST e-resources. Out of 115 users, 64(55.65%) users answered yes and 51(44.35%) of the users answered that they were not using these resources.

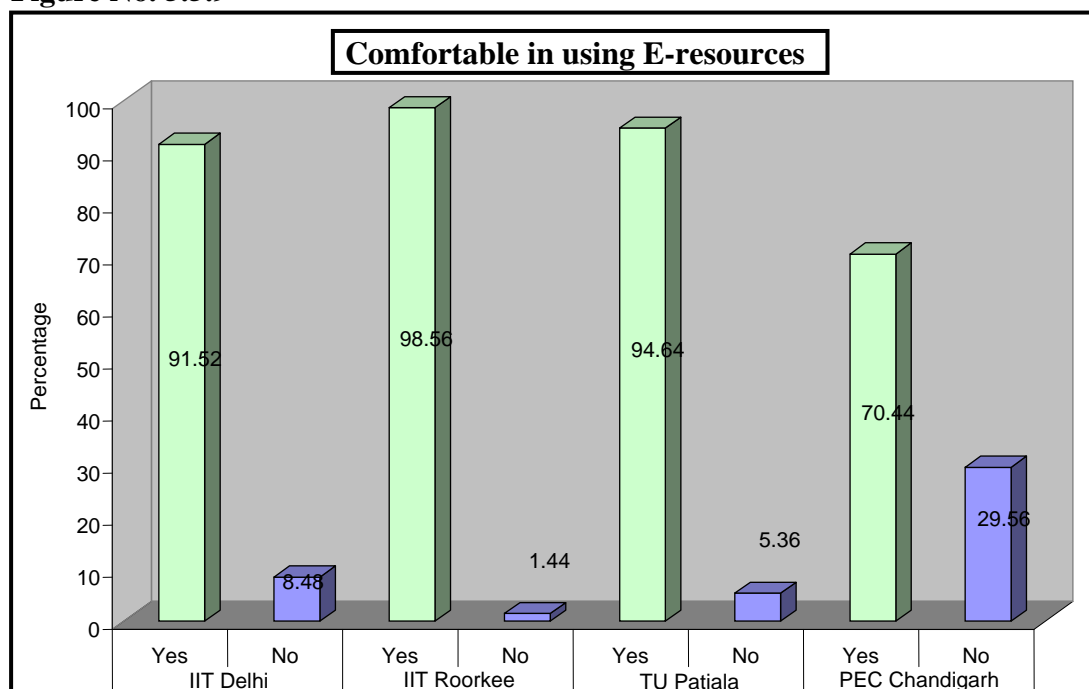
Thus, majority of users from both the IITs were using INDEST consortium as compared to TU, Patiala and PEC users. The results show that total 736 (55.50) users were only using INDEST/UGC-INFONET.

**Table No. 5.5.9 Comfortable in using E-resources**

Respondents	Response		Total	Chi <sup>2</sup> (df;C)		
	Yes	N (%)	No		N (%)	N (%)
IIT, Delhi	755	(91.52)	70	(8.48)	825 (100)	240.373** (3 ;0.306)
IIT, Roorkee	614	(98.56)	9	(1.44)	623 (100)	
TU, Patiala	459	(94.64)	26	(5.36)	485 (100)	
PEC, Chandigarh	274	(70.44)	115	(29.56)	389 (100)	
Total	2102	(90.53)	220	(9.47)	2322 (100)	

\*\*Significant at 0.01

**Figure No. 5.5.9**



The data indicates that 755 (91.52%) users from IIT, Delhi were comfortable with

electronic information resources, 614 (98.56%) users from IIT, Roorkee answered yes and 459 (94.64%) respondents from TU, Patiala were uncomfortable, while 274 (70.44%) users from PEC, Chandigarh responded positive. The results indicated that, out of 2322 users 2102(90.53%) were comfortable with electronic information resources and 220(9.47%) of users were not.

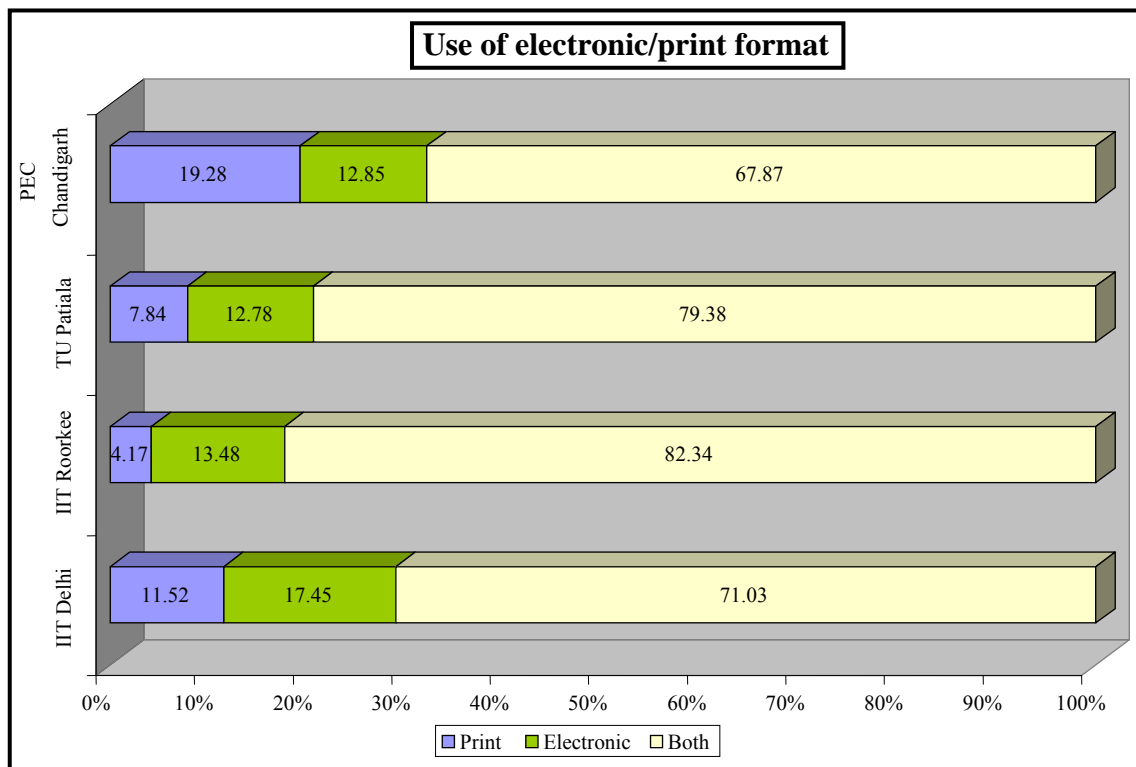
Table No.5.5.9 shows that for users the Chi-Square test for independence is significant at 1 per cent level of significance. This implies that there is significant variation among the users as far as the comfort in use of electronic information resources is concerned. Thus majority of users were comfortable with electronic information.

**Table No 5.5.10 Use of electronic/print format**

Document prefer to use	IIT, Delhi	IIT, Roorkee	TU, Patiala	PEC, Chandigarh	Total N (%)	Chi <sup>2</sup> (df;C)
Print	95 (11.52)	26 (4.17)	38 (7.84)	75 (19.28)	234 (10.08)	75.407** (6;0.177)
Electronic	144 (14.45)	84 (13.48)	62 (12.78)	50 (12.85)	340 (14.64)	
Both	586 (71.03)	513 (82.34)	385 (79.38)	264 (67.87)	1748 (75.28)	
Total	825 (100)	623 (100)	485 (100)	379 (100)	2223 (100)	

\*\*Significant at 0.01

**Figure No 5.5.10**



The Table No. 5.5.10 depicts that 11.52% users from IIT, Delhi followed by

4.17% IIT, Roorkee; 7.84% from TU and 19.28% PEC preferred to use only document in print format. Where as 14.45% from IIT, Delhi; 13.48% from IIT, Roorkee; 12.78% from TU and 12.85% users from PEC, prefer to use document only in electronic format.

The maximum percentage of users prefers to use the document in both the format i.e. print as well as electronic.

The data shows that 71.03% users from IIT, Delhi; 82.34% from IIT Roorkee; 79.38% TU, Patiala and 67.87% from PEC, Chandigarh responses in positive for their having choice to use document in both the formats.

The results reveal that from total respondents 75.28% preferred to use both the format. Whereas, 10.08% users gave choice for print format and 14.64% for electronic format.

The results reveal that from total respondents 38 (7.84%) preferred print document, 62 (12.78%) preferred electronic and 385 (79.38%) were in favor of both the formats. The value of  $\chi^2$  is 75.407 and the degrees of freedom (df) is 3. The value of p shows statistically significant ( $P \leq 0.01$ ). The Chi-Square test for independence is significant at 1 per cent level of significance. This implies that there is significant variation among the users as far as the preference for use of the format of document (printed, electronic or both) is concerned.

**Table No. 5.5.11 Use of online services**

Using online services	IIT, Delhi	IIT, Roorkee	TU, Patiala	PEC, Chandigarh	Total N (%)	Chi <sup>2</sup> (df;C)
Mostly	429 (52.00)	461 (74.00)	351 (72.37)	188 (48.33)	1429(61.54)	263.306** (9 ;0.319)
Sometimes	127 (15.39)	33 (5.30)	48 (9.90)	70 (17.99)	278 (11.97)	
Weekly	124 (15.03)	127 (20.39)	79 (16.29)	85 (21.85)	415 (17.87)	
Daily	145 (17.58)	2 (0.32)	7 (1.44)	46 (11.83)	200 (8.61)	
Total	825 (100)	623 (100)	485 (100)	389 (100)	2322 (100)	

\*\*Significant at 0.01

**Figure No. 5.5.11**

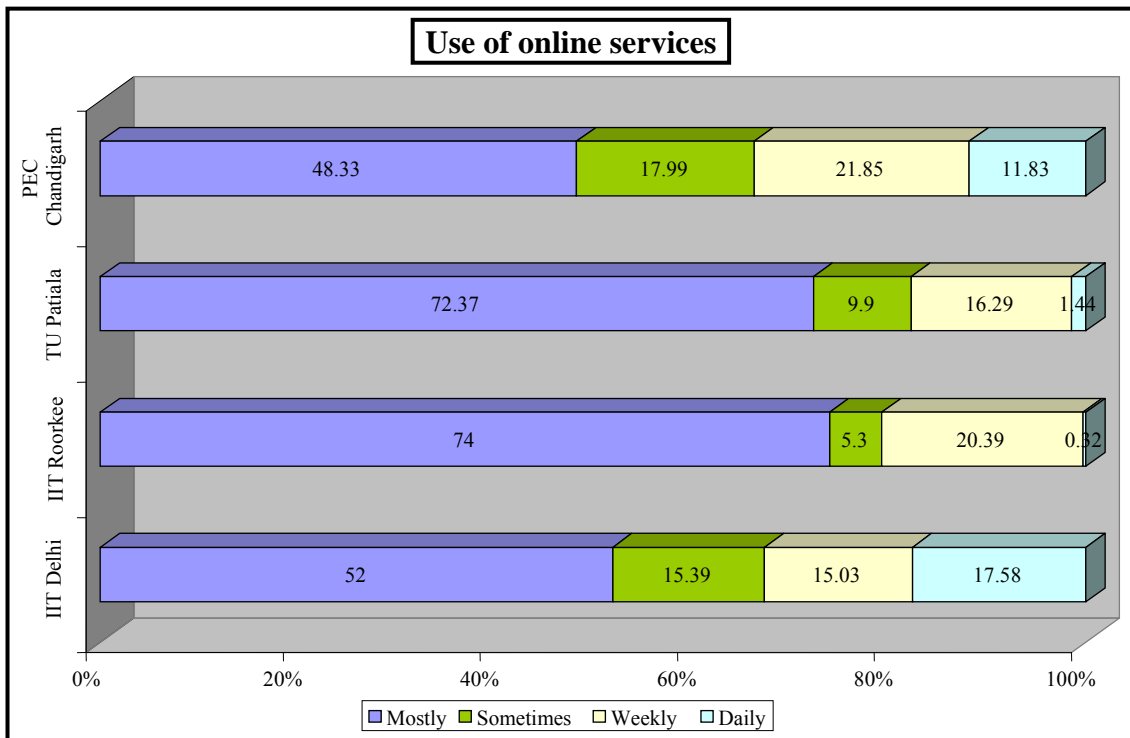


Figure No.5.5.11 clearly reveals that 429 (52%) users from IIT, Delhi, 461 (74%) from IIT, Roorkee 351 (72.37%) from TU, Patiala and 188(48.33%) from PEC use on-line services mostly.

The users responded that on-line services are used sometimes by 127 (15.39%) users at IIT, Roorkee, 78 (9.90%) from TU, Patiala .Users who use online services weekly 124 (15.03%) were from IIT, Delhi; 127 (20.39%) were from IIT, Roorkee; 79 (16.29%) from TU, Patiala and 85 (21.85%) from PEC. On-line services were used daily by 145 (17.58%) users from IIT, Delhi; 2 (32%) from IIT, Roorkee; 7(1.44%) from TU, Patiala and 46 (11.83%) users from PEC, Chandigarh.

From the total response it has been found that on-line services are used mostly i.e., 1429 (61.54%) as compared to used sometimes 278 (11.97%), weekly 415(17.87%) daily 200 (8.61%).

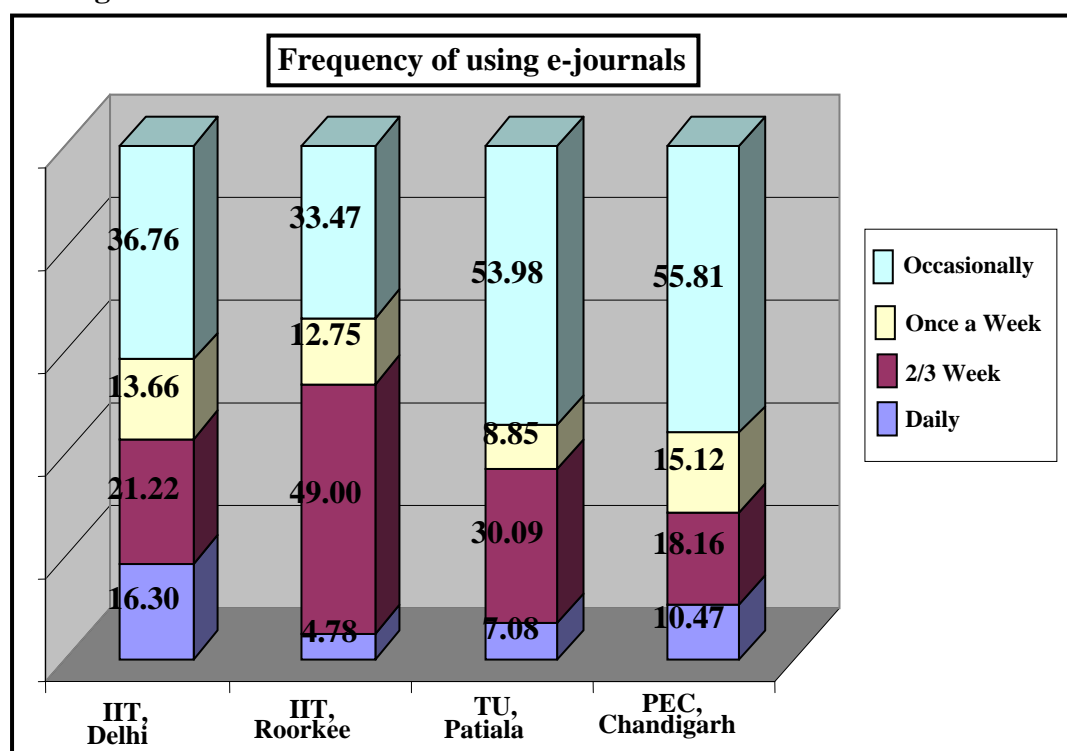
Table No.5.5.11 shows the Chi-Square test for independence is significant at 1 per cent level of significance. The value of  $\chi^2$  is 263.306 and the degree of freedom (df) is 9. The value of p shows statistically significant ( $P \leq 0.01$ ). This shows that as far as institute wise use of on-line services is concerned, there is a significant variation among all these institutes.

**Table No.5.5.12 Frequency of using E-journal**

Frequency of using e-journal	IIT, Delhi	IIT, Roorkee	TU, Patiala	PEC, Chandigarh	Total N (%)	Chi <sup>2</sup> (df;C)
Daily	97 (16.36)	12 (4.78)	8 (7.08)	9 (10.47)	126 (12.08)	61.464** (9;0.236) NA 1279 (55.08%)
2/3 Week	197 (21.22)	123 (49.00)	34 (30.09)	16 (18.60)	370 (35.47)	
Once a week	81 (13.66)	32 (12.75)	10 (8.85)	13 (15.12)	136 (13.04)	
Occasionally	218 (36.76)	84 (33.47)	61 (53.98)	48 (55.81)	411 (39.41)	

\*\*Significant at 0.01

**Figure No.5.5.12**



The data from Figure No. 5.5.12 reveals that e-journals were used daily by 97 (16.34%) users from IIT, Delhi; followed by 12 (4.78%) users from IIT, Roorkee; 8 (7.08%) from TU, Patiala and 9 (10.47%) from PEC, Chandigarh. E-journals are used occasionally by 218 (36.76%) users from IIT, Delhi; 84 (33.47%) from IIT, Roorkee; 61 (53.98%) from TU, Patiala and 48 (55.81%) from PEC, Chandigarh. The Table No. 5.5.12 indicates that from total 2322 respondents, 1279 (55.08%) gave no response to this question, where as e-journals were mostly used 2/3 times a week by 370 (35.47%) users and occasionally by 411 (39.41%) users.

The Table No. 5.5.12 shows the Chi-Square test for independence is significant at 1 per cent level of significance. The value of  $\chi^2$  is 61.464 and the degrees of freedom (df) is 9. The value of p shows statistically significant ( $P \leq 0.01$ ). This shows that there is a

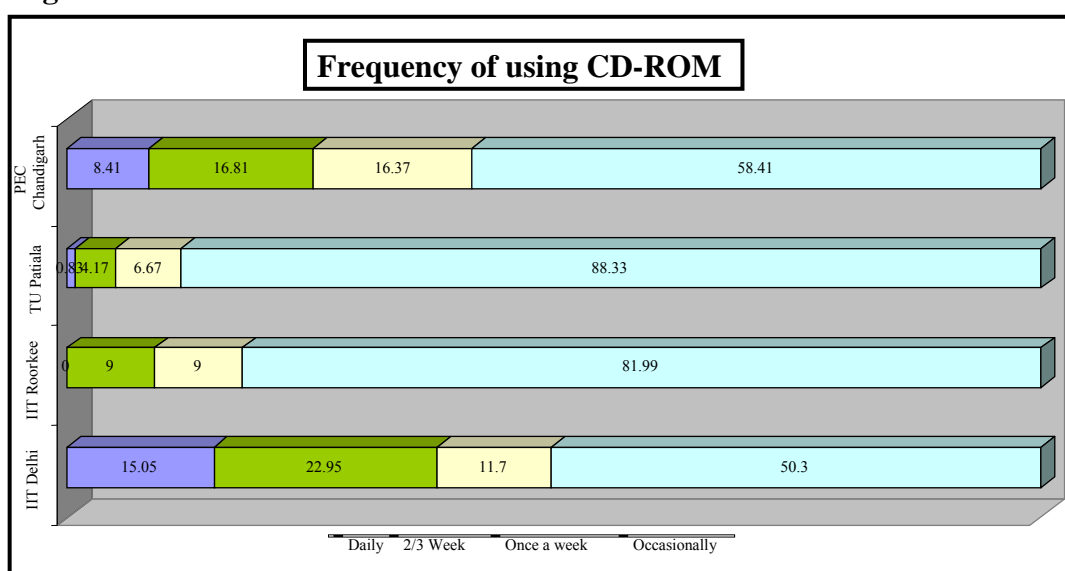
significant variation among the institutes as far as frequency of use of e-journals is concerned.

**Table No.5.5.13 Frequency of using CD-ROM**

Frequency of using CD-Rom	IIT, Delhi	IIT, Roorkee	TU, Patiala	PEC, Chandigarh	Total N (%)	Chi <sup>2</sup> (df;C)
Daily	99 (15.05)		3 (0.83)	19 (8.41)	121 (6.85)	276.268** (9;0.368) NA 556 (25.94%)
2/3 Week	151 (22.95)	47 (9.00)	15 (4.17)	38 (16.81)	251 (14.21)	
Once a week	77 (11.70)	47 (9.00)	24 (6.67)	37 (16.37)	185 (10.48)	
Occasionally	331 (50.30)	428 (81.99)	318 (88.33)	132 (58.41)	1209 (68.06)	

\*\*Significant at 0.01

**Figure No.5.5.13**



It is revealed from the Figure No. 5.5.13 that CD-ROM is used daily by 99 (15.05%) users from IIT, Delhi followed by 3 (0.83%) from TU, Patiala and 19(8.41%) from PEC, Chandigarh where as, users from IIT, Roorkee do not use CD-ROM daily.

The CD-ROM is used 2/3 Times a week by 151 (22.95%) users of IIT, Delhi; 47 (9%) from IIT, Roorkee; 15 (4.17%) users from TU, Patiala; and 38 (16.81%) from PEC, Chandigarh. Respondents using CD-Rom service once in a week were 77(11.70%) from IIT, Delhi; 47(9%) IIT, Roorkee; 24 (6.67%) from TU, Patiala and 37 (16.37%) from PEC, Chandigarh. The users using CD-ROM occasionally were 331 (50.30%) from IIT, Delhi; 428 (81.99%) from TU, Patiala and 132 (58.41%) users from PEC, Chandigarh. Thus the data indicates that CD-ROM services are used maximum by users of all institutions occasionally as compared to other times. From 2322 total survey users, 556

(25.94%) respondents did not answer the question. Out of 1766 users, who answered, shows that 1209 (68.06%) use CD-ROM occasionally.

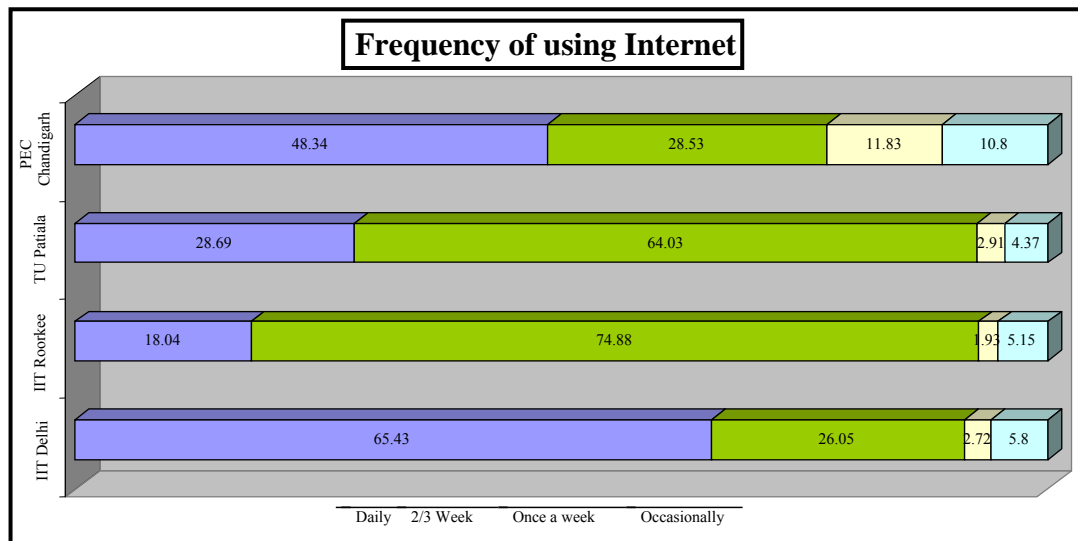
The Chi-Square test for independence is significant at 1 per cent level of significance. The value for  $\chi^2$  is 276.268 and the degrees of freedom (df) is 9. The value of p shows statistically significant ( $P \leq 0.01$ ). This shows that there is a significant variation among the users as far as the use of CD-ROM services is concerned.

**Table No.5.5.14 Frequency of using Internet**

Frequency of Internet	IIT, Delhi	IIT, Roorkee	TU, Patiala	PEC, Chandigarh	Total N (%)	Chi <sup>2</sup> (df;C)
Daily	530 (65.43)	112 (18.04)	138 (28.69)	190 (48.84)	970 (42.16)	534.471** (9;0.434) NA 21 (0.90%)
2/3 Week	211 (26.05)	465 (74.88)	308 (64.03)	111 (28.53)	1095 (47.59)	
Once a week	22 (2.72)	12 (1.93)	14 (2.91)	46 (11.83)	94 (4.09)	
Occasionally	47 (5.80)	32 (5.15)	21 (4.37)	42 (10.80)	142 (6.17)	

\*\*Significant at 0.01

**Figure No.5.5.14**



It is seen from Figure No. 5.5.14 that 530 (65.43%) users from IIT, Delhi; 112 (18.04%) from IIT, Roorkee; 138 (28.69%) from TU, Patiala and 190 (48.84%) PEC, Chandigarh used internet daily. Respondents who were using internet 2/3 times a week were 465 (74.88%) from IIT, Roorkee followed by 308 (64.03%) from TU, Patiala 111 (28.53%) from PEC, Chandigarh and 211 (26.05%) from IIT, Delhi. The users using the internet once a week was less in number. Their response was 22 (2.72%) from IIT, Delhi; 32

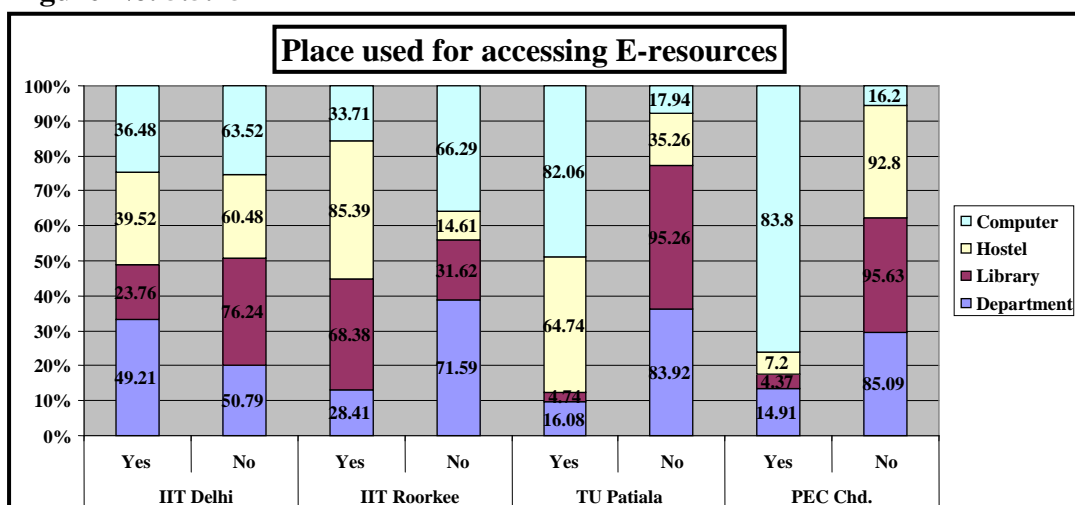
(5.15%) from IIT, Roorkee; 14 (2.91%) from TU, Patiala and 46 (11.83%) PEC, Chandigarh. Same way the internet is used occasionally by 47(5.80%) users from IIT, Delhi; 32 (5.15%) from IIT, Roorkee; 21 (4.37%) from TU, Patiala and 42 (10.80%) from PEC, Chandigarh. Thus internet is mostly used daily and 2/3 time a week as compared to once a week and occasionally. From total response of users it has been found that 970 (42.16%) users use internet daily and 1095 (47.59%) 2/3 times a week. where as 21 (0.90%) users did not responds to time question.

The Table No. 5.5.14 shows the Chi-Square test for independence is significant at 1 per cent level of significance. The value of  $\chi^2$  is 534.471 and the degrees of freedom (df) is 9. The value of p shows statistically significant ( $P \leq 0.01$ ). This shows that there is a significant variation among the institutions as far as use of the internet services is concerned.

**Table No. 5.5.15 Place used for accessing of E-resources**

Place of Accessing	IIT, Delhi		IIT, Roorkee		TU, Patiala		PEC, Chandigarh		Total N(%)	
	Yes	No	Yes	No	Yes	No	Yes	No	Yes	No
Department	406 (49.21)	419 (50.79)	177 (28.41)	446 (71.59)	78 (16.08)	407 (83.92)	58 (14.91)	331 (85.09)	719 (30.96)	1603 (69.03)
Library	196 (23.76)	629 (76.24)	426 (68.38)	197 (31.62)	23 (4.74)	462 (95.26)	17 (4.37)	372 (95.63)	662 (28.50)	1660 (71.49)
Hostel	326 (39.52)	499 (60.48)	532 (85.39)	91 (14.61)	314 (64.74)	171 (35.26)	28 (7.20)	361 (92.80)	1200 (51.67)	1122 (48.32)
Computer Center	301 (36.48)	524 (63.52)	210 (33.71)	413 (66.29)	398 (82.06)	87 (17.94)	326 (83.80)	63 (16.20)	1235 (53.19)	1087 (46.81)

**Figure No. 5.5.15**



The libraries are providing electronic information services through intranet. These e-

resources can be accessed within the institutions at various places like departments, library, computer center and hostels.

The response from the user who used the department shows that 406 i.e. (49.21%) of users from IIT, Delhi said yes and 419(50.79%) said no, while 177(28.41%) users from IIT, Roorkee answered yes and 446 (71.59%) answered no. The response from users at TU, Patiala was 78(16.08%) positive. While, users from PEC, Chandigarh only 58(14.91%) users used their departments for accessing the e-resources. The results show that IIT, Delhi users were using departments more as place for accessing the e-resources as compared to other institutions.

The library was used by 196(23.76%) users from IIT, Delhi and 629(76.27%) said they did not use the library for accessing e-resource, 426(68.38%) users from IIT, Roorkee answered yes and 197(31.62%) answered no. While 23(4.47%) users from TU, Patiala responded yes. 17(4.37%) users of PEC, Chandigarh said yes for using library. It has been found from the data that users from IIT, Roorkee used library more as place for accessing e-resources as compared to users from other institutions.

The hostels as a place for accessing the e-resources were used by 326 (39.52%) users from IIT, Delhi 532(85.39%) users from Roorkee answered yes and 91(14.61%) answered no, while 314(64.14%) users from TU, Patiala said they used hostels as place for accessing e-resources. 28(7.20%) users from PEC, Chandigarh responded yes and 361(92.80%) response was no. It has been found from the data that IIT, Roorkee and TU, Patiala users were using hostels more for accessing e-resources as compared to IIT, Delhi and PEC, Chandigarh. The computer center was used by 301(36.48%) users from IIT, Delhi and 524(63.52%) did not use it. Response shows that 210(33.71%) users from IIT, Roorkee said yes and 413(66.29%) said no.

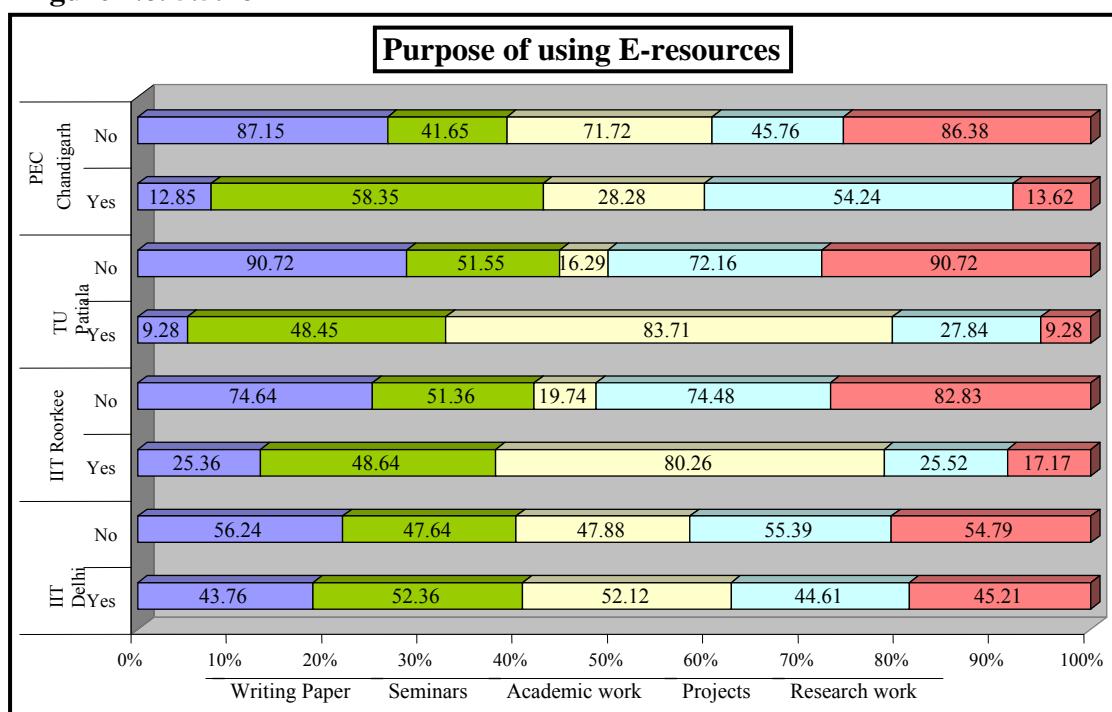
While positive response was given by 398 (82.6%) users from TU, Patiala and 326 (83.80%) users from PEC, Chandigarh.

The results show that computer center is used more by users of TU, Patiala and PEC, Chandigarh as place for accessing e-resources. The data indicates from the total population that 1235(53.19%) of users were using computer center more as compared to other places.

**Table No. 5.5.16 Purpose of using E- resources**

Purpose	IIT, Delhi		IIT, Roorkee		TU, Patiala		PEC, Chandigarh		Total	
	Yes	No	Yes	No	Yes	No	Yes	No	Yes	No
Writing Paper	361 (43.76)	464 (56.24)	158 (25.36)	465 (74.64)	45 (9.28)	440 (90.72)	50 (12.85)	339 (87.15)	614 (26.44)	1708 (73.35)
Seminars	432 (52.36)	393 (47.64)	303 (48.64)	320 (51.36)	235 (48.45)	250 (51.55)	227 (58.35)	162 (41.65)	1197 (51.55)	1125 (48.44)
Academic work	430 (52.12)	395 (47.88)	500 (80.26)	123 (19.74)	406 (83.71)	79 (16.29)	110 (28.28)	279 (71.72)	1446 (62.27)	876 (37.72)
Projects	368 (44.61)	457 (55.39)	159 (25.52)	464 (74.48)	135 (27.84)	350 (72.16)	211 (54.24)	178 (45.76)	873 (37.59)	1449 (62.40)
Research work	373 (45.21)	452 (54.79)	107 (17.17)	516 (82.83)	45 (9.28)	440 (90.72)	53 (13.62)	336 (86.38)	578 (24.89)	1744 (75.100)

**Figure No. 5.5.16**



The Table No. 5.5.16 shows the purpose of using e-resources by users. It has been found that for writing papers 361 users (43.76%) from IIT, Delhi, 158(25.36%) from IIT, Roorkee, 45(9.28%) from TU, Patiala and 50(12.82%) from PEC, Chandigarh users were using e-resources. E-resources were consulted for writing seminars by 432(52.36%) users from IIT, Delhi, 303 (48.64%) from IIT, Roorkee, 235(48.45%) from TU, Patiala and 227(58.35%) from PEC, Chandigarh. The results show that users from IIT, Delhi and PEC, Chandigarh were using more e-resources for seminars as compared to IIT, Roorkee and TU, Patiala. The e-resources for academic work were used by 430(52.12%) users from IIT, Delhi, 500(50.26%) users from IIT, Roorkee, 406(83.71%) users from TU,

Patiala and 110(28.28%) from PCE, Chandigarh. The results show that IIT, Roorkee and TU, Patiala users were using e-resources more for getting help for their academic work as compared to IIT, Delhi and PEC users. 368(44.61%) users from IIT, Delhi 159(25.52%) from IIT, Roorkee 135(27.84%) from TU, Patiala and 211(54.24%), PEC, Chandigarh were using e-resources for projects work. It has been found that IIT, Delhi and PEC, users were using more e-resources for project work as compared to IIT, Roorkee and PEC, Chandigarh. The e-resources were used for research work by 373(45.21%) users from IIT, Delhi 107(17.17%) from IIT, Roorkee 45(9.28%) from TU, Patiala and 53(13.62%) from PEC, Chandigarh. The results indicates that IIT, Delhi and IIT, Roorkee users were using e-resource more for research work as compared to TU, Patiala and PEC, Chandigarh. The results show that from the total population e-resources were used more for seminars by 1197(51.55%) users and for academic work by 1446(62.27%) users, while 614(26.44%) users were using e-resources for writing papers, 837(37.60%) for projects work and 578(24.89%)for research work.

**Table No.5.5.17 Purpose of using internet/websites**

Purposes	IIT, Delhi		IIT, Roorkee		TU, Patiala		PEC, Chandigarh		Total N (%)	
E-mail	731 (88.61)	94 (11.39)	601 (96.47)	22 (3.53)	454 (93.61)	31 (6.39)	322 (82.78)	67 (17.22)	2108 (90.78)	214 (9.22)
Career development	358 (43.39)	467 (56.61)	269 (43.18)	354 (56.82)	222 (45.77)	263 (54.23)	243 (62.47)	146 (37.53)	1092 (47.03)	1230 (52.97)
Research work	400 (48.48)	425 (51.52)	117 (18.78)	506 (21.22)	52 (10.72)	433 (89.28)	78 (20.05)	311 (79.95)	647 (27.86)	1675 (72.14)
Finding relevant information	740 (89.70)	85 (10.30)	612 (98.23)	11 (1.77)	468 (96.49)	17 (3.51)	329 (84.58)	60 (15.62)	2149 (92.55)	173 (7.45)
Entertainment	180 (21.82)	645 (78.18)	206 (33.07)	417 (66.93)	112 (23.09)	373 (76.91)	97 (24.94)	292 (75.06)	595 (25.62)	1727 (74.38)

Figure No.5.5.17

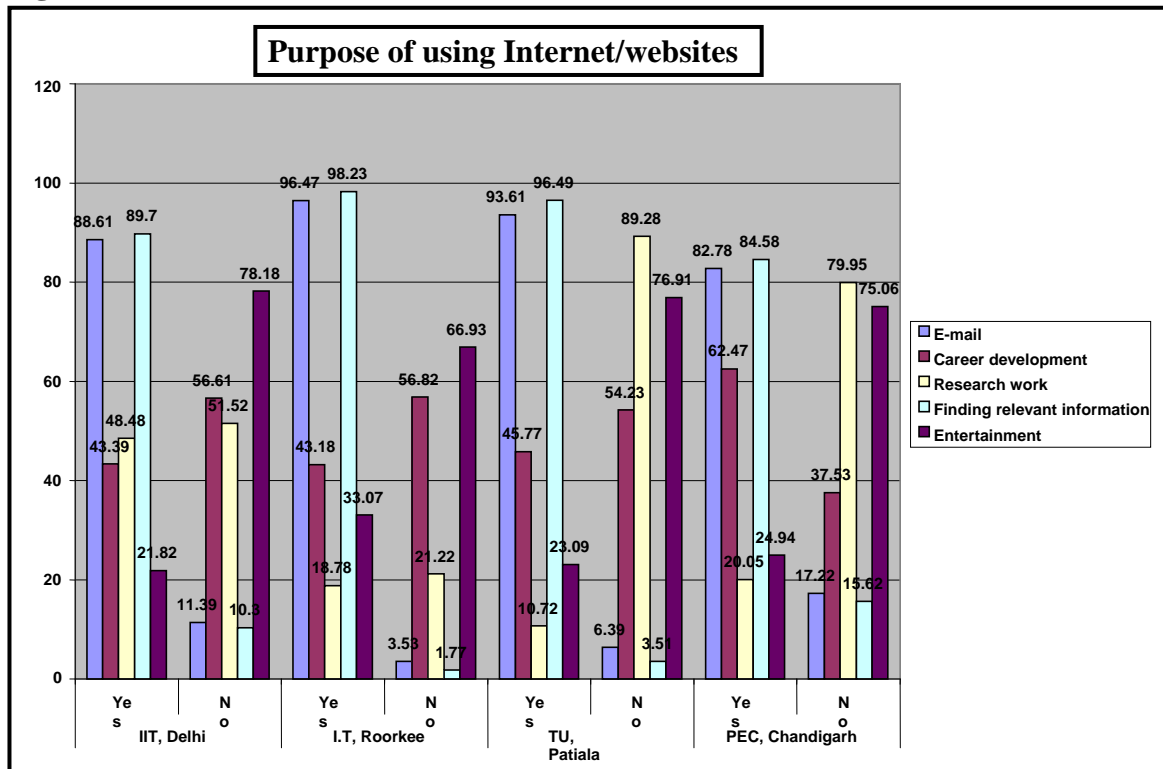


Table No. 5.5.17 shows institution wise response from users for using internet/website for various purposes. It reveals that e-mail services are used by all the users. The response was above 80% in positive from all the four institutes, for career development response was positive almost same (i.e. 43.39% and 43.18%) from both the IITs 77% from TU, Patiala and 48.48% from PEC, Chandigarh. For research work 48.48% IIT, Delhi user use more internet/website as compared to 18.78% IIT, Roorkee, 10.72% TU, Patiala and 20.05% from PEC.

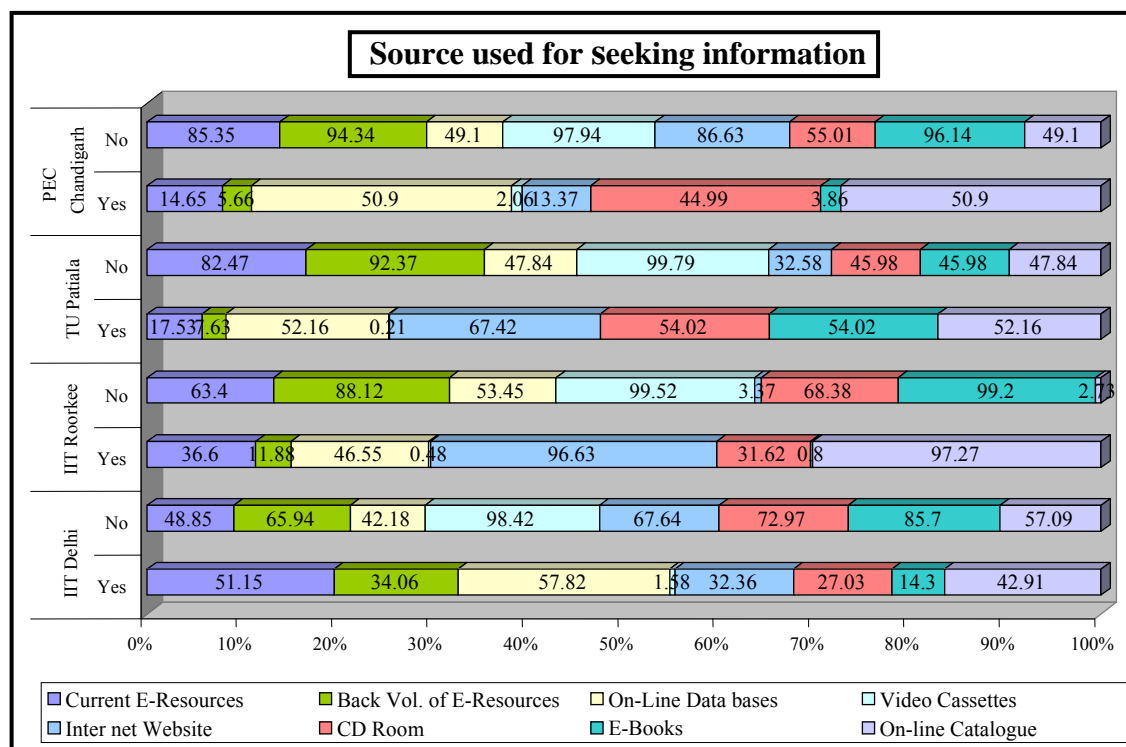
The response was above 84% from all the four institutions in regard to use of internet/websites for finding relevant information. Similarly, for entertainment the response was below 35% from all the four institutions.

From total users' data, it has been found that 92.55% users use internet/websites for finding relevant information, 90.78% for e-mail, 47.03% for career development and 25.62% for entertainment.

**Table No. 5.5.18 Source used for seeking information**

Seeking information from	IIT, Delhi N (%)		IIT, Roorkee N (%)		TU, Patiala N (%)		PEC, ChandigarhN(%)		Total N (%)	
	Yes	No	Yes	No	Yes	No	Yes	No	Yes	No
Current E-resources	422 (51.15)	403 (48.85)	228 (36.60)	395 (63.40)	85 (17.53)	400 (82.47)	57 (14.65)	332 (85.35)	792 (34.10)	1530 (65.89)
Back Vol. of E-resources	281 (34.06)	544 (65.94)	74 (11.88)	549 (88.12)	37 (7.63)	448 (92.37)	22 (5.66)	367 (94.34)	414 (17.82)	1908 (82.17)
On-Line Data bases	477 (57.82)	348 (42.18)	290 (46.55)	333 (53.45)	253 (52.16)	232 (47.84)	198 (50.90)	191 (49.10)	1218 (52.45)	1104 (47.54)
Video Cassettes	13 (1.58)	812 (98.42)	3 (0.48)	620 (99.52)	1 (0.21)	484 (99.79)	8 (2.06)	381 (97.94)	25 (1.07)	2297 (98.92)
Inter net Website	267 (32.36)	558 (67.64)	602 (96.63)	21 (3.37)	327 (67.42)	158 (32.58)	52 (13.37)	337 (86.63)	1248 (53.74)	1074 (46.25)
CD Room	223 (27.03)	602 (72.97)	197 (31.62)	426 (68.38)	262 (54.02)	223 (45.98)	175 (44.99)	214 (55.01)	857 (36.90)	1465 (63.09)
E-Books	118 (14.30)	707 (85.70)	5 (0.80)	618 (99.20)	262 (54.02)	223 (45.98)	15 (3.86)	374 (96.14)	400 (17.22)	1922 (82.77)
On-line Catalogue	354 (42.91)	471 (57.09)	606 (97.27)	17 (2.73)	253 (52.16)	232 (47.84)	198 (50.90)	191 (49.10)	1411 (60.76)	857 (36.90)

**Figure No. 5.5.18**



The Table No. 5.5.18 shows the sources used by users from four institutes. It has been found that 422 (51.15%) users from IIT, Delhi, 228 (36.60%) from IIT, Roorkee, 85 (17.53%) from TU, Patiala and 15(14.65%) from PEC, Chandigarh were using current e-resources for seeking information. It has been found that IIT, Delhi users were using current e-journals more as compared to users from other institutes.

The back volume of e-journals were used by 281 (34.06%) users from IIT, Delhi, 77 (11.88%) from IIT, Roorkee 37 (7.63%) from TU, Patiala and 22 (5.66%) from PEC, Chandigarh. The results show that IIT, Delhi users were using back volume of e-journals more as compared to users from other institutes.

The online data bases were used almost by all the users from the four institutes. It has been seen that 477 (57.82%) users from IIT, Delhi, 290 (46.55%) from IIT, Roorkee, users 253 (52.16%) from TU, Patiala and 198 (50.90%) from PEC, Chandigarh were using on-line bases.

The use of video cassettes was very less by all the users and the response is below 3% only.

Internet websites were used by 267 (32.36%) users from IIT, Delhi, 602 (96.63%) from IIT, Roorkee 327 (67.42%) from TU, Patiala and 52 (13.37%) from PEC, Chandigarh. The data indicates that users from IIT, Roorkee and TU, Patiala were using internet websites more for seeking information as compared to users from IIT, Delhi and PEC, Chandigarh.

CD-ROM service were used by 223 (32.36%) users from IIT, Delhi, 197 (31.62%) from IIT, Roorkee, 262 (54.02%) from TU, Patiala and 175 (44.99%) from PEC, Chandigarh. It has been found that IIT, Roorkee and TU, Patiala users were using CD-ROM services more as compared to IIT, Delhi and PEC, Chandigarh.

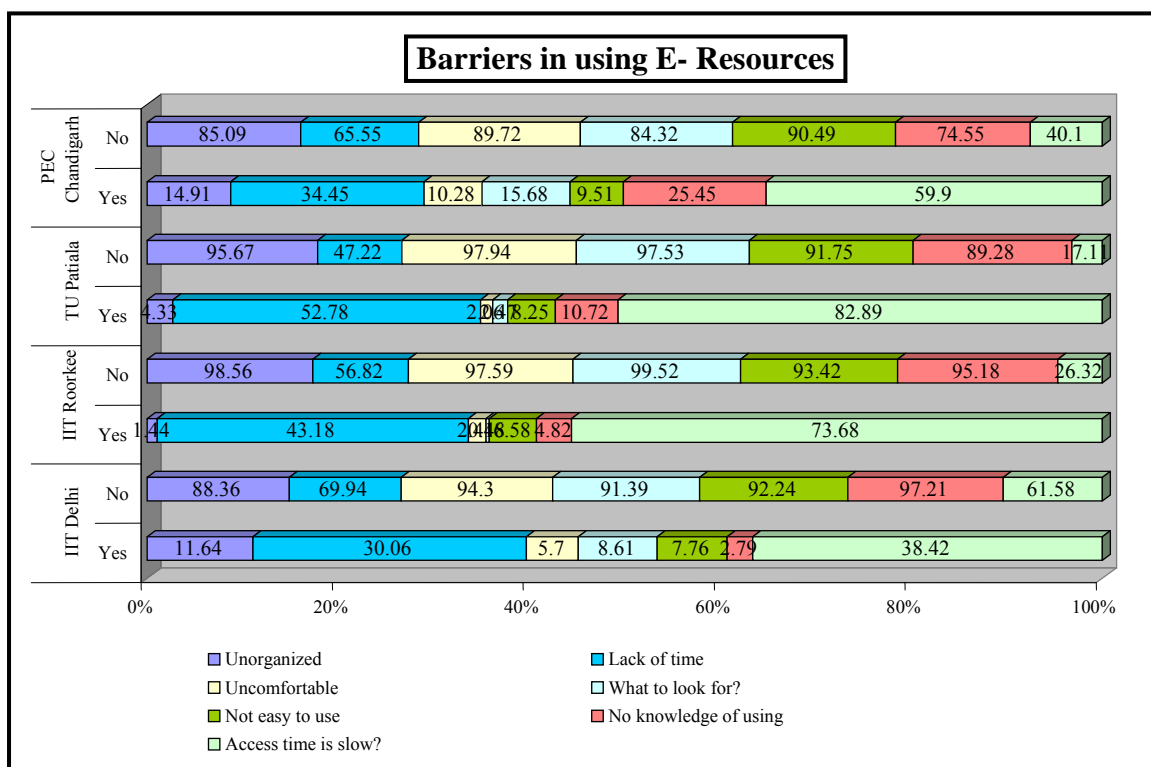
The Data shows that use of free e-books by users was very less. 261 (54.02%) users from TU, Patiala were using e-books more as compared to the users from other institutes.

The OPAC was used by 354 (42.91%) users from IIT, Delhi; 606 (97.27%) from IIT, Roorkee; 253 (52.16%) from TU, Patiala and 198 (50.90%) from PEC, Chandigarh. The users from IIT, Roorkee were using OPAC more as compared to the users from other institutes. The results show from the total users who were seeking information from e-resources 60.77% of users were using OPAC, 53.74% of users were using internet website, 52.46% were using on-line data bases, 34.10% of users were using current e-journals and 17.827% of users were using back volumes of e-journals. The use of video cassettes, e-books and CD-ROM was very less as compared to other e-resources.

**Table No. 5.5.19 Barriers in using E- Resources**

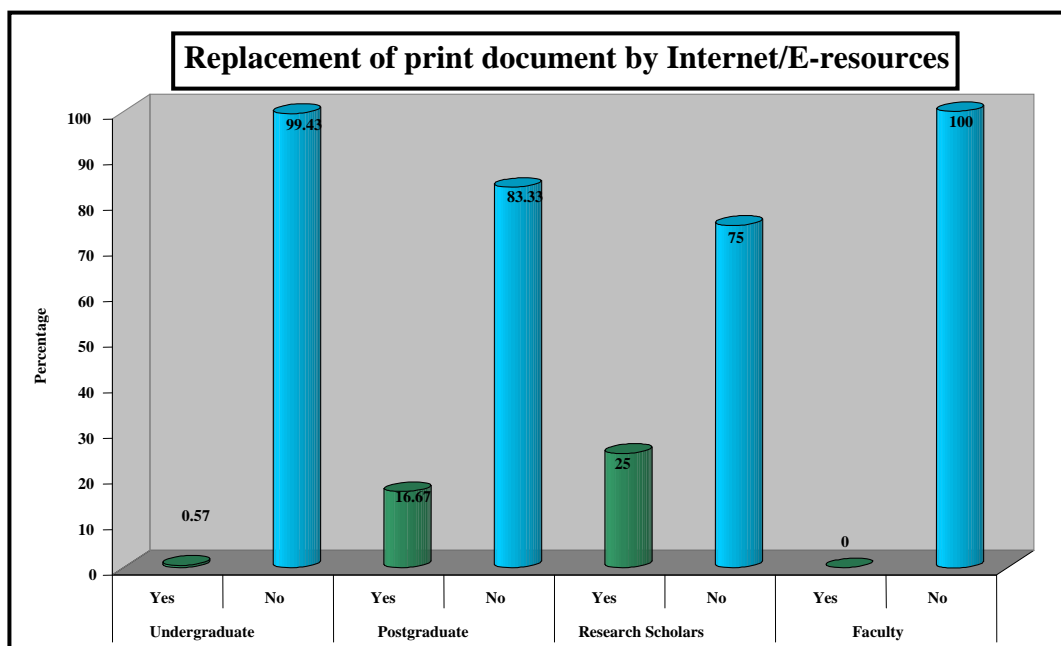
Barriers in using E- Resources	IIT, Delhi		IIT, Roorkee		TU, Patiala		PEC, Chandigarh		Total N (%)	
	Yes	No	Yes	No	Yes	No	Yes	No	Yes	No
Unorganized	96 (11.64)	729 (88.36)	9 (1.44)	614 (98.56)	21 (4.33)	464 (95.67)	58 (14.91)	339 (85.09)	184 (7.92)	2138 (92.08)
Lack of time	248 (30.06)	577 (69.94)	269 (43.18)	354 (56.82)	256 (52.78)	229 (47.22)	134 (34.45)	255 (65.55)	907 (39.06)	1415 (60.94)
Uncomfortable	47 (5.70)	778 (94.30)	15 (2.41)	608 (57.59)	10 (2.06)	475 (97.94)	40 (10.28)	349 (89.82)	112 (4.82)	2210 (95.18)
What to Look for?	71 (8.61)	754 (91.39)	3 (0.48)	620 (99.82)	12 (2.47)	473 (97.53)	61 (15.68)	328 (84.32)	147 (6.33)	2175 (93.67)
Not easy to use	64 (7.76)	761 (92.24)	41 (6.58)	582 (93.42)	40 (8.25)	445 (91.75)	37 (9.51)	352 (90.49)	182 (7.84)	2140 (92.16)
No knowledge of using	23 (2.79)	802 (97.21)	30 (4.82)	593 (95.18)	52 (10.72)	433 (89.28)	99 (25.45)	290 (74.55)	204 (8.79)	2118 (91.21)
Access time is slow	317 (38.42)	508 (61.58)	459 (73.58)	164 (26.32)	402 (82.89)	83 (17.11)	233 (59.90)	156 (40.10)	1411 (60.77)	911 (39.23)

**Figure No. 5.5.19**



The users were using e-resources/services of their library, to know what kind of barrier they were facing in using e-resources, users were asked some question. The table shows that 96 (11.64%) users from IIT, Delhi 9 (1.44%) from IIT, Roorkee, 21 (4.33%) users

**Figurer No 5.3.20**



The users were asked whether internet/electronic resources can replace print documents. The response from the Figure No. 5.3.20 shows that 2(0.57%) of undergraduates response was yes and 346(99.43%) responded no, postgraduates 15(16.67%) answered in affirmative and 75 (83.33%) in negative, response from 15(75%) research scholars was yes, while faculty 27(100%) responded in negative. Thus, maximum numbers of users do not feel that internet/electronic resources can replace printed document.

The Table No. 5.3.20 shows that for users, the Chi-Square test for independence is significant at one per cent level of significance. The value of  $\chi^2$  is 63.819 and the degrees of freedom (df) is 3. The value of p shows statistically significant ( $p \leq 0.01$ ). This implies that there is a significant variation among the users as far as the replacement of internet/electronic with the printed document resources is concerned. The data shows that users don't feel that internet/electronic resources can replace printed document.

## 5.4 Punjab Engineering College, (PEC) (Deemed University) Chandigarh: Case study-4

**Table No. 5.4.1 Population taken for Survey**

Respondents	Total Strength	Questionnaire Distributed	Response Received N (%)
Undergraduates	1630	326	310 (79.69)
Postgraduates	276	55	50 (12.85)
Research Scholars	16	04	04 (1.02)
Faculty	134	28	25 (6.42)
Total	2056	413	389 (100)

**Figure No. 5.4.1**

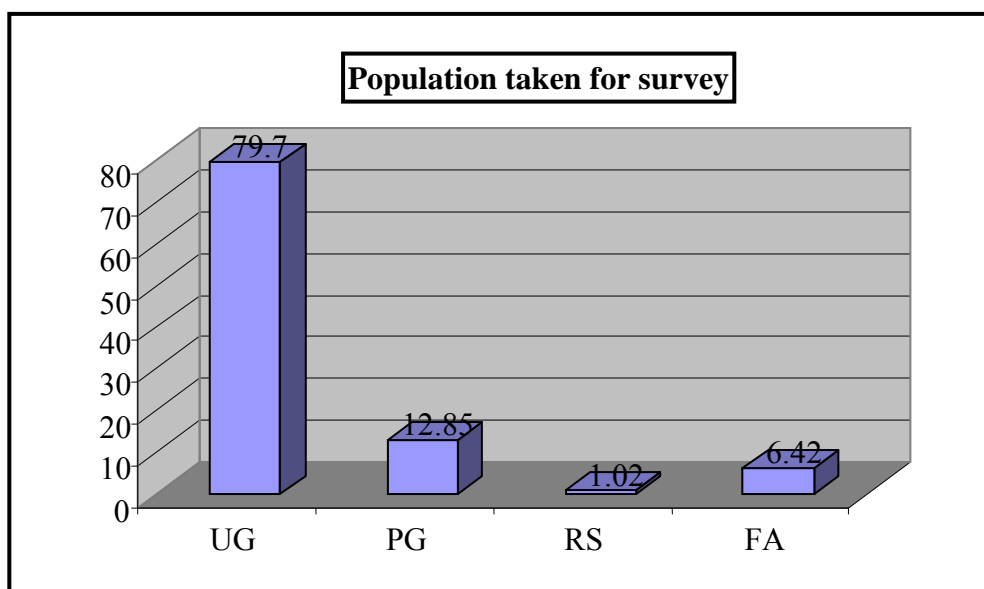


Table No.5.4.1 exhibits that the total population of the users taken up for the survey was 2056 which included undergraduates, postgraduates, research scholars and faculty. 413 questionnaires were distributed and 389 response was received. The questionnaires distributed to undergraduates were 326 and the response was 310. Similarly, 55 questionnaires were given to postgraduates and the response was received from 50. The response received from the research scholars was 100 per cent, whereas 25 faculty members out of 28 responded to the questionnaire.

**Table No. 5.4.2 Use of Institute Library**

Respondents	Response		Total N (%)	Chi <sup>2</sup> (df;C)
	Yes N (%)	No N (%)		
Undergraduates	310 (100)	-	310 (100)	6.797** (3;0.131)
Postgraduates	49 (98.00)	1 (2.00)	50 (100)	
Research Scholars	4 (100)	-	4 (100)	
Faculty	25 (100)	-	25 (100)	
Total	388 (99.74)	1 (0.26)	389 (100)	

\*\*Significant at 0.01

**Figure No. 5.4.2**

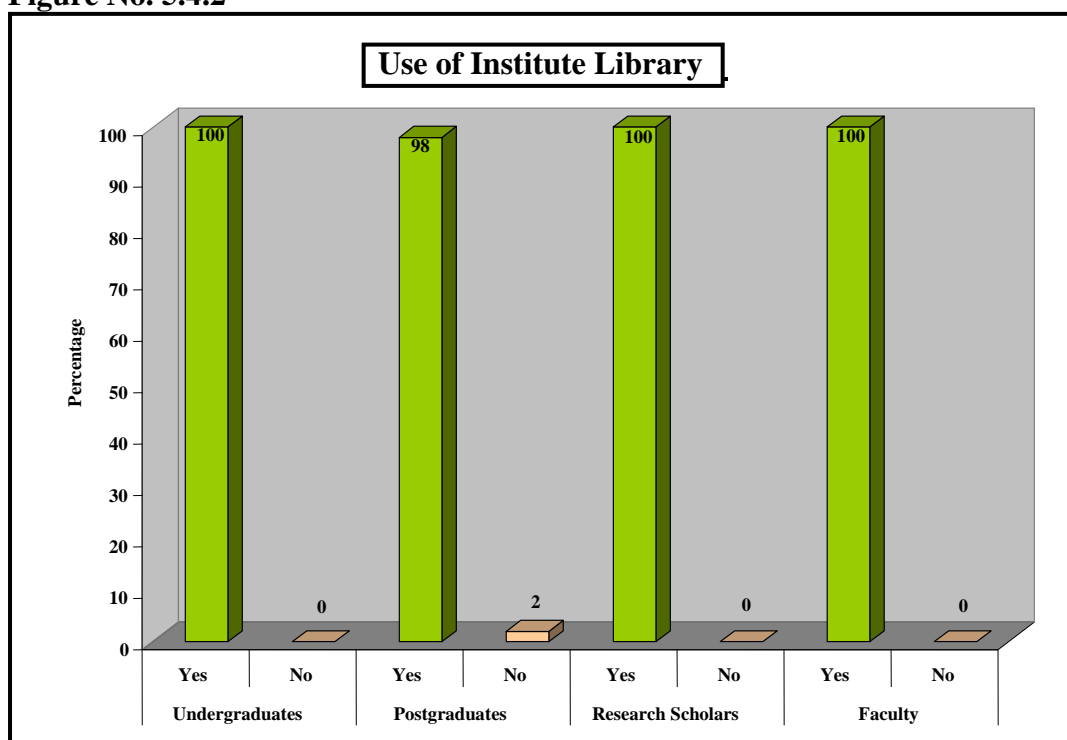


Figure No 5.4.2 shows the percentage of users surveyed. It has been found that undergraduates, research scholars and faculty used their library 100% while 49 (98.00%) postgraduates used the library and 1 (2.00%) did not use the library.

Table No.5.4.2 represents that majority of users 388 (99.74%) used the library. The Chi-Square value is a significant at one per cent level of significance, which indicates that there is a significant relationship among the users as far as the using of the institute library is concerned.

**Table No. 5.4.3 Awareness of library’s E-resources**

Respondents	Response		Total N (%)	Chi <sup>2</sup> (df;C)
	Yes N (%)	No N (%)		
Undergraduates	76 (24.52)	234 (75.48)	310 (100)	49.101** (3 ;0.335)
Postgraduates	19 (38.00)	31 (62.00)	50 (100)	
Research Scholars	4 (100)	-	4 (100)	
Faculty	21 (84.00)	4 (16.00)	25 (100)	
Total	120 (30.85)	269 (69.15)	389 (100)	

\*\*Significant at 0.01

**Figure No. 5.4.3**

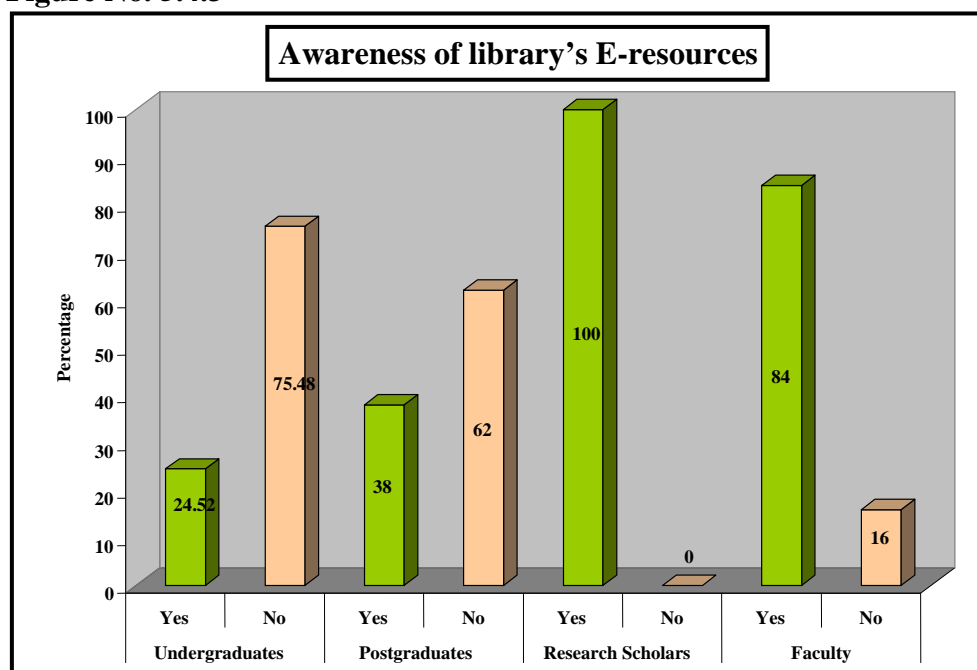


Figure No. 5.4.3 illustrates the response of respondents belonging to different categories with regard to their knowledge about the library’s electronic resources. It was found that a maximum proportion of the undergraduates, i.e., 234 (75.48%) were not aware about their library e-resources; where as the remaining 76 (24.52%) were aware about such resources. Similarly, among the postgraduates, a high proportion of them, i.e. 31(62.00%) were not aware about such resources, remaining 19(38.00%) were aware. On the other hand 100% research scholars were aware about the library e-resources. However, a large proportion of faculty members, i.e., 84.00% were aware about such e-resources, where as the remaining only 4(16.00%) were not aware about them. It is evident that maximum number of research scholars and faculty were aware of library e-resources as compared to undergraduates and postgraduates.

The data from Table No. 5.4.3 shows that from total 389 respondents 120 (30.85%) were aware and 269 (69.15%) were unaware of their library e-resources. Thus, maximum number of users did not have the knowledge about their library e-resources / services. The value of  $\chi^2$  is 49.101 and the degrees of freedom (df) is 3. The value of p is found to be statistically significant ( $P \leq 0.01$ ). The results of Chi-Square test is at significant value at 1 per cent level, shows there is a significant variation among the users as far as the awareness about e-resources/services provided by their library is concerned.

**Table No. 5.4.4 Users visiting library's website/ home page**

Respondents	Response		Total N (%)	Chi <sup>2</sup> (df;C)
	Yes	No		
Undergraduates	121 (39.03)	189 (60.97)	310 (100)	15.565** (3 ;0.196)
Postgraduates	15 (30.00)	35 (70.00)	50 (100)	
Research Scholars	-	4 (100)	4 (100)	
Faculty	18 (72.00)	7 (28.00)	25 (100)	
Total	154 (39.59)	235 (60.41)	389 (100)	

\*\*Significant at 0.01

**Figure No. 5.4.4**

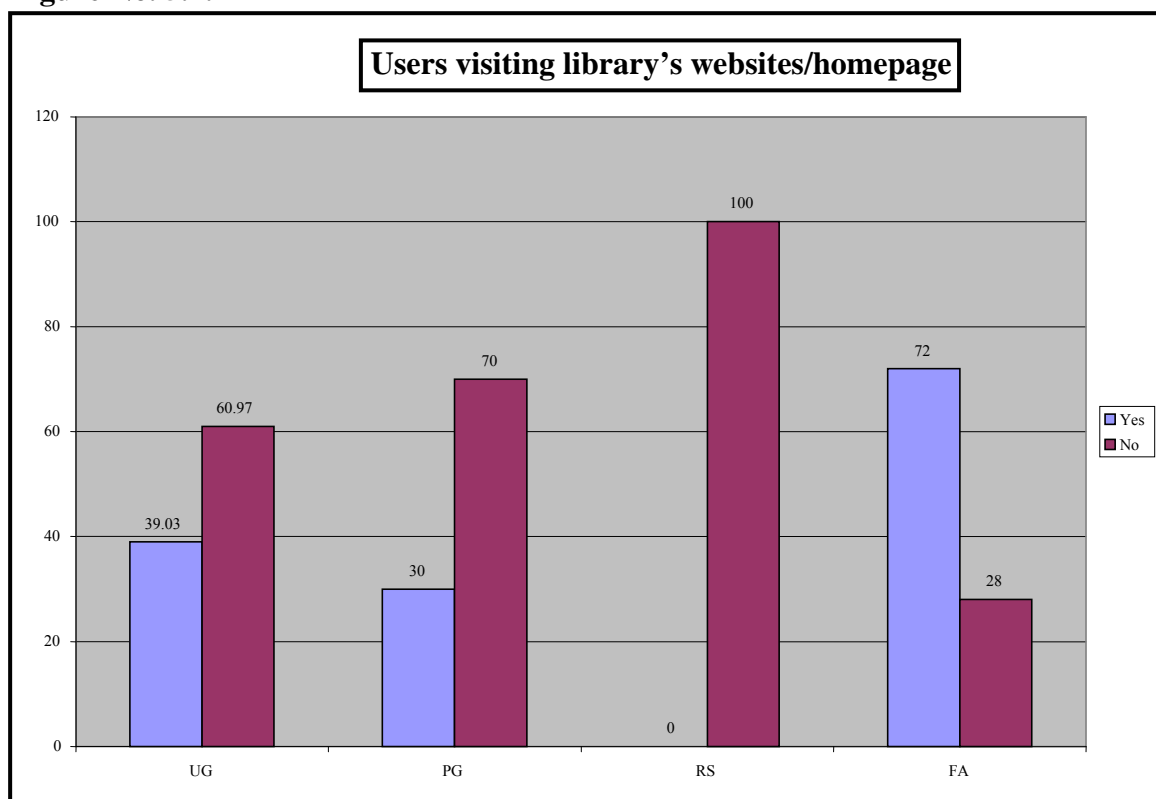


Figure No.5.4.4 shows the percentage of users who have visited their library website/homepage. There were 121 (39.03%) undergraduate respondents who had visited

their library website and 189 (60.97%) replied in negative, 15 (30.00%) postgraduates said yes and 35 (70.00%) responded in negative, while 100% research scholars answered negative, 18(72.00%) faculty answered yes and 7(28.00%) answered in negative. It has been found that faculty knows about website/home page more as compared to other users, on the other side 100% research scholar's response shows that they were totally unaware of this service.

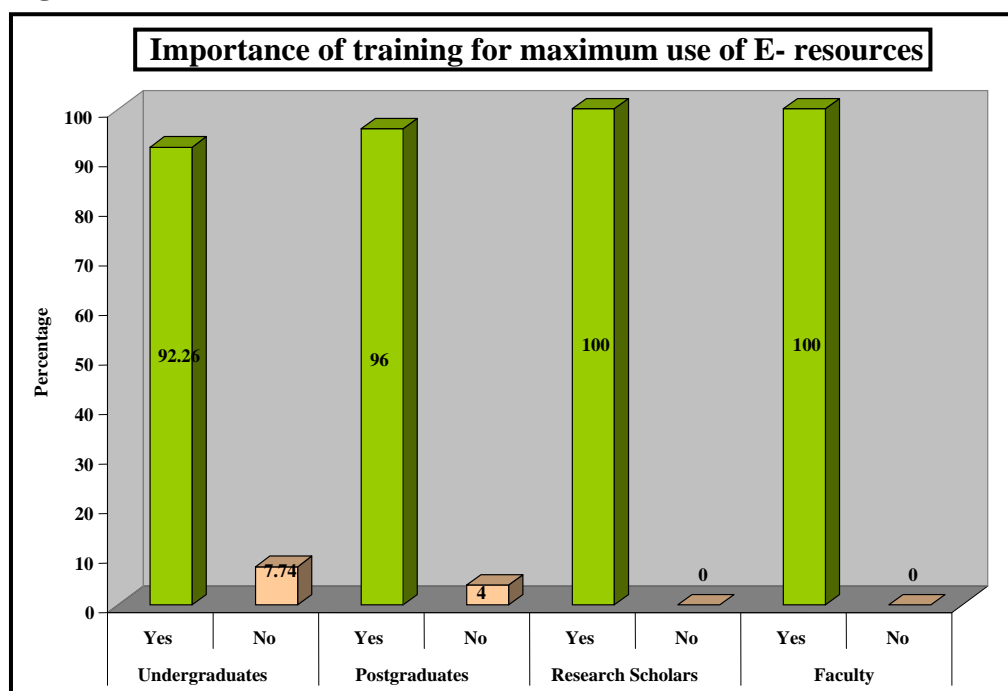
Tables No. 5.4.4 shows that the Chi-Square test for independence is significant at one percent level of significance .This implies that there is a significant variation among the users as far as visiting their library website/homepage is concerned. The results show that from 389 users at PEC institute, 154(39.59%) have visited their library websites and 235(60.41%) have not. Thus maximum numbers of users have not visited their library website/ homepage.

**Table No. 5.4.5 Importance of training for maximum use of E- resources**

Respondents	Response		Total N (%)	Chi <sup>2</sup> (df;C)
	Yes	No		
Undergraduates	286 (92.26)	24 (7.74)	310 (100)	3.211** (3;0.090)
Postgraduates	48 (96.00)	2 (4.00)	50 (100)	
Research Scholars	4 (100)	-	4 (100)	
Faculty	25 (100)	-	25 (100)	
Total	363 (93.32)	26 (6.68)	389 (100)	

\*\*Significant at 0.01

**Figure No.5.4.5**



Respondents in this study were asked whether training is important to make maximum use of e-resources. Figures No. 5.4.5 shows that 286 (92.26%) undergraduates students said yes and 24 (7.74%) no. 48 (96.0%) postgraduates response was yes and that of 2 (4.0%) was no. Where as, the response from research scholars and faculty was 100% in positive. The result shows that maximum users felt that to make maximum use of e-resources institute library must provide training to them.

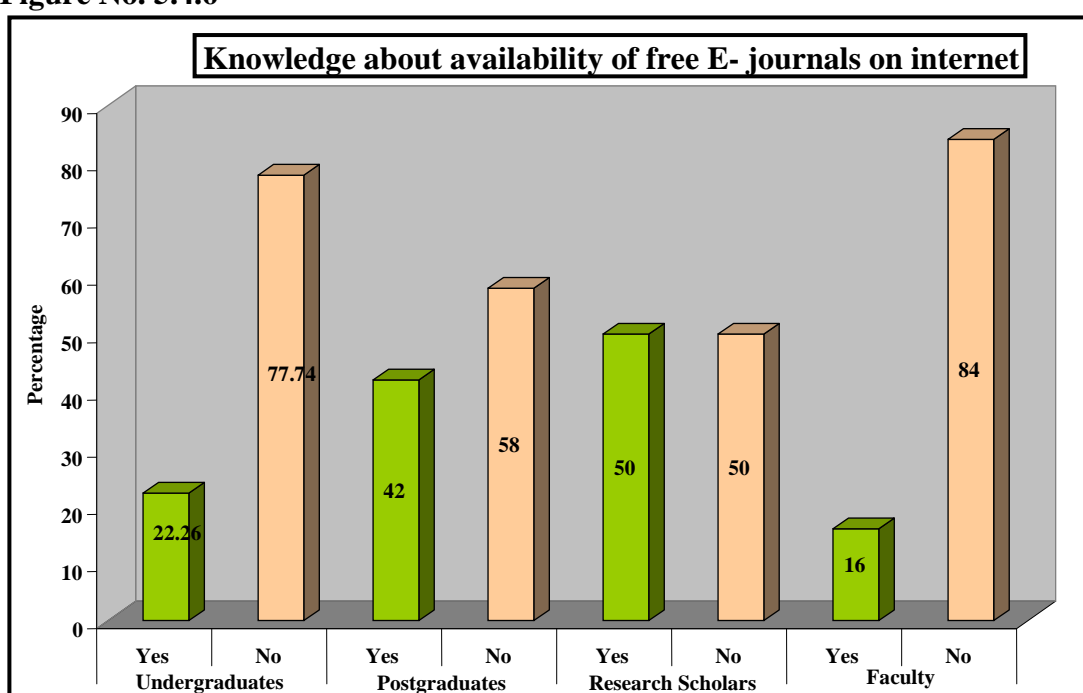
The Table No. 5.4.5 shows the Chi-Square test for independence is significant at 1 per cent level of significance. This implies that there is a significant variation among the users as far as the importance of training is needed for maximum use of e-resources is concerned. From 389 respondents it has been found that 363 (93.32%) responded in favors of training and 26 (6.68%) were not in favor of training to be provided. Thus the majority of the users are in favor of provision of training.

**Table No. 5.4.6 Knowledge about availability of free E- journals on internet**

Respondents	Response		Total N (%)	Chi <sup>2</sup> (df;C)
	Yes N (%)	No N (%)		
Undergraduates	69 (22.26)	241 (77.74)	310(100)	11.440** (3;0.169)
Postgraduates	21 (42.00)	29 (58.00)	50 (100)	
Research Scholars	2 (50.00)	2 (50.00)	4 (100)	
Faculty	4 (16.00)	21 (84.00)	25 (100)	
Total	96 (24.68)	293 (75.32)	389 (100)	

\*\*Significant at 0.01

**Figure No. 5.4.6**



The Figure No. 5.4.6 shows that in response to the question whether the users have the knowledge about availability of free electronic journals on the net, 69 (22.26%) undergraduates were found to have the awareness in this regard, whereas 241 (77.74%) were lacking this awareness. Similarly, 21 (42.0%) postgraduates responded yes and 29 (58.0%) responded no. However, the response of research scholars was 50:50 in this regard, while 4 (16.0%) faculty member's response was yes and 21 (84.00%) responded in no. The awareness about availability of free electronic journals among the research scholars and postgraduates was greater as compared to undergraduates and faculty.

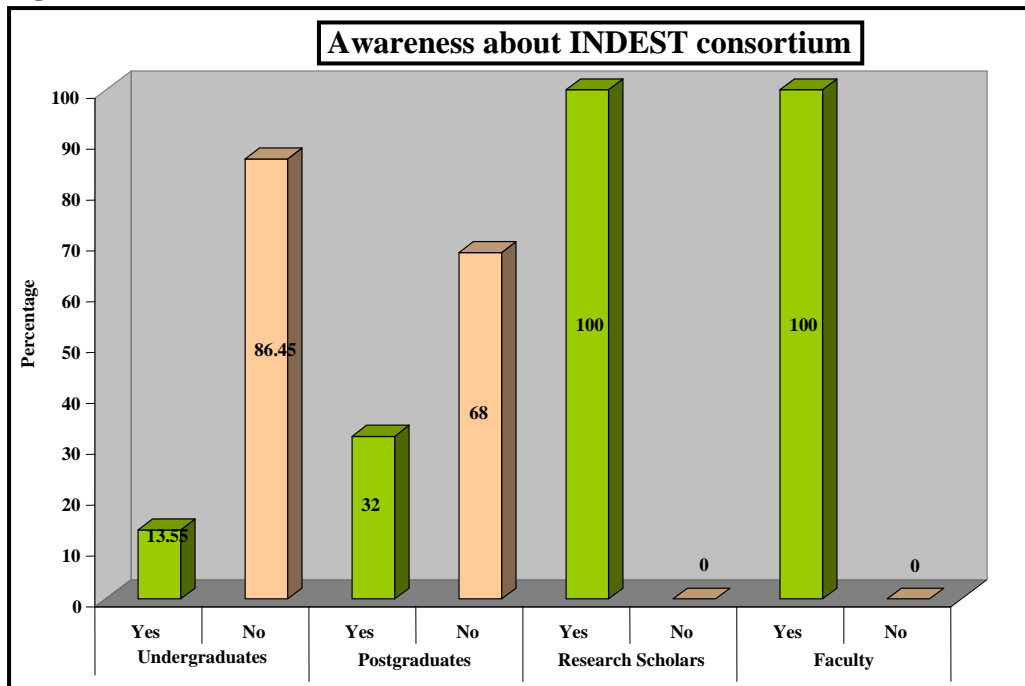
The Table No. 5.4.6 clearly shows that maximum numbers of users did not have the knowledge about availability of free e-journals on the net. The Chi-Square test for independence is significant at 1 per cent level. It implies that there is a significant variation among the users as the knowledge of availability of free e-journals on the net is concerned. The data provides that out of the total 389 respondents, 96 (24.68%) responded positively and 293 (75.32%) responded negatively. This shows that maximum of users were not aware about the free e-journals/portals on the net.

**Table No. 5.4.7 Awareness about INDEST consortium**

Respondents	Response		Total N (%)	Chi <sup>2</sup> (df;C)
	Yes N (%)	No N (%)		
Undergraduates	42 (13.55)	268(86.45)	310 (100)	117.218** (3 ;0.481)
Postgraduates	16 (32.00)	34 (68.00)	50 (100)	
Research Scholars	4 (100)	-	4 (100)	
Faculty	25 (100)	-	25 (100)	
Total	87 (22.37)	302 (77.63)	389 (100)	

\*\*Significant at 0.01

Figure No. 5.4.7



The Institute library under study subscribes to various e-journals/portals for its users under INDEST consortium. Figure No.5.4.7 shows that in response to the question whether the respondents have heard the name of INDEST consortium and know about its working. Majority of the undergraduates, i.e., 168 (86.45%) responded negatively, whereas the remaining 42 (13.55%) of them responded positively. Similarly, a high proportion of postgraduates, i.e., 34 (68.00%) responded positively. However, all the research scholars and faculty members responded that they have heard the name of INDEST consortium and know about its working. It has been seen that research scholars and faculty were fully aware about INDEST consortium.

Table No.5.4.7 shows that from 389 users, maximum numbers of users 302 (77.63%) were not aware of INDEST consortium. Only 87 (22.37%) were aware of it. The value of  $\chi^2$  is 117.218 and the degree of freedom (df) is 3. The value of p found to be statistically significant ( $p \leq 0.01$ ). The Chi-Square test of independence is significant at 1 per cent level of significance. This implies that there is a significant variation among the users as far as the awareness of INDEST consortium is concerned.

**Table No. 5.4.8 Use of INDEST Consortium**

Respondents	Response		Total	Chi <sup>2</sup> (df;C)
	Yes	No	N (%)	
Undergraduates	-	42 (100)	42 (100)	53.605** (3;0.617) NR:302 (77.63%)
Postgraduates	3 (18.75)	13 (81.25)	16 (100)	
Research Scholars	13 (81.25)	4 (100)	17 (100)	
Faculty	19 (76.00)	6 (24.00)	25 (100)	
Total	26 (29.89)	61 (70.11)	87 (100)	

\*\*Significant at 0.01

**Figure No. 5.4.8**

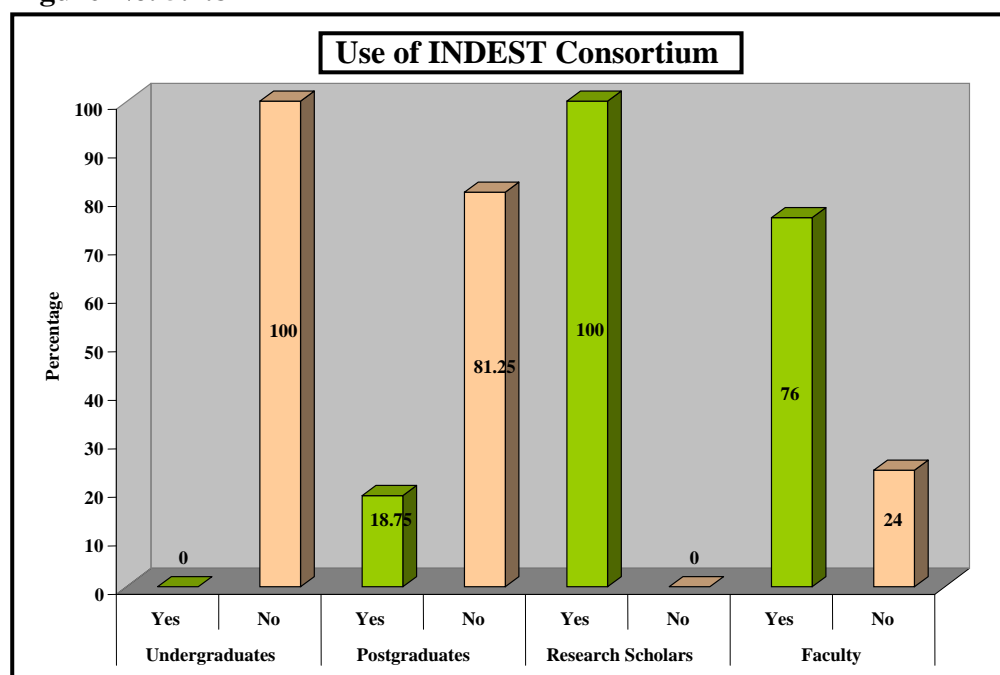


Figure No. 5.4.8 shows the response of users regarding the use of INDEST consortium. It has been found that none of the respondents used the e-resources. Similarly, a high proportion of postgraduates, i.e., 13 (81.25%) did not use such e-resources, whereas the remaining 3(18.75%) used these resources. However, 100 per cent of the research scholars were using e-resources from INDEST consortium. Among the faculty members, 19 (76.0%) of them used the e-resources, whereas the remaining 6 (24.0%) did not use such resources. Further, it has been found that research scholars and faculty used these e-resources more as compared to undergraduates and postgraduates.

Table No.5.4.7 shows that out of total 389 respondents, 302 (77.63%) users said no about awareness of INDEST and 87 responded to this question. From these 87, only 26 (29.89%) respondents were found to be aware about e-resources provided by their library,

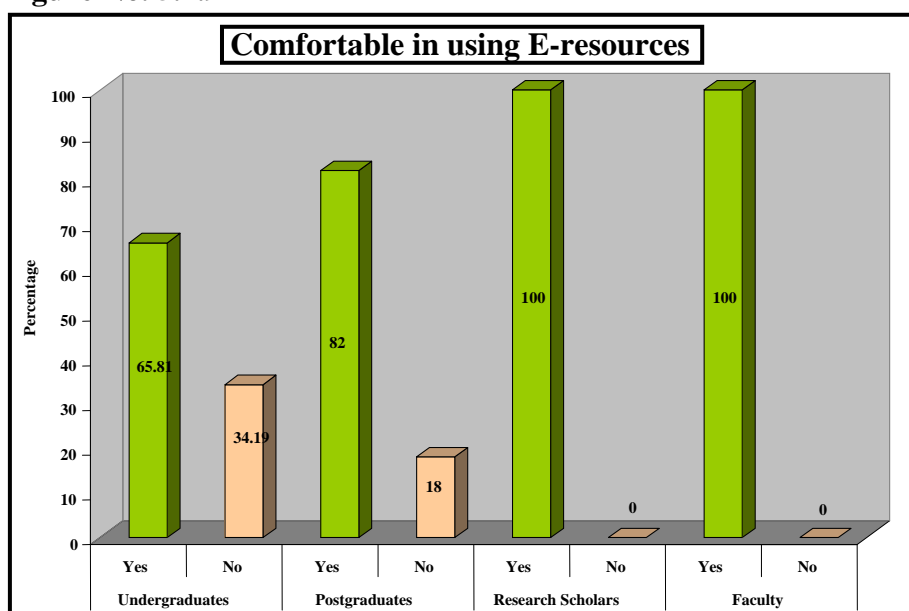
while 61 (70.11%) were not using them. Thus, majority of the users were not using the e-resources. The Chi-Square value is significant at 1 per cent level. This implies that there is a significant variation among the users as far as the use of e-resources is concerned.

**Table No. 5.4.9 Comfortable in using E-resources**

Respondents	Response		Total N (%)	Chi <sup>2</sup> (df;C)	
	Yes	N (%)			No
Undergraduates	204	(65.81)	106	(34.19)	18.574** (3;0.213)
Postgraduates	41	(82.00)	9	(18.00)	
Research Scholars	4	(100)	-		
Faculty	25	(100)	-		
Total	274	(70.44)	115	(29.56)	

\*\*Significant at 0.01

**Figure No. 5.4.9**



The respondents of the survey were asked whether they were comfortable in using electronic information resources or not. Figure No. 5.4.9 shows that 204 undergraduates (65.81%) replied positively and 106 (34.19%) answered in negative, 106 postgraduates (82.0%) said yes and 9 (18.0%) said no, whereas research scholars and faculty members responded 100% in positive. The result shows that research scholars and faculty were comfortable and they feel easy to use electronic information as compared to undergraduate and postgraduate users.

The Table No. 5.4.9 shows that majority of users were comfortable with electronic information i.e. 274 (70.44%) responded positively and 115 (29.56%) answered no. The

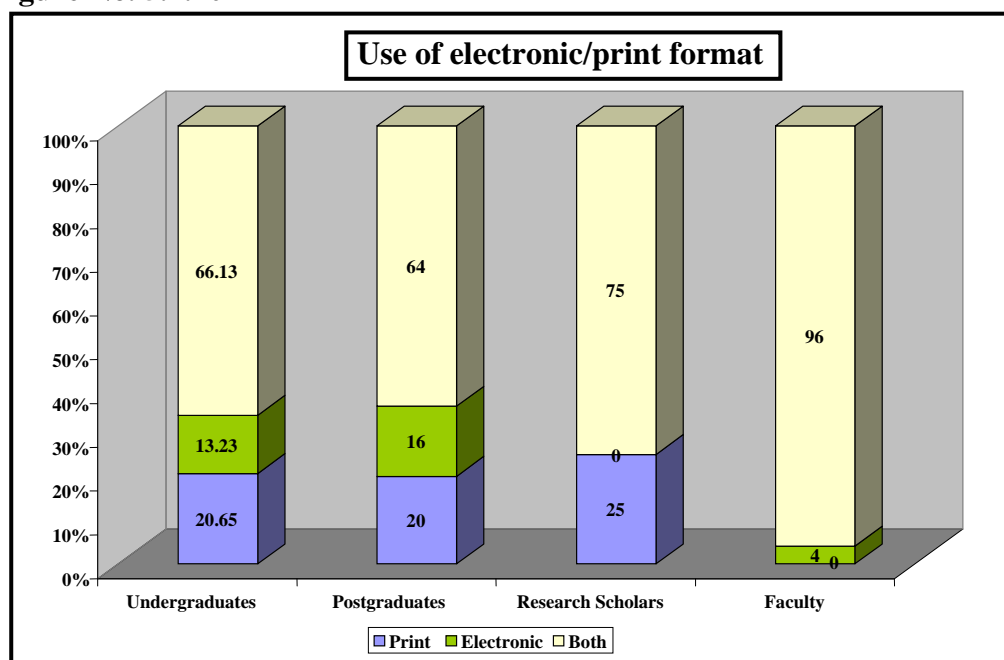
Chi-Square test for independence is significant at 1 per cent level of significance. This implies that there is a significant variation among the users as far as the comfort in using the electronic information is concerned.

**Table No. 5.4.10 Use of electronic/print format**

Document you prefer to use	UG N (%)	PG N (%)	RS N (%)	FA N (%)	Total N (%)	Chi <sup>2</sup> (df;C)
Print	64 (20.65)	10 (20.00)	1 (25.00)	-	75 (19.28)	10.852** (6;0.165)
Electronic	41 (13.23)	8 (16.00)	-	1 (4.00)	50 (12.85)	
Both	205 (66.13)	32 (64.00)	3 (75.00)	24 (96.00)	264 (67.87)	
Total	310 (100)	50 (100)	4 (100)	25 (100)	389 (100)	

\*\*Significant at 0.01

**Figure No. 5.4.10**



The library provides e-resources as well as print document. The availability of electronic information services from the library along with print document is an advantage for the users, as they have a choice to use these as per their convenience. From Figure No.5.4.10 it has been found that preference for only electronic document was less as compared to the choice for using print document and using both the format for getting information. The choice for using printed document by undergraduates was 64 (20.65%), postgraduate was 10 (20.0%) and research scholar was 1 (25.0%), where as faculty did not answered

this question. The response for using the electronic document from undergraduates was 41 (13.23%), postgraduates was 8 (16.0%) and faculty was 4.0% where as research scholars did not replied to it. Similarly the response for using both the formats from undergraduates was 66.13%, postgraduates were 64.0%, research scholar was 75.0% and from faculty it was 96.0%.

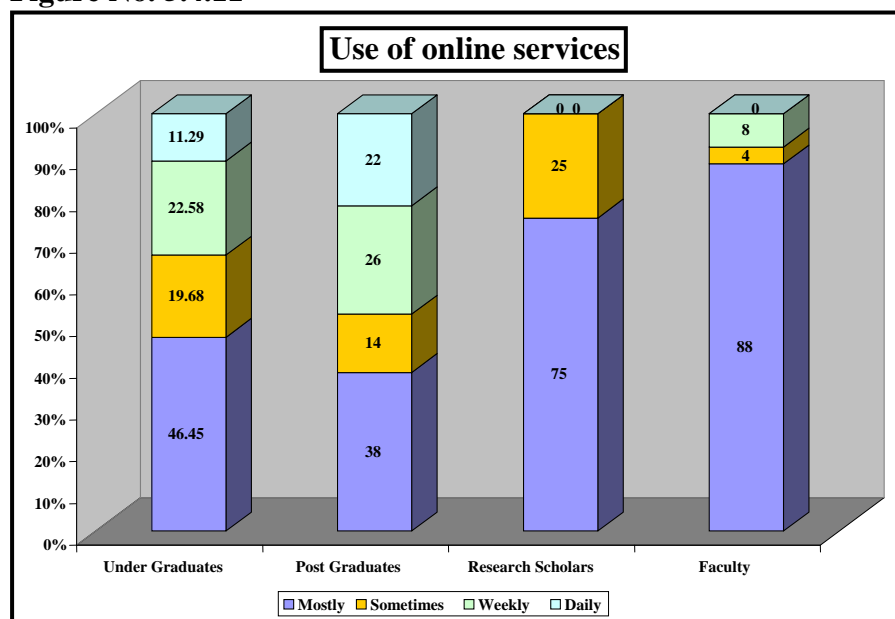
The Table No. 5.4.10 shows that out of 389 users the maximum response was 264 (67.87%) in the favors of document using both the formats as compared to printed and electronic only. The Chi-Square test for independence is significant at 1 per cent level of significance. The value of  $\chi^2$  is 10.852 and the degrees of freedom (df) is 6. The value of p shows statistically significant ( $P \leq 0.01$ ). This implies that there is a significant variation among the users as for the preference for use of the format of document is concerned.

**Table No. 5.4.11 Use of online services**

Using online services	UG N (%)	PG N (%)	RS N (%)	FA N (%)	Total N (%)	Chi <sup>2</sup> (df;C)
Mostly	144 (46.45)	19 (38.00)	3 (75.00)	22 (88.00)	188 (48.33)	25.241** (9 ;0.247)
Sometimes	61 (19.68)	7 (14.00)	1 (25.00)	1 (4.00)	70 (17.99)	
Weekly	70 (22.58)	13 (26.00)	-	2 (8.00)	85 (21.85)	
Daily	35 (11.29)	11 (22.00)	-	-	46 (11.83)	
Total	310 (100)	50 (100)	4 (100)	25 (100)	389 (100)	

\*\*Significant at 0.01

**Figure No. 5.4.11**



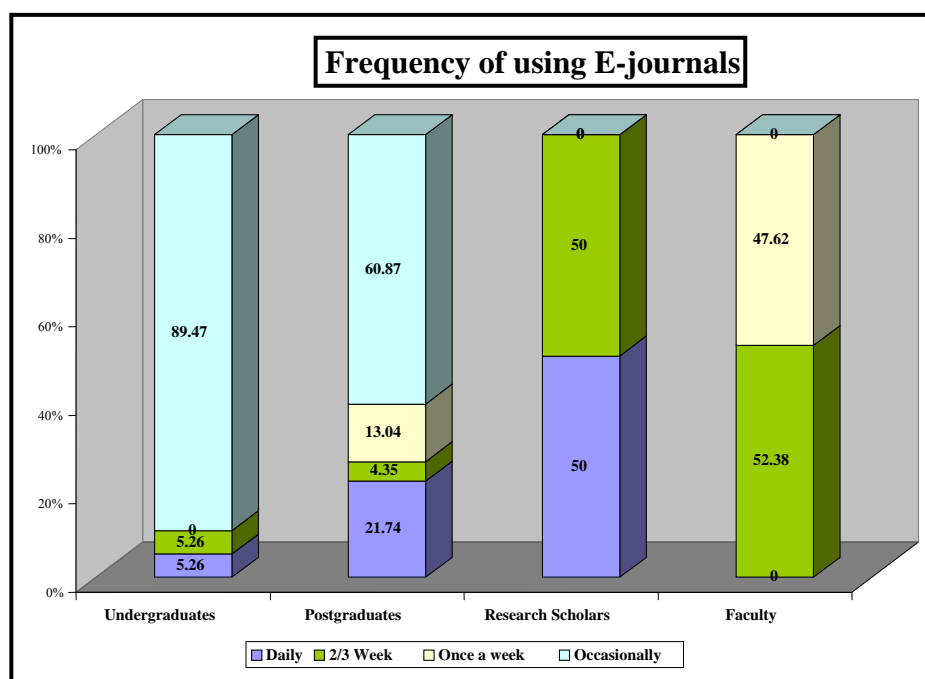
The respondents were asked how often they use on-line services. The response from Table No.5.4.11 shows that, 144 (46.45%) research scholars and 22 (88.00%) faculty members used on-line services mostly. While 61 (19.58%) undergraduates, 7(14.00%) postgraduates, 1(25.00%) research scholars and 1(4.00%) faculty used on-line services sometimes. Where as 70 (22.58%) undergraduates, 13 (26.00%) postgraduates and 3(8.00%) faculty used on-line services weekly. 35 (11.29%) undergraduates and 11(22.00%) postgraduates use on-line services daily. It has been found that maximum users use on-line services most of the time. From the total users survey, 188(48.33%) users use on-line services mostly, 70 (17.99%) sometimes, 85 (21.85%) weekly and 46 (11.83%) daily. The Chi-Square test for independence is significant at 1 per cent level of significance. The value of  $\chi^2$  is 25.241 and the degree of freedom (df) is 9. The value of p shows statistically significant ( $P \leq 0.01$ ). This implies that there is a significant variation among the users as far as the use of on-line services is concerned.

**Table No. 5.4.12** Frequency of using E-journals

Using E-journals	UG N (%)	PG N (%)	RS N (%)	FA N (%)	Total N (%)	Chi <sup>2</sup> (df;C)
Daily	2 ( 5.26)	5 ( 21.74)	2 (50.00)	-	9 (10.47 )	75.956** (9 ;0.685)
2/3 Week	2 (5.26)	1 ( 4.35)	2 (50.00)	11 (52.38)	16 (18.60)	
Once a week	-	3 (13.04)	-	10 (47.62)	13 (15.12)	
Occasionally	34 (89.47)	14 (60.87)	-	-	48 (55.81)	
Total	310 (100)	50 (100)	4 (100)	25 (100)	389 (100)	

\*\*Significant at 0.01

**Figure No. 5.4.12**



The users were asked how frequently they are using the electronic journals. Figure No. 5.4.12 reveals that very few users used e-journals daily and once a week. The e-journals are used maximum by users occasionally and 2/3 times a week. The data reveals that 2 (5.26%) undergraduates, 5 (21.74%) postgraduates, 2 (50.0%) research scholars used e-journals daily, where as 2 (5.26%) undergraduates, 1 (4.35%) postgraduates 2 (50.00%) research scholars and 11 (52.38%) faculty members used e-journals 2/3 times a week. It has been found that 3 (13.04%) postgraduates and 10 (47.62%) faculty members used e-journals once a week. While 34 (89.47%) undergraduates and 14 (60.87%), postgraduates used e-journals occasionally.

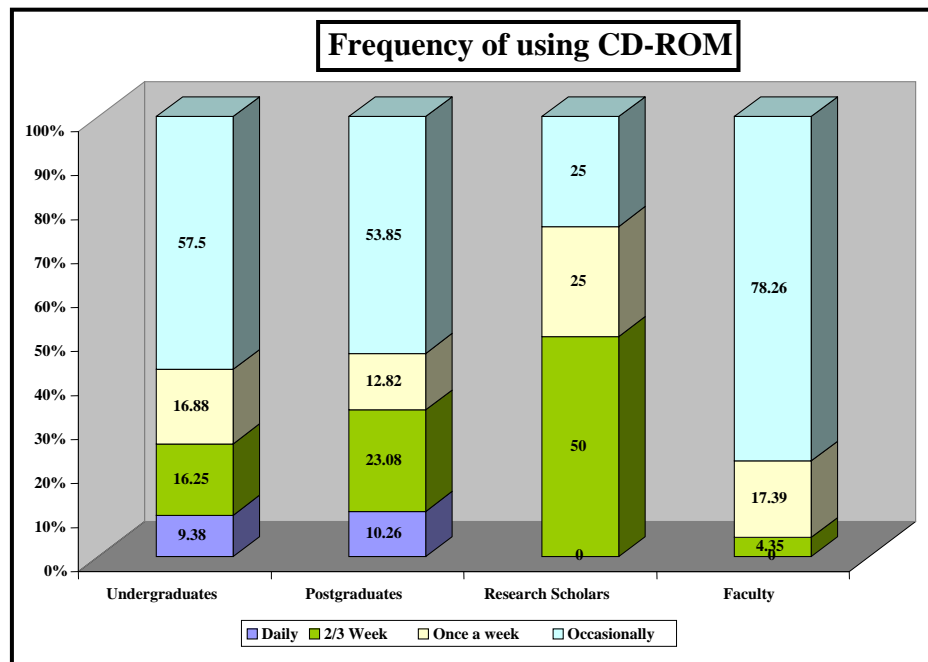
The Table No.5.4.12 shows that maximum no of users used e-journals occasionally and they are undergraduates and postgraduates. It has been found that the Chi-Square test for independence is significant at 1 per cent level of significance. The value of  $\chi^2$  is 75.956 and the degrees of freedom (df) is 9. The value of p shows statistically significant ( $P \leq 0.01$ ). The variation among the users has been found as far as the frequency of use of e-journals is concerned.

**Table No. 5.4.13 Frequency of using CD-ROM**

Using CD-ROM	UG N (%)	PG N (%)	RS N (%)	FA N (%)	Total N (%)	Chi <sup>2</sup> (df;C)
Daily	15 (9.38)	4 (10.26)	-	-	19 (8.41)	11.292** (9 ;0.218)
2/3 Week	26 (16.25)	9 (23.08)	2 (50.00)	1 (4.35)	38 (16.81)	
Once a week	27 (16.88)	5 (12.82)	1 (25.00)	4 (17.39)	37 (16.37)	
Occasionally	92 (57.50)	21 (53.85)	1 (25.00)	18 (78.26)	132 (58.41)	
Total	310 (100)	50 (100)	4 (100)	25 (100)	389 (100)	

\*\*Significant at 0.01

**Figure No. 5.4.13**



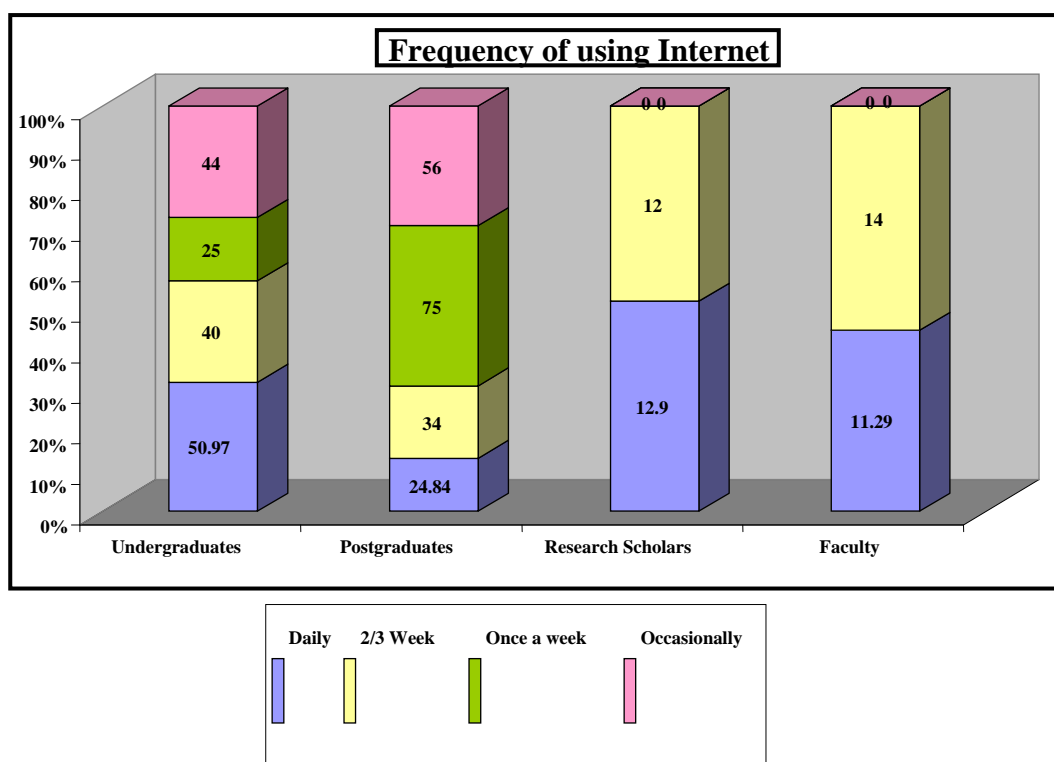
The Figure No.5.4.13 shows that CD-ROM is used daily by 15 (9.38%) undergraduates, 4 (10.26%) postgraduates while research scholars and faculty did not respond. The use of CD-ROM 2/3 times a week by 26 (16.25%) undergraduates, 9 (23.08%) postgraduates, 2(50%) research scholars and 1 (4.35%) faculty member. Respondents who use CD-ROM once a week are 27 (16.88%) undergraduates, 5 (12.82%) postgraduates, 1 (25.00%) research scholars and 4 (17.39%) faculty. 92 (57.50%) undergraduates, 21 (53.85%) postgraduates and 1 (25.00%) research scholars and 18 (78.26%) faculty members use CD-ROM occasionally. Thus CD-ROM services are used maximum by users occasionally as compared to other time. From 389 survey users, 19 (8.41%) use CD-ROM daily, 38 (16.81%) 2/3 times a week, 37(16.37%) once a week and 132 (58.41%) occasionally. The Chi-Square test for independence is significant at 1 per cent level of significance. The value of  $\chi^2$  is 11.292 and the degrees of freedom (df) is 9. The value of p shows statistically significant ( $P \leq 0.01$ ). The variation among the users has been found as far as use of the CD-ROM services is concerned.

**Table No. 5.4.14 Frequency of using Internet**

Using online services	UG N (%)	PG N (%)	RS N (%)	FA N (%)	Total N (%)	Chi <sup>2</sup> (df;C)
Daily	158 (50.97)	77 (24.84)	40 (12.90)	35 (11.29)	190 (48.84)	20.727* (9 ;0.225)
2/3 Week	20 (40.0)	17 (34.00)	6 (12.00)	7 (14.0)	111 (28.53)	
Once a week	1 (25.0)	3 (75.0)	-	-	46 (11.83)	
Occasionally	11 (44.0)	14 (56.0)	-	-	42 (10.80)	
Total	310 (100)	50 (100)	4 (100)	25 (100)	389 (100)	

\*\*Significant at 0.05

**Figure No. 5.4.14**



The users were asked how frequently they use the internet services provided to them. The Table No.5.4.14 shows that 158 (50.97%) undergraduates, 77 (24.84%) postgraduates, 40 (12.90%) research scholars and 35 (11.29%) faculty members use the internet services daily. While the internet is used 2/3 times a week by 20 (40.00%) undergraduates, 17 (34.00%) postgraduates, 6 (12.00%) research scholars and 7 (14.00%) faculty members. It has been found that 1 (25.00%) undergraduates and 3 (75.00%) postgraduates use internet once a week where as 11 (44.00%) of undergraduates and 14 (56.00%) postgraduates use occasionally. From the results it has been found that from the total survey population i.e. 399, the internet is used daily by 190 (48.84%), 2/3 times a week by 111 (28.53%) users 46 (11.83%) once a week and 42(10.80%) occasionally. Thus the result indicates that maximum users use internet services daily. The Chi-Square test for independence is

significant at 1 percent level of significance. The value of  $\chi^2$  is 20.727 and the degrees of freedom (df) is Q. The value of p shows statistically significant ( $P \leq 0.01$ ). This implies that there is a significant variation among the users as far as use of the internet is concerned.

**Table No. 5.4.15 Place used for accessing E-resources**

Place	UG N (%)		PG N (%)		RS N (%)		Faculty N (%)		Total N (%)	
	Yes	No	Yes	No	Yes	No	Yes	No	Yes	No
Department	22 (7.10)	288 (92.90)	7 (14.0)	43 (86.0)	4 (100)	-	25 (100)	-	58 (14.90)	331 (85.09)
Library	10 (3.23)	300 (96.77)	3 (6.0)	47 (94.0)	4 (100)	-	-	25 (100)	17 (4.37)	372 (95.63)
Hostel	19 (6.13)	291 (93.87)	5 (10.0)	45 (90.0)	4 (100)	-	-	25 (100)	28 (7.20)	361 (92.80)
Computer center	280 (90.32)	30 (9.68)	43 (86.0)	7 (14.0)	-	4 (100)	3 (12.0)	22 (88.0)	326 (83.80)	63 (60.20)

**Figure No. 5.4.15**

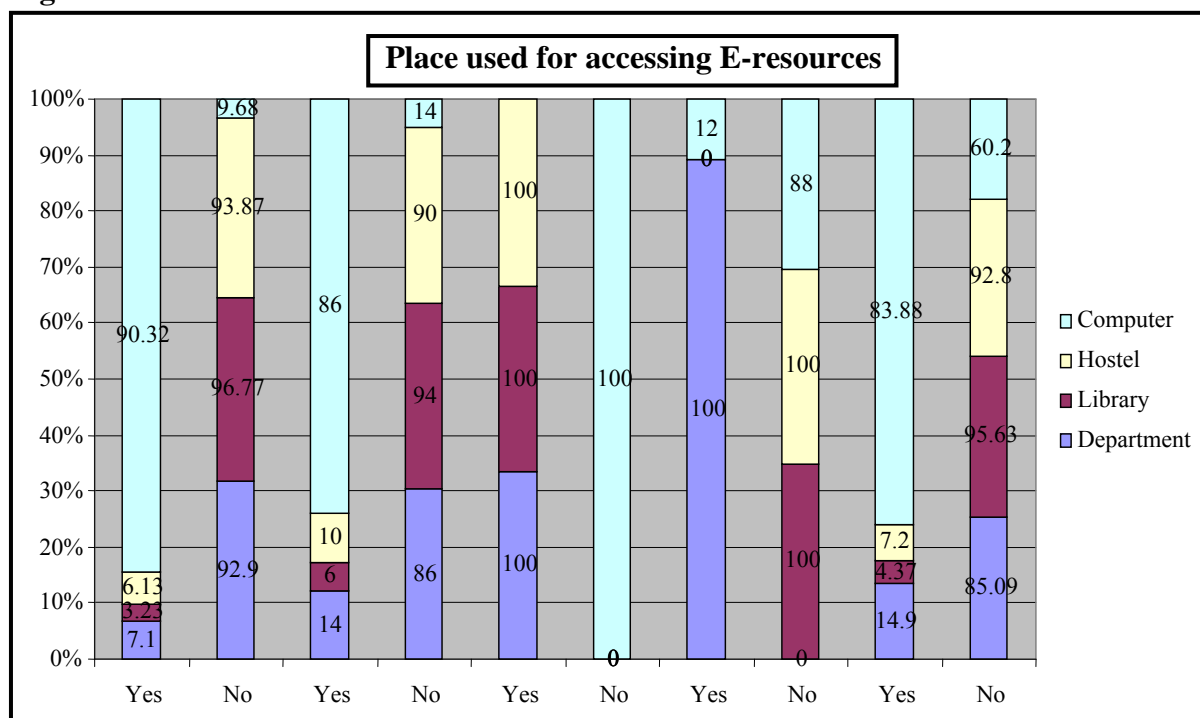


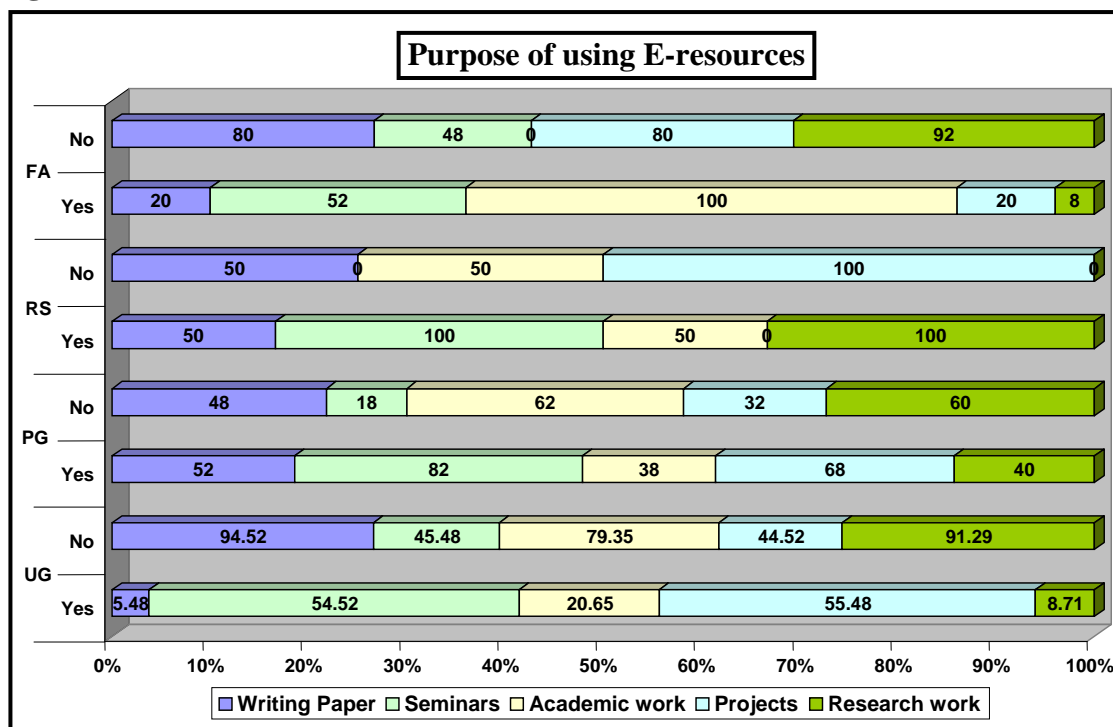
Table No. 5.4.15, it has been derived that users wise department was used by all the research scholars and faculty members. They all responded 100% in positive. Where as, only 7.10% undergraduates and 14% a postgraduate answered in positive. The library was used by only 3.23% undergraduates and 6% postgraduates. All the research scholars said

that they used library while faculty did not answer to the question. Similarly hostels were used for accessing e-resources by 100% research scholars, 10% postgraduate, 6.31% undergraduates. Faculty do not use hostel as a place for searching e-resources. Computer centre was used by 90.32% undergraduates, 86% postgraduates and 12% faculty members. Research scholars do not use computer centre for accessing e-resources. Thus the data of total users shows that 8.38% users used computer centre, 14.90% departments, 7% hostels and 4.37% were using library. It has been found that users from PEC used computer centre more as compared to library for accessing e-resources.

**Table No. 5.4.16 Purpose of using E-resources**

Use of E-Resources	UG N (%)		PG N (%)		RS N (%)		Faculty N (%)		Total N (%)	
	Yes	No	Yes	No	Yes	No	Yes	No	Yes	No
Writing Paper	17 (5.48)	293 (94.52)	26 (52.0)	24 (48.0)	2 (50.0)	2 (50.0)	5 (20.0)	20 (80.0)	50 (12.85)	339 (87.15)
Seminars	169 (54.52)	141 (45.48)	41 (82.0)	9 (18.0)	4 (100)	-	13 (52.0)	12 (48.0)	227 (58.35)	162 (41.65)
Academic work	64 (20.65)	246 (79.35)	19 (38.0)	31 (62.0)	2 (50.0)	2 (50.0)	25 (100)	-	110 (28.28)	279 (71.72)
Projects	172 (55.48)	138 (44.52)	34 (68.0)	16 (32.0)	-	4 (100)	5 (20.0)	20 (80.0)	211 (54.24)	178 (45.76)
Research work	27 (8.71)	283 (91.29)	20 (40.0)	30 (60.0)	4 (100)	-	2 (8.0)	23 (92.0)	53 (13.62)	336 (86.38)

**Figure No. 5.4.16**

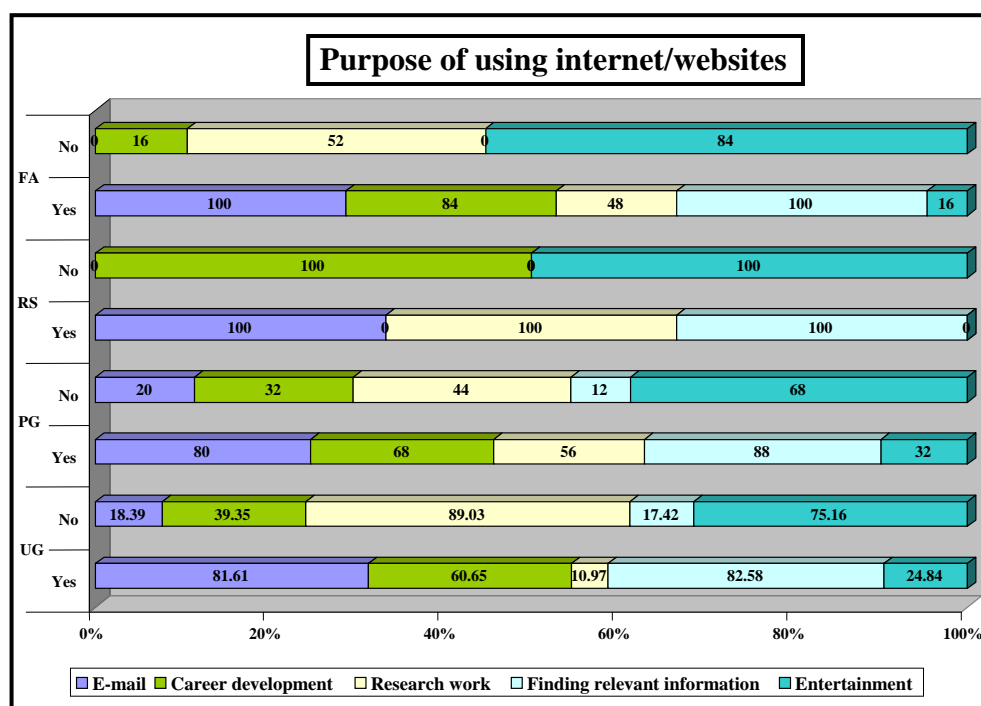


The e-resources are used for various purposes. The users were asked for what purpose they use e-journals and bibliographic database. Table No.5.4.16 shows that of the total respondents, maximum number of them, i.e., 339 (87.15%) did not use these e-resources for writing papers, where as the remaining 50 (12.85%) used for this purpose. As many as 227 (58.35%) used such e-resources for seminars, and the rest 162(41.65%) did not use for this purpose. Similarly, most of the respondents, i.e., 279 (71.72%) did not use e-resources for academic work, whereas the remaining 110 (28.28%) used for this purpose. It has been found that a greater number of respondents, i.e., 211 (54.24%) used library e-resources for the purpose of writing projects, whereas 178 (45.76%) were not using for this purpose. As many as 336 (86.38%) respondents were not using the library e-resources for the purpose of research work and only 53 (13.62%) of them were using these e-resources for research work.

**Table No. 5.4.17 Purpose of using internet/websites**

Purpose	UG N (%)		PG N (%)		RS N (%)		FA N (%)		Total N (%)	
	Yes	No	Yes	No	Yes	No	Yes	No	Yes	No
E-mail	253 (81.61)	57 (18.39)	40 (80.0)	10 (20.0)	4 (100)	-	25 (100)	-	322 (82.78)	67 (17.22)
Career development	188 (60.65)	122 (39.35)	34 (68.0)	16 (32.0)	-	4 (100)	21 (84.0)	4 (16.0)	243 (62.47)	146 (37.53)
Research work	34 (10.97)	276 (89.03)	28 (56.0)	22 (44.0)	4 (100)	-	12 (48.0)	13 (52.0)	78 (20.05)	311 (79.95)
Finding relevant information	256 (82.58)	54 (17.42)	44 (88.0)	6 (12.0)	4 (100)	-	25 (100)	-	329 (84.58)	60 (15.42)
Entertainment	77 (24.84)	233 (75.16)	16 (32.0)	34 (68.0)	-	4 (100)	4 (16.0)	21 (84.0)	97 (24.94)	292 (75.06)

**Figure No. 5.4.17**



The purposes of using the internet/website are e-mail, for career development, research work, finding relevant information and entertainment. From the Figure No. 5.4.17 it has been found that all the research scholars and faculty members were using e-mail where as e-mail services are used by 8.61% undergraduates and 80% postgraduates. For career development users answered in positive were 84% faculty member, 60.65% undergraduates and 68% postgraduates. Research scholars did not replied to the question.

For research work, the entire research scholars, 48% faculty, 56% postgraduates and 10.97% undergraduates answered in affirmative.

The use of internet/websites for finding relevant information was more. All the research scholars and faculty replied positive as compared to 82.58% undergraduates, 88% postgraduates. For entertainment, 24.84% of undergraduates 32% of postgraduates, 16% of faculty said yes and research scholars did not replied. From total users' data, it is evident that internet/websites were used by 84.58% for finding relevant information, 82.78% for e-mail, 62.47% for career development, 24.94% for entertainment and 20.05% for research work.

**Table No. 5.4.18 Sources used for seeking information**

Sources for seek information	UG N (%)		PG N (%)		RS N (%)		Faculty N (%)		Total N (%)	
	Yes	No	Yes	No	Yes	No	Yes	No	Yes	No
Current E-resources	8 (2.58)	302 (97.42)	29 (58.0)	21 (42.0)	4 (100)	-	16 (64.0)	9 (36.0)	57 (14.65)	332 (85.35)
Back Vol. of E-Resources	4 (1.29)	306 (98.71)	13 (26.0)	37 (74.0)	-	4 (100)	5 (20.0)	20 (80.0)	22 (5.66)	367 (94.34)
On-Line Data bases	151 (48.71)	159 (51.29)	26 (52.0)	24 (48.0)	3 (75.0)	1 (25.0)	18 (72.0)	7 (28.0)	198 (50.90)	191 (49.10)
Video Cassettes	8 (2.58)	302 (97.42)	-	50 (100)		4 (100)	-	25 (100)	8 (2.06)	381 (97.94)
Inter net Website	14 (4.52)	296 (95.48)	11 (22.0)	39 (78.0)	3 (75.0)	1 (25.0)	24 (96.10)	1 (4.00)	52 (13.37)	337 (86.63)
CD Room	151 (48.71)	159 (51.29)	20 (40.0)	30 (60.0)	3 (75.0)	1 (25.0)	1 (4.00)	24 (96.0)	175 (44.99)	214 (85.01)
E-Books	8 (2.58)	302 (97.42)	7 (14.0)	43 (86.0)		4 (100)	-	25 (100)	15 (3.86)	374 (96.14)
On-line Catalogue	4 (1.29)	306 (98.71)	6 (12.00)	44 (88.0)	4 (100)		1 (4.00)	24 (26.0)	15 (3.86)	374 (96.14)

**Figure No. 5.4.18**

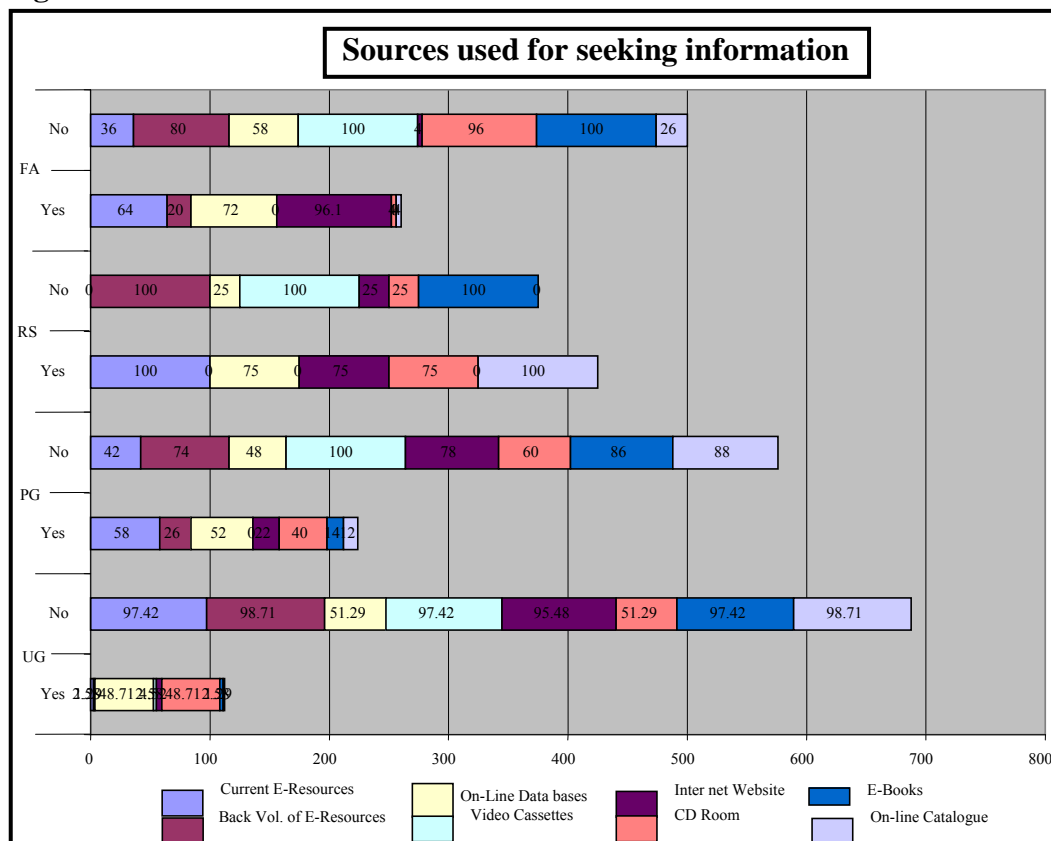


Table No. 5.4.18 shows that electronic sources used for seeking information 8 (2.58%) undergraduates used **current e-journals** as compared to 29 (58%) postgraduates, 16 (64%) faculty and 4 (100%) research scholars. From total response it has been reveals that only 14.65% users are using current e-journals.

The **back volumes of e-journals** are used very less as per the data shown i.e., 4 (1.29%) undergraduates, 26% postgraduates and 20% faculty members answered positive but 100% response was negative from research scholars. From total data it has been found that only 5.66% users are using back volumes of e-journals.

It has been found that 151 (48.71%) undergraduates, 26 (52%) postgraduates, 3 (75%) research scholars and 18 (72%) faculty members are using **online databases**. The results depict that from total users, 50.90% are using on-line databases services provided to them. The use of **video cassettes** for seeking information was 5% only 8(2.58%).

The **internet/websites** are used very less for getting information by users it has been seen from Figure No.5.4.18, that 14 (4.52%) undergraduates, 11 (22%) postgraduates, 3 (75%) research scholars and 24 (96%) faculty members answered positive. From total respondents it has been noted that only 52 (13.37%) users answered yes.

The response reveals that for use of **CD-ROM**, user who answered in positive are 151 (48.71%) undergraduates, 20 (40%) postgraduates, 3 (75%) research scholars and 1 (4%) faculty.

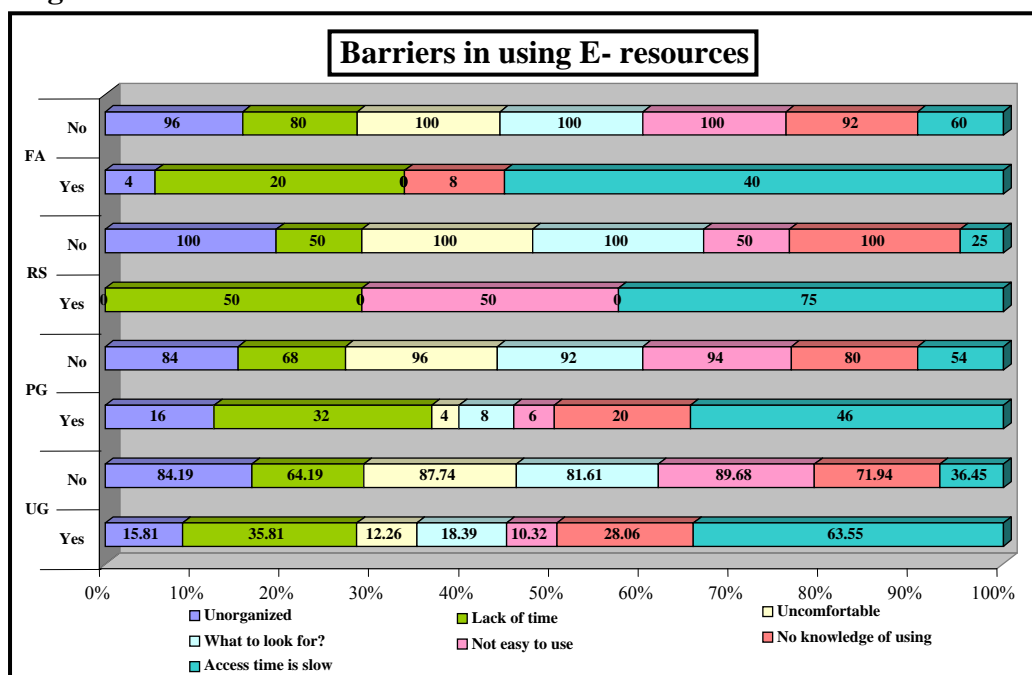
The response for use of **E-books** is very less i.e., below 5% only, 8 (2.58%) undergraduates and 43 (86%) postgraduates answered in positive while, research scholars and 100% faculty answered in negative.

The use of **on-line catalog** was less i.e., below 5%. The results depict that 4 (1.29%) undergraduates, 6 (12%) postgraduates, 1(4%) faculty and 4(100%) research scholars responded in positive.

**Table No. 5.4.19 Barriers in using E- Resources**

Barriers in using E- Resources	UG N (%)		PG N (%)		RS N (%)		FA N (%)		Total N (%)	
	Yes	No	Yes	No	Yes	No	Yes	No	Yes	No
Unorganized	49 (15.81)	261 (84.19)	8 (16.0)	42 (84.0)	- (100)	4 (100)	1 (4.0)	24 (96.0)	58 (14.91)	331 (85.09)
Lack of time	111 (35.81)	199 (64.19)	16 (32.0)	34 (68.0)	2 (50.0)	2 (50.0)	5 (20.0)	20 (80.0)	134 (34.45)	255 (65.55)
Uncomfortable	38 (12.26)	272 (87.74)	2 (4.0)	48 (96.0)	- (100)	4 (100)	- (100)	25 (100)	40 (10.28)	349 (89.72)
What to look for?	57 (18.39)	253 (81.61)	4 (8.0)	46 (92.0)	- (100)	4 (100)	- (100)	25 (100)	61 (15.68)	328 (84.32)
Not easy to use	32 (10.32)	278 (89.68)	3 (6.0)	47 (94.0)	2 (50.0)	2 (50.0)	- (100)	25 (100)	37 (9.51)	352 (90.49)
No knowledge of using	87 (28.06)	223 (71.94)	10 (20.0)	40 (80.0)	- (100)	4 (100)	2 (8.0)	23 (92.0)	99 (25.45)	290 (74.55)
Access time is slow	197 (63.55)	113 (36.45)	23 (46.0)	27 (54.0)	3 (75.0)	1 (25.0)	10 (40.0)	15 (60.0)	233 (59.90)	156 (40.10)

**Figure No. 5.4.19**



The users of Punjab Engineering College, Chandigarh use their library e-resources. While accessing these resources they also face difficulties. So they were asked what type of barriers they are facing while accessing the electronic information resources. From the Figure No.5.4.19 it is evident that 49 (15.81%) undergraduates said that electronic information is **unorganized** and 261 (84.19%) did not agree with this, 8 (16.00%) postgraduates answered in positive and 42 (84.00%) answered no, 4 (100%) research scholars did not agreed with this point that e-resources information is unorganized, while 1 (4.00%) faculty members response was yes and 24(96.00%) responded no. The results indicate that very less percentage of users felt that e-resources information is unorganized.

The users who said that they have **lack of time** for accessing e-resources are 111 (35.81%) undergraduates, 16 (32.00%) postgraduates, 2 (50.00%) research scholars and 5 (20.00%) faculty members. The data indicates that maximum number of users hold the point of view that they don't face the problem of lack of time for accessing the information.

The users who said that while using e-resources they felt **uncomfortable** were very less, the result shows that 38 (12.26%) undergraduates, 1 (4.00%) postgraduates answered yes while 100% research scholars and faculty members answered in negative.

Due to vast information users do feel that they are confused and **feel what to look** for, only 51 (18.39%) undergraduates and 498% postgraduates answered in positive. Where as, 100% research scholars and faculty members answered in negative.

The data indicates that only 32 (10.32%) undergraduates, 3(6.00%) postgraduates, 2 (50.00%) research scholars, and the entire faculty said that they do feel easy in using e-resources. The knowledge of using electronic information resources helps users in providing to have maximum access. The users who feel they have **no knowledge of using** e-resources were 87 (28.06%) undergraduates, 10 (20.00%) postgraduates and 2 (8.00%) faculty while research scholars' response was 100% positive. The results of the data show that maximum users feel that **access time is slow**. 197 (63.55%) undergraduates, 23 (46.00%) postgraduates, 3 (75.00%) research scholars and 10 (40.00%) faculty member answered yes from the total population of the survey. It has been revealed that 58 (14.91%) users said e-resources information is unorganized and 331 (85.09%) replied in negative, 134 (34.45%) feel they have lack of time while 255 (65.55%) do not feel so. 40 (10.28%) feel uncomfortable and 349 (89.72%) do not feel so, 61 (15.68%) users said they feel what to look for where 328 (84.32%) answered negative, 37(9.51%) users said

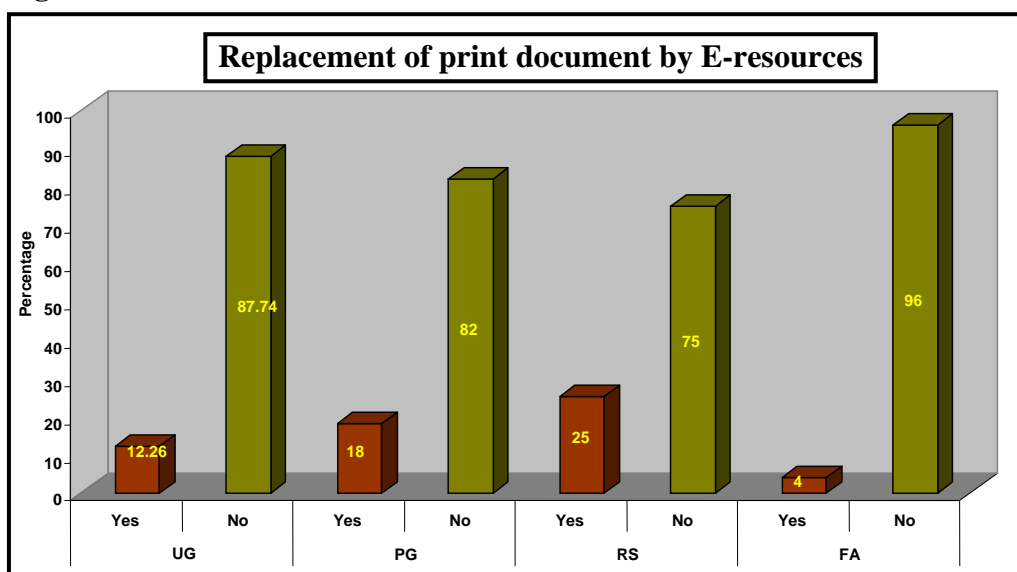
e-resources are not easy to use where as 352 (90.49%) answered they do not have any problem while using electronic information resources. 99 (35.45%) users have no knowledge of using these e-resource but 290 (74.55%) have knowledge of it. It has been seen that 233 (59.90%) users feels that when they access the information the speed is slow where as 156 (40.10%) replied in negative.

**Table No. 5.4.20 Replacement of print document by E-resources**

Respondents	Response		Total N (%)	Chi <sup>2</sup> (df;C)
	Yes	No N (%)		
Undergraduates	38 (12.26)	272 (87.74)	310 (100)	3.595 (3;0.096)
Postgraduates	9 (18.00)	41 (82.00)	50 (100)	
Research Scholars	1 (25.00)	3 (75.00)	4 (100)	
Faculty	1 (4.00)	24 (96.00)	25 (100)	
Total	59 (100)	304 (100)	389 (100)	

No significant variation

**Figure No. 5.4.20**



To know from the users whether internet/electronic resources can replace print document. The response from the users shows Figure No.5.4.20 that 38 undergraduates (12.26%) response to yes and 272 (87.74%) response to no. The response from 9 postgraduates (18.00%) was yes and 41 (82.00%) was no, where as research scholars response to yes was 1 (25.00%) and 3 (75.00%) was in negative, same way 1 (4.00%) faculty responded for yes and 24 (76.00%) for no. The data shows that maximum numbers of users feel that internet/electronic resources cannot replace print document

Table No.5.4.20 shows that the Chi-Square test for users shows that there is no significant variation among the users as far as the view for replacement of electronic information resources with print document is concerned. From 389 respondents of the survey, 49 (12.60%) answered yes and 340 (87.40%) answered no. Thus maximum numbers of users don't feel that internet/electronic information can replace print document.

**PART-B COMPARATIVE STUDY**

Comparison Among the Institutes

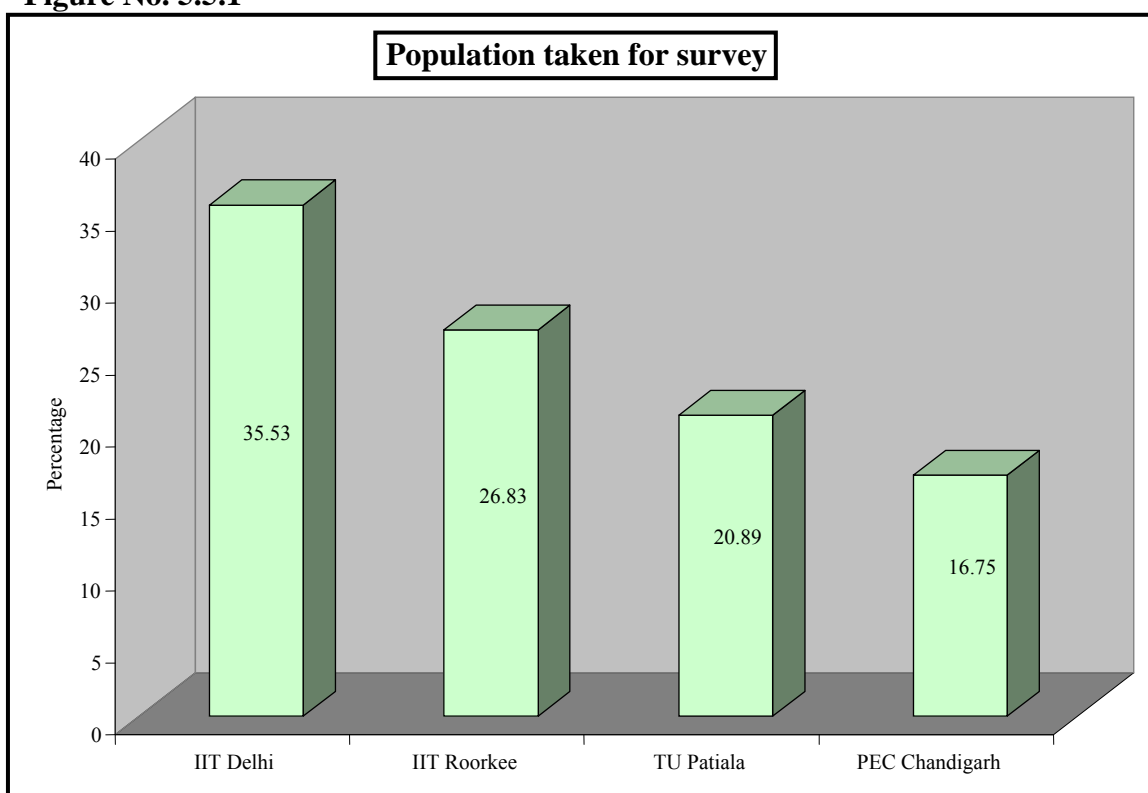
Comparison Among the Users

## 5.5 Comparison among the Institutes

**Table No. 5.5.1** Population taken for survey

Respondents	Total Strength	Questionnaire distributed	Response received
IIT, Delhi	4985	997	825(35.53)
IIT, Roorkee	3363	772	623(26.83)
TU, Patiala	2506	504	485(20.89)
PEC, Chandigarh	2056	413	389(16.75)
Total	12910	2686	2322(100)

**Figure No. 5.5.1**



The Table No.5.5.1 shows that the total population of all the four institutes was 12910. The questionnaires distributed to the users were 2686 and response received 2322. The data indicates that IIT, Delhi population was 4985, the questionnaires were distributed to 997 users and response received was 825. From the population of 3363 at IIT, Roorkee, the questionnaires were distributed to 772 and response received from them was 623. The population of TU, Patiala was 2506, questionnaires were distributed to 504 and response received was 485, while at PEC, Chandigarh population was 2056, 413 questionnaires

were distributed and response received was 389. From the total strength of 12910 at all the four institutes, questioners given were 2686 and response was received from 2322 users.

**Table No.5.5.2 Use of Institute Library**

Respondents	Response		Total N (%)	Chi <sup>2</sup> (df;C)
	Yes N (%)	No N (%)		
IIT, Delhi	769(93.21)	56(6.79)	825 (100)	36.675** (3;0.125)
IIT, Roorkee	605(97.11)	18 (2.89)	623 (100)	
TU, Patiala	472 (97.32)	13(2.68)	485 (100)	
PEC, Chandigarh	388 (99.74)	1(0.26)	389 (100)	
Total	2234 (96.21)	88 (3.79)	2322 (100)	

\*\*Significant at 0.01

**Figure No.5.5.2**

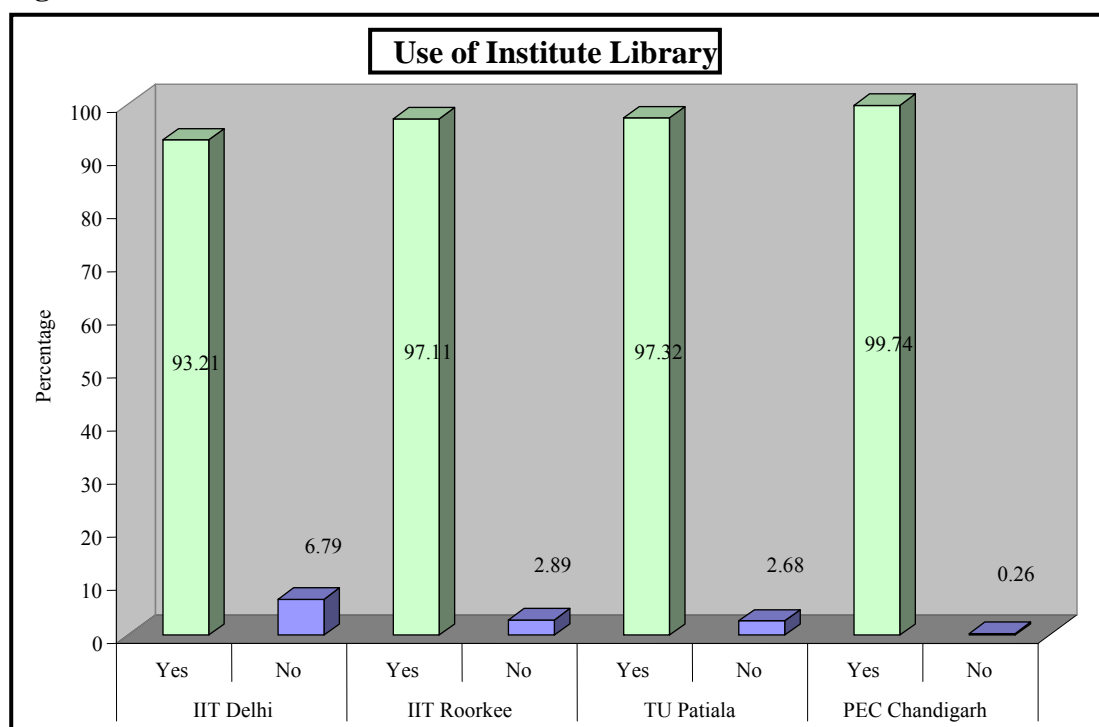


Table No. 5.5.2 shows the use of institute library by respondents in the four institutes. There were 769 (93.21%) respondents from IIT, Delhi using the library and 56 (6.79%) who did not use the library. There were 605 (97.11%) users from IIT, Roorkee who used the library and 18(2.89%) who did not use it. From TU, Patiala 472 (97.32%) users responded positively and 13 (2.68%) responded negatively .While 388(99.74%)

respondents from PEC, Chandigarh said yes and 1 (0.26%) said no. Table shows that out of 2322 respondents, 2234 (96.21%) users of the four institutes were using the library and 88(3.79%) users were not using it.

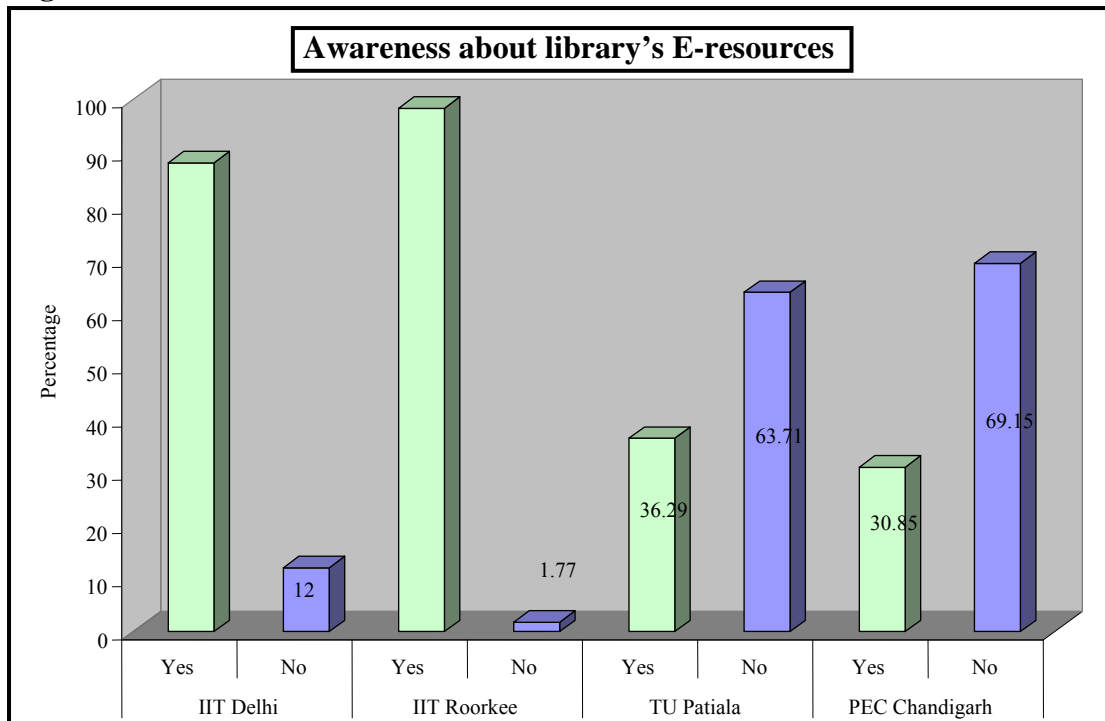
The Chi-Square test for independence is significance at 1 per cent level of significant. The value of  $\chi^2$  is 21.299 and the degree of freedom (df) is 3. The value of p is statistically significant ( $p \leq 0.01$ ). This implies that there is a significant variation among the users as far as use of the library of their institutes is concerned.

**Table No. 5.5.3 Awareness about library’s E-resources**

Respondents	Response		Total	Chi <sup>2</sup> (df;C)	
	Yes	N (%)	No N (%)		N (%)
IIT, Delhi	726	(88.00)	99 (12.00)	825 (100)	916.566** (3 ;0.532)
IIT, Roorkee	612	(98.23)	11 (1.77)	623 (100)	
TU, Patiala	176	(36.29)	309 (63.71)	485 (100)	
PEC, Chandigarh	120	(30.85)	269 (69.15)	389 (100)	
Total	1634	(70.37)	688 (29.63)	2322 (100)	

\*\*Significant at 0.01

**Figure No.5.5.3**



The library provides various-resources/services to its users and for making users aware about these resources services various users’ orientation programmes are organized from

time to time. The data from the survey shows that 726(88%) users from IIT, Delhi were aware and 99(12%) were not aware. 612 users from IIT, Roorkee (98.23%) answered yes and 11(1.77%) answered no, while 176(36.29%) users from TU, Patiala responded yes and 309(63.71%) response was no. 120 (30.85%) users from PEC, Chandigarh said yes and 269(69.15%) said that they were not aware of library e-resources. The result shows from 2322 users 1634(70.37%) were aware of e-resources and 688(29.63%) were not aware of it.

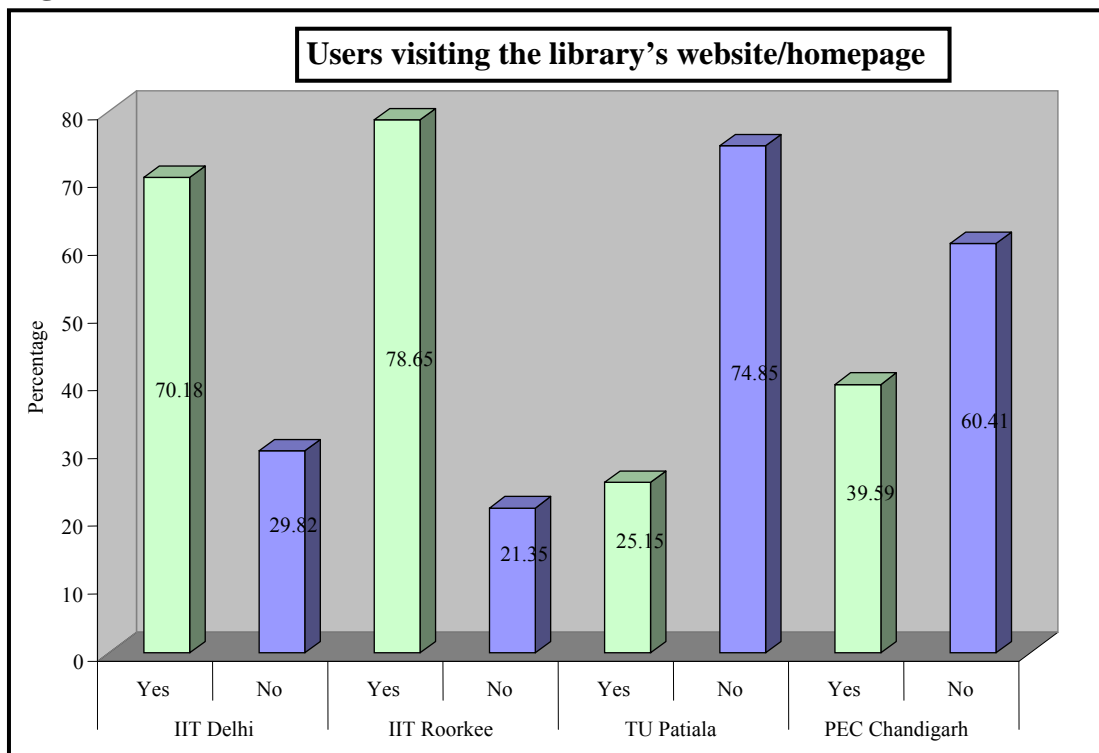
As shown in the table No.5.5.3 the value of  $\chi^2$  is 916.566 and the degrees of freedom (df) is 3. The value of p shows statistically significant ( $p \leq 0.01$ ). The Chi-Square value test for independence is significant at 1 per cent level of significance. This implies that there is a significant variation among users having awareness of e-resources/services provided by their library. Thus the users from IIT, Delhi and IIT, Roorkee were more aware of their library e-resources as compared to TU, Patiala and PEC, Chandigarh.

**Table 5.5.4 Users visiting the library's website/homepage**

Respondents	Response		Total	Chi <sup>2</sup> (df;C)		
	Yes	N (%)	No		N (%)	
IIT, Delhi	579	(70.18)	246	(29.82)	825 (100)	428.034** (3 ;0.395)
IIT, Roorkee	490	(78.65)	133	(21.35)	623 (100)	
TU, Patiala	122	(25.15)	363	(74.85)	485 (100)	
PEC, Chandigarh	154	(39.59)	235	(60.41)	389 (100)	
Total	1345	(57.92)	977	(42.04)	2322 (100)	

\*\*Significant at 0.01

**Figure No.5.5.4**



The libraries are having their home page/websites where information about the e-resources and services to their users is provided. The libraries are also providing current information on new addition to their collection. The users were asked whether they have visited their library websites/homepage. The results indicate that 579(70.18%) users from IIT, Delhi, 490(78.65%) from IIT, Roorkee, 122(25.15%) from TU, Patiala and 154(39.59%) from PEC, Chandigarh responded that they visit the site. It has been found that the users from both the IIT's have visited this library website/homepage as compared to users from TU, Patiala and PEC, Chandigarh. The results show from the Table No. 5.5.4, out of the total population of the four institutions 1345(57.92%) users have visited library website/homepage and 977(42.04%) users have not visited.

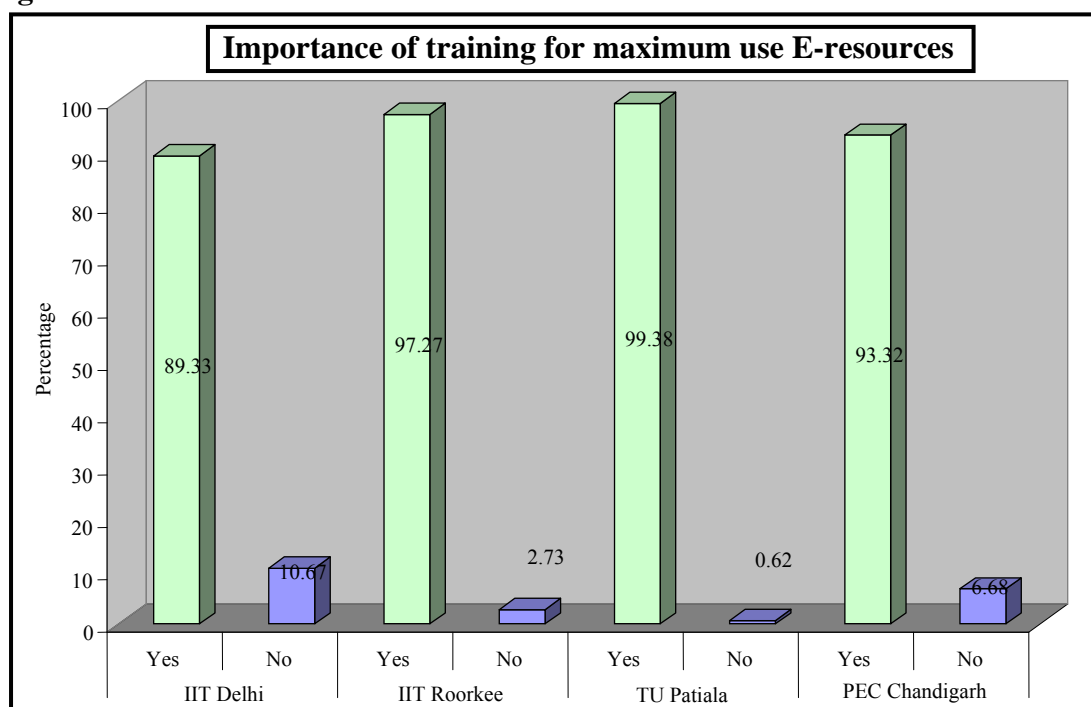
Table No.5.5.4 shows that the value of  $\chi^2$  is 428.034 and the degrees of freedom (df) is 3. The value of p shows statistically significant ( $p \leq 0.01$ ). For users the Chi-Square test for independence is significant at 1 per cent level of significance. This implies that there is a significant variation among the users visiting the library site.

**Table No. 5.5.5 Importance of training for maximum use E-resources**

Respondents	Response		Total	Chi <sup>2</sup> (df;C)	
	Yes	N (%)	No N (%)		N (%)
IIT, Delhi	737	(89.33)	88 (10.67)	825 (100)	71.240** (3;0.173)
IIT, Roorkee	606	(97.27)	17 (2.73)	623 (100)	
TU, Patiala	482	(99.38)	3 (0.62)	485 (100)	
PEC, Chandigarh	363	(93.32)	26 (6.68)	389 (100)	
Total	2123	(94.23)	134 (5.77)	2322 (100)	

\*\*Significant at 0.01

**Figure No.5.5.5**



The Table No 5.5.5 shows the response from the users about the importance of training to make maximum use of e- resources. 737 (89.33%) of users from IIT, Delhi; 606 (97.27%) from IIT, Roorkee; 482(99.38%) from TU, Patiala and 363 (93.32%) users from PEC, Chandigarh were in favor of imparting training. It has been found that maximum numbers of user from all the four institutions feel that training is important to make maximum use of e-resources. The result from the total population of users from all the four institutes indicates that 2123(94.23%) users responded positively for training and 134(5.77%) users response was negative. Table shows that the value of  $\chi^2$  is 71.240 and the degrees of freedom (df) is 3. The value of p shows statistically significant ( $p \leq 0.01$ ).

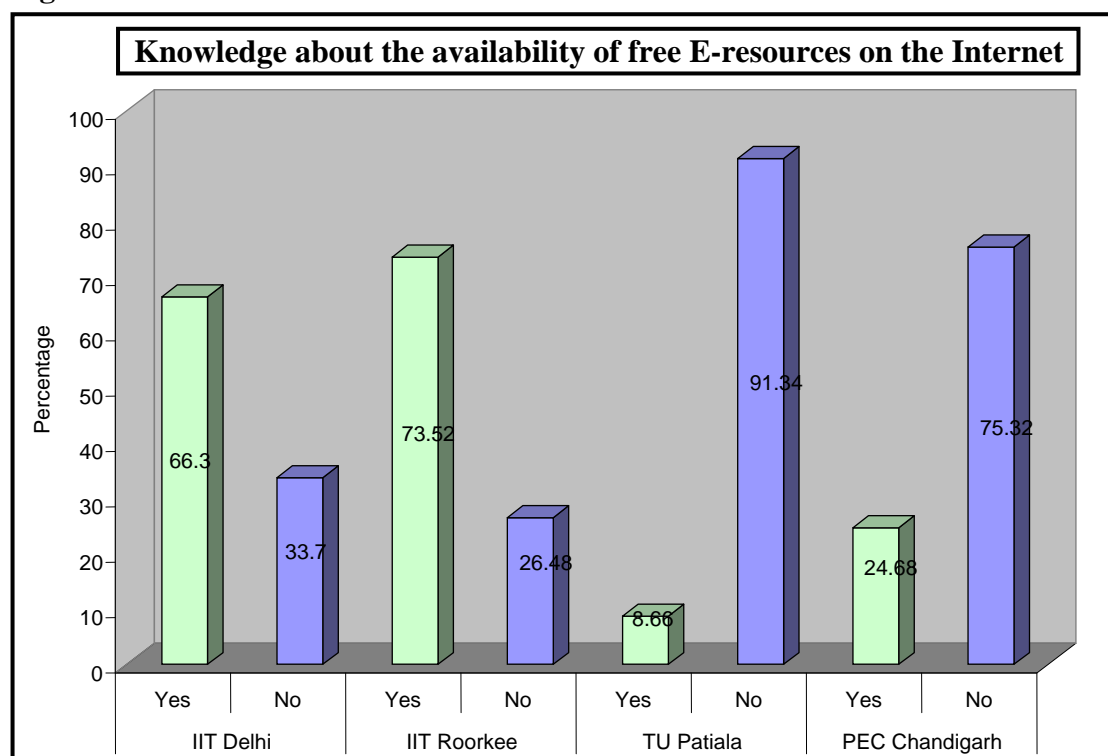
The Chi-Square test for independence is significant at 1 per cent level of significance. This implies that there is a significant variation among the users as far as the importance of training for use of e-resources is concerned.

**Table No. 5.5.6 Knowledge about the availability of free E-resources on the Internet**

Respondents	Response				Total N (%)	Chi <sup>2</sup> (df;C)
	Yes	N (%)	No	N (%)		
IIT, Delhi	547	(66.30)	278	(33.70)	825 (100)	656.424** (3 ;0.469)
IIT, Roorkee	458	(73.52)	165	(26.48)	623 (100)	
TU, Patiala	42	(8.66)	443	(91.34)	485 (100)	
PEC, Chandigarh	96	(24.68)	293	(75.32)	389 (100)	
Total	1143	(49.22)	1179	(50.78)	2322 (100)	

\*\*Significant at 0.01

**Figure No. 5.5.6**



There are several free e-journal portals on the internet which can be browsed any time. 547(66.30%) users from IIT, Delhi were aware of availability of free e-journals on the net and 278(33.70%) were not aware about it. From IIT, Roorkee 458(73.52%) users were aware and 165(26.48%) were not aware about it. 42(8.66%) users from TU, Patiala were aware about free e-journals and 443(91.34%) of users answered in negative. 96 (24.68%)

of users from PEC responded in positive and 293(75.32%) of users response was negative. From the total population, the results show that 1143(49.22%) of the users were aware of free e-journals portals on the net and 1179(50.78%) users were not aware about it.

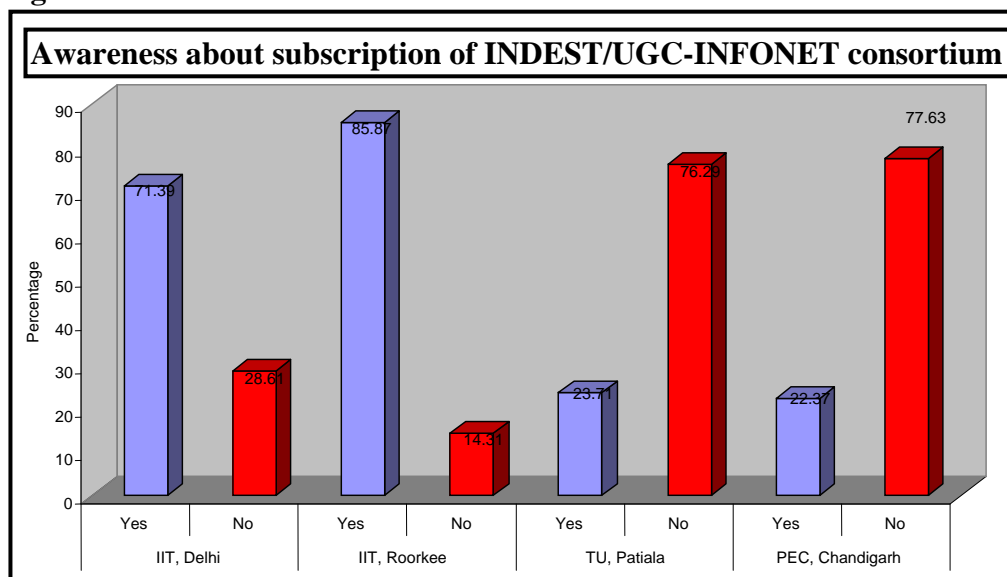
Table No. 5.5.6 shows for users the Chi-Square test for independent is significant at 1 per cent level of significance. The value of  $\chi^2$  is 656.424, degree of freedom (df) is 3, this implies that there is a significant relationship among the users who are aware about the availability of free e-journals portals on the net. Thus users from both the IIT's were more aware of free e-journals portals on the internet as compared to TU Patiala and PEC users.

**Table No. 5.5.7 Awareness about subscription of INDEST/UGC-INFONET consortium**

Respondents	Response		Total N (%)
	Yes N (%)	No N(%)	
IIT, Delhi	589 (71.39)	236 (28.61)	825 (100)
IIT, Roorkee	535 (85.87)	88 (14.13)	623 (100)
TU, Patiala	115 (23.71)	370 (76.29)	485 (100)
PEC, Chandigarh	87 (22.37)	302 (77.63)	389 (100)
Total	1326 (57.10)	996 (42.90)	2322 (100)

\*\*Significant at 0.01

**Figure No.5.5.7**



From the Table No. 5.5.7 data indicates that 589 (71.39%) users from IIT, Delhi , 535 (85.87%) users from IIT, Roorkee and 87(22.37%) from PEC, Chandigarh were aware of

INDEST consortium subscribed by their institute library .The results show that users from both the IIT's were more aware as compared to users from PEC. It has been found from the total users data that 1326(57.10%) of them were aware of INDEST consortium and 996(42.89%) were not were of it. Table shows that for users the Chi-Square test for independence is significant at 1 per cent level of significance. This implies that there is significant variation among the users as far as the awareness of INDEST consortium is concerned. Thus the majority of users from both the IITs were more aware of INDEST consortium as compared to PEC users. The data indicates about the TU, Patiala. Only TU is subscribing to UGC-INFONET. From 485 users, only 115 were aware of UGC e-journals consortia and 370(76.29%) of the users were not aware of it.

**Table No. 5.5.8 Use of INDEST/UGC INFONET consortium**

Respondents	Response		Total N (%)
	Yes N (%)	No N (%)	
IIT, Delhi	405 (68.76)	184 (31.24)	589(100)
IIT, Roorkee	241 (45.05)	294 (54.95)	535(100)
TU, Patiala	64 (55.65)	51 (44.35)	115 (100)
PEC, Chandigarh	26 (29.89)	61 (70.11)	389(100)
Total	736 (55.50)	590 (44.50)	1326 (100)

\*\*Significant at 0.01

**Figure No. 5.5.8**

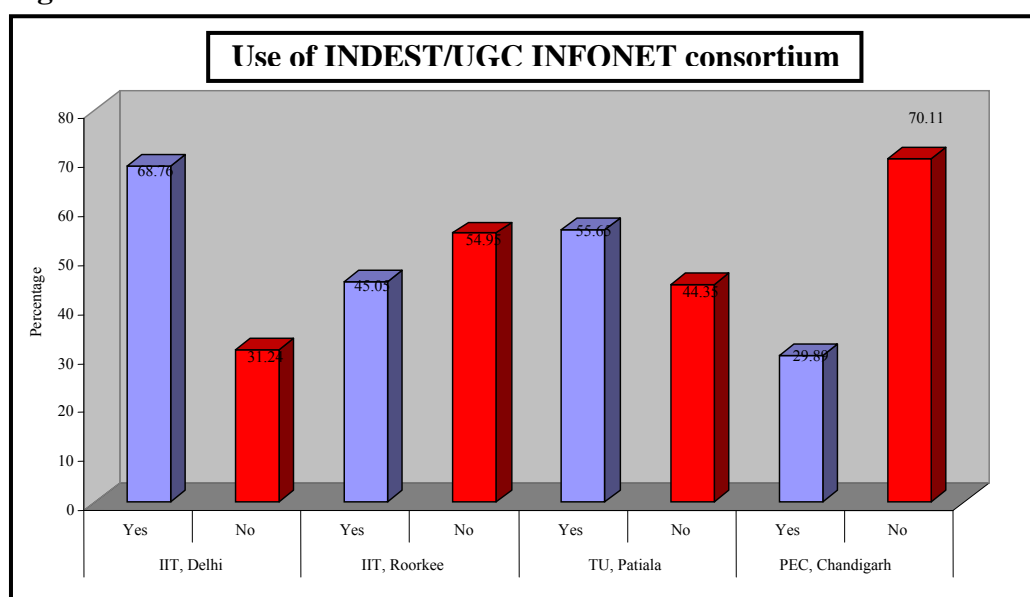


Table and Figure No. 5.5.7 show about the awareness of INDEST/UGC-INFONET Consortium at all the four institutions. Table and Figure No. 5.5.8 shows the respondents

who were aware of INDEST/UGC-INFONET e-resources and the percentage of users using it. Response from 405(68.76%) users from IIT, Delhi was positive and 184(31.24%) negative. Use of INDEST/UGC-INFONET resources was 241 (45.05%) by users at IIT, Roorkee while 26 (29.89%) users from PEC, Chandigarh answered in yes and 61(70.11%) users answered in negative. The Table No. 5.5.8 also shows data about TU, Patiala 115 respondents were aware of UGC-INFONET and INDEST e-resources. Out of 115 users, 64(55.65%) users answered yes and 51(44.35%) of the users answered that they were not using these resources.

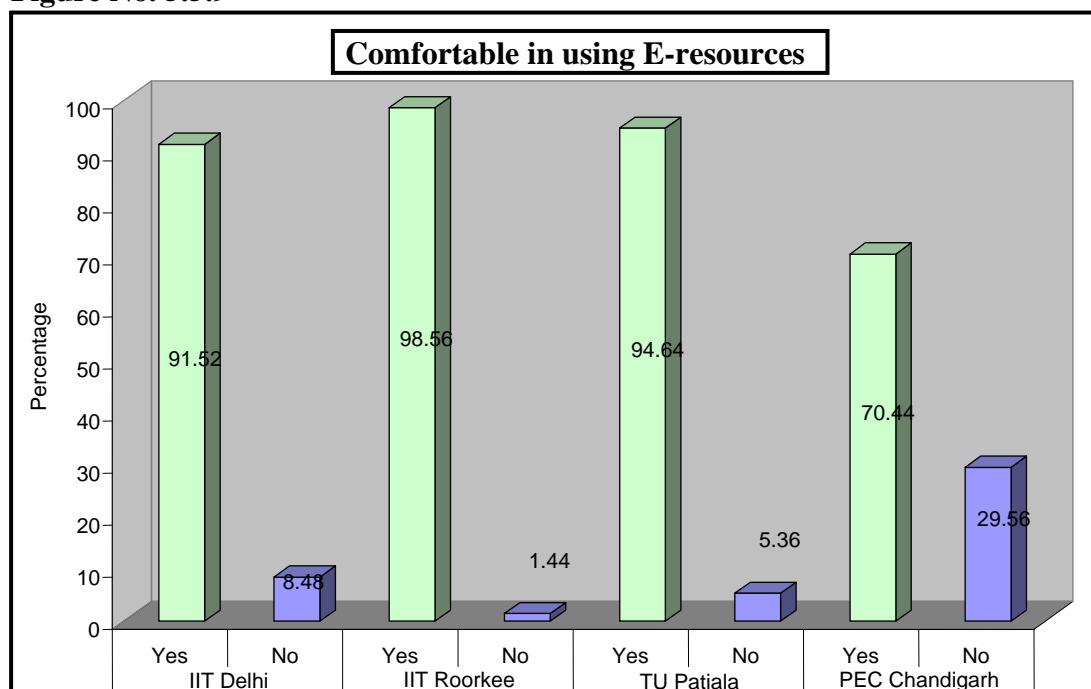
Thus, majority of users from both the IITs were using INDEST consortium as compared to TU, Patiala and PEC users. The results show that total 736 (55.50) users were only using INDEST/UGC-INFONET.

**Table No. 5.5.9 Comfortable in using E-resources**

Respondents	Response		Total	Chi <sup>2</sup> (df;C)		
	Yes	N (%)	No		N (%)	N (%)
IIT, Delhi	755	(91.52)	70	(8.48)	825 (100)	240.373** (3 ;0.306)
IIT, Roorkee	614	(98.56)	9	(1.44)	623 (100)	
TU, Patiala	459	(94.64)	26	(5.36)	485 (100)	
PEC, Chandigarh	274	(70.44)	115	(29.56)	389 (100)	
Total	2102	(90.53)	220	(9.47)	2322 (100)	

\*\*Significant at 0.01

**Figure No. 5.5.9**



The data indicates that 755 (91.52%) users from IIT, Delhi were comfortable with

electronic information resources, 614 (98.56%) users from IIT, Roorkee answered yes and 459 (94.64%) respondents from TU, Patiala were uncomfortable, while 274 (70.44%) users from PEC, Chandigarh responded positive. The results indicated that, out of 2322 users 2102(90.53%) were comfortable with electronic information resources and 220(9.47%) of users were not.

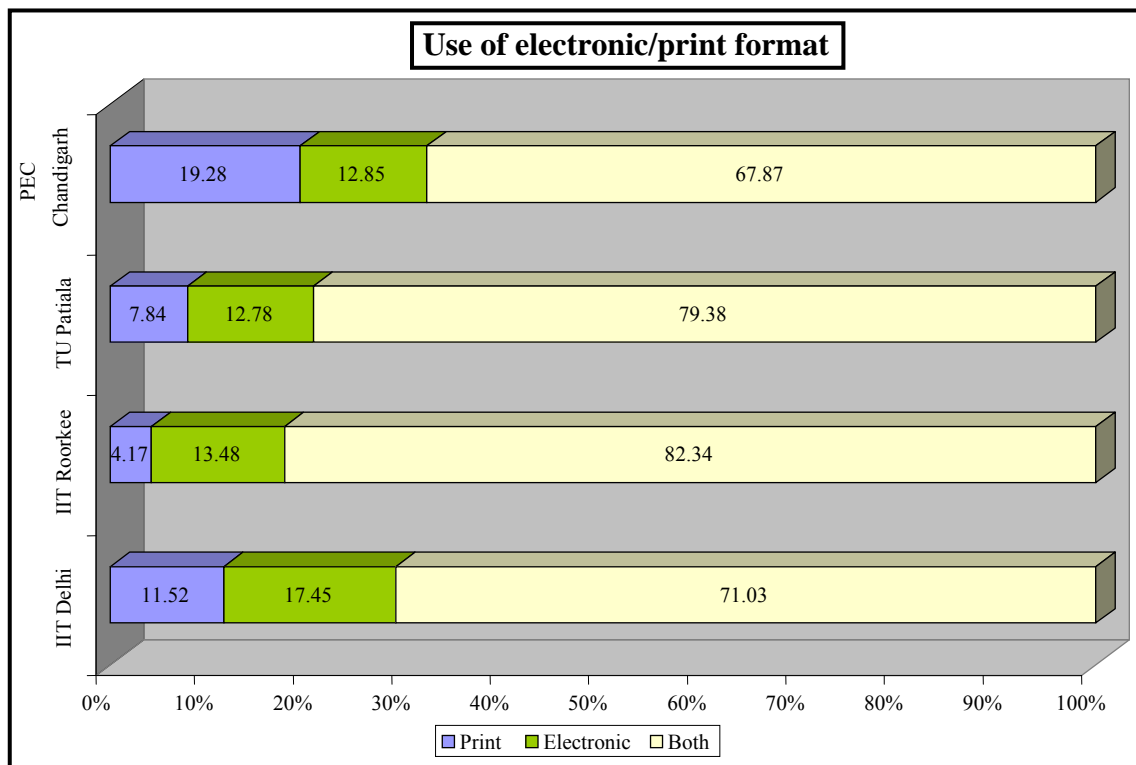
Table No.5.5.9 shows that for users the Chi-Square test for independence is significant at 1 per cent level of significance. This implies that there is significant variation among the users as far as the comfort in use of electronic information resources is concerned. Thus majority of users were comfortable with electronic information.

**Table No 5.5.10 Use of electronic/print format**

Document prefer to use	IIT, Delhi	IIT, Roorkee	TU, Patiala	PEC, Chandigarh	Total N (%)	Chi <sup>2</sup> (df;C)
Print	95 (11.52)	26 (4.17)	38 (7.84)	75 (19.28)	234 (10.08)	75.407** (6;0.177)
Electronic	144 (14.45)	84 (13.48)	62 (12.78)	50 (12.85)	340 (14.64)	
Both	586 (71.03)	513 (82.34)	385 (79.38)	264 (67.87)	1748 (75.28)	
Total	825 (100)	623 (100)	485 (100)	379 (100)	2223 (100)	

\*\*Significant at 0.01

**Figure No 5.5.10**



The Table No. 5.5.10 depicts that 11.52% users from IIT, Delhi followed by

4.17% IIT, Roorkee; 7.84% from TU and 19.28% PEC preferred to use only document in print format. Where as 14.45% from IIT, Delhi; 13.48% from IIT, Roorkee; 12.78% from TU and 12.85% users from PEC, prefer to use document only in electronic format.

The maximum percentage of users prefers to use the document in both the format i.e. print as well as electronic.

The data shows that 71.03% users from IIT, Delhi; 82.34% from IIT Roorkee; 79.38% TU, Patiala and 67.87% from PEC, Chandigarh responses in positive for their having choice to use document in both the formats.

The results reveal that from total respondents 75.28% preferred to use both the format. Whereas, 10.08% users gave choice for print format and 14.64% for electronic format.

The results reveal that from total respondents 38 (7.84%) preferred print document, 62 (12.78%) preferred electronic and 385 (79.38%) were in favor of both the formats. The value of  $\chi^2$  is 75.407 and the degrees of freedom (df) is 3. The value of p shows statistically significant ( $P \leq 0.01$ ). The Chi-Square test for independence is significant at 1 per cent level of significance. This implies that there is significant variation among the users as far as the preference for use of the format of document (printed, electronic or both) is concerned.

**Table No. 5.5.11 Use of online services**

Using online services	IIT, Delhi	IIT, Roorkee	TU, Patiala	PEC, Chandigarh	Total N (%)	Chi <sup>2</sup> (df;C)
Mostly	429 (52.00)	461 (74.00)	351 (72.37)	188 (48.33)	1429(61.54)	263.306** (9 ;0.319)
Sometimes	127 (15.39)	33 (5.30)	48 (9.90)	70 (17.99)	278 (11.97)	
Weekly	124 (15.03)	127 (20.39)	79 (16.29)	85 (21.85)	415 (17.87)	
Daily	145 (17.58)	2 (0.32)	7 (1.44)	46 (11.83)	200 (8.61)	
Total	825 (100)	623 (100)	485 (100)	389 (100)	2322 (100)	

\*\*Significant at 0.01

**Figure No. 5.5.11**

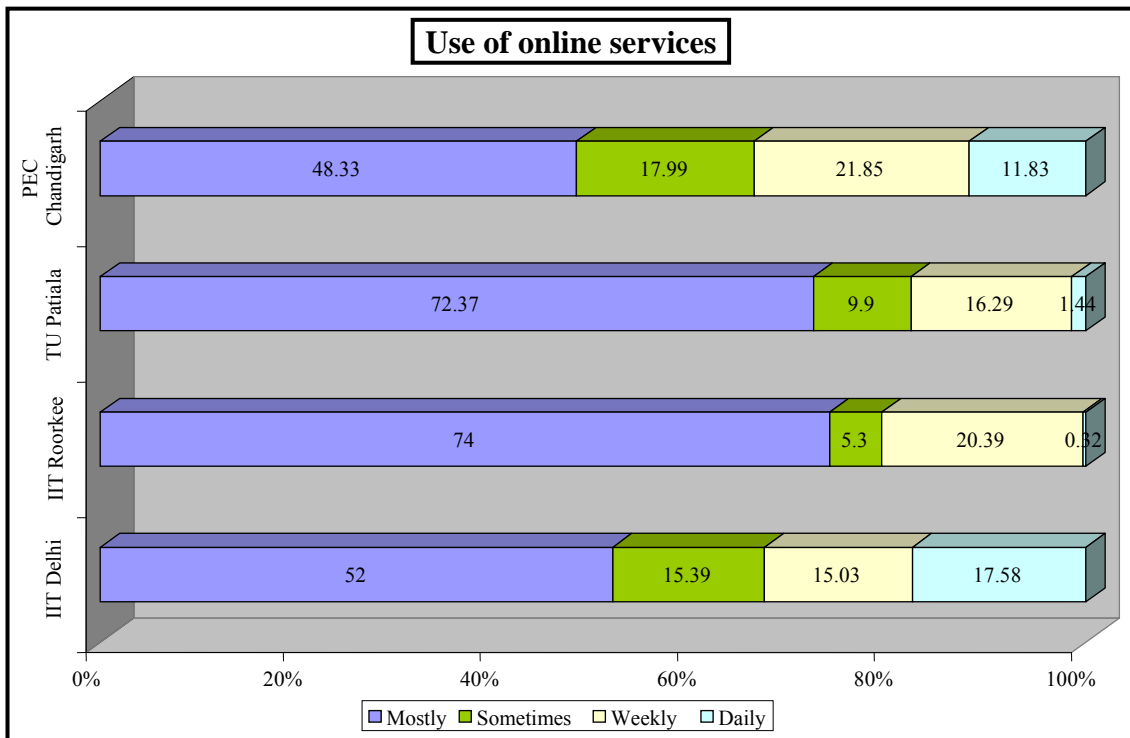


Figure No.5.5.11 clearly reveals that 429 (52%) users from IIT, Delhi, 461 (74%) from IIT, Roorkee 351 (72.37%) from TU, Patiala and 188(48.33%) from PEC use on-line services mostly.

The users responded that on-line services are used sometimes by 127 (15.39%) users at IIT, Roorkee, 78 (9.90%) from TU, Patiala .Users who use online services weekly 124 (15.03%) were from IIT, Delhi; 127 (20.39%) were from IIT, Roorkee; 79 (16.29%) from TU, Patiala and 85 (21.85%) from PEC. On-line services were used daily by 145 (17.58%) users from IIT, Delhi; 2 (32%) from IIT, Roorkee; 7(1.44%) from TU, Patiala and 46 (11.83%) users from PEC, Chandigarh.

From the total response it has been found that on-line services are used mostly i.e., 1429 (61.54%) as compared to used sometimes 278 (11.97%), weekly 415(17.87%) daily 200 (8.61%).

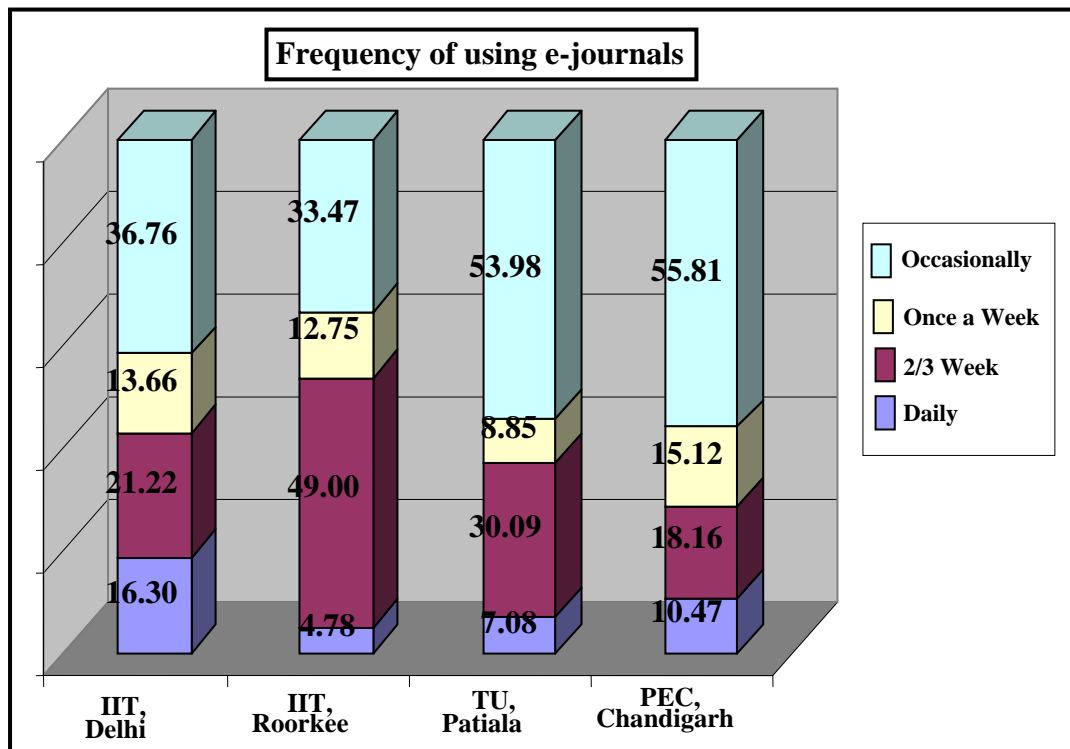
Table No.5.5.11 shows the Chi-Square test for independence is significant at 1 per cent level of significance. The value of  $\chi^2$  is 263.306 and the degree of freedom (df) is 9. The value of p shows statistically significant ( $P \leq 0.01$ ). This shows that as far as institute wise use of on-line services is concerned, there is a significant variation among all these institutes.

**Table No.5.5.12 Frequency of using E-journal**

Frequency of using e-journal	IIT, Delhi	IIT, Roorkee	TU, Patiala	PEC, Chandigarh	Total N (%)	Chi <sup>2</sup> (df;C)
Daily	97 (16.36)	12 (4.78)	8 (7.08)	9 (10.47)	126 (12.08)	61.464** (9;0.236) NA 1279 (55.08%)
2/3 Week	197 (21.22)	123 (49.00)	34 (30.09)	16 (18.60)	370 (35.47)	
Once a week	81 (13.66)	32 (12.75)	10 (8.85)	13 (15.12)	136 (13.04)	
Occasionally	218 (36.76)	84 (33.47)	61 (53.98)	48 (55.81)	411 (39.41)	

\*\*Significant at 0.01

**Figure No.5.5.12**



The data from Figure No. 5.5.12 reveals that e-journals were used daily by 97 (16.34%) users from IIT, Delhi; followed by 12 (4.78%) users from IIT, Roorkee; 8 (7.08%) from TU, Patiala and 9 (10.47%) from PEC, Chandigarh. E-journals are used occasionally by 218 (36.76%) users from IIT, Delhi; 84 (33.47%) from IIT, Roorkee; 61 (53.98%) from TU, Patiala and 48 (55.81%) from PEC, Chandigarh. The Table No. 5.5.12 indicates that from total 2322 respondents, 1279 (55.08%) gave no response to this question, where as e-journals were mostly used 2/3 times a week by 370 (35.47%) users and occasionally by 411 (39.41%) users.

The Table No. 5.5.12 shows the Chi-Square test for independence is significant at 1 per cent level of significance. The value of  $\chi^2$  is 61.464 and the degrees of freedom (df) is 9. The value of p shows statistically significant ( $P \leq 0.01$ ). This shows that there is a

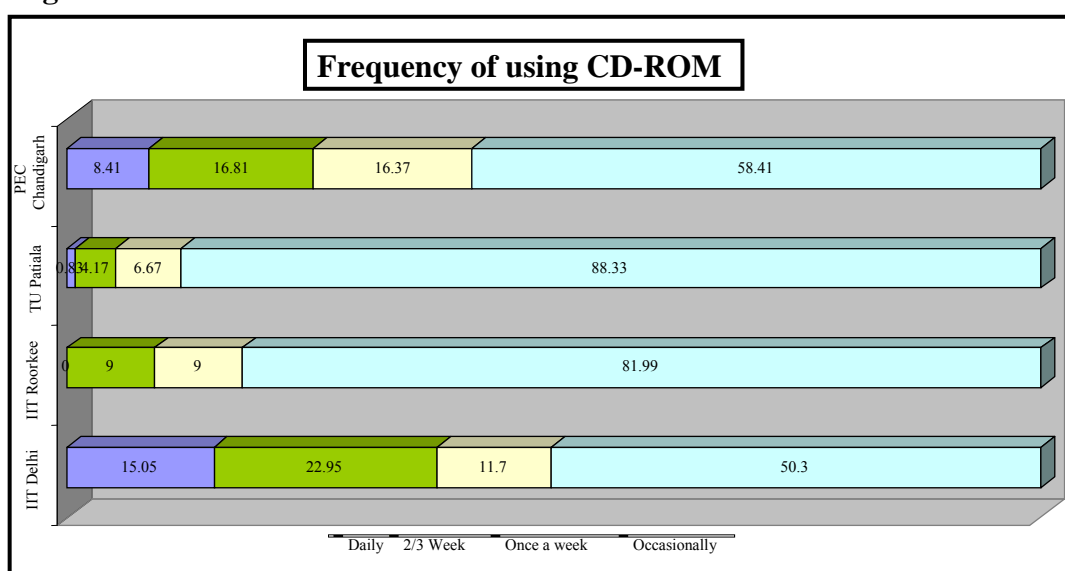
significant variation among the institutes as far as frequency of use of e-journals is concerned.

**Table No.5.5.13 Frequency of using CD-ROM**

Frequency of using CD-Rom	IIT, Delhi	IIT, Roorkee	TU, Patiala	PEC, Chandigarh	Total N (%)	Chi <sup>2</sup> (df;C)
Daily	99 (15.05)		3 (0.83)	19 (8.41)	121 (6.85)	276.268** (9;0.368) NA 556 (25.94%)
2/3 Week	151 (22.95)	47 (9.00)	15 (4.17)	38 (16.81)	251 (14.21)	
Once a week	77 (11.70)	47 (9.00)	24 (6.67)	37 (16.37)	185 (10.48)	
Occasionally	331 (50.30)	428 (81.99)	318 (88.33)	132 (58.41)	1209 (68.06)	

\*\*Significant at 0.01

**Figure No.5.5.13**



It is revealed from the Figure No. 5.5.13 that CD-ROM is used daily by 99 (15.05%) users from IIT, Delhi followed by 3 (0.83%) from TU, Patiala and 19(8.41%) from PEC, Chandigarh where as, users from IIT, Roorkee do not use CD-ROM daily.

The CD-ROM is used 2/3 Times a week by 151 (22.95%) users of IIT, Delhi; 47 (9%) from IIT, Roorkee; 15 (4.17%) users from TU, Patiala; and 38 (16.81%) from PEC, Chandigarh. Respondents using CD-Rom service once in a week were 77(11.70%) from IIT, Delhi; 47(9%) IIT, Roorkee; 24 (6.67%) from TU, Patiala and 37 (16.37%) from PEC, Chandigarh. The users using CD-ROM occasionally were 331 (50.30%) from IIT, Delhi; 428 (81.99%) from TU, Patiala and 132 (58.41%) users from PEC, Chandigarh. Thus the data indicates that CD-ROM services are used maximum by users of all institutions occasionally as compared to other times. From 2322 total survey users, 556

(25.94%) respondents did not answer the question. Out of 1766 users, who answered, shows that 1209 (68.06%) use CD-ROM occasionally.

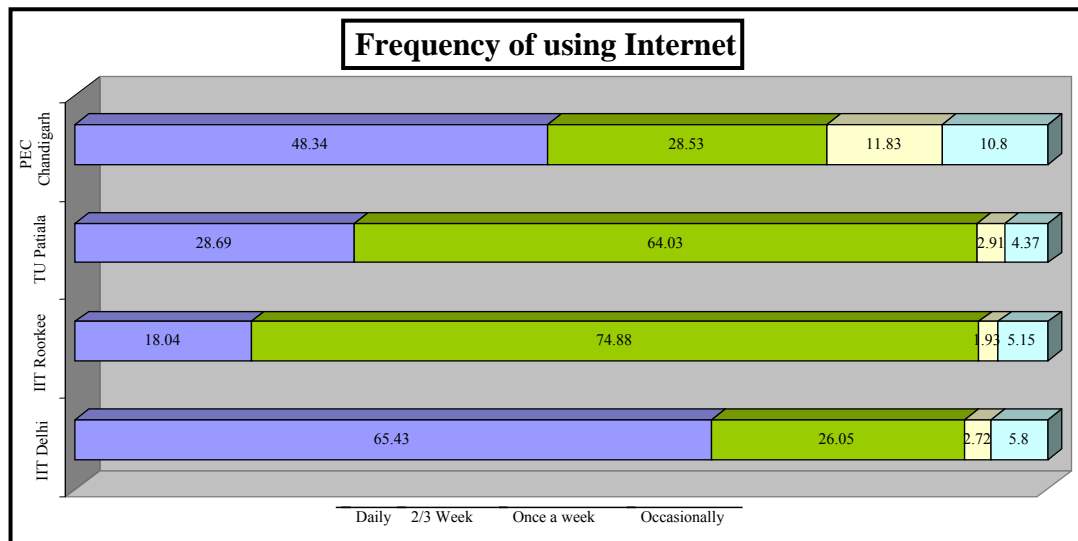
The Chi-Square test for independence is significant at 1 per cent level of significance. The value for  $\chi^2$  is 276.268 and the degrees of freedom (df) is 9. The value of p shows statistically significant ( $P \leq 0.01$ ). This shows that there is a significant variation among the users as far as the use of CD-ROM services is concerned.

**Table No.5.5.14 Frequency of using Internet**

Frequency of Internet	IIT, Delhi	IIT, Roorkee	TU, Patiala	PEC, Chandigarh	Total N (%)	Chi <sup>2</sup> (df;C)
Daily	530 (65.43)	112 (18.04)	138 (28.69)	190 (48.84)	970 (42.16)	534.471** (9;0.434) NA 21 (0.90%)
2/3 Week	211 (26.05)	465 (74.88)	308 (64.03)	111 (28.53)	1095 (47.59)	
Once a week	22 (2.72)	12 (1.93)	14 (2.91)	46 (11.83)	94 (4.09)	
Occasionally	47 (5.80)	32 (5.15)	21 (4.37)	42 (10.80)	142 (6.17)	

\*\*Significant at 0.01

**Figure No.5.5.14**



It is seen from Figure No. 5.5.14 that 530 (65.43%) users from IIT, Delhi; 112 (18.04%) from IIT, Roorkee; 138 (28.69%) from TU, Patiala and 190 (48.84%) PEC, Chandigarh used internet daily. Respondents who were using internet 2/3 times a week were 465 (74.88%) from IIT, Roorkee followed by 308 (64.03%) from TU, Patiala 111 (28.53%) from PEC, Chandigarh and 211 (26.05%) from IIT, Delhi. The users using the internet once a week was less in number. Their response was 22 (2.72%) from IIT, Delhi; 32

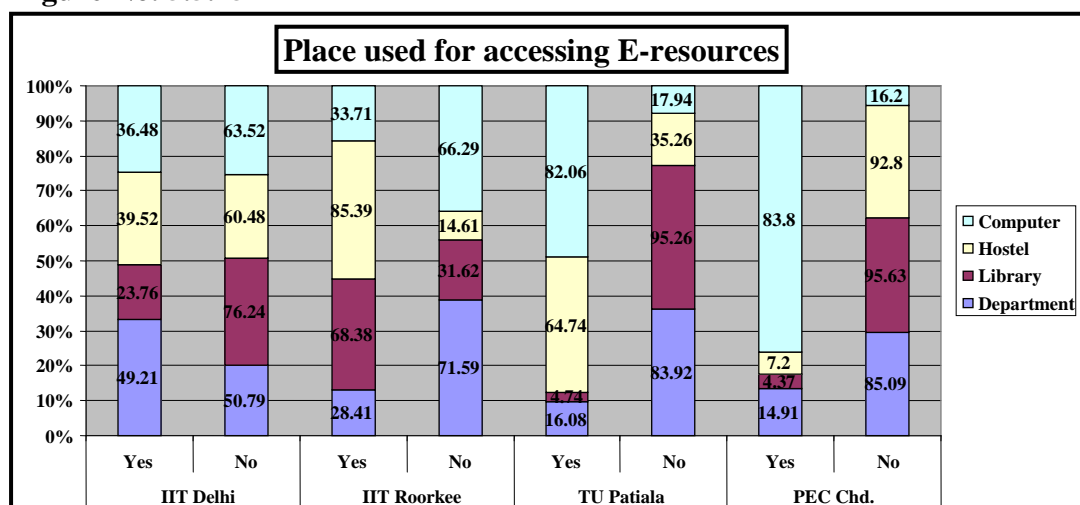
(5.15%) from IIT, Roorkee; 14 (2.91%) from TU, Patiala and 46 (11.83%) PEC, Chandigarh. Same way the internet is used occasionally by 47(5.80%) users from IIT, Delhi; 32 (5.15%) from IIT, Roorkee; 21 (4.37%) from TU, Patiala and 42 (10.80%) from PEC, Chandigarh. Thus internet is mostly used daily and 2/3 time a week as compared to once a week and occasionally. From total response of users it has been found that 970 (42.16%) users use internet daily and 1095 (47.59%) 2/3 times a week. where as 21 (0.90%) users did not responds to time question.

The Table No. 5.5.14 shows the Chi-Square test for independence is significant at 1 per cent level of significance. The value of  $\chi^2$  is 534.471 and the degrees of freedom (df) is 9. The value of p shows statistically significant ( $P \leq 0.01$ ). This shows that there is a significant variation among the institutions as far as use of the internet services is concerned.

**Table No. 5.5.15 Place used for accessing of E-resources**

Place of Accessing	IIT, Delhi		IIT, Roorkee		TU, Patiala		PEC, Chandigarh		Total N(%)	
	Yes	No	Yes	No	Yes	No	Yes	No	Yes	No
Department	406 (49.21)	419 (50.79)	177 (28.41)	446 (71.59)	78 (16.08)	407 (83.92)	58 (14.91)	331 (85.09)	719 (30.96)	1603 (69.03)
Library	196 (23.76)	629 (76.24)	426 (68.38)	197 (31.62)	23 (4.74)	462 (95.26)	17 (4.37)	372 (95.63)	662 (28.50)	1660 (71.49)
Hostel	326 (39.52)	499 (60.48)	532 (85.39)	91 (14.61)	314 (64.74)	171 (35.26)	28 (7.20)	361 (92.80)	1200 (51.67)	1122 (48.32)
Computer Center	301 (36.48)	524 (63.52)	210 (33.71)	413 (66.29)	398 (82.06)	87 (17.94)	326 (83.80)	63 (16.20)	1235 (53.19)	1087 (46.81)

**Figure No. 5.5.15**



The libraries are providing electronic information services through intranet. These e-

resources can be accessed within the institutions at various places like departments, library, computer center and hostels.

The response from the user who used the department shows that 406 i.e. (49.21%) of users from IIT, Delhi said yes and 419(50.79%) said no, while 177(28.41%) users from IIT, Roorkee answered yes and 446 (71.59%) answered no. The response from users at TU, Patiala was 78(16.08%) positive. While, users from PEC, Chandigarh only 58(14.91%) users used their departments for accessing the e-resources. The results show that IIT, Delhi users were using departments more as place for accessing the e-resources as compared to other institutions.

The library was used by 196(23.76%) users from IIT, Delhi and 629(76.27%) said they did not use the library for accessing e-resource, 426(68.38%) users from IIT, Roorkee answered yes and 197(31.62%) answered no. While 23(4.47%) users from TU, Patiala responded yes. 17(4.37%) users of PEC, Chandigarh said yes for using library. It has been found from the data that users from IIT, Roorkee used library more as place for accessing e-resources as compared to users from other institutions.

The hostels as a place for accessing the e-resources were used by 326 (39.52%) users from IIT, Delhi 532(85.39%) users from Roorkee answered yes and 91(14.61%) answered no, while 314(64.14%) users from TU, Patiala said they used hostels as place for accessing e-resources. 28(7.20%) users from PEC, Chandigarh responded yes and 361(92.80%) response was no. It has been found from the data that IIT, Roorkee and TU, Patiala users were using hostels more for accessing e-resources as compared to IIT, Delhi and PEC, Chandigarh. The computer center was used by 301(36.48%) users from IIT, Delhi and 524(63.52%) did not use it. Response shows that 210(33.71%) users from IIT, Roorkee said yes and 413(66.29%) said no.

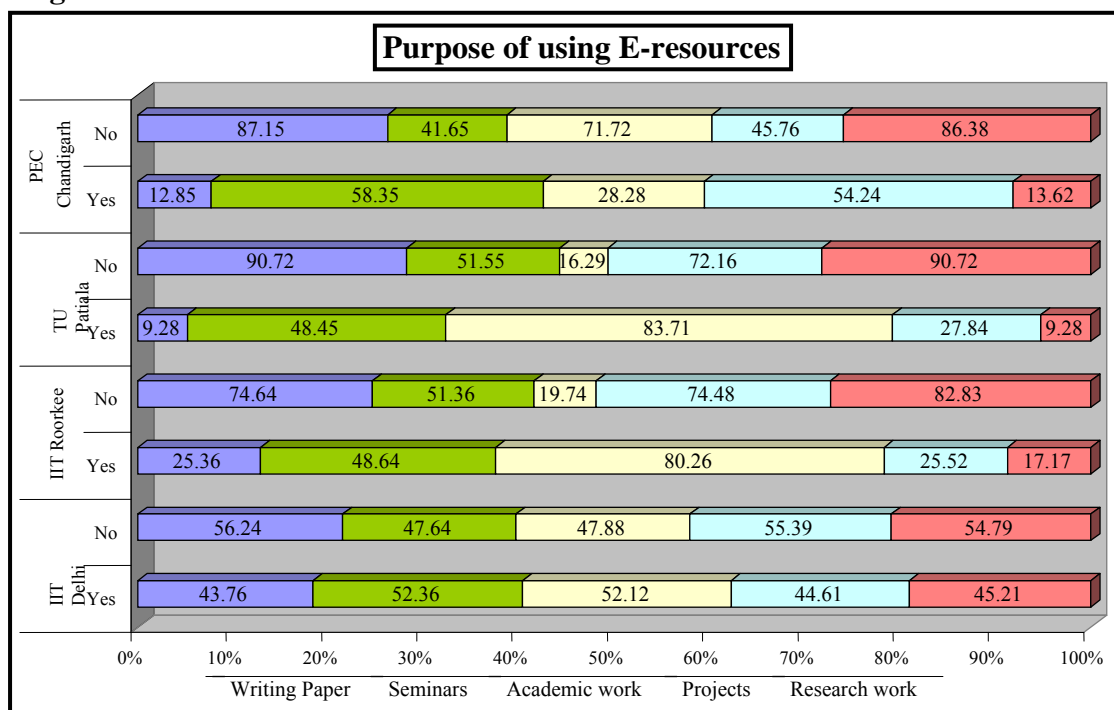
While positive response was given by 398 (82.6%) users from TU, Patiala and 326 (83.80%) users from PEC, Chandigarh.

The results show that computer center is used more by users of TU, Patiala and PEC, Chandigarh as place for accessing e-resources. The data indicates from the total population that 1235(53.19%) of users were using computer center more as compared to other places.

**Table No. 5.5.16 Purpose of using E- resources**

Purpose	IIT, Delhi		IIT, Roorkee		TU, Patiala		PEC, Chandigarh		Total	
	Yes	No	Yes	No	Yes	No	Yes	No	Yes	No
Writing Paper	361 (43.76)	464 (56.24)	158 (25.36)	465 (74.64)	45 (9.28)	440 (90.72)	50 (12.85)	339 (87.15)	614 (26.44)	1708 (73.35)
Seminars	432 (52.36)	393 (47.64)	303 (48.64)	320 (51.36)	235 (48.45)	250 (51.55)	227 (58.35)	162 (41.65)	1197 (51.55)	1125 (48.44)
Academic work	430 (52.12)	395 (47.88)	500 (80.26)	123 (19.74)	406 (83.71)	79 (16.29)	110 (28.28)	279 (71.72)	1446 (62.27)	876 (37.72)
Projects	368 (44.61)	457 (55.39)	159 (25.52)	464 (74.48)	135 (27.84)	350 (72.16)	211 (54.24)	178 (45.76)	873 (37.59)	1449 (62.40)
Research work	373 (45.21)	452 (54.79)	107 (17.17)	516 (82.83)	45 (9.28)	440 (90.72)	53 (13.62)	336 (86.38)	578 (24.89)	1744 (75.100)

**Figure No. 5.5.16**



The Table No. 5.5.16 shows the purpose of using e-resources by users. It has been found that for writing papers 361 users (43.76%) from IIT, Delhi, 158(25.36%) from IIT, Roorkee, 45(9.28%) from TU, Patiala and 50(12.82%) from PEC, Chandigarh users were using e-resources. E-resources were consulted for writing seminars by 432(52.36%) users from IIT, Delhi, 303 (48.64%) from IIT, Roorkee, 235(48.45%) from TU, Patiala and 227(58.35%) from PEC, Chandigarh. The results show that users from IIT, Delhi and PEC, Chandigarh were using more e-resources for seminars as compared to IIT, Roorkee and TU, Patiala. The e-resources for academic work were used by 430(52.12%) users from IIT, Delhi, 500(50.26%) users from IIT, Roorkee, 406(83.71%) users from TU,

Patiala and 110(28.28%) from PCE, Chandigarh. The results show that IIT, Roorkee and TU, Patiala users were using e-resources more for getting help for their academic work as compared to IIT, Delhi and PEC users. 368(44.61%) users from IIT, Delhi 159(25.52%) from IIT, Roorkee 135(27.84%) from TU, Patiala and 211(54.24%), PEC, Chandigarh were using e-resources for projects work. It has been found that IIT, Delhi and PEC, users were using more e-resources for project work as compared to IIT, Roorkee and PEC, Chandigarh. The e-resources were used for research work by 373(45.21%) users from IIT, Delhi 107(17.17%) from IIT, Roorkee 45(9.28%) from TU, Patiala and 53(13.62%) from PEC, Chandigarh. The results indicates that IIT, Delhi and IIT, Roorkee users were using e-resource more for research work as compared to TU, Patiala and PEC, Chandigarh. The results show that from the total population e-resources were used more for seminars by 1197(51.55%) users and for academic work by 1446(62.27%) users, while 614(26.44%) users were using e-resources for writing papers, 837(37.60%) for projects work and 578(24.89%)for research work.

**Table No.5.5.17 Purpose of using internet/websites**

Purposes	IIT, Delhi		IIT, Roorkee		TU, Patiala		PEC, Chandigarh		Total N (%)	
E-mail	731 (88.61)	94 (11.39)	601 (96.47)	22 (3.53)	454 (93.61)	31 (6.39)	322 (82.78)	67 (17.22)	2108 (90.78)	214 (9.22)
Career development	358 (43.39)	467 (56.61)	269 (43.18)	354 (56.82)	222 (45.77)	263 (54.23)	243 (62.47)	146 (37.53)	1092 (47.03)	1230 (52.97)
Research work	400 (48.48)	425 (51.52)	117 (18.78)	506 (21.22)	52 (10.72)	433 (89.28)	78 (20.05)	311 (79.95)	647 (27.86)	1675 (72.14)
Finding relevant information	740 (89.70)	85 (10.30)	612 (98.23)	11 (1.77)	468 (96.49)	17 (3.51)	329 (84.58)	60 (15.62)	2149 (92.55)	173 (7.45)
Entertainment	180 (21.82)	645 (78.18)	206 (33.07)	417 (66.93)	112 (23.09)	373 (76.91)	97 (24.94)	292 (75.06)	595 (25.62)	1727 (74.38)

Figure No.5.5.17

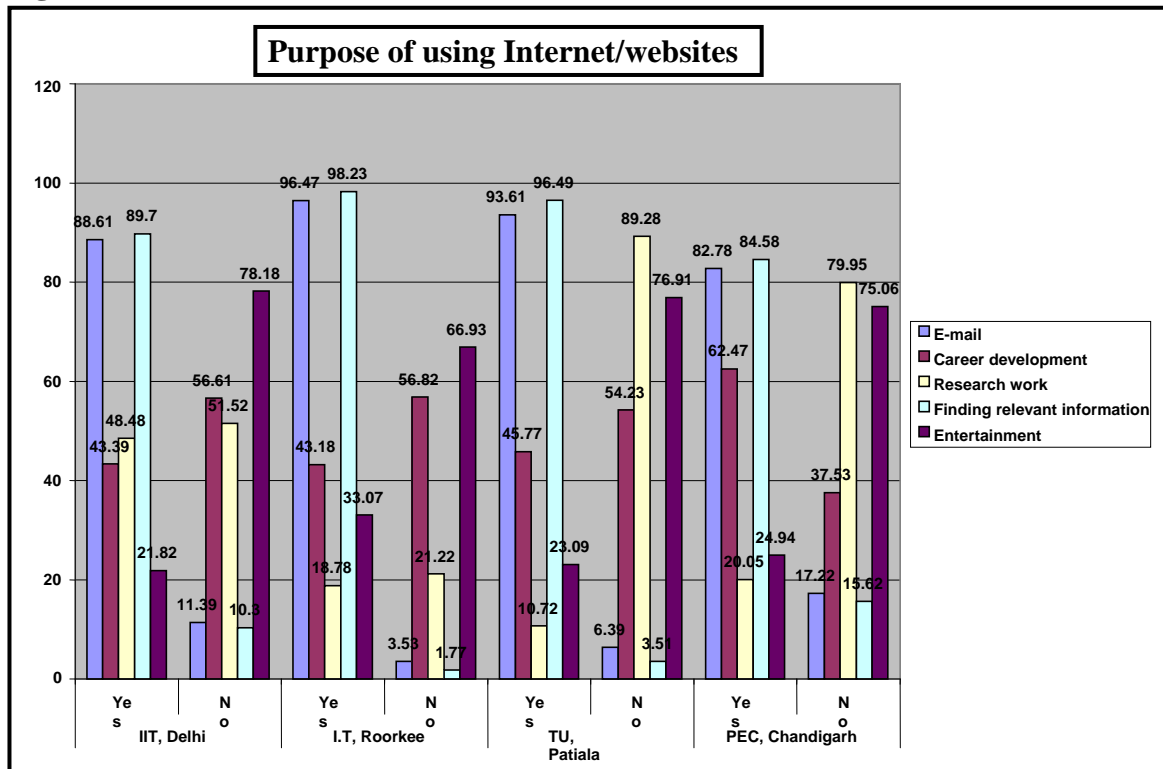


Table No. 5.5.17 shows institution wise response from users for using internet/website for various purposes. It reveals that e-mail services are used by all the users. The response was above 80% in positive from all the four institutes, for career development response was positive almost same (i.e. 43.39% and 43.18%) from both the IITs 77% from TU, Patiala and 48.48% from PEC, Chandigarh. For research work 48.48% IIT, Delhi user use more internet/website as compared to 18.78% IIT, Roorkee, 10.72% TU, Patiala and 20.05% from PEC.

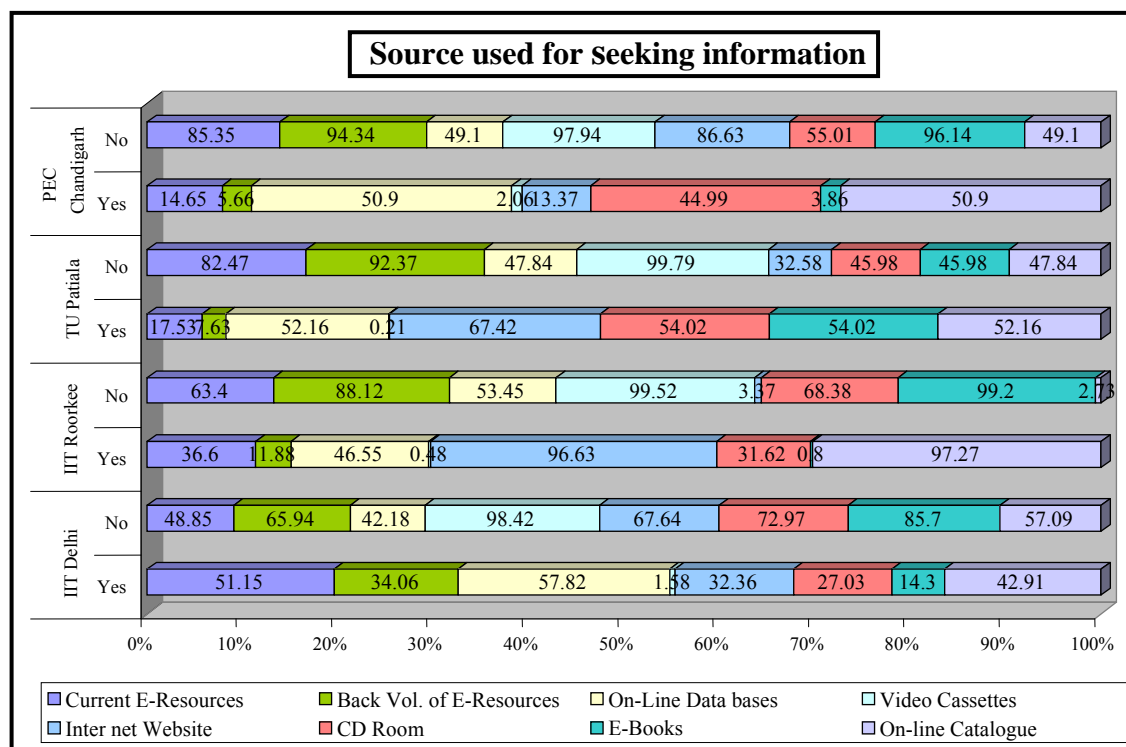
The response was above 84% from all the four institutions in regard to use of internet/websites for finding relevant information. Similarly, for entertainment the response was below 35% from all the four institutions.

From total users' data, it has been found that 92.55% users use internet/websites for finding relevant information, 90.78% for e-mail, 47.03% for career development and 25.62% for entertainment.

**Table No. 5.5.18 Source used for seeking information**

Seeking information from	IIT, Delhi N (%)		IIT, Roorkee N (%)		TU, Patiala N (%)		PEC, ChandigarhN(%)		Total N (%)	
	Yes	No	Yes	No	Yes	No	Yes	No	Yes	No
Current E-resources	422 (51.15)	403 (48.85)	228 (36.60)	395 (63.40)	85 (17.53)	400 (82.47)	57 (14.65)	332 (85.35)	792 (34.10)	1530 (65.89)
Back Vol. of E-resources	281 (34.06)	544 (65.94)	74 (11.88)	549 (88.12)	37 (7.63)	448 (92.37)	22 (5.66)	367 (94.34)	414 (17.82)	1908 (82.17)
On-Line Data bases	477 (57.82)	348 (42.18)	290 (46.55)	333 (53.45)	253 (52.16)	232 (47.84)	198 (50.90)	191 (49.10)	1218 (52.45)	1104 (47.54)
Video Cassettes	13 (1.58)	812 (98.42)	3 (0.48)	620 (99.52)	1 (0.21)	484 (99.79)	8 (2.06)	381 (97.94)	25 (1.07)	2297 (98.92)
Inter net Website	267 (32.36)	558 (67.64)	602 (96.63)	21 (3.37)	327 (67.42)	158 (32.58)	52 (13.37)	337 (86.63)	1248 (53.74)	1074 (46.25)
CD Room	223 (27.03)	602 (72.97)	197 (31.62)	426 (68.38)	262 (54.02)	223 (45.98)	175 (44.99)	214 (55.01)	857 (36.90)	1465 (63.09)
E-Books	118 (14.30)	707 (85.70)	5 (0.80)	618 (99.20)	262 (54.02)	223 (45.98)	15 (3.86)	374 (96.14)	400 (17.22)	1922 (82.77)
On-line Catalogue	354 (42.91)	471 (57.09)	606 (97.27)	17 (2.73)	253 (52.16)	232 (47.84)	198 (50.90)	191 (49.10)	1411 (60.76)	857 (36.90)

**Figure No. 5.5.18**



The Table No. 5.5.18 shows the sources used by users from four institutes. It has been found that 422 (51.15%) users from IIT, Delhi, 228 (36.60%) from IIT, Roorkee, 85 (17.53%) from TU, Patiala and 15(14.65%) from PEC, Chandigarh were using current e-resources for seeking information. It has been found that IIT, Delhi users were using current e-journals more as compared to users from other institutes.

The back volume of e-journals were used by 281 (34.06%) users from IIT, Delhi, 77 (11.88%) from IIT, Roorkee 37 (7.63%) from TU, Patiala and 22 (5.66%) from PEC, Chandigarh. The results show that IIT, Delhi users were using back volume of e-journals more as compared to users from other institutes.

The online data bases were used almost by all the users from the four institutes. It has been seen that 477 (57.82%) users from IIT, Delhi, 290 (46.55%) from IIT, Roorkee, users 253 (52.16%) from TU, Patiala and 198 (50.90%) from PEC, Chandigarh were using on-line bases.

The use of video cassettes was very less by all the users and the response is below 3% only.

Internet websites were used by 267 (32.36%) users from IIT, Delhi, 602 (96.63%) from IIT, Roorkee 327 (67.42%) from TU, Patiala and 52 (13.37%) from PEC, Chandigarh. The data indicates that users from IIT, Roorkee and TU, Patiala were using internet websites more for seeking information as compared to users from IIT, Delhi and PEC, Chandigarh.

CD-ROM service were used by 223 (32.36%) users from IIT, Delhi, 197 (31.62%) from IIT, Roorkee, 262 (54.02%) from TU, Patiala and 175 (44.99%) from PEC, Chandigarh. It has been found that IIT, Roorkee and TU, Patiala users were using CD-ROM services more as compared to IIT, Delhi and PEC, Chandigarh.

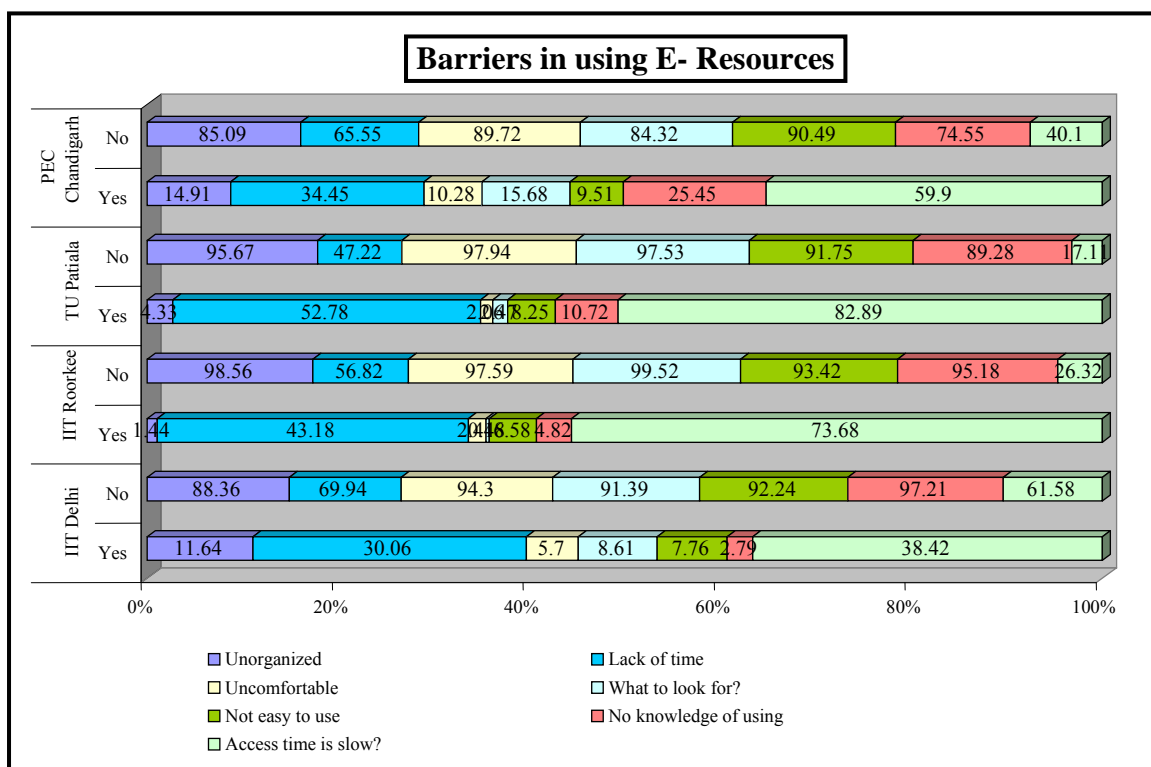
The Data shows that use of free e-books by users was very less. 261 (54.02%) users from TU, Patiala were using e-books more as compared to the users from other institutes.

The OPAC was used by 354 (42.91%) users from IIT, Delhi; 606 (97.27%) from IIT, Roorkee; 253 (52.16%) from TU, Patiala and 198 (50.90%) from PEC, Chandigarh. The users from IIT, Roorkee were using OPAC more as compared to the users from other institutes. The results show from the total users who were seeking information from e-resources 60.77% of users were using OPAC, 53.74% of users were using internet website, 52.46% were using on-line data bases, 34.10% of users were using current e-journals and 17.827% of users were using back volumes of e-journals. The use of video cassettes, e-books and CD-ROM was very less as compared to other e-resources.

**Table No. 5.5.19 Barriers in using E- Resources**

Barriers in using E- Resources	IIT, Delhi		IIT, Roorkee		TU, Patiala		PEC, Chandigarh		Total N (%)	
	Yes	No	Yes	No	Yes	No	Yes	No	Yes	No
Unorganized	96 (11.64)	729 (88.36)	9 (1.44)	614 (98.56)	21 (4.33)	464 (95.67)	58 (14.91)	339 (85.09)	184 (7.92)	2138 (92.08)
Lack of time	248 (30.06)	577 (69.94)	269 (43.18)	354 (56.82)	256 (52.78)	229 (47.22)	134 (34.45)	255 (65.55)	907 (39.06)	1415 (60.94)
Uncomfortable	47 (5.70)	778 (94.30)	15 (2.41)	608 (57.59)	10 (2.06)	475 (97.94)	40 (10.28)	349 (89.82)	112 (4.82)	2210 (95.18)
What to Look for?	71 (8.61)	754 (91.39)	3 (0.48)	620 (99.82)	12 (2.47)	473 (97.53)	61 (15.68)	328 (84.32)	147 (6.33)	2175 (93.67)
Not easy to use	64 (7.76)	761 (92.24)	41 (6.58)	582 (93.42)	40 (8.25)	445 (91.75)	37 (9.51)	352 (90.49)	182 (7.84)	2140 (92.16)
No knowledge of using	23 (2.79)	802 (97.21)	30 (4.82)	593 (95.18)	52 (10.72)	433 (89.28)	99 (25.45)	290 (74.55)	204 (8.79)	2118 (91.21)
Access time is slow	317 (38.42)	508 (61.58)	459 (73.58)	164 (26.32)	402 (82.89)	83 (17.11)	233 (59.90)	156 (40.10)	1411 (60.77)	911 (39.23)

**Figure No. 5.5.19**



The users were using e-resources/services of their library, to know what kind of barrier they were facing in using e-resources, users were asked some question. The table shows that 96 (11.64%) users from IIT, Delhi 9 (1.44%) from IIT, Roorkee, 21 (4.33%) users

from TU, Patiala and 58 (14.91%) from PEC, Chandigarh felt that e-resources were unorganized.

The lack of time for accessing was one of the barrier felt by 248 (30.06%) users from IIT, Delhi; 269 (43.18%) from IIT, Roorkee; 256 (52.78%) users from TU, Patiala and 134 (34.45%) from PEC, Chandigarh, while 47 (5.70%) users from IIT, Delhi; 15 (2.41%) users from IIT, Roorkee; 10 (2.06%) from TU, Patiala and 40 (10.28%) from PEC, Chandigarh felt uncomfortable when accessing the electronic information.

For the barrier what to look for the information they need 71 (8.61%) users from IIT, Delhi; 41 (6.58%) from IIT, Roorkee; 12 (2.47%) from TU, Patiala and 61 (15.68%) from PEC Chandigarh felt they struck up and don't get the required information. 64 (7.76%) users from IIT, Delhi; 41 (6.58%) from IIT, Roorkee; 40 (8.25%) from TU, Patiala and 37 (9.51%) users from PEC, Chandigarh; felt that it is not easy to use e-resources.

The results show that 23 (2.79%) users from IIT, Delhi; 30 (4.82%) users from IIT, Roorkee; 52 (10.72%) from TU, Patiala and 99 (25.45%) from PEC, Chandigarh felt that they do not have the knowledge for using e-resources

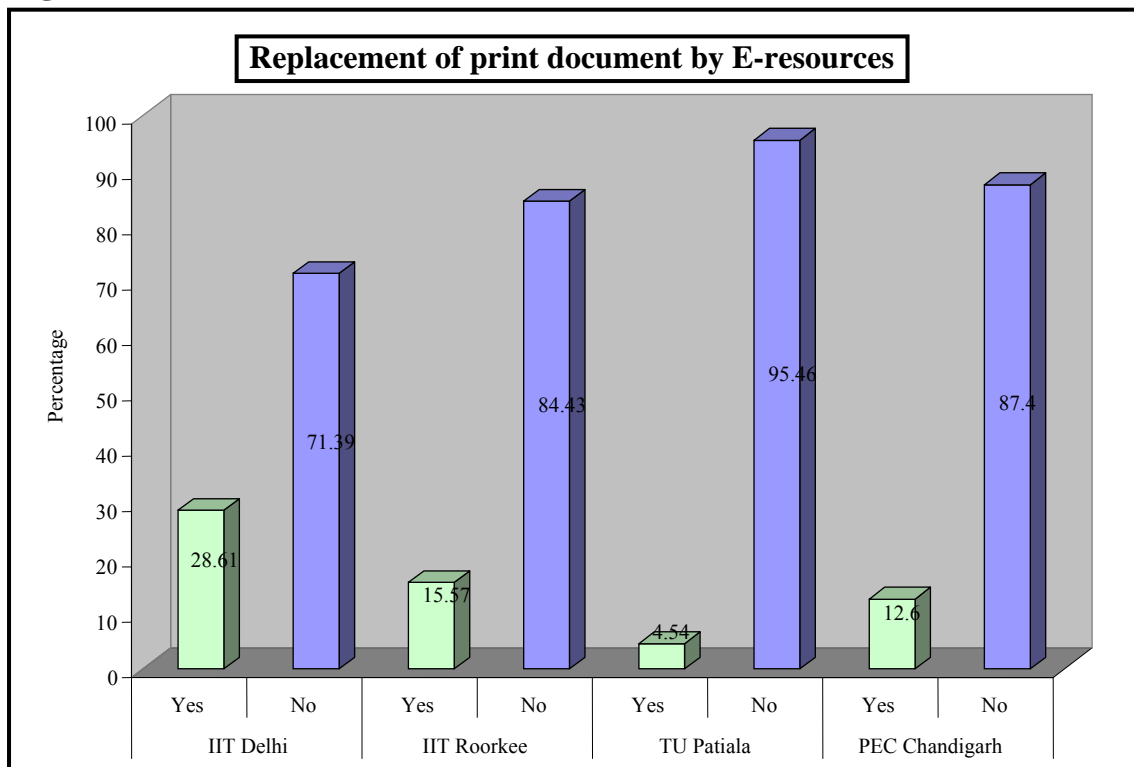
317 (38.42%) users from IIT, Delhi; 459 (73.68%) from IIT, Roorkee; 402 (82.89%) from TU, Patiala and 233 (59.90%) from PEC, Chandigarh; felt that speed of internet is slow and it is a big barrier for them to get the information from net.

**Table No. 5.5.20 Replacement of print document by E-resources**

Respondents	Response		Total	Chi <sup>2</sup> (df;C)		
	Yes	N (%)	No		N (%)	
IIT, Delhi	236	(28.61)	589	(71.39)	825 (100)	135.629** (3 ;0.235)
IIT, Roorkee	97	(15.57)	526	(84.43)	623 (100)	
TU, Patiala	22	(4.54)	463	(95.46)	485 (100)	
PEC, Chandigarh	49	(12.60)	340	(87.40)	389 (100)	
Total	404	(17.39)	1918	(82.61)	2322 (100)	

\*\*Significant at 0.01

**Figure No. 5.5.20**



The data indicates that 236 (28.61%) users from IIT, Delhi answered yes, while 589 (71.39%) answered no. Response from 97(15.51%) users from IIT, Roorkee was yes. In TU, Patiala 22 (4.54%) users said they felt that internet electronic resource can replace printed document while 340(87.40%) said they did not feel so. 49 users from PEC, Chandigarh (12.60%) answered yes and 340(87.40%) users answered no. The result indicate that out of 2322 users only 17.39% said that print document can be replaced where as 82.61% are not in favor.

Table No. 5.5.20 shows that for users the Chi-Square test for independence is significant at 1 per cent level. This implies that there is significant variation among the users for giving their opinion regarding the replacement of print document with internet/electronic resources. Thus majority of users from all the four institutes feel that internet/electronic resource can not replace the printed document.

## 5.6 Comparison Among the Users

**Table No. 5.6.1** Population taken for the survey

Respondents	Total strength	Questionnaire distributed	Response received
Undergraduates	7519	1503	1415 (60.94)
Postgraduates	3087	617	535 (23.04)
Research Scholars	1363	373	215 (9.26)
Faculty	941	193	157 (6.76)
Total	12910	2686	2322 (100)

**Figure No. 5.6.1**

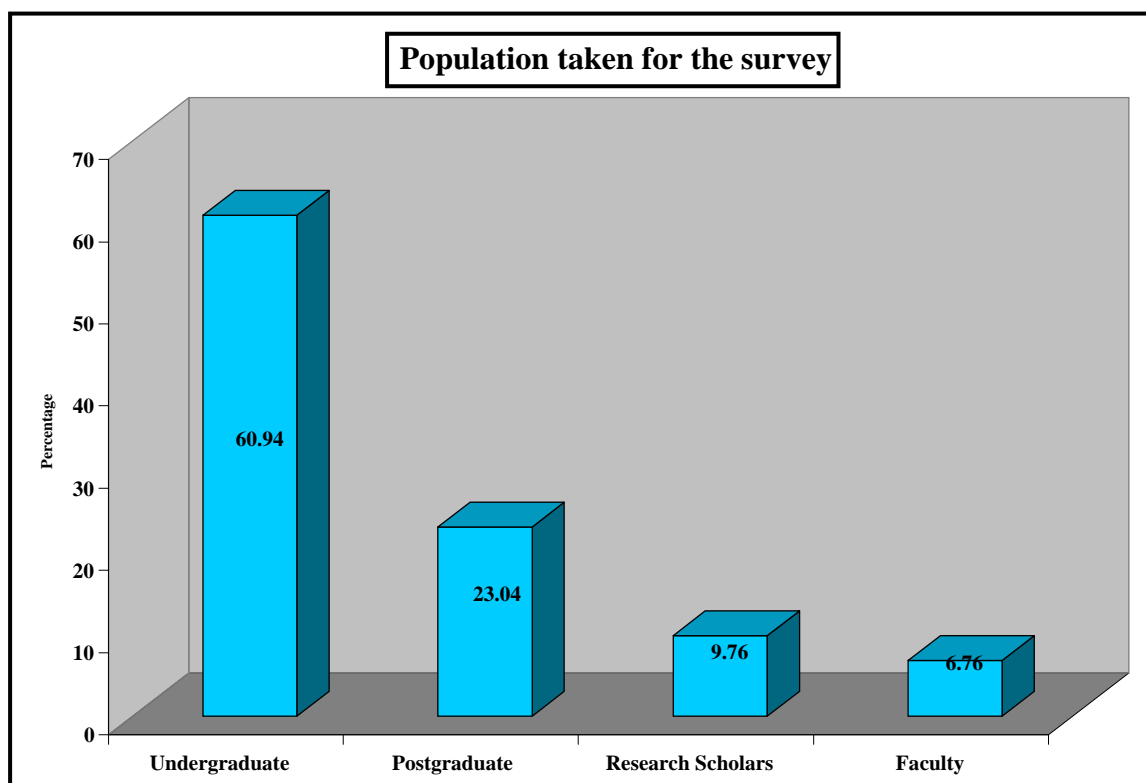


Table No.5.6.1 shows the survey population taken as per users' of the institutes. There were 7519 undergraduates; 1503 questionnaires were distributed; and response from 1415 was received. Total strength of postgraduates was 3087, questionnaires were distributed to 617 and response received was 535. There were 1363 research scholars; 373 questionnaires were distributed and response from only 215 respondents was received. The strength of faculty was 941, questionnaires distributed were 193 and response

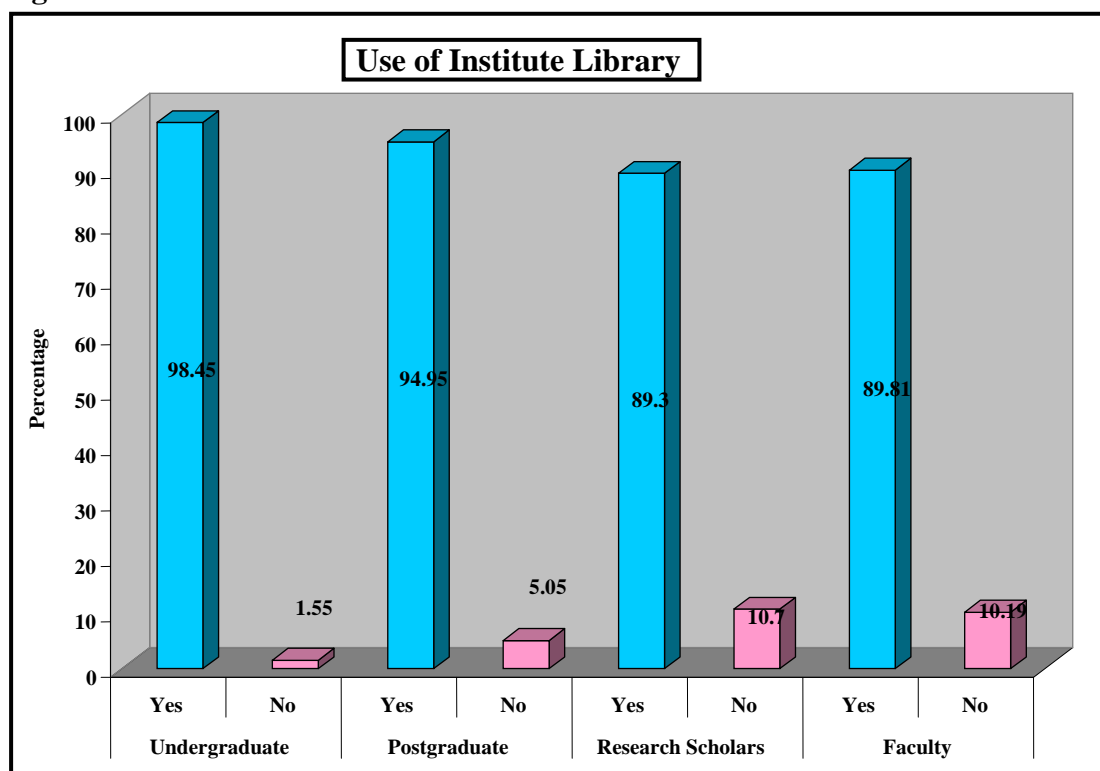
received was from 157 only.

**Table No. 5.6.2 Use of Institute Library**

Respondents	Response		Total	Chi <sup>2</sup> (df;C)	
	Yes	N (%)	No		N (%)
Undergraduates	1393	(98.45)	22	(1.55)	67.485** (3;0.168)
Postgraduates	508	(94.95)	27	(5.05)	
Research scholars	192	(89.30)	23	(10.70)	
Faculty	141	(89.81)	16	(10.19)	
Total	2234	(96.21)	88	(3.79)	

\*\*Significant at 0.01

**Figure No. 5.6.2**



The users were asked whether they are using the library of their institute or not. From the response of the respondents given in Table No. 5.6.2 it is clear that 1393 undergraduates (98.45%), 508 postgraduates (95.95%) , 192 research scholars (89.30%) and 141 faculty members (89.81%) used the library of their institute. The data shows that out of the total 2322 users, 2234 (96.21%) users were using the library and the remaining 88 (3.79%) were not using it. As shown in the table the the value of  $\chi^2$  is 67.485 and the degrees of freedom (df) is 3. The value of p shows statistically significant ( $p \leq 0.01$ ). The Chi-Square test for independence is significant at 1 per cent level of significance. This implies that

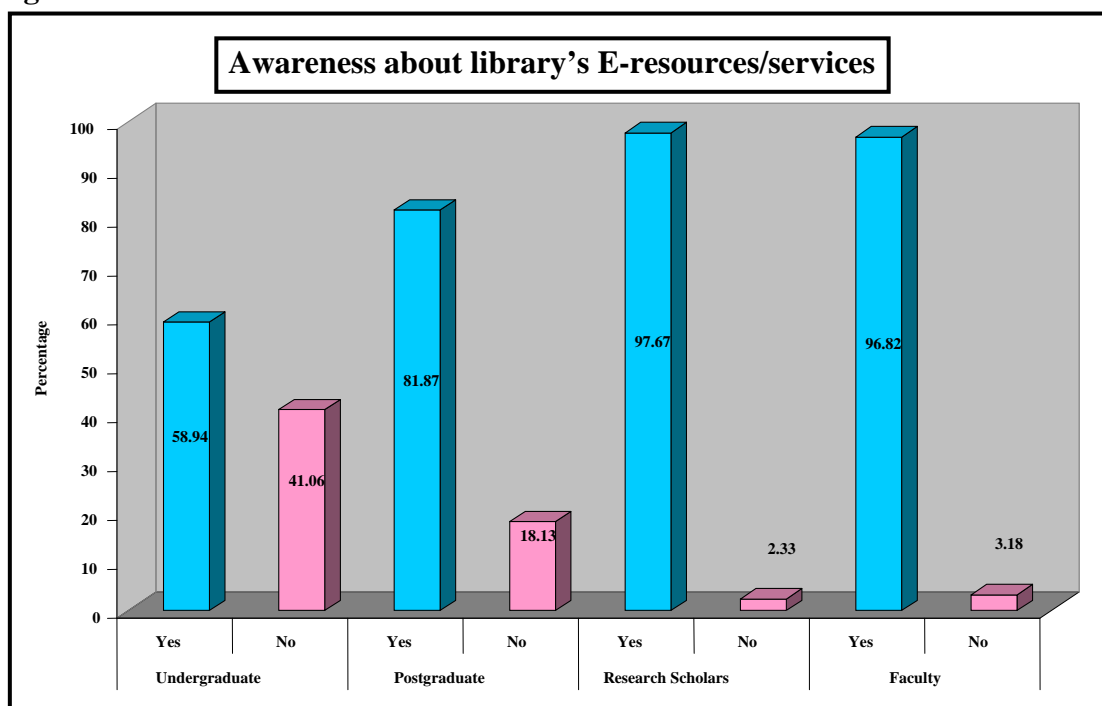
there is a significant variation among the users as far as the use of the library is concerned.

**Table No.5.6.3 Awareness about library’s E-resources/services**

Respondents	Response		Total	Chi <sup>2</sup> (df;C)	
	Yes	N (%)	No N (%)		N (%)
Undergraduates	834	(58.94)	581 (41.06)	1415 (100)	252.127** (3 ;0.313)
Postgraduates	438	(81.87)	97 (18.13)	535 (100)	
Research scholars	210	(97.67)	5 (2.33)	215 (100)	
Faculty	152	(96.82)	5 (3.18)	157 (100)	
Total	1634	(70.37)	688 (29.63)	2322 (100)	

\*\*Significant at 0.01

**Figure No.5.6.3**



The Table No. 5.6.3 provides the data showing the awareness of respondents about the awareness about their library electronic resources/services. As many as 834 (58.94%) undergraduates were aware about their library e-resources/services, while 581 (41.06%) do not have the awareness about such e-resources. However, among the postgraduates, a higher proportion, i.e., 438 (81.87%) have the awareness and the remaining 97 (18.13%) do not have the awareness about such e-resources/services. Similarly, 210 (97.67%) users among the research scholars have been found to be aware about e-services, whereas the

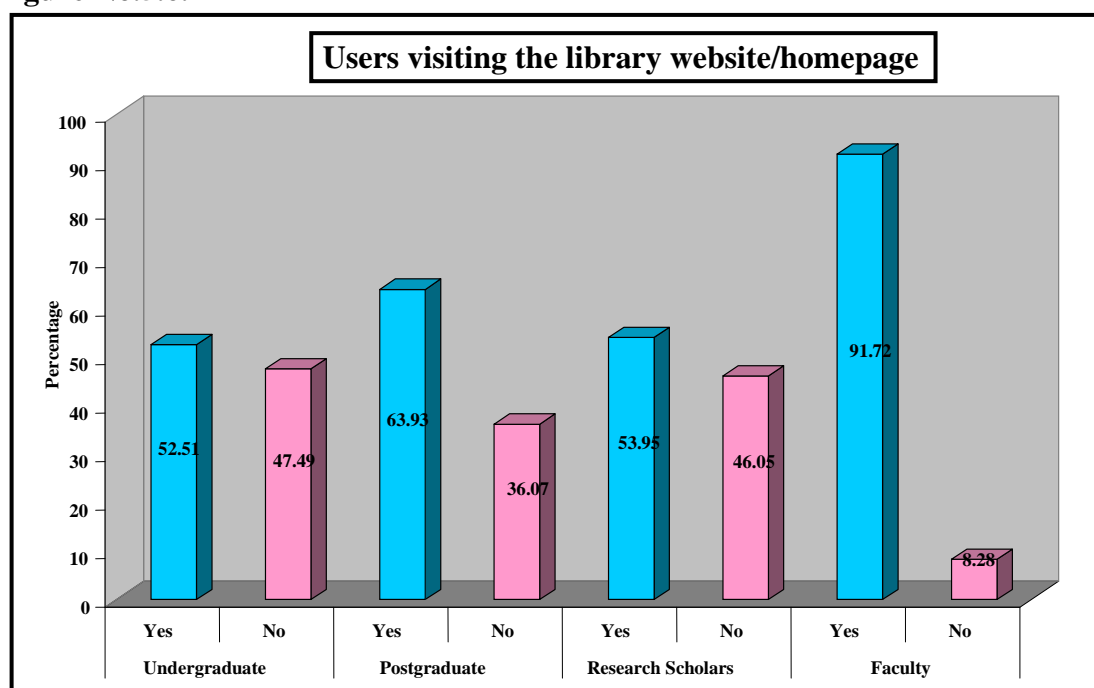
remaining only 5 (2.33%) were not aware about such services. Among the faculty members 152 (96.82%) of them were aware about the e-resources and the remaining lack awareness about these services. Of the total 2322 users, 1634 (70.37%) were found to be aware about their library e-resources/services. As shown in the table the the value of  $\chi^2$  is 252.127 and the degrees of freedom (df) is 3. The value of p shows statistically significant ( $p \leq 0.01$ ). The Chi-Square test for independence is significant at 1 per cent level of significance. This implies that there is a significant relationship among the users as far as the awareness about library e-resources/services is concerned. Thus, majority of the research scholars and faculty members were found to be more aware about the library electronic resources than the undergraduates and postgraduates.

**Table No. 5.6.4 Users visiting the library’s website/homepage**

Respondents	Response		Total	Chi <sup>2</sup> (df;C)
	Yes N (%)	No N (%)	N (%)	
Undergraduates	743 (52.51)	672 (47.49)	1415(100)	99.897** (3;0.203)
Postgraduates	342 (63.93)	193 (36.07)	535 (100)	
Research scholars	116 (53.95)	99 (46.05)	215 (100)	
Faculty	144 (91.72)	13 (8.28)	157 (100)	
Total	1345 (57.92)	977 (42.08)	2322 (100)	

\*\*Significant at 0.01

**Figure No.5.6.4**



The libraries provide information about the e-resources and services to their users through their home page/websites. The libraries are also providing current information on every new addition to their collection. The users were asked whether they have ever visited the

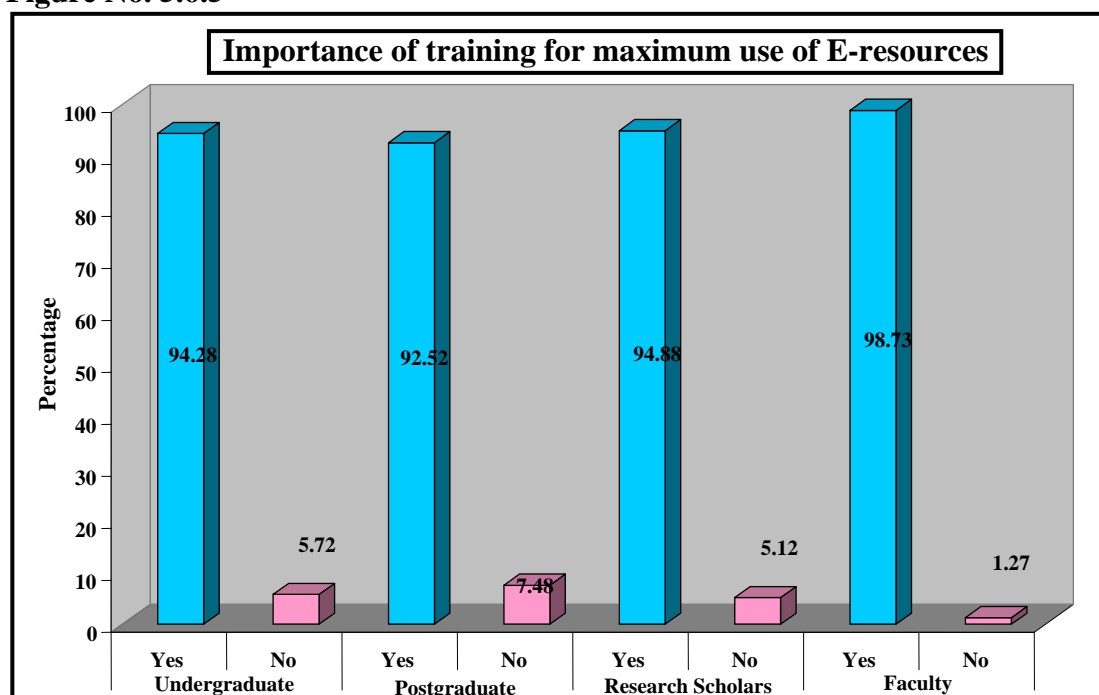
library website/homepage. The data given in Table No. 5.6.4 indicates that 743 (52.51%) undergraduates, 342 (63.93%) postgraduates, 116 (53.95%) research scholars and 144 (91.74%) faculty answered in the affirmative. The number of users who answered in the negative were 672 (47.49%), undergraduates, 193 (36.07%) postgraduates, 99 (46.05%) research scholars, and 13 (8.28%) faculty. Postgraduates visited their library home page more as compared to undergraduates and research scholars. Of the total 2322 users, it has been found that 1345 (57.92%) of them visited the library website/homepage, and the rest 977 (42.08%) did not visit their library website. The Chi-Square test for independence is significant at 1 per cent level of significance. As shown in the table No. 5.6.4 the value of  $\chi^2$  is 99.897 and the degrees of freedom (df) is 3. The value of p shows statistically significant ( $p \leq 0.01$ ). This implies that there is a significant variation among the users as far as visiting websites/home page of their library is concerned.

**Table No. 5.6.5 Importance of training for maximum use of E-resources**

Respondents	Response		Total	Chi <sup>2</sup> (df;C)
	Yes N (%)	No N (%)	N (%)	
Undergraduates	1334 (94.28)	81 (5.72)	1415 (100)	8.876** (3 ;0.062)
Postgraduates	495 (92.52)	40 (7.48)	535 (100)	
Research scholars	204 (94.88)	11 (5.12)	215 (100)	
Faculty	155 (98.73)	2 (1.27)	157 (100)	
Total	2188 (94.23)	134 (5.77)	2322 (100)	

\*\*Significant at 0.01

**Figure No. 5.6.5**



The Table No. 5.6.5 carries the response of the users to the question whether training is important to make maximum use of e-resources. It has been found that 1334 (94.28%) undergraduate users said yes, While 81 (5.72%) replied in the negative. Similarly, 495 (92.52%) postgraduates responded that training is important to make maximum use of e-resources, whereas the remaining 40 (7.48%) did not feel so. Among the research scholars 204 (94.88%) responded in the affirmative, and 11 (5.12%) in the negative, similarly, the response of 155 (98.73%) faculty members was in the affirmative, and 2 (1.27%) of them responded that training is not so important. From the total of 2322 users, most of them i.e., 2188 (94.23%) responded that training is important to make maximum use of e-resources, while 134 (5.77%) felt there is no need of such training. As shown in the table No. 5.6.5 the value of  $\chi^2$  is 8.876 and the degrees of freedom (df) is 3. The value of p shows statistically significant ( $p \leq 0.01$ ). The Chi-Square test for independence is significant at 1 per cent level of significance. This implies that there is a significant variation among the users as far as the importance of training for using e-resources is concerned.

**Table No .5.6.6 Knowledge about availability of free E-journals on the internet**

Respondents	Response		Total	Chi <sup>2</sup> (df;C)
	Yes	No	N (%)	
Undergraduates	639 (45.16)	776 (54.84)	1415 (100)	34.804** (3;0.122)
Postgraduates	284 (53.08)	251 (46.92)	535 (100)	
Research scholars	114 (53.02)	101 (46.98)	215 (100)	
Faculty	106 (67.52)	51 (32.48)	157 (100)	
Total	1143 (49.22)	1179 (50.78)	2322 (100)	

\*\*Significant at 0.01

**Figure No .5.6.6**

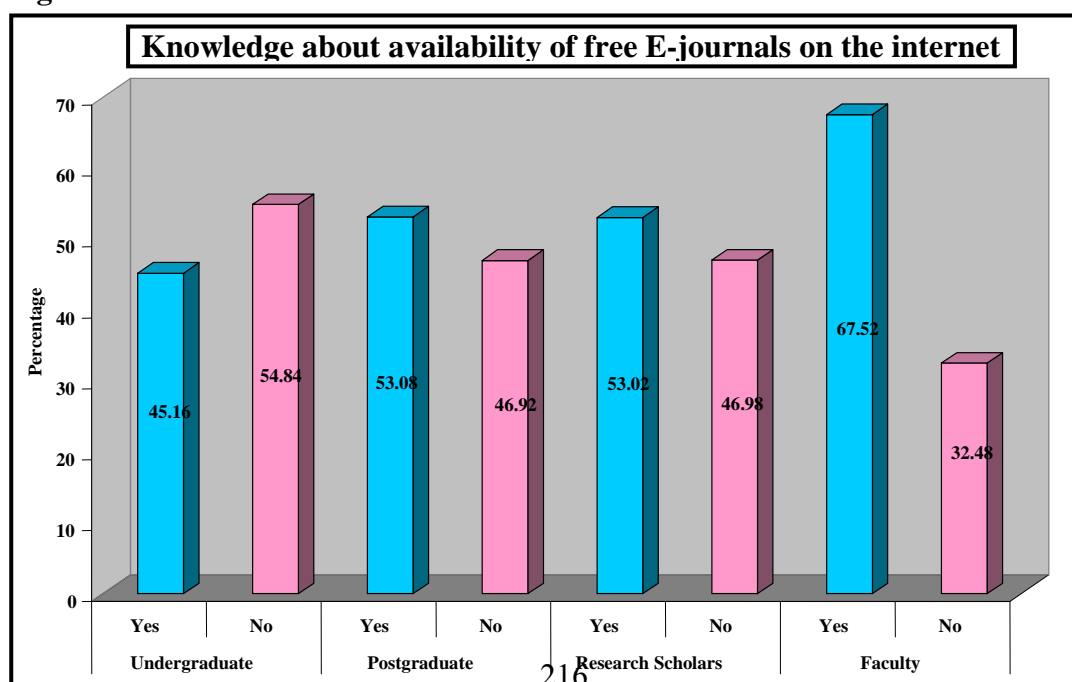


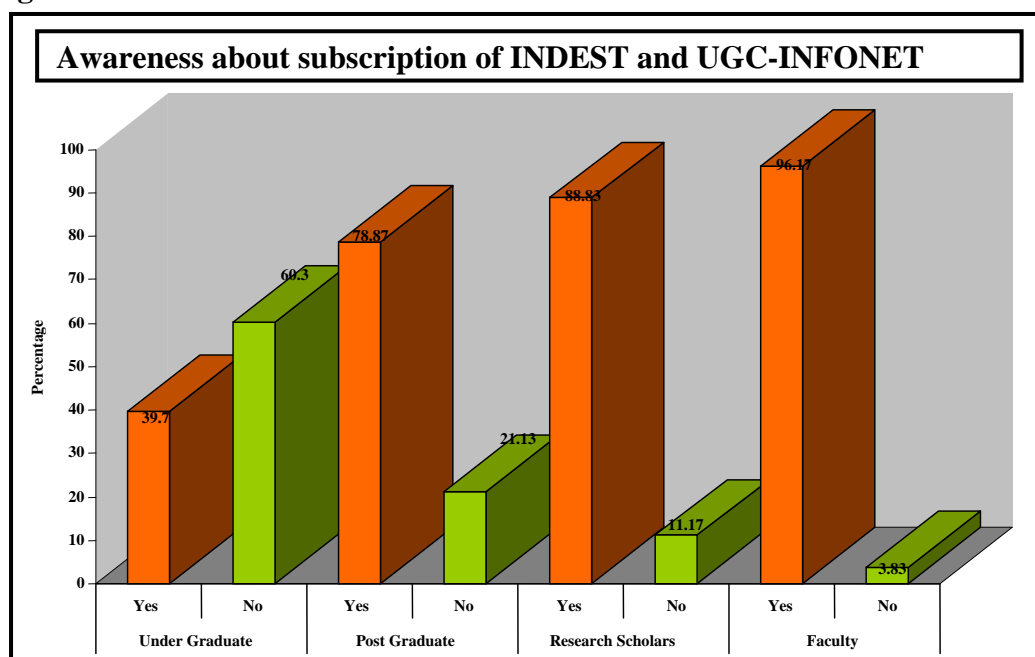
Table No. 5.6.6 evidently shows that only 639 (45.16%) undergraduates had the knowledge about availability of free e-journals on the net, whereas the rest 54.84% undergraduates did not know about it. Among the postgraduates 53.08% of them responded in the affirmative to the above question, while 46.92% responded in the negative. Among the faculty 106 (67.52%) were aware about the availability of free e-journals on the net, while 51 (32.48%) were not aware about availability of such free journals. As shown in the table No. 5.6.6 the value of  $\chi^2$  is 34.804 and the degrees of freedom (df) is 3. The value of p shows statistically significant ( $p \leq 0.01$ ). This implies that there is a significant relationship among the users having awareness about the availability of free e-journals/portal on the net. Thus faculty users were having more awareness about availability of free e-journals/ portals on the internet as compared to undergraduates, postgraduates and research scholars.

**Table No.5.6.7 Awareness about subscription of INDEST and UGC-INFONET**

Respondents	Response		Total N (%)
	Yes N (%)	No N (%)	
Undergraduates	562 (39.70)	853 (60.30)	1415 (100)
Postgraduates	422 (78.87)	113 (21.13)	535 (100)
Research scholars	191 (88.83)	24 (11.17)	215 (100)
Faculty	151 (96.17)	6 (3.83)	157 (100)
Total	1326 (57.10)	996 (42.90)	2322 (100)

\*\*Significant at 0.01

**Figure No.5.6.7**



The data given in the Table No. 5.6.7 shows the awareness of subscription of INDEST consortium by their institutes. As many as 562 (39.70%) undergraduates were found to be aware and 853 (60.30%) not aware about INDEST and UGC-INFONET consortium. However, among the postgraduates 422 (78.87%) were aware and 113 (21.13%) were not aware about such a consortium. Similarly, among the research scholars 191 (88.83%) users were aware about INDEST and UGC-INFONET consortium, and the rest 24 (11.17%) were not aware about it. However, among the faculty members 151 (96.17%) were aware and 6 (3.83%) were unaware about INDEST and UGC-INFONET consortium subscribed by their institutes out of the total 2322 respondents surveyed, 1326 (57.10%) of them were aware about INDEST and UGC-INFONET consortium and the remaining 996(42.90%) users were not aware about it.

**Table No.5.6.8 Use of INDEST/UGC INFONET consortium**

Respondents	Response		Total
	Yes N (%)	No N (%)	N (%)
Undergraduates	111 (19.75)	451 (80.25)	562 (100)
Postgraduates	292 (69.20)	130 (30.80)	422 (100)
Research scholars	189 (98.95)	2 (1.05)	191 (100)
Faculty	144 (95.36)	7 (4.64)	151 (100)
Total	736 (55.50)	590 (44.50)	1326 (100)

\*\*Significant at 0.01

**Figure No.5.6.8**

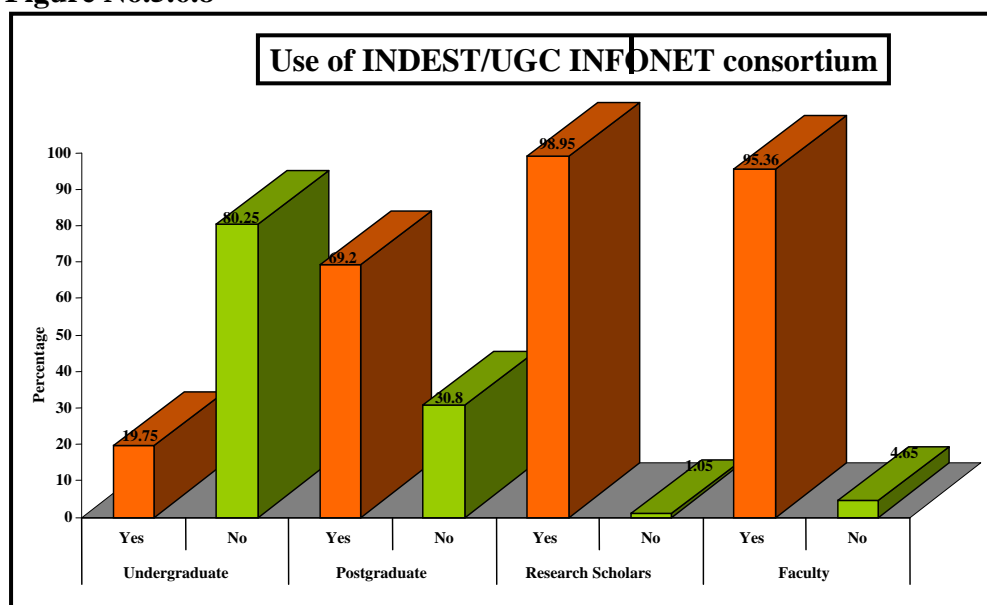


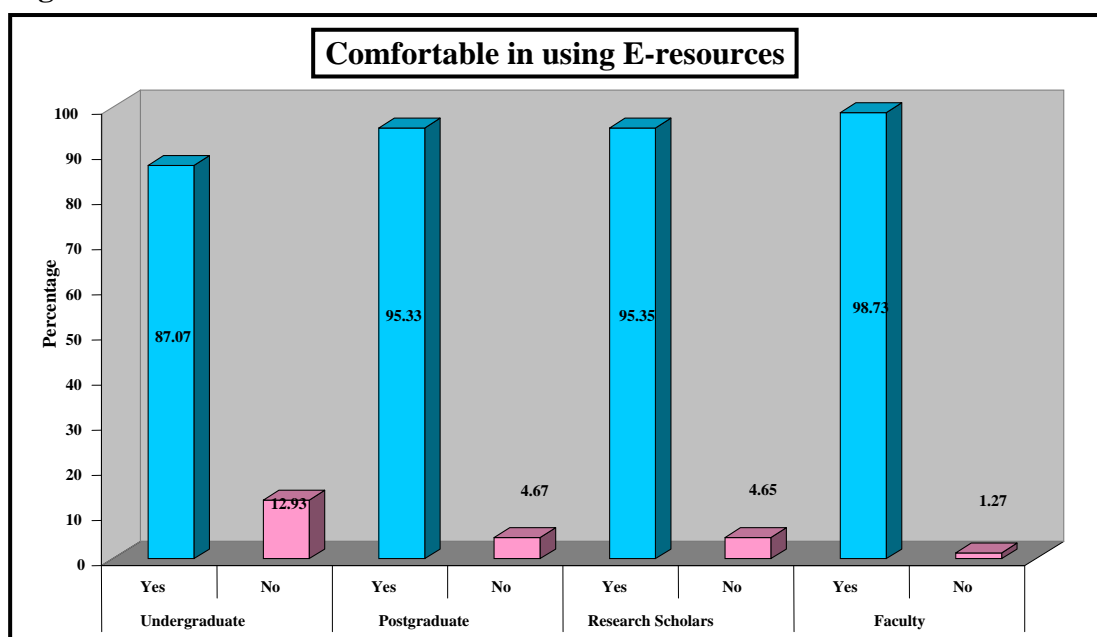
Table No 5.6.8 provides the data about the respondents who were aware about INDEST/UGC-INFONET consortium and the proportion using it. Among the undergraduates, only 111 (19.75%) of them were found using it, whereas a large proportion i.e. 451 (80.25%) never responded the other way. 292 (60.20%) postgraduates were using and 130 (30.80%) were not similarly, among the research scholars, 189 (98.95%) of them used the INDEST/UGC-INFONET consortium, while a very small proportion i.e., 2 (1.05%) research scholars did not use it. However, among the faculty members 124 (95.38%) of them used the INDEST/UGC-INFONET consortium, and the rest 6 (4.62%) did not use it. Of the total 1326 users, 736 (55.50%) of them were found using INDEST/UGC-INFONET consortium subscribed by their institutional library and 590 of them (44.50%) were not using it.

**Table No. 5.6.9 Comfortable in using E-resources**

Respondents	Response				Total N (%)	Chi <sup>2</sup> (df;C)
	Yes	N (%)	No	N (%)		
Undergraduates	1232	(87.07)	183	(12.93)	1415 (100)	52.255** (3;0.148)
Postgraduates	510	(95.33)	25	(4.67)	535 (100)	
Research scholars	205	(95.35)	10	(4.65)	215 (100)	
Faculty	155	(98.73)	2	(1.27)	157 (100)	
Total	2102	(90.53)	220	(9.47)	2322 (100)	

\*\*Significant at 0.01

**Figure No. 5.6.9**



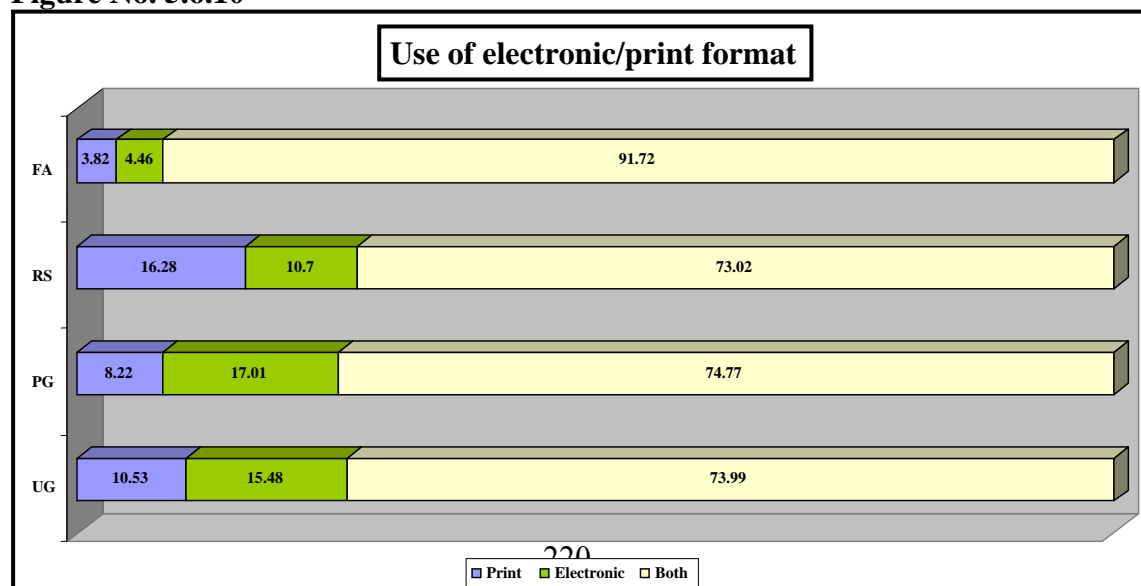
The libraries of technical institutions are providing electronic resources to their users. The users are using these services so it is important to know whether the users are comfortable with these electronic resources or not. The data from Table No. 5.6.9 shows that 1232 (87.07%) undergraduates feel that they were easy with e-resources and 183 (12.93%) of undergraduates do not feel so. There were 570 (95.33%) postgraduates users who were comfortable with e-resources and 25 (4.69%) of them were not. The research scholars who answered yes were 205 (95.35%) and 10 (4.65%) answered no. While response from faculty response shows that 155 (98.73%) of them were comfortable and 2 (1.27%) were not comfortable with these resources. From the total number of 2322, the results show that 2102 (90.53%) users were comfortable in using these services and 220 (9.49%) users were not. Table shows that the value of  $\chi^2$  is 52.255 and the degrees of freedom (df) is 3. The value of p shows statistically significant ( $p \leq 0.01$ ). The Chi-Square test for independence is significant at 1 per cent level of significance. This implies that there is a significant relationship among the users about comfort with using electronic information services provided by their institution library. Thus majority of users are comfortable with these services.

**Table No. 5.6.10 Use of electronic/print format**

Document preferred	UG N (%)	PG N (%)	RS N (%)	FA N (%)	Total N (%)	Chi <sup>2</sup> (df;C)
Print	149 (10.53)	44 (8.22)	35 (16.28)	6 (3.82)	234 (10.08)	38.650** (6 ;0.128)
Electronic	219 (15.48)	91 (17.01)	23 (10.70)	7 (4.46)	340 (14.64)	
Both	1047 (73.99)	400 (74.77)	157 (73.02)	144 (91.72)	1748 (75.28)	
Total	1415 (100)	535 (100)	215 (100)	157 (100)	2322 (100)	

\*\*Significant at 0.01

**Figure No. 5.6.10**



The libraries provide information which is printed as well as in electronic format. The users were asked which format of document they preferred to use. The Table No. 5.6.10 shows that preference for print documents was 149 (10.53%) by undergraduates, from postgraduates 44 (8.22%), research scholars 35 (16.28%) and faculty 6 (3.82%). The users who preferred electronic format of document was only 219 undergraduates (55.48%), 91 postgraduates (17.01%), 23 research scholars (10.70%) and 7 faculty (4.46%) only. The users who preferred to use both the formats were 1047 (73.99%) undergraduates, 400 (74.77%) postgraduates, 157 (73.02%) research scholars 144 (91.72%) faculty users.

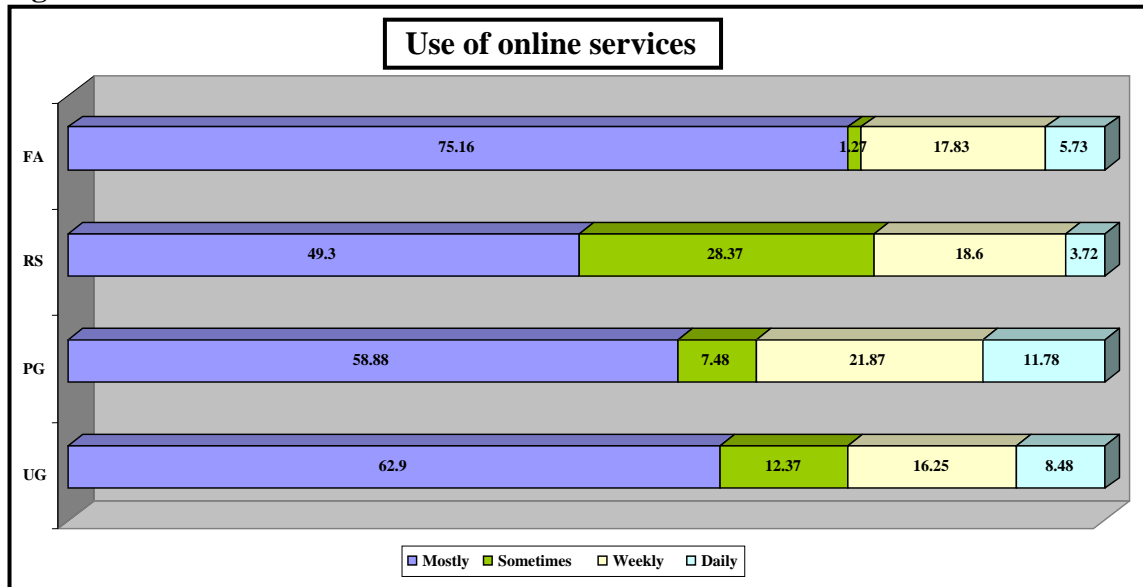
The result shows from the total population that of 1748 (75.28%) users preferred to use both the formats of documents as compared to print and electronic only. The Chi-Square test for independence is significant at 1 per cent level of significance. This implies that there is a significant relationship among the users responding to preference for using the format of document. Thus majority of users preferred to use the both the formats of documents i.e. print as well as electronic.

**Table No. 5.6.11 Use of online services**

Using On-line	UG N (%)	PG N (%)	RS N (%)	FA N (%)	Total N (%)	Chi <sup>2</sup> (df;C)
Mostly	890 (62.90)	315 (58.88)	106 (49.30)	118 (75.16)	1429 (61.54)	104.174** (9;0.207)
Sometimes	175 (12.37)	40 (7.48)	61 (28.37)	2 (1.27)	278 (11.97)	
Weekly	230 (16.25)	117 (21.87)	40 (18.60)	28 (17.83)	415 (17.87)	
Daily	120 (8.48)	63 (11.78)	8 (3.72)	9 (5.73)	200 (8.61)	
Total	1415 (100)	535 (100)	215 (100)	157 (100)	2322 (100)	

\*\*Significant at 0.01

**Figure No. 5.6.11**



The Table No. 5.6.11 shows frequency of using online information by users mostly, some times, weekly and daily. The data indicates that 118 (58.88%), faculty and 890 (62.90%) undergraduates used the online mostly as compared to postgraduates and 49.30% research scholars. The respondents who used online services sometimes was very less. Like 175 (12.37%) undergraduates, 40 (7.48%) postgraduates, 61 (28.37%) research scholars and 2 (1.27%) faculty members. While, users using online information services weekly were 230 (16.25%) undergraduates 40 (21.87%), postgraduates, 40 (18.60%) research scholars and 28 (17.83%) faculty. The users who go online daily were 120 (8.48%) undergraduates, 63 (11.78%) postgraduates 8 (3.72%) research scholars and 9 (5.73%) faculty. From the total 2322 respondents, 1429 (61.54%) users are using online services mostly which is more as compared to 278(11.97%) sometimes, weekly 415(17.87%) and 200 (8.61%) daily. The value of  $\chi^2$  is 104.174 and the degrees of freedom (df) is 3 shows that the value of p shows statistically significant ( $p \leq 0.01$ ).

The Chi-Square test for independence is significant at 1 per cent level of significance. This implies that there is a significant relation among the users using on-line information service. Thus the majority of users were using online services mostly.

**Table No. 5.6.12 Frequency of using E-journals**

Frequency of using E-journal	UG N (%)	PG N (%)	RS N (%)	FA N (%)	Total N (%)	Chi <sup>2</sup> (df;C)
Daily	16 (6.18)	48 (11.29)	50 (23.70)	12 (8.11)	126 (12.08)	247.758** (9;.0438)  N.A:1279 (55.08%)
2/3 Week	34 (13.13)	144 (33.88)	91 (43.13)	101 (68.24)	370 (35.47)	
Once a week	28 (10.81)	55 (12.94)	25 (11.85)	28 (18.92)	136 (13.04)	
Occasionally	181 (69.88)	178 (41.88)	45 (21.33)	7 (4.73)	411 (39.41)	
Total	259 (100)	425 (100)	211 (100)	148 (100)	1043 (100)	

\*\*Significant at 0.01

**Figure No.5.6.12**

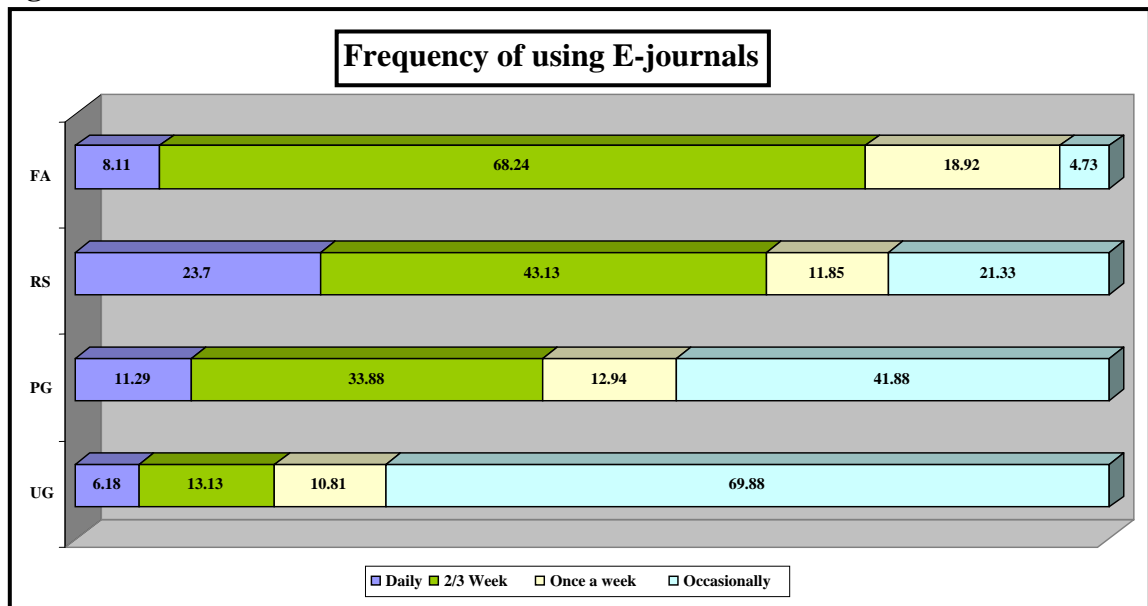


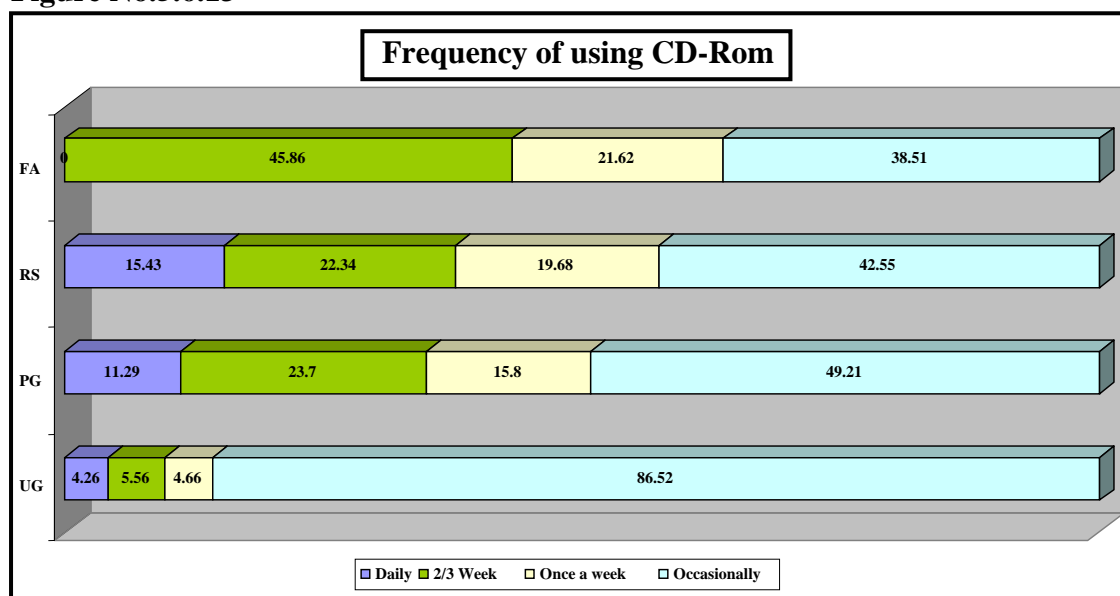
Table No.5.6.12 shows that from 2322 total population, 1279(55.08%) did not answered this question. The data shows that 181 (69.88%) undergraduates and 178 (41.88%) postgraduates occasionally used e-journals maximum. 91(43.13%) research scholars and 101 (68.24%) faculty members used e-journals 2/3 times a week. The overall response shows that users used e-journals occasionally were 411 (39.41%) and 2/3 time as compared to daily and once a week. The value of  $\chi^2$  is 247.758 and the degree of freedom (df) is 9.

**Table No.5.6.13 Frequency of using CD-Rom**

Frequency of using CD-Rom	UG N (%)	PG N (%)	RS N (%)	FA N (%)	Total N (%)	Chi <sup>2</sup> (df;C)
Daily	42 (4.26)	50 (11.29)	29 (15.43)	-	121 (6.85)	408.238** (9;0.433)  N.A:556 (23.94%)
2/3 Week	45 (5.56)	105 (23.70)	42 (22.34)	59 (45.86)	251 (14.21)	
Once a week	46 (4.66)	70 (15.80)	37 (19.68)	32 (21.62)	185 (10.48)	
Occasionally	854 (86.52)	218 (49.21)	80 (42.55)	57 (38.51)	1209 (42.38)	
Total	987 (100)	443 (100)	188 (100)	148 (100)	766 (100)	

\*\*Significant at 0.01

**Figure No.5.6.13**



It is revealed from the Table No.5.6.13 that from 2322 total users 556 (23.94%) not answer to this question, 854 (86.52%) undergraduates, 218 (49.21%) postgraduates and 80(42.55%) research scholars used CD-ROM maximum occasionally. While 59 (45.86%) faculty used CD-ROM 2/3 times a week. The response from total users' shows that CD-ROM services were used maximum by users occasionally i.e. 1209 (42.38%) as compared to other times. The value of  $\chi^2$  is 408.238 and the degree of freedom (df) is 9. The value of p is significant at 1 per cent level. This shows that there is significant variation among the users as far as use of CD-ROM is concerned.

**Table No.5.6.14 Frequency of using Internet**

Frequency of using Internet	UG N (%)	PG N (%)	RS N (%)	FA N (%)	Total N (%)	Chi <sup>2</sup> (df;C)
Daily	438 (31.15)	296 (58.38)	112 (52.58)	124 (78.98)	970 (42.16)	220.878** (9;0.296)  N.A:21 (0.90%)
2/3 Week	809 (57.54)	176 (33.52)	77 (36.15)	33 (21.02)	1095 (47.59)	
Once a week	65 (4.62)	18 (3.43)	11 (5.16)	-	94 (4.09)	
Occasionally	94 (6.69)	35 (6.67)	13 (6.10)	-	142 (6.17)	
Total	140 (100)	525 (100)	213 (100)	157 (100)	2301 (100)	

\*\*Significant at 0.01

**Figure No.5.6.14**

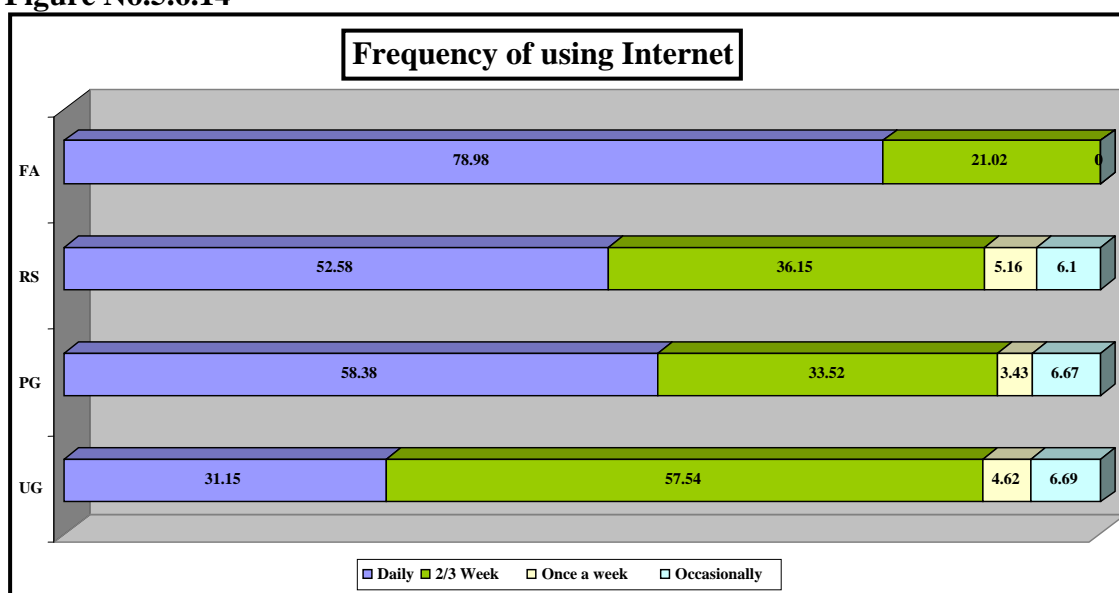


Table No.5.6.14 depicts that from 2322 total users 21(0.09%) did not answered to this question. 809(57.54%) undergraduates used maximum internet 2/3 times a week. Where as internet used daily by 296(58.38%) postgraduates, 112 (52.58%) research scholars and 124 (78.98%) faculty members more as compared to 2/3 times a week, once a week and occasionally. The response from total users data shows that internet is used daily by 970 (42.16%), 2/3 times a week 1095(47.49%). The value of  $\chi^2$  is 220.878 and the degree of freedom (df) is 9. The value of p is significant at 0.01 per cent level ( $P \geq 0.01$ ). This shows that there is a significant variation among the users' as far as use of internet services is concerned.

**Table No. 5.6.15**

**Place used for accessing E-resources**

Place	UG N (%)		PG N (%)		RS N (%)		FA N (%)		Total N (%)	
	Yes	No	Yes	No	Yes	No	Yes	No	Yes	No
Department	76 (5.37)	1339 (94.63)	289 (53.08)	251 (46.92)	207 (96.82)	8 (3.72)	152 (96.82)	5 (3.18)	270 (11.80)	2048 (88.20)
Library	367 (25.94)	1048 (74.06)	182 (34.02)	353 (65.98)	111 (51.63)	104 (48.37)	2 (1.27)	155 (98.73)	662 (28.51)	1660 (71.49)
Hostel	857 (60.57)	558 (45.43)	257 (48.04)	278 (51.96)	86 (40.0)	129 (60.0)	-	157 (100)	1200 (51.68)	1122 (48.32)
Computer center	907 (64.10)	508 (35.90)	286 (53.46)	249 (46.54)	32 (14.88)	183 (85.12)	10 (6.37)	147 (93.63)	1235 (53.19)	1087 (46.81)

**Figure No. 5.6.15**

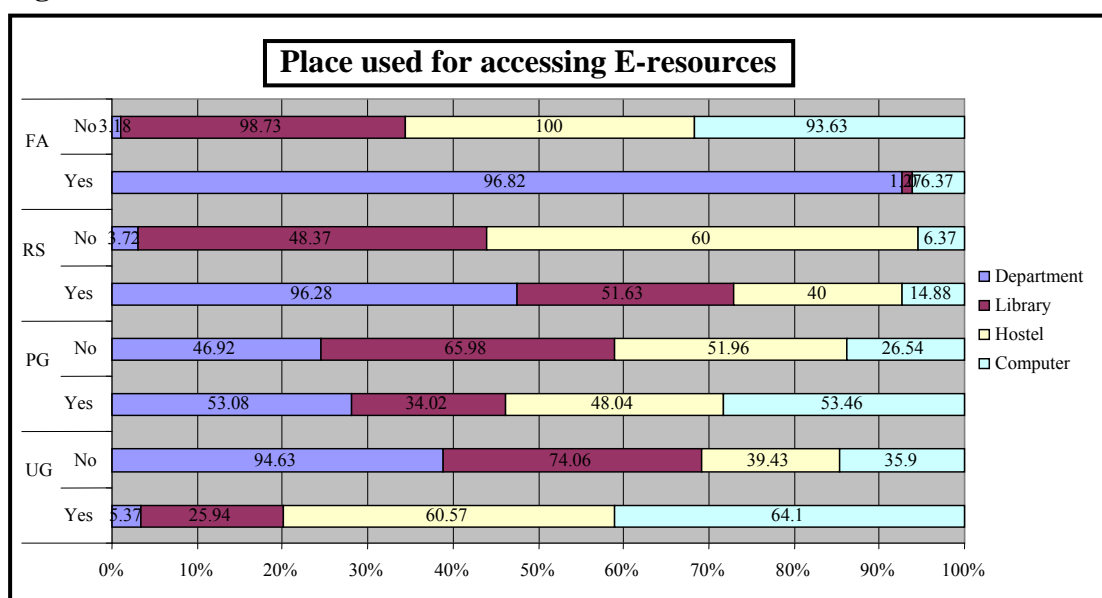


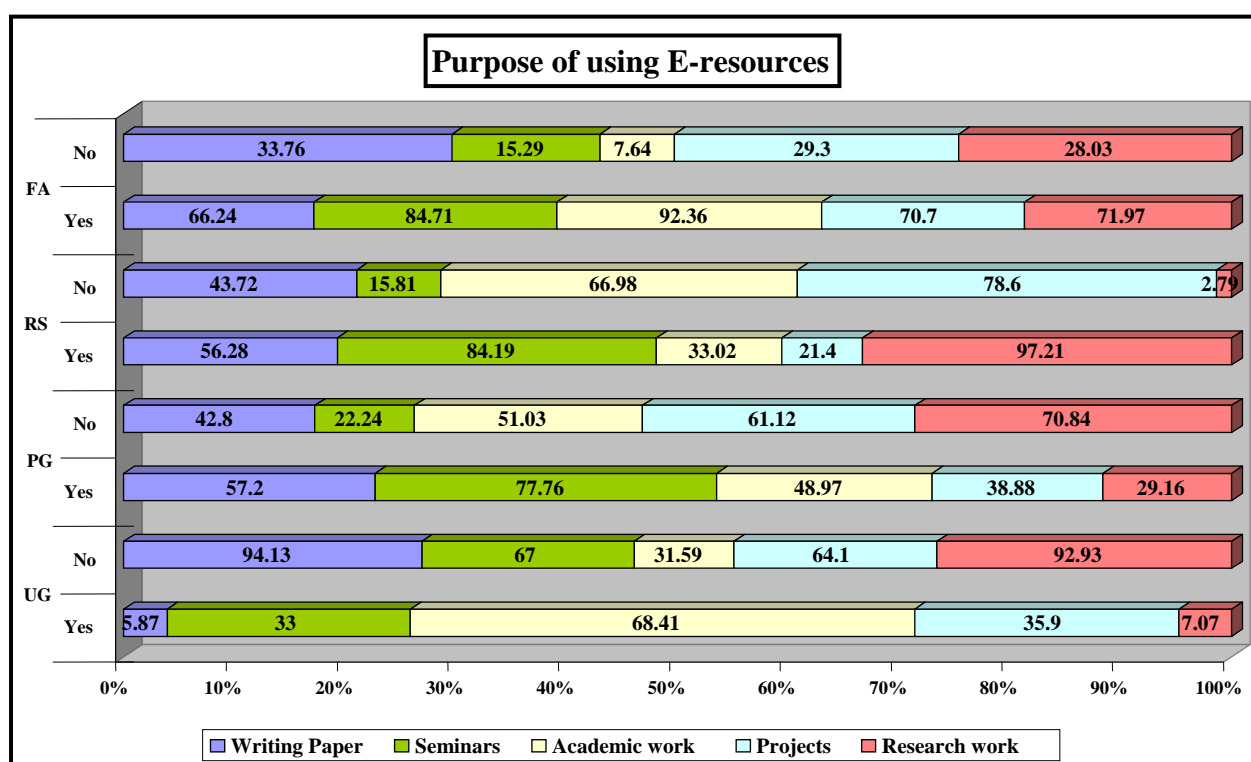
Table No. 5.6.15 shows 5.37% undergraduates, 53.08% postgraduates, 96.82% research scholars and 96.82% faculty member used departments for accessing e-resources as place of accessing e-resources by users. As the libraries are providing electronic information services through intranet. These e-resources can be accessed within the institute at various places like departments, library, computer centre and hostels. The results show that faculty and research scholars used their departments more as a place for accessing the e-resource as compared to undergraduates and postgraduates. The library is used by 367 undergraduates and 182 postgraduates. The hostels as a place for accessing the e-resources were used by 60.57% undergraduates, 48.04% postgraduates and 40% research scholars. The computer centre was used by 907 undergraduates, 286 postgraduates. The

results shows that the departments is used more by research scholars and faculty as compared to undergraduates and postgraduates, whereas library is used more by research scholars as compared to undergraduates, postgraduates and faculty. The hostels were used more by undergraduates and research scholars as compared to postgraduates and faculty. The computer centre is used more by undergraduates as compared to postgraduates, research scholars and faculty. The results from total population shows that computer centre is used by 1235 users i.e. (53.19%) and hostels by 1200 (51.68%). which is more as compared to library and departments.

**Table No. 5.6.16 Purpose of using E-resources**

Purpose	UG		PG		RS		FA		Total	
	Yes	No	Yes	No	Yes	No	Yes	No	Yes	No
Writing Paper	83 (5.87)	1332 (94.13)	306 (57.20)	229 (42.80)	121 (56.28)	94 (43.72)	104 (66.24)	53 (33.76)	614 (26.44)	1708 (73.56)
Seminars	467 (33.00)	948 (67.00)	416 (77.76)	119 (22.24)	181 (84.19)	34 (15.81)	133 (84.71)	24 (15.29)	1197 (51.55)	1125 (48.45)
Academic work	968 (68.41)	447 (31.59)	262 (48.97)	273 (51.03)	71 (33.02)	144 (66.98)	145 (92.36)	12 (7.64)	1446 (62.27)	876 (37.73)
Projects	508 (35.90)	907 (64.10)	208 (38.88)	327 (61.12)	46 (21.40)	169 (78.60)	111 (70.70)	46 (29.30)	873 (37.60)	1449 (62.40)
Research work	100 (7.07)	1315 (92.93)	156 (29.16)	379 (70.84)	209 (97.21)	6 (2.79)	113 (71.97)	44 (28.03)	578 (24.89)	1744 (75.11)

**Figure No. 5.6.16**

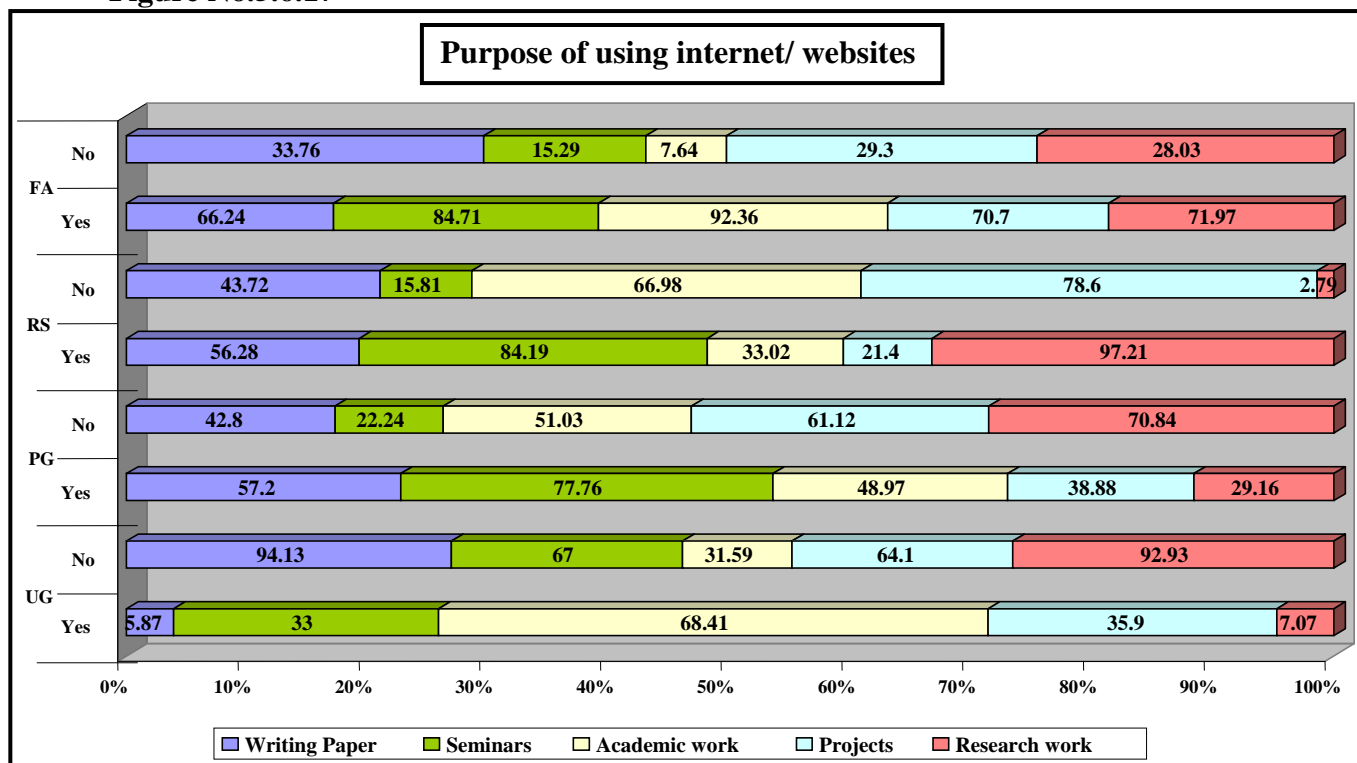


The Table No. 5.6.16 shows the purpose of using e-resources by users. E-resources are used for many purposes, like writing papers, research work, seminars, project and academic work. It has been found that for writing papers 306 postgraduates (57.20%), 121 research scholars and 104 (66.24%) faculty used e-resources more as compared to 83 undergraduate users. E-resources were used for seminars by 416 (77.76%) postgraduates, 181 (84.19%) research scholars and 33 (84.71%) members of faculty more as compared to 467 (33%) undergraduates. The data shows that 969 undergraduates used e-resources and 145 faculty members used e-resources more for academic work as compared to 262 postgraduates and 71 research scholars. While the use of e-resources for project work was more by faculty 711 (70.70%) as compared to undergraduates 508 (35.90%), postgraduates 208 (38.88%) and research scholars 46 (21.40%). The use of e-resources for research work was more by research scholars i.e. 97.21% and faculty 113 (71.97%) as compared to 100 (7.07%) undergraduates and 156 (29.16%) postgraduates. The results show from the total users that e-resources were used more for seminars by 1197 (51.55%) users and for academic work by 1446 (62.27%) users. While 614 (26.44%) users were using e-resources for writing papers, for projects 837 (37.60%) users were using and for research work 578 (24.89%) users were using these resources.

**Table No.5.6.17 Purpose of using internet/ websites**

Purpose	UG		PG		RS		FA		Total	
	Yes	No	Yes	No	Yes	No	Yes	No	Yes	No
E-mail	1270 (89.75)	145 (10.25)	493 (92.15)	42 (7.85)	190 (88.38)	25 (11.63)	155 (98.73)	2 (1.27)	2108 (90.78)	214 (9.22)
Career development	655 (46.29)	760 (53.71)	277 (51.78)	258 (48.22)	40 (18.60)	175 (81.40)	120 (76.43)	37 (23.57)	1092 (47.03)	1230 (52.77)
Research work	477 (33.71)	938 (66.29)	86 (16.07)	449 (83.93)	18 (8.37)	197 (91.63)	14 (8.92)	143 (91.08)	595 (25.62)	1727 (74.38)
Relevant information	1311 (92.65)	104 (7.35)	493 (92.15)	42 (7.85)	196 (91.16)	19 (8.84)	149 (94.90)	8 (5.10)	2149 (92.55)	173 (7.45)
Entertainment	145 (10.25)	1270 (89.75)	175 (32.71)	360 (67.29)	196 (91.16)	19 (8.84)	131 (83.44)	26 (16.56)	647 (27.86)	1675 (72.14)

Figure No.5.6.17



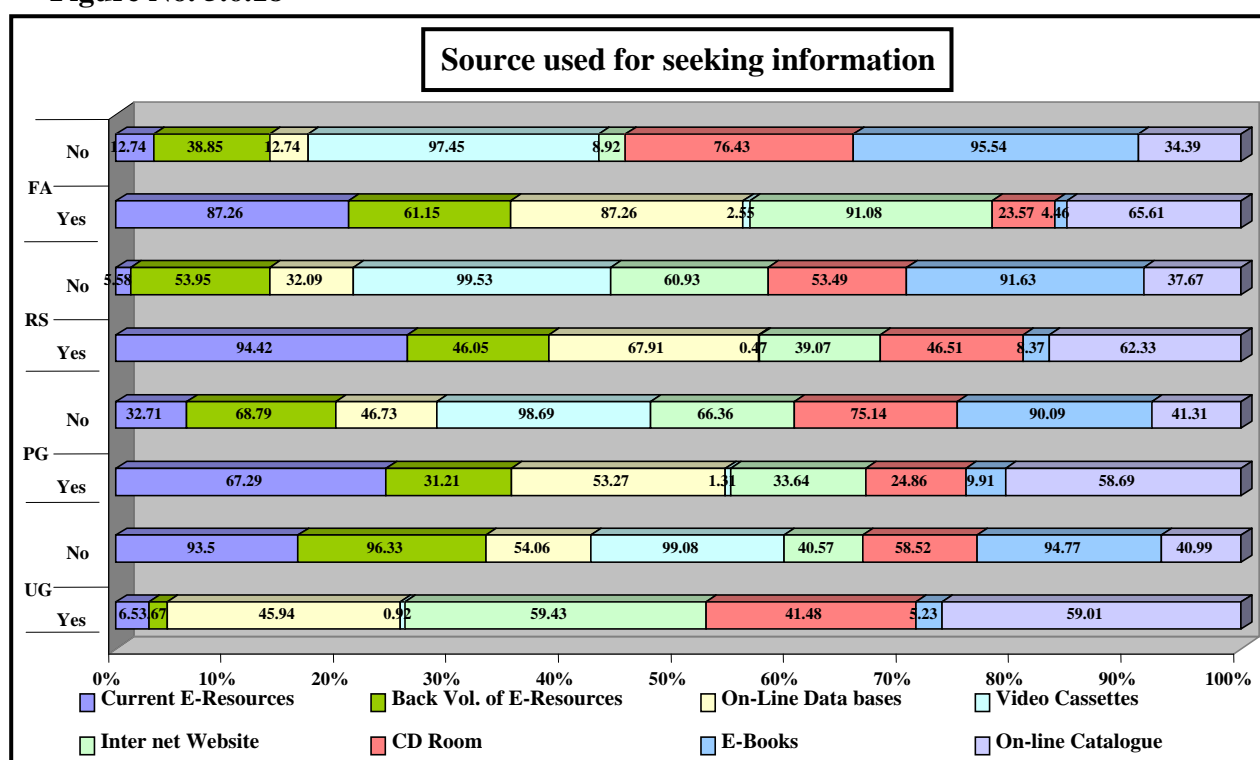
It is seen from Table No.5.6.17 that internet/websites are used maximum for e-mail by 90.78% of the users. 1270(89.75%) undergraduates, 493(92.15%) postgraduates, 190 (88.38%) research scholars and 155 (98.73%) faculty used internet for e-mail. For career development 120 (76.43%) faculty and 277 (51.78%) postgraduates used internet/websites more as compared to 655(46.29%) undergraduates and 40(18.60%) research scholars.

Where as, internet services were not used for entertainment by maximum of the users. But for finding relevant information 92.55% users were using internet/websites i.e. 1311(92.65%) undergraduates, 493(92.15%) postgraduates 196(91.16%) research scholars and 131(83.44%) faculty. From the total users data it has been found that internet/websites are used maximum for e-mail i.e., 2108(90.78%) and 2149(92.55%) for finding relevant information as compared to 47.03% career development, 27.86% research work and 25.62% for entertainment.

**Table No. 5.6.18 Source used for seeking information**

Purpose	UG		PG		RS		FA		Total	
	Yes	No	Yes	No	Yes	No	Yes	No	Yes	No
Current E-Resources	92 (6.50)	1323 (93.50)	360 (67.29)	175 (32.71)	203 (94.42)	12 (5.58)	137 (87.26)	20 (12.74)	792 (34.10)	1530 (65.89)
Back Vol. of E-Resources	52 (3.67)	1363 (96.33)	167 (31.21)	368 (68.79)	99 (46.05)	116 (53.95)	96 (61.15)	61 (38.85)	414 (17.82)	1908 (82.17)
On-Line Data bases	650 (45.94)	765 (54.06)	285 (53.27)	250 (46.73)	146 (67.91)	69 (32.09)	137 (87.26)	20 (12.74)	1218 (52.45)	1104 (47.54)
Video Cassettes	13 (0.92)	1402 (99.08)	7 (1.31)	528 (98.69)	1 (0.47)	214 (99.53)	4 (2.55)	153 (97.45)	25 (1.07)	2297 (98.92)
Inter net Website	841 (59.43)	574 (40.57)	180 (33.64)	355 (66.36)	84 (39.07)	131 (60.93)	143 (91.08)	14 (8.92)	1248 (53.74)	1074 (46.25)
CD Room	587 (41.48)	828 (58.52)	133 (24.86)	402 (75.14)	100 (46.51)	115 (53.49)	37 (23.57)	120 (76.43)	857 (36.90)	1465 (63.09)
E-Books	74 (5.23)	1341 (94.77)	53 (9.91)	482 (90.09)	18 (8.37)	197 (91.63)	7 (4.46)	150 (95.54)	400 (17.22)	1922 (82.77)
On-line Catalogue	835 (59.01)	580 (40.99)	314 (58.69)	221 (41.31)	134 (62.33)	81 (37.67)	103 (65.61)	54 (34.39)	1411 (60.76)	857 (36.90)

**Figure No. 5.6.18**



The Table No. 5.6.18 shows the use of various e-resources by users for seeking electronic information. It has been found that 203 (94.42%) research scholars, 137 (87.26%) faculty and 360 (67.29%) postgraduates used current e-journals more for getting the Information as compared to 92 (6.50%) undergraduates. The back volume of e-journals were used

more by 137 87.26% faculty members and research scholars 46.05% as compared to 52 (3.67%) undergraduates and 167 (31.21%) postgraduates. On-line data bases were used more by 87.267% faculty, (87.26%) postgraduates and 67.91% by research scholars as compared to 45.94% undergraduates. The use of video cassettes was very less by all the users. Internet web-site was used more by 143 (91.08%) faculty and 841 (59.43%) undergraduate users as compared to 180 (33.64%) postgraduates and 84 (39.07%) research scholars. The CD-ROM services were used more by 100 (46.51%) research scholars and 587(41.48%) undergraduates as compared to 133 (24.8%) postgraduates and 37 (23.57%) faculty. E-books were used very less by all the users. The online catalogue is used more by 103 faculty and 134 research scholars as compared to 835 undergraduates and 314 postgraduates.

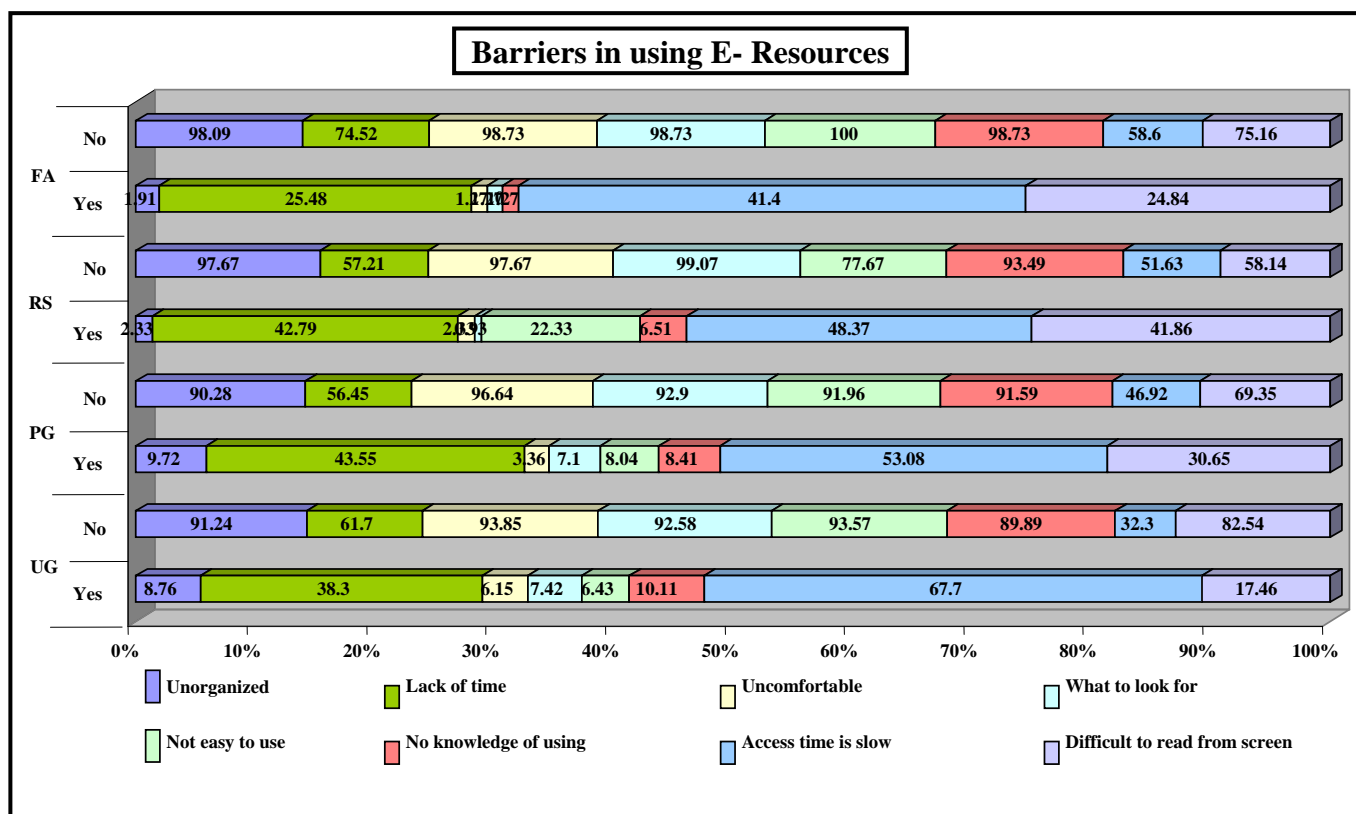
It has been found that 59.69% of users were using online catalogue, 53.74% of users were using internet websites, 52.46% of users were using on-line data bases, current e-journals were used by 34.10% users and back volume of e-journals were used by 17.82% users.

The use of video cassettes, e-books and CD-ROM was very less. The use of video cassettes by users was only 1.08%, and e-books were used by 6.54% of users which is very less.

**Table No. 5.6.19 Barriers in using E- Resources**

Purpose	UG		PG		RS		FA		Total	
	N (%)	N (%)	N (%)	N (%)	N (%)	N (%)	N (%)	N (%)	N (%)	N (%)
Unorganized	124 (8.76)	1291 (91.24)	52 (9.72)	483 (90.28)	5 (2.33)	210 (97.67)	3 (1.91)	154 (98.09)	184 (7.92)	2138 (92.08)
Lack of time	542 (38.30)	873 (61.70)	233 (43.55)	302 (56.45)	92 (42.79)	123 (57.21)	40 (25.48)	117 (74.52)	907 (39.06)	1415 (60.94)
Uncomfortable	87 (6.15)	1328 (93.85)	18 (3.36)	517 (96.64)	5 (2.33)	210 (97.67)	2 (1.27)	155 (98.73)	112 (4.82)	2210 (95.18)
What to look for?	105 (7.42)	1310 (92.58)	38 (7.10)	497 (92.90)	2 (0.93)	213 (99.07)	2 (1.27)	155 (98.73)	147 (6.33)	2175 (98.67)
Not easy to use	91 (6.43)	1324 (93.57)	43 (8.04)	492 (91.96)	48 (22.33)	167 (77.67)	-	157 (100.0)	182 (7.89)	2140 (92.16)
No knowledge of using	143 (10.11)	1272 (89.89)	45 (8.41)	490 (91.59)	14 (6.51)	201 (93.49)	2 (1.27)	155 (98.73)	1411 (60.77)	911 (39.33)
Access time is slow	958 (67.70)	457 (32.30)	284 (53.08)	251 (46.92)	104 (48.37)	111 (51.63)	65 (41.40)	92 (58.60)	204 (8.79)	2118 (91.21)

Figure No. 5.6.19



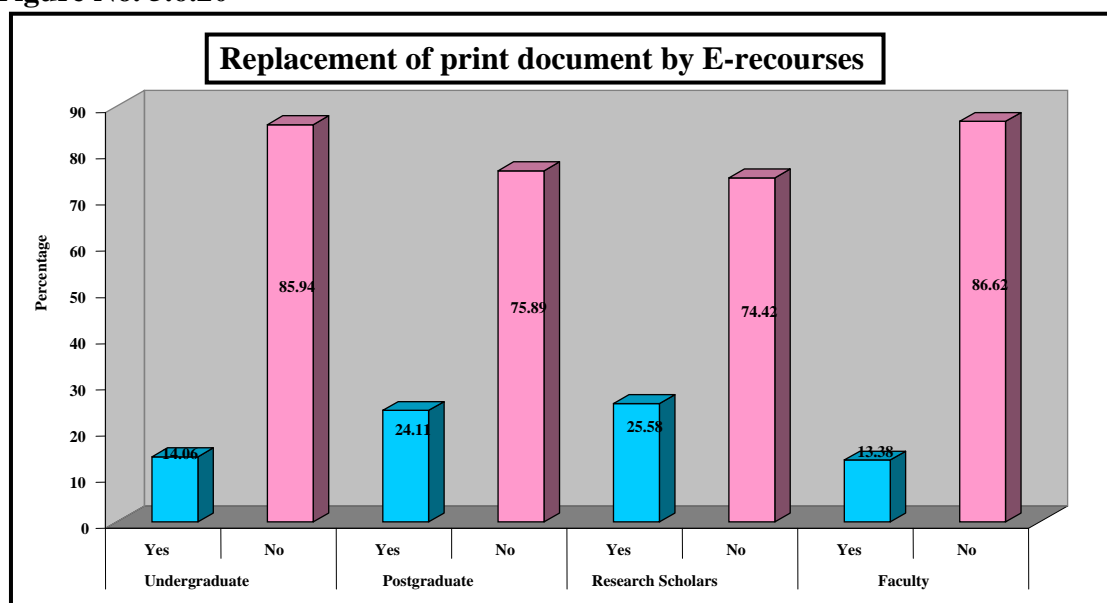
The users are using e-resources/services of their library. To know what kind of barrier they are facing in using e-resources users response shows in table No. 5.6.19 that 8.76% undergraduates, 9.72% postgraduates, 2.33% research scholars and 1.91% faculty felt that electronic information is unorganized. 38.30%, undergraduates, 43.55% postgraduates, 42.79% research scholars and 25.48% faculty members felt that lack of time for accessing was one of the barriers. While the users felt uncomfortable when accessing the electronic information were 6.15% undergraduates, 3.36% postgraduates, 2.33% research scholars and 1.27% faculty only. The users who felt what to look for the information they need were 7.42% undergraduates 7.10% postgraduates, 0.93% research scholars and 1.27% faculty. The users also felt that they do not have knowledge of using e-resources. The results show that 10.11% undergraduates, 8.41% postgraduates, 6.51% research scholars and 1.27% faculty felt so. The 67.70% undergraduates, 53.08% postgraduates, 48.37% research scholars and 41.40% faculty felt that the speed of the internet was slow when they access the information through internet. From the total users, 60.77% of users feel the access to information through internet is a very slow process while 39.06% of users felt that they have lack of time and 23.26% of users felt that it is difficult to read from the screen.

**Table No. 5.6.20 Replacement of print document by E-recourses**

Respondents	Response		Total N (%)	Chi <sup>2</sup> (df;C)
	Yes	No		
Undergraduates	199 (14.06)	1216 (85.94)	1415 (100)	39.514** (3;0.129)
Postgraduates	129 (24.11)	406 (75.89)	535 (100)	
Research scholars	55 (25.58)	160 (74.42)	215 (100)	
Faculty	21 (13.38)	136 (86.62)	157 (100)	
Total	404 (17.40)	1918 (82.60)	2322 (100)	

\*\*Significant at 0.01

**Figure No. 5.6.20**



The users were asked if the internet/electronic resources can replace the printed document. The response from the users has been shown in the Table No. 5.6.20. 199 (14.06%) undergraduates, 129 (24.11%) postgraduates, 55 (25.58%) research scholars and 21(13.38%) faculty said that e-resources can replace print format. From 2222 respondents it has been found that 404 (17.40%) users said that internet/electronic can replace printed document and 1918 (82.60%) of users said no. The Chi-Square test for independence is significant at 1 per cent level of significance. This implies that there is a significant relationship among the users responding to view that internet/electronic resources can replace the printed document. Thus majority of users feel that internet/e-resources cannot replace the printed document.



**PART-C IMPACT OF ELECTRONIC RESOURCES**

**Collection Development of E-Resources**

Library budget allocated

Budget Spent

E-resources collection

**Use of E-Resources**

Download statistics

**Collection and Usage**

In this part of chapter 5, an attempt has been made to study the impact of usage of e-resources on various aspects and issues in the libraries

### 5.7.1 Collection Development of E-Resources

**Table No.5.7.1 Library Budget Allocated by the Four Institutes**

Year	IIT, Delhi Rs. (Lacs)	IIT, Roorkee Rs. (Lacs)	TU, Patiala Rs. (Lacs)	PEC, Chandigarh Rs. (Lacs)
2003-04	320	523.76	13.0	9,00,000
2004-05	345	589.33	40.0	9,00,000
2005-06	380	486.00	37.88	10,50,000
2006-07	400	582.18	47.55	20,00,000
2007-08	450	585.70	57.0	20,00,000
<b>Status</b>	<b>Increased</b>	<b>Increased</b>	<b>Increased</b>	<b>Increased</b>

- From Table No. 5.7.1 it has been found that library budget given by institution to libraries has increased.

**Table No.5.7.2 Budget Spent on Library Collection by four Institutes from March, 2003 to March, 2008**

Year	Books		Print journals		E- journals		Status
	Collection Added	Spent Rs.(Lacs)	Collection	Spent Rs.(Lacs)	Collection	Spent Rs.(Lacs)	
<b>IIT, Delhi</b>							
2003-04	1775	40,34,658	900	Amount Included print and E- journals	6,500	182.8	Increased
2004-05	1805	36,99,038	616		6,500	215.0	
2005-06	1305	46,12,152	657		8,000	252.9	
2006-07	1441	41,57,009	715		8,000+	350.0	
2007-08	2204	74,72,279	714		10,000	450.0	
<b>IIT, Roorkee</b>							
2003-04	6609	1,50,4500	773	Amount Included Print and E-journals	-	2.675	Increased
2004-05	5988	1,55,53,000	905		8,000	389.6	
2005-06	4169	93,35,000	814		8,000+	332.18	
2006-07	7638	16,04,000	856		8,000+	445.56	
2007-08	8220	17,03,000	782		10,000	329.58	
<b>TU, Patiala</b>							
2003-04	1991	3.37	138	9.07	580 (free)	0	Increased
2004-05	1518	25.00	134	5.00	3,570	10.78	
2005-06	2184	15.48	111	1.04	3,790	21.00	
2006-07	2307	17.55	111	1.05	3,790	28.05	
2007-08	9621	22.00	124	5.00	5,586	30.00	
<b>PEC, Chandigarh</b>							
2003-04	574	2,00,000	84	7,00,000	290	Amount Supported by AICET	Increase Expenditure Decrease Collection
2004-05	926	2,00,000	108	7,00,000	290		
2005-06	661	2,50,000	110	8,59,370	290		
2006-07	698	4,00,000	106	15,18,730	290		
2007-08	825	5,00,000	90	17,30,823	290		

- Table No. 5.7.2 show the amount spent on books, print journals and e-journals has increased in both the IITs and TU from March, 2003 to March 2008.
- Where as the amount spent on books and print journals has increased in PEC library from 2003 to 2008 but number of e-journals has remained same, and it is supported by AICET.
- There is growth in the collection of e-journals in both the IITs and TU.
- The growth in collection of books has kept on increasing every year in all the institutions.

**Table No.5.7.3 E-Resources Collection (as on March 31, 2008)**

<b>E-Resources</b>	<b>IIT, Delhi</b>	<b>IIT, Roorkee</b>	<b>TU, Patiala</b>	<b>PEC, Chandigarh</b>
E-Journals (full text)	10,000+	10,000+	5586	887
E-Journals along With print	-do-	-do-	NA	NA
Bibliographic Data Bases	08	08	10	Compendex 1985-95
E-Journal (Total)	10,000+	10,000+	5500+	4453+
CDs/DVDs/CD-ROM	1,340		1500	697
Video Cassettes/Floppies	1,460	575	1500	581/91
E-books	30,000	1893	NA	NA
Microfilm/Microfiches	2,261	2,322	NA	NA
Scanned theses/Desertion/special collection archives	12,389/3,300	12,000	717	NA

Table No.5.7.3 shows the present collection of e-resources in all the four institutions

- Both the IITs are having more than 10,000 print+ electronic journals.
- TU, Patiala has 5586 and PEC, Chandigarh 887 electronic journal in library
- All the libraries of four institutions maintain the collection of CDs/DVD/CD-ROM but PEC, Chandigarh is also maintaining collection of Floppies.
- Both the IITs are having collection of E-books and Microfilm/Microfiches.
- Both the IITs and TU have scanned theses/Dissertations/special collection archives, research papers published by their faculty members.

**Table No.5.7.4 Down load Usages Statistics of Electronic Resources by all the four Institutes from 2004 to 2007**

Electronic Resources	IIT, Delhi					IIT, Roorkee					PEC, CHD					TU, Patiala				
	2004	2005	2006	2007		2004	2005	2006	2007		2004	2005	2006	2007		2004	2005	2006	2007	
IEL Online	107425	113013	120344	66756	↑	83035	105770	106640	111014	↓	17457	19579	12067	7673	↓	-	6750	21167	20747	↑
ASME	11951	12400	11305	-	↓	3827	4420	8966	15577	↑	299	1416	1442	968	↓					
ASCE	13189	10692	6088	-	↓	22774	17519	9843	6160	↓	1972	641	127	812	↑	-	823			↓
ACM DL	-	52016	16252	-	↓	-	27679	5812	-	↓	-	-								
Springer-Verlagslink	-	2914	5812	34710	↑	-	4278	10749	38927	↑	-	-				-				
Nature	-	26691	12123	6493	↓	-	15465	5132	2320	↑	-	-								
Pro quest Science	-	2393-	-	352	↓	-	152	-	59	↓	-	-					-			
Science Direct	-	317635	479217	371807	↑	-	210889	310061	308849	↓	-	-								
ABI/Inform	6405	8005	-	-	↓	1050	1417	-	-	↑	-	-					-			
Capita line	553154	2332390	3253328	-	↑	328238	1264268	2779393	-	↑	-	-					-			
EBSCO	10807	8389	10475	-	↑	4218	1478	3820	-	↑	-	-								
Emerald	7768	7310	26667	20510	↓	908	2155	7497	9489	↑	-	-					-			
<b>Total</b>	<b>71069</b>	<b>2893848</b>	<b>3941611</b>	<b>500629</b>	<b>↓</b>	<b>444050</b>	<b>1655490</b>	<b>3247913</b>	<b>492395</b>	<b>↓</b>	<b>19728</b>	<b>21636</b>	<b>13636</b>	<b>9453</b>	<b>↓</b>	<b>-</b>	<b>7573</b>	<b>21167</b>	<b>20747</b>	<b>↓</b>

# ↑ Increased and ↓ Decreased

### Comparison of Usages Statistics of Electronic Resources by all the four Institutes

Table No. 5.7.4 reflects how much of these e-resources are used by the users. The data given in the table shows the download usage statistics from 2004 to 2007 of various full text e-resources. The users had started using these e-resources as shown by download usage data in the same year 2004 itself. The new collection was added in the year 2005 with ACM Digital library, Springer Verlag's Link, Nature, Pro Quest Science, and Elsevier's Science Direct. The download usage data shows that there was increase in the usage of e-resources from the previous year and decreased in three of the e-resources only and this is due to addition of new resources. E-resources subscribed by TU Patiala and PCE, Chandigarh from INDEST consortium are American Society of Civil Engineers (ASCE) and IEEE / IEE Publications (IEL online). From total download usage data of full text e-resources, it has been found that the usage has increased.

**Table No.5.7.5 Download Usage Statistics of E-Resources Subscribed by TU, Patiala from INFLIBNET Consortium**

Titles of e-resources	2004	2005	2006	2007	Status of usage
Institute of Physics Publishing (IOPP)	935	697	306	1745	Increased
American Institute of Physics (AIP) & American Physical Society (APS)	861	1151	983	2163	Increased
American Chemical Society (ACS)	2494	1722	1851	1548	Decreased
Royal Society of Chemistry (RCS)	-	115	28	610	Increased
Science direct from Elsevier science	131	479	159	317	Increased
Blackwell Publishing	-	426	994	-	Increased
Portland Press	0	27	-	-	Decreased
BIOSIS-biological Abstract (BA) Database	495	27	-	-	Decreased
Annual Review	492	489	42	16	Decreased
Cambridge University Press (CUP)	296	123	-	215	Increased
Nature Journal Access	-	34	07	23	Decreased
Science Magazine	61	50	-	-	Decreased
Project MUSE	104	-	13	60	Increased
Taylor & Fancies (T&F)	-	1331	1137	1439	Increased
Kulver Journals	1355	890	-	4039	Increased
Springer Journals	838	732	1805	-	Increased
Oxford University Press(OUP)	0	427	119	457	Increased
Britannica (Encyclopedia)	-	18	-	-	Decreased
Total down loads of usages of all the E-resources	8062	8711	7608	12632	Increased

Out of all the four institutes under study only Thapar University is member of INFLIBNET consortium. The library of Thapar University introduced electronic resources and services in 2002 with 82 (free) e- resources. The number increased up to 580 (free) in the year 2003. It shows that users have started using these resources. The Table No. 5.7.4 & 5 shows the download usage statistics for the four years from 2004 to 2007. The status of usage indicates that there were some e- resources which were not used in the year 2004 but the same were used in 2005. On comparing the usage of four years. The total usage of the e- resources shows that there was increase in the usage from the previous year i.e. the overall total download usage from 2004 to 2007 has increased.

**Table No.5.7.6 Impact of E-Resources on the Collection and Usage**

Services/Activity	Electronic Format	Print Format	Impact /Net Results
<b><i>Infrastructure</i></b>			
Library automation and networking in Library	Completely done in all the institutes	-	Increased cost Users satisfied Easy to work Time saving
Campus LAN	Completely done in all the institutes	-	Increased cost Users satisfied Easy to work Time saving
Software purchased/used	New activity/ Initial problems	-	Increased cost Technical staff appointed Technical training provided to the existing staff
Maintenance of hardware/computers	New activity /Initial problems	-	Increased cost Technical staff appointed and initial training provided to the existing staff
Update of website	Activity performed by technical staff	-	Increased cost Duty of technical staff to keep it updated
Space used	Need proper storage place	Collection weeding/digitizing of print	Reduced space
<b><i>Management/Administration</i></b>			
Provide Links to home-	Partial links provided	-	Technical staff

page			
Orientation programme for users	Organised	-	Usage increased
Training for Staff	Provided	-	Better services
E-mail/Internet mailing	Provided	-	Better and efficient services
Managing catalog	Activity performed by technical staff	-	Better and efficient services
Negotiations for e-journals	New work and deep study required	Less efforts	Increased efforts at the end of librarian
Decisions	Responsibility increased	Less efforts	Librarian's efforts required
Budgeting	Increased tracking and planning	Less efforts	Librarian's efforts required
<b><i>Technical Services</i></b>			
Print journals checking	-	No change in work but became easy	Reduced work
Acquisitions	Requires skilled persons	Remain same	Technical training provided to existing staff
Bindery Staff	-	Reduced work to some extent	Reduced work
Cataloging of new documents	Increased work load	Same process	Technical training provided to existing staff
Reserving of documents	Increased work load	Same process	Reduced work
Document delivery	Copies of e-journals	Reduced	Easy work
<b><i>User Services</i></b>			
Information services	Provided	Less efforts due to computerisation	Users satisfied
Provide access to library OPAC	Provided	-	Users satisfied
Generate reminders for overdue books	Provided	Less efforts due to computerisation	Users satisfied
Provide recent additions list	Provided	Less efforts due to computerisation	Users satisfied
Provide individual alert services	Provided	Less efforts due to computerisation	Users satisfied
CD-ROM database services	Provided	-	Users satisfied
Contents pages services	Provided	-	Users satisfied
Electronic Reference service	Provided	-	Users satisfied
Online Access to databases	Provided	-	Users satisfied

Access to internet in the library	Provided	-	Users satisfied
Access to other library Database	Provided	Less efforts due to computerisation	Users satisfied
Access to electronic journals service	Provided	-	Users satisfied
Access to internet resources through library portals	Provided	-	Users satisfied
<b>Resources Collection</b>	Increased	Decreased	Increased
<b>Usage</b>	Increased	Decreased	Increased

Table No. 5.7.6 shows the impact of e-resources on the environment of the library. By analyzing the questionnaire filled by the librarians of all the four institutions following has been inferred.

- The libraries of IIT's and TU are fully computerized where as PEC library is at developing stage.
- The local area network (LAN) is spread over to all the departments, centers, labs and well connected to all the hostels.
- Both the IIT's and TU users are being provided training through orientation programs where as the PEC users are given training only on demand.
- Internet facility has been provided for all the users in both the IIT's and TU library, where as in PEC this service is limited for staff only
- All the four institutions under study have designed their websites. Links through the websites have been provided to the library.
- The collection of e-resources in all the institutions is increasing every year.
- The main users who use the e-resources are postgraduates, research scholars and faculty members.
- Faculty members and research scholars strongly agreed with the necessity for training.
- The chief impact of e-resources is, it has eliminated space concerns, no more trimming the collection or moving the back volumes to remote place to make space for new volumes.
- Users satisfied with the automation of library activities
- Users feel comfortable in locating resources in the library
- Visibility of the library resources increased with computers
- With the introduction of IT in the library, the Image of the Library has improved

## **CHAPTER-6**

### **DISCUSSION**

Discussions on the results derived from analysis

Testing of Hypothesis

Findings of the study

Conclusions

Suggestions/Recommendations for implementation

Limitations of the Study

Recommendations for Further Research

## **6.1 Discussions on the results derived from analysis**

This chapter discusses about the results obtained on the different variables studied in the previous chapters, on the basis of this discussion hypotheses have been tested.

### **1. Use of Institute library**

- Use of library in all the institutes has been studied a comparative analysis has been given in table No.5.6.2. Among users, 98.45% undergraduates, 94.95% postgraduates, 89.30% research scholars and 89.81% faculty members used library of their institute.
- Institution wise it has been found that 93.21% users from IIT, Delhi; 97.11% users from IIT, Roorkee and from TU, Patiala 97.32% users While 99.74% respondents from PEC, Chandigarh used the library. From Table No 5.5.2 it has been found that 96.21% total users from all the four institutions are using the library and the remaining 3.79% are not using it. The Chi-Square test for independence is significant at 1 per cent level of significance. This implies that, there is a significant variation among the users as far as the use of the library is concerned.
- Simmonds (2001) study shows that the use of academic libraries is influenced most by users perceived familiarity with the library and its resources; those who are more familiarity with the library are more likely to use academic libraries.
- The findings from the study conducted by Kelly and Orr (2003) show that “Physical library use is significantly higher among those who take the majority of their courses face to face”.

### **2. Awareness about library’s E-resources/ services**

- From the Table No. 5.6.3 it has been found that 97.67% of the research scholars, 96.82% of the faculty and 81.87% of the postgraduates were more aware about the E-resources/services of their library than 58.94% undergraduates.
- Most of the users from IIT, Delhi 88%, 98.23% IIT, Roorkee were more aware in comparison to 36.29% TU, Patiala and 30.85% from PEC, Chandigarh (Table No.5.5.3).
- Total 70.37% users from all the four institutions need awareness and 29.63% of them do have awareness about e-resources/services provide by their library. The Chi-Square test for independence is significant at 1 per cent level of significance. This implies that there is a significant relationship among the users as far as the awareness about library e-resources/services is concerned.

- Waldman (2003) in his study found that students who visit the library more frequently had higher self efficacy scores than those who reported using the library less often. Students who found the library electronic resources easy to use had higher self-efficacy scores as compared to those who found the electronic resources difficult to use and students who report being highly motivated to learn about the library's electronic resources have higher self-efficacy scores when compared to those who are motivated to learn.
- Kelly and Orr (2003) also reported that library efforts are reaching online students and the students are aware of the library resources and use them for their research.

### **3. Users visiting the library's website/homepage**

- A majority of the faculty (91.72%) and postgraduates (63.93%) have visited their library websites/homepage as compared to (52.51%) undergraduate and (53.95%) research scholars (Table No.5.6.4).
- A majority of respondents from IIT, Delhi (70.81%) and IIT, Roorkee (78.65%) have visited their Library websites/homepage in comparison to (25.15%) TU, Patiala and (39.59%) PEC, Chandigarh.
- From total population of survey it has been found that 57.92% users have visited their library website/homepage showing that there is a significant variation ( $P < 0.01$ ) among the users as well as institutions (Table No.5.5.4).

### **4. Importance of training for using E-resources**

- Majority of users i.e., 94.28% undergraduates, 92.52% postgraduates, 94.88% research scholars and 98.73% faculty felt that there is a need of training for making maximum use of e-resources (Table No.5.6.5.).
- Among institutions, 737 (89.33%) of users from IIT, Delhi; 606 (97.27%) from IIT, Roorkee; 482(99.38%) from TU, Patiala and 363 (93.32%) users from PEC, Chandigarh were in favor of imparting training.
- Over all results show that 94.23% users from all institutions are in favour of training and felt that with training e-resources can be used maximum (Table No.5.5.5). Thus showing highly significant differences ( $P \leq 0.01$ ) among users as well as institutions

### **5. Knowledge about availability of free E-journals on the Internet**

- Most of the faculty members (67.52%) have knowledge about availability of free e-journals on the internet. Where as response from postgraduate and research

scholars was about fifty percent (53.8%, 53.02%), and undergraduates (45.16%) was below fifty percent (Table No.5.6.6).

- Institute wise users from IIT, Delhi (66.30%) and IIT, Roorkee (73.52%) were aware of free e-journals on the internet as compared to TU (8.66%) and PEC (24.68%)(Table No.5.5.6).
- From the total respondents, 99.22% of them were aware of free e-journals on the internet showing highly significant differences ( $P \leq 0.01$ ) among users and institutions.

#### **6. Awareness about subscription of INDEST/ UGC-INFONET consortium**

- Among users, 88.83 % research scholars, 78.87% postgraduates and 96.17% faculty members were aware about INDEST/UGC-INFONET consortium in comparison to 39.70%of the undergraduates (Table No.5.6.7).
- Users from both the IITs were more aware, i.e., 85.87% from IIT, Roorkee and 71.39% IIT, Delhi as compared to 22.37% PEC, Chandigarh and 23.37% TU, Patiala.
- Out of the total 2322 respondents surveyed, 1326 (57.10%) of them were aware about INDEST and UGC-INFONET consortium and the remaining 996(42.90%) users were not aware about it (Table No.5.5.7). thus a majority of respondents (57.10%) were aware about INDEST/UGC-INFONET consortium

#### **7. Use of INDEST/UGC-INFONET consortium**

- Intuitions wise the results show that 68.76% users from IIT, Delhi; 45.05% from IIT, Roorkee and 55.65 % users from TU,Patiala while 29.89% users from PEC, Chandigarh use INDEST/ UGC-INFONET consortium resources. Thus, majority of users from both the IITs were using INDEST consortium as compared to TU, Patiala and PEC users.
- A majority of research scholars (98.95%) faculty (95.38%) and postgraduates (60.20%) use the INDEST consortium more as compared to undergraduates (19.75%).
- Of the total 1326 users, 736(55.50%) of them were found using INDEST/UGC-INFONET consortium subscribed by their institution library and 590 of them (44.50%) were not using it (Table No.5.6.8)

## **8. Comfortable in using electronic information**

- The data indicates that 91.52% users from IIT, Delhi were comfortable with electronic information resources, 98.56% users from IIT, Roorkee; 94.64% respondents from TU, Patiala; and while 70.44% users from PEC, Chandigarh responded positive.
- The results indicated that, out of total users 70.44% were comfortable with electronic information resources (Table No. 5.5.9). Majority users were comfortable, which shows highly significant differences ( $P \leq 0.01$ ) among them.
- Herring (2002) in his study that online resources are increasingly important for today's scholars and researchers. There is change in information seeking behaviour. The use of information resources is greater as scholars and researchers feel comfortable and familiar with the resources available through the web.
- Momani's (2003) findings of the study indicated that the faculty members in Jordan found no discomfort in their use of the internet and they perceived it as a very useful tool for research and communication.

## **9. Use of electronic/print format**

- Preference for printed document was by 10.53% of undergraduates, 8.22% postgraduates, 16.28% research scholars and only 3.82% faculty (Table No. 5.6.10).
- The users who preferred electronic format were only 15.48% undergraduates, 17.01% postgraduates, 10.70% research scholars and 4.46% faculty.
- The users who preferred to use both the formats were 1047 (73.99%) undergraduates, 400 (74.77%) postgraduates, 157 (73.02%) research scholars, and 144 (91.72%) faculty users.
- A majority of users i.e., 75.28% preferred to use documents in both the formats i.e., print as well as electronic. The results show that there is a significant relationship among the users responding to preference for using the format of document (Table No. 5.5.10).
- Lenares (1999) found that the increase in electronic journals usage is accompanied by a decrease in the frequent use of print journals. Print journal usage, however, continues to dominate electronic journal usage.
- The results of the study Milne's (1999) showed that disciplinary culture does effect academic adoptions of the new technology, 95 per cent of the academics

had a computer at the university and over 90 per cent used it daily, this shows a very high acceptance and use of computer technology. A decrease in the use of printed materials was found during the period of these two surveys 1991 to 1994.

- Bjork and Turk (2000) in the survey showed that professors/teachers used the internet more than the students. The maximum users of internet were the engineers and professors not working at a university, the survey also showed that a strong majority of the respondents (67 per cent) believe that the papers on the web were easier to generate and that these would be read by a more people (59 per cent) than those of printed articles.
- The findings of the study Tenopir (2003) show that both faculty and students use and like electronic resources and most readily adopt them if the sources are perceived as convenient, relevant, and time saving to their natural work flow. Print medium is still used for some reading and is part of research in almost every discipline.
- Siebenberg et al. (2004) proves that the statistics available from publishers of the journals from 1998 to 2001 were used as method for study in three Sci/tech disciplines at Washington State University. The results showed that print journals were being used more than electronic journals. Generally, electronic journals were used heavily and the availability of electronic format enhanced the total use of most titles. Some electronic journals were used little or not at all and there was a substantial increase in the use of some print journals.
- Al-Saleh (2004) in his study found that half of the Saudi graduate students used electronic information resources despite extensive availability of electronic resources, the graduate students preferred to use printed books and documents, from other the university libraries on their own, rather than electronic databases or the internet, and the electronic information resources purchased by Saudi University libraries appear to be underutilized

#### **10. Use of online services**

- Institution wise it has been found that 429 (52%) users from IIT, Delhi, 461 (74%) from IIT, Roorkee 351 (72.37%) from TU, Patiala and 188(48.33%) from PEC use on-line services mostly.
- The users responded that on-line services are used sometimes by 15.39% users at IIT, Roorkee, 9.90% from TU, Patiala.

- Users who use online services weekly 15.03% were from IIT, Delhi; 20.39% were from IIT, Roorkee; 16.29% from TU, Patiala and 21.85% from PEC.
- On-line services were used daily by 17.58% users from IIT, Delhi; 32% from IIT, Roorkee; 1.44% from TU, Patiala and 11.83% users from PEC, Chandigarh (Table No.5.5.11).
- The data indicates that among users 58.88%, faculty and 62.90% undergraduates used the online mostly as compared to postgraduates and 49.30% research scholars.
- The respondents who used online services sometimes was very less. Like 12.37% undergraduates, 7.48% postgraduates, 28.37% research scholars and 1.27% faculty members. While, users using weekly online information services were 16.25% undergraduates 21.87%, postgraduates, 18.60% research scholars and 17.83% faculty.
- The users who go online daily were 8.48% undergraduates, 11.78% postgraduates 3.72% research scholars and 5.73% faculty.
- From the total respondents, 61.54% users are using online services mostly which is more as compared to 11.97% sometimes, weekly 17.87% and 8.61% daily. The Chi-Square test for independence is significant at 1 per cent level of significance. This implies that there is a significant relation among the users using on-line information service. Thus the majority of users were using online services mostly (Table No.5.6.11).
- The findings of Kelly and Orr (2003) study show that national trends demonstrate that non traditional, predominantly part time student usage patterns have changed and now they favor the use of electronic resources particularly internet.
- Study by Smith (2003) indicates that almost three quarters of respondents reported reading at least one article from an online source every week. Also junior faculty members used electronic resources more than senior faculty members.
- The results show in study carried by Woo (2005) that 68.8 per cent of the respondents prefer to use online journals as compared to 31.2 per cent who prefer to use print journals, and 71.8 per cent of the respondents prefer to use print books as compared to 28.2 per cent who prefer to use electronic books.

## 11. Frequency of using E-journals

- E-journals were used daily by 16.34% users from IIT, Delhi; followed by 4.78% users from IIT, Roorkee; 7.08% from TU, Patiala and 10.47% from PEC, Chandigarh. E-journals are used occasionally by 36.76% users from IIT, Delhi; 33.47% from IIT, Roorkee; 53.98% from TU, Patiala and 55.81% from PEC, Chandigarh.
- The Table No. 5.5.12 indicates that from total respondents, e-journals were mostly used 2/3 times a week by 35.47% users and occasionally by 39.41% users.
- From table No.5.6.12 User wise data, it has been found that 69.88% undergraduates and 41.88% postgraduates occasionally used e-journals maximum. Where as 43.13% research scholars and 68.24% faculty members used e-journals 2/3 times a week.
- The overall response shows that users used e-journals occasionally were 39.41% and by 35.47% users 2/3 time as compared to daily by 12.08% users and once a week. The value of p is significant at 1 per cent level. This shows that there is significant variation among the users as far as use of e-journals is concerned.
- Findings of the study Liew et al. (2000) shows that there is a significantly high acceptance of e-journals by graduate students and growing interest in e-journals among end-users. There was strong acceptance, high expectations and enthusiasm for future e-journals.
- Rogers (2001) research shows an increased use of e-journals and decreased use of printed journals by faculty and graduate students as the number of available e-journals increased from 200 to 3000 titles. A majority of frequent users of all these three types of resources were from the departments in sciences.
- De-Groote (2001) shows that print journals usage decreased significantly since the introduction of on-line journals. This decrease occurred where a journal was available in print. The inter-library loan request was decreased due to the introduction of online journals. The decrease in use of print collection was due to preference of use to access on-line journals and the negative impact of on-line journals was that the use of journals' titles was available only in print. It has also focused that the users may compromise over quality for convenience when selecting articles from journals.

- The findings of the research by Tenopir (2003) show that both faculty and students use and like electronic resources and most readily adopt them if the sources are perceived as convenient, relevant, and time saving to their natural work flow. Print medium is still used for some reading and is part of research in almost every discipline.

## **12. Frequency of using CD-ROM**

- Institutions wise table No 5.5.13 shows that CD-ROM is used daily by 15.05% users from IIT, Delhi followed by 0.83% from TU, Patiala and 8.41% from PEC, Chandigarh where as, users from IIT, Roorkee do not use CD-ROM daily.
- The CD-ROM is used 2/3 Times a week by 22.95% users of IIT, Delhi; 9% from IIT, Roorkee; 4.17% users from TU, Patiala; and 16.81% from PEC, Chandigarh.
- Respondents using CD-Rom service once in a week were 11.70% from IIT, Delhi; 9% IIT, Roorkee; 6.67% from TU, Patiala and 16.37% from PEC, Chandigarh.
- The users using CD-ROM occasionally were 50.30% from IIT, Delhi; 81.99% from TU, Patiala and 58.41% users from PEC, Chandigarh. Thus the data indicates that CD-ROM services are used maximum by users of all institutions occasionally as compared to other times.
- Among users results of the study shows that 86.52% undergraduates, 49.21% postgraduates and 42.55% research scholars used CD-ROM maximum occasionally. While 45.86% faculty used CD-ROM 2/3 times a week.
- The response from total users' shows that CD-ROM services were used maximum by users occasionally i.e. 42.38% as compared to other times. The value of p is significant at 1 per cent level. This shows that there is significant variation among the users as far as use of CD-ROM is concerned (Table No.5.6.13).
- Ray and Day (1998) brought out that the most popular electronic resources were CD-ROM and the internet. 37.5 per cent of the sample population used electronic journals as an information tool

## **13. Frequency of using Internet**

- The study shows that institution wise 65.43% users from IIT, Delhi; 18.04% from IIT, Roorkee; 28.69% from TU, Patiala and 48.84% PEC, Chandigarh used internet daily.

- Respondents who were using internet 2/3 times a week were 74.88% from IIT, Roorkee followed by 64.03% from TU, Patiala 28.53% from PEC, Chandigarh and 26.05% from IIT, Delhi.
- The users who use the internet once a week was less in number. Their response was 2.72% from IIT, Delhi; 5.15% from IIT, Roorkee; 2.91% from TU, Patiala and 11.83% PEC, Chandigarh. Same way the internet is used occasionally by 5.80% users from IIT, Delhi; 5.15% from IIT, Roorkee; 4.37% from TU, Patiala and 10.80% from PEC, Chandigarh. Thus internet is mostly used daily and 2/3 time a week as compared to once a week and occasionally (Table No.5.5.14).
- Users wise it is found that internet used daily by 58.38% postgraduates, 52.58% research scholars and 78.98% faculty members.
- The response from total users' data shows that internet is used daily by 42.16% and for 2/3 times a week 47.49%. The value of p is significant at 0.01 per cent level ( $P \geq 0.01$ ). This shows that there is a significant variation among the users' as far as use of internet services is concerned (Table No.5.5.14).
- The results from study conducted by Lazinger et al. (1998) indicated that internet is used consistently higher among faculty members in the science and agriculture than among those in the humanities or social sciences.
- Brockington (2003) found that African-American students used the internet mainly for communication, followed by cultural sites and entertainment sites. The study also indicated that 86 per cent of the respondents used the internet daily and 13 per cent used the internet weekly and nearly 84 per cent spent between one and four hours per day online.
- The findings by Dadzie (2005) are that general computer access was high and also the usage for information access was high due to the university's state-of-the-art infrastructure. Usage of some internet resources was also very high while the usage of scholarly databases was quite low. The low patronage was attributed to inadequate information about the existence of electronic library resources.
- The results of the study Robinson (2005) indicated that most of the African-American college students (76 per cent) had used the internet for more than three years. The use of the internet for most African-American college students occurred at school or work place with 49 per cent response or at home with 47 per cent response and they spent on an average two hours per day on-line. A small

percentage of the students spent 5-6 hours per day on the internet. 43 per cent of the students used the internet primarily to learn and find school resources.

#### **14. Place used for accessing E-resources**

- Among users department is used by greater part of research scholars (96.28%), faculty (96.82%) and postgraduates (53.08%) as compared to 5.37% undergraduates. Library is used mainly by postgraduates (34.02%), research scholars (51.63%) and undergraduates (25.94%) where as, only 1.27% faculty used the library (Table No.5.6.15).
- Hostels are mainly used by 60.57% of undergraduates 48.04% postgraduates of, and 40% of research scholars. A good number of undergraduates (64.10%) postgraduates (53.46%) used computer centre as compared to (14.88%) research scholars and (63.17%) faculty (Table No.5.6.15).
- Table No.5.5.15 shows that majority of the respondents from IIT, Roorkee (68.38%) used library as compared to 23.76% from IIT, Delhi, the response of users from TU and PEC was nearly same (i.e., 4.74% and 4.37%).
- A greater part of users from IIT Roorkee (60.48%) and TU users (64.74%) were using hostels for accessing e-resources in comparison to (39.52%) IIT, Delhi and PEC (7.20%).
- A large percentage of users from TU (82.06%) and PEC users (83.80%) used computer centre for accessing information as compared to IIT, Delhi (36.48%) and IIT, Roorkee (33.71%). Over all data shows that 53.19% respondent were using computer centre, 51.67% hostel, 30.96% department and only 28.50% used library (Table No.5.5.15).
- The findings brought out by Ray and Day (1998) that 91 per cent of respondents acknowledged access to a networked computer via university i.e. more internet access is from work place than from home.
- The survey by Razaand and Upadhyay (2006) reveals that many research scholars are consulting e-journals from their departmental labs and computer centers, not only for research purposes but also to update their own knowledge.

#### **15. Purpose of using E-resources**

- It has been found from institution wise (Table No. 5.5.16) that for writing papers 43.76% from IIT, Delhi; 25.36% from IIT, Roorkee; 9.28% from TU, Patiala; and 12.82% from PEC, Chandigarh users were using e-resources.

- E-resources were consulted for writing seminars by 52.36% users from IIT, Delhi; 48.64% from IIT, Roorkee; 48.45% from TU, Patiala; and 58.35% from PEC, Chandigarh. The results show that users from IIT, Delhi and PEC, Chandigarh were using more e-resources for seminars as compared to IIT, Roorkee and TU, Patiala.
- The e-resources for academic work were used by 52.12% users from IIT, Delhi; 50.26% users from IIT, Roorkee; 83.71% users from TU, Patiala; and 28.28% from PCE, Chandigarh. The results show that IIT, Roorkee and TU, Patiala users were using e-resources more for getting help for their academic work as compared to IIT, Delhi and PEC users.
- 44.61% users from IIT, Delhi; 25.52% from IIT, Roorkee; 27.84% from TU, Patiala; and 54.24%, PEC, Chandigarh were using e-resources for projects work. It has been found that IIT, Delhi and PEC, users were using more e-resources for project work as compared to IIT, Roorkee and PEC, Chandigarh.
- The e-resources were used for research work by 45.21% users from IIT, Delhi; 17.17% from IIT, Roorkee; 9.28% from TU, Patiala; and 13.62% from PEC, Chandigarh. The results indicates that IIT, Delhi and IIT, Roorkee users were using e-resource more for research work as compared to TU, Patiala and PEC, Chandigarh.
- It has been found users wise from table No.5.6.16 that for writing papers 57.20% postgraduates, research scholars and 66.24% faculty used e-resources more as compared to 83 undergraduate users.
- E-resources were used for seminars by 77.76% postgraduates, 84.19% research scholars and 84.71% members of faculty more as compared to 33% undergraduates.
- The data shows that 68.41 undergraduates used e-resources and 92.36 faculty members used e-resources more for academic work as compared to 48.97 postgraduates and 33.02 research scholars
- While the use of e-resources for project work was more by faculty 70.70% as compared to undergraduates 35.90%, postgraduates 38.88% and research scholars 21.40%.

- The use of e-resources for research work was more by research scholars i.e. 97.21% and faculty 71.97% as compared to 7.07% undergraduates and 29.16% postgraduates.
- The results show that from the total population e-resources were used more for seminars by 51.55% users and for academic work by 62.27% users, while 26.44% users were using e-resources for writing papers, 37.60% for projects work and 24.89% for research work (Table No.5.5.16).

#### **16. Purpose of using internet/ websites**

- Table No.5.6.17 that users' wise internet/websites are used maximum for e-mail by 90.78% of the users. 89.75% undergraduates, 92.15% postgraduates, 88.38% research scholars and 98.73% faculty used internet for e-mail.
- For career development 76.43% faculty and 51.78% postgraduates used internet/websites more as compared to 46.29% undergraduates and 18.60% research scholars.
- Where as, internet services were not used for entertainment by maximum of the users. But for finding relevant information 92.55% users were using internet/websites i.e. 92.65% undergraduates, 92.15% postgraduates 91.16% research scholars and 83.44% faculty.
- The response was above 84% from all the four institutions in regard to use of internet/websites for finding relevant information. Similarly, for entertainment the response was below 35% from all the four institutions.
- From the total users data it has been found that internet/websites are used maximum for e-mail i.e., 90.78% and 92.55% for finding relevant information as compared to 47.03% career development, 27.86% research work and 25.62% for entertainment (Table No.5.5.17).
- Nicholas (2000) the findings of survey provided that 58 per cent of the student journalists used internet very frequently, 24 per cent sometimes, 15 per cent occasionally and 3 per cent never. All the respondents who used internet also used e-mail. 47 per cent of the respondents used e-mail for overseas contacts. 18 per cent of the respondents used list serves and were members of discussions groups in their respective fields. 24 per cent of the respondents used newsgroup services of the internet.

- Momani's (2003) findings of the study indicated that the internet was widely used among faculty members in Jordan and its use was similar to that in any other developed country. The most widely used applications were the web for research and e-mail for communication.
- The findings of the study by Kwon (2003) indicated that 53.4 per cent of the respondents used internet for searching research materials. As a result, the internet served as a predictable means of acquiring information, a means of communicating with others, a means of finding entertainment, and a means of shopping. The study suggested that the internet altered the relationship between the users and traditional providers of education, information, entertainment, and commerce.
- Brockington (2003) found that African-American students used the internet mainly for communication, followed by cultural sites and entertainment sites.
- Heydet-kirsch (2003) in his study found that 66 per cent high school students used the internet to verify information provided by the college. Some of the students preferred the internet because they disliked other means of college-student interaction.

#### **16. Sources used for seeking information**

- It has been found from table No.5.5.18 that 51.15% users from IIT, Delhi, 36.60% from IIT, Roorkee, 17.53% from TU, Patiala and 14.65% from PEC, Chandigarh were using **current e-resources** for seeking information. It has been found that IIT Delhi users were using current e-journals more as compared to users from other institutes.
- Schanffner (2001) illustrated that electronic technology is simply one tool, for searching information.
- The **back volumes of e-journals** were used by 34.06% users from IIT, Delhi, 11.88% from IIT, Roorkee while 7.63% from TU, Patiala and 5.66% from PEC, Chandigarh. The results show that IIT, Delhi users were using back volume of e-journals more as compared to users from other institutes.
- The **online data bases** were used almost by all the users from the four institutes. It has been seen that 57.82% users from IIT, Delhi, 46.55% from IIT Roorkee, 52.16% users from TU, Patiala and 50.90% from PEC, Chandigarh were using on-line bases.

- Where as the usage of video cassettes were very less by all the users and the response shows below 3%.
- The result of the research brought out by Herring (2002) that online resources are increasingly important for today's scholars and researchers. There is change in information seeking behaviour.
- **Internet websites** were used by 32.36% users from IIT, Delhi, 96.63% from I.I.T, Roorkee 67.42% from TU, Patiala and 13.37% from PEC Chandigarh. The data indicates that users from IIT Roorkee and TU, Patiala were using internet websites more for seeking information as compared users from IIT, Delhi and PEC, Chandigarh.
- Study carried by Zhang (1999) found that the user group of students welcomed the adoption and use of the internet for research. He concluded that students in the user group perceived the internet positively in four of the five measured innovation attributes: as providing good relative advantage and high compatibility for research work, and positive tradability and absorbability.
- **CD-ROM service** was used by 32.36% from IIT Delhi, 31.62% from IIT Roorkee .02% from TU Patiala and 44.99% from PEC, Chandigarh. It has been found that IIT, Roorkee and TU, Patiala users were using CD-ROM services more as compared to IIT Delhi and PEC, Chandigarh.
- Al-Najran (1998) Analysis indicated that gratification factors play an important role in internet service selection and time spent online. It has been found that internet applications and gratification were better predictions of time spent online than background and demographic characteristics.
- Crawford and Daye (2000) 18 per cent used CD-ROMs and only 13 per cent used online databases.
- The **OPAC was used** by 42, 91% users from IIT Delhi, 97.27% users from IIT Roorkee, 52.16% users from TU, Patiala and 50.90% users from PEC, Chandigarh.
- Abdullah (2000) The findings of the study show that the students preferred using impersonal information sources such as the online catalogue, references, and the internet.
- Doraswamy (2005) 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. The 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.

### 17. Barriers in using E-resources

- 11.64% users from IIT, Delhi; 1.44% from IIT, Roorkee; 4.33% users from TU, Patiala and 14.91% users from PEC, Chandigarh feel that e-resources were **unorganized**.
- The lack of time for accessing was one of the barrier users felt 30.06% users from IIT, Delhi, 43.18% from IIT, Roorkee, 52.78% from TU, Patiala and 34.45% users from PEC, Chandigarh, felt the **lack of time** was the big barrier.
- Ibrahim (2004) found that frequency of use of electronic resources was low due to lack of time because of the time needed to focus on teaching.
- 5.70% of the users from IIT, Delhi, 2.41% from IIT Roorkee, 2.06% from TU, Patiala and 10.28% from PEC, Chandigarh felt **uncomfortable** when accessing the electronic information.
- The users who felt what **to look for** the information they need were 8.61% users from IIT, Delhi 6.58% from IIT Roorkee, 2.47% users from TU, Patiala and 15.68% from PEC, Chandigarh.
- The finding brought out by Monopli et al. (2002)also show that a vast majority of respondents were regular internet users, 64 per cent users faced the problem of "too much networked information" when searching the internet, 85.5 per cent used internet daily and 8.4 per cent weekly. Due to lack of time to search for information, 45 per cent respondent failed to find required information. The main users of e-journals service were mostly researchers and academic staff.
- 2.79% users from IIT, Delhi; 4.82% from IIT, Roorkee; 10.72% from TU Patiala; and 25.45% from PEC, Chandigarh felt that they **do not have knowledge** of using e-resources.
- Abdullah (2000) The findings of the study show that the international graduate's student search behaviours, such as computer experiences and cultural proximity

had only “minimum affect on their use of online catalog and other information sources.

- Choukhande and Kumar (2004) in his study found that users face difficulty in searching information through electronic sources, and they need skill to use the available sources in the library.
- The users access the information through internet and the speed of internet saves the time of the users. 38.42% users, from IIT, Delhi; 73.68% from IIT, Roorkee; 82.89% from TU, Patiala and 59.90% from PEC, Chandigarh felt that **speed of internet is slow**.
- From the total users' data, 60.77% of users felt that the access to information through internet is a very slow process while 39.06% of users felt that they were short of time and 23.26% of users felt that it was difficult to read from the screen.
- Woodward et al. (1998) also showed that low level technical problems are still a deterrent to the use of electronic journals and people prefer not to read at length on screen, the printing out is slow and commercial publishers tend to follow the lead of technology rather than convenience of their users.
- Momani (2003) the findings of the study indicated that the internet was widely used among faculty members in Jordan and its use was similar to that in any other developed country. The most widely used applications were the web for research and e-mail for communication. The faculty members in Jordan found no discomfort in their use of the internet and they perceived it as a very useful tool for research and communication
- Respondents also indicated that lack of time, lack of access, lack of speed, lack of training, and lack of university support were the most important barriers for the effective use of the internet. The study recommended that more training should be provided for the vast majority of faculty members, for all schools, ranks and both the genders.
- Rao (1997) reported that it is quite significant. It is necessary to conduct a survey of available sources on various networks. Effective techniques are needed to search and store the download data.
- In the survey, Nicholas (2000) revealed that major factors that affected the use of the internet were lack of internet access and lack of printer.

- Ali, Naushad (2005) 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.
- Kanwal, Ameen (2008) The results of his study revealed that various technical, procedural, psychological, and behavioral barriers in achieving planned and meaningful collection-sharing (CS) programs still prevail. It suggests analyzing the possibilities, opportunities, and challenges of CS in the emerging paradigm.

### **18. Replacement of print document by electronic.**

- The data indicates institution wise from table No.5.5.20 that 28.61% users from IIT, Delhi; 15.51% users from IIT, Roorkee was yes. In TU, Patiala 4.54% users said they felt that internet electronic resource can replace printed document while 12.60% users from PEC, Chandigarh.
- The response from the users has been shown in the Table No.5.6.20, (14.06%) undergraduates, (24.11%) postgraduates, (25.58%) research scholars and (13.38%) faculty said that e-resources can replace print format.
- From total respondents results it has been found that 17.40% users said that internet/electronic can replace printed document and 82.60% of users said no. The Chi-Square test for independence is significant at 1 per cent level of significance. This implies that there is a significant relationship among the users responding to view that internet/electronic resources can replace the printed document. Thus majority of users feel that internet/e-resources cannot replace the printed document.

### **19. Collection development and usage of E-resources**

- Table No.5.7.2 shows the amount spent on books, print journals and e-journals has increased in both the IITs and TU from 2003 to 2007.
- Where as the amount spent on books and print journals has increased in PEC library from 2003 to 2006 but number of e-journals has remained same.
- There is growth in the collection of e-journals has increased in the IITs and TU, Patiala. The growth in collection of books has kept on increased every year in all the institutions.

- The download usage data in Table No.5.7.4 shows that there was increase in the usage of e-resources from the previous years and decrease in three of the e-resources only and this may be due to the new addition of e-resources as users might have started using new resources.
- From total download of usage data of full text e-resources, it has been found that the usage has increased from 71, 0,699 to 28, 93,848 numbers.
- The Table No. 5.7.5 shows the download usage statistics of TU, Patiala for the four years from 2004 to 2007. The status of usage indicates that there were some e-resources which were not used in the year 2004 but the same were used in 2005.
- On comparing the usage of four years. The total usage of the e- resources shows that there was increase in the usage from the previous year i.e. the overall total download usage from 2004 to 2007 has increased.
- Edward et al. (1995) shows that more library assistants in large majority agreed with the use of electronic information, as it reduces their workload and provides job satisfaction. They also broadly agreed that electronic information resources bring effectiveness in their work. It has been found that library staff felt to have low level of technical expertise.
- Harter (1998) in his study has derived the result that, with a few possible expectations, the impact of e-journals on scholarly communication has been minimized.
- Milne (1999) in his study found that disciplinary culture does effect academic adoptions of the new technology, 95 per cent of the academics had a computer at the university and over 90 per cent used it daily, this shows a very high acceptance and use of computer technology. A decrease in the use of printed materials was found during the period of these two surveys. The electronic library service (EAIS), a gateway to many services available over the internet was very important and the importance of information stored on CD-ROM has increased between the two surveys 1991 to 1994. The ability to access online databases from individual workstations was important to almost 70 per cent of academics and scientists.
- Miller (2000) has showed that over the past twenty years, academic collection development specialists have dealt with dramatic changes, brought about by decreasing purchasing power and the growing importance of electronic resources. The collection managers have rethought their efforts and revised criteria for the

selection of materials in new formats while also maintaining traditional collections.

- The results of study shows by Zhang (2001) shows that there has been a notable increase in the number and proportion of authors who cite e-resources in their research articles over an eight year period but e-resources were still cited much less frequently than print sources. E-resources are increasingly used among scholars and also becoming an important component in their research.
- The findings of the study by Samson et al. (2004) shows that data collected have impact on the collection development policy. Based on the data over \$ 40,000 of duplicate print subscriptions were migrated to electronic subscriptions.

## 6.2 Testing of Hypothesis

**Hypothesis1: Use of library is decreasing due to internet and intranet services provided by institutes in departments, hostels and computer centre.**

- From 2322 (100%) respondents it has been found that not all the users were using the library. 96.21% of the total users were using their institute library and 3.79% of them were not.
- 98.45% undergraduates, 94.55% postgraduates 89.30% research scholars and 89.81% faculty members were using the library
- 93.21% users from IIT, Delhi, 97.11% from IIT, Roorkee, 97.32% TU and 99.74% PEC were using the library. There is decrease in the per cent of users in all the institutions user wise it has been found that 10.70% research scholar and 10.19% faculty members were not using the library (Table No. 5.5.1, 5.6.1)
- Due to internet and intranet facilities provided by the institution on different places, on campus, the users have started using other places for accessing the e-resources.
- Departments were used by 96.28% research scholars, 96.82% faculty and 53.08% postgraduates. Computer centre is used by 64.10% undergraduates and 53.46% postgraduates. Hostels are used by 60.57% undergraduates (Table No. 5.5.17, 5.6.17)
- **With the above discussions, it can be concluded that (i) all the respondents were not using the library. (ii) There has been decrease in percentage of users coming to the library. (iii) The majority of them were using departments, hostels and computer centre more for accessing the information. Thus the**

**hypothesis number 1 stands vindicated and the finding of the study proves the hypothesis.**

**Hypothesis 2: All the users are not aware about the electronic library services provided by their institute library**

- It is evident from the Table No. 5.5.3, 5.6.3 that all the users were not aware about their library electronic resources/services. From 2322 respondents it has been found that 70.37% of users were aware and 29.63% were not aware. 88% of the users from IIT Delhi, 98.23% users from IIT Roorkee, 36.29% from TU and 30.85% from PEC were aware about their library e-resources. Awareness about these resources was less at TU and PEC as compare to IIT's.
- Similarly 58.94% undergraduates were aware as compared to (81.87%) postgraduates, (97.67%) research scholars and (96.82%) faculty.
- From Table No. 5.5.4, 5.6.4 results show that 57.92% of users have visited their library website/homepage and 42.04% have not visited.
- 25.15% users from TU, Patiala and 39.59% from PEC Chandigarh have visited their library home page, which is less as compared to both the IITs.
- Among the users, 52.51% undergraduates, 53.95% research scholars have visited their library websites/homepage in comparison to 91.72% faculty members.
- It has been found that users who visit library websites of their institute have the knowledge about the services provided by their library.

**The findings of the study exhibit that all the users are not aware about the electronic resources/services provided by their library thus the second hypothesis is also supported by the findings of the study.**

**Hypothesis 3: Usage of e-resources increases, if users are aware and familiar with electronic resources of the library**

- From Table No. 5.5.8, 5.6.8 it is evident that 18.37 (100%) that 65.92% of users were aware about e-resources from INDEST consortium is provided where as 34.08% were not aware.
- 71.39% of user from IIT Delhi and 85.87% from IIT Roorkee were aware as compared to 22.37% users from PEC. It has been found that 51.55% undergraduates, 97.95% research scholars were aware, where as, 100% faculty members were aware.

- Table No. 5.5.9, 5.6.9 exhibits that 1211 (100%) users were aware about their library e-resources but 55.49% of them use it and 44.51% were not using. This shows that as much as awareness among the users about the library e-resources helps in increase.
- Users wise, it is found the 20% undergraduates were using e-resources, in comparison to 73.24% postgraduates, 98.95% research scholars and 95.38% faculty (Table No. 5.6.9) similar results have been found in the Table No. 5.5.9.
- Institute wise 68.76% from IIT Delhi, 45.05% from IIT Roorkee and 29.89% from PEC, users were using e-resources.
- Therefore from the above findings of the study it is clear that awareness among the users increases the usage of the e-resources.

**Thus the findings of the present study establish the third hypothesis.**

#### **Hypothesis 4: The users are in need of training for handling the electronic resources**

- From Table No.5.5.7, 5.6.7 reveals that 89.33% of users from IIT Delhi, 97.27% from IIT Roorkee, 99.38% from TU and 93.32% from PEC said they need training for handling these resources.
- Category wise break up shows that 94.28% undergraduates 92.52% postgraduates, 94.88% undergraduates, 92.52% postgraduates, 94.88% research scholars and 98.73% faculty members were in favors and said that training is important for using maximum e-resources.
- From the total 2322 users, 2123 (94.23%) responded that training is important to make maximum use of e-resources.
- **The finding of the study indicates that users are in need of skills for handling the e-resources; therefore, present study supports the fourth hypothesis**

#### **Hypothesis 5: Frequency of using Internet is more as compared to E-journals and CD-ROM**

- From 1043 respondents, it is evident that only 39.41% users used e-journals occasionally and 35.47% users used 2/3 times in a week and 42.16% used daily.

- CD-ROM services were used occasionally by 1209 (42.38%) out of 1766 (100%) respondents.

**From the above finding it has been depicted that internet was used by 44.59% users for 2/3 times in a week. E-journals and CD-ROM were used occasionally. Thus the study clearly proves hypothesis.**

### **Hypothesis 6: The users face difficulties in accessing information through electronic resources**

- The users feel that accessing the e-resources was difficult 7.76% users from IIT Delhi; 6.58% from IIT Roorkee; 8.25% from TU Patiala; and 9.51% users from PEC, Chandigarh said they were not comfortable in accessing e-resources.
- 10.11% undergraduates, 8.41% postgraduates, 6.51% research scholars and 1.27% faculty from the entire institute felt that they have no knowledge about use of e-resources.
- The **lack of time** for accessing e-recourses was one of the barriers felt by 30.06% users from IIT Delhi, 43.18% from IIT Roorkee 52.78% from TU Patiala and 34.45% users from PEC Chandigarh.
- Users-wise, lack of time for accessing was felt by 38.30%, undergraduates, 43.55% postgraduates, 42.79% research scholars and 25.48% faculty members.
- The users access the information through internet, where the speed of internet saves the time of the users. 38.42% users from IIT Delhi, 73.68% from IIT Roorkee, 82.89% users from TU Patiala and 59.90% from PEC Chandigarh, felt that the speed of internet was slow, which delays their work.
- Many of the respondents felt difficulty in reading from the screen 17.46% undergraduates, 30.65% postgraduates, 41.86% research scholars and 24.34% faculty members agreed that reading directly from search is not convenient.
- From the total users' data, 60.77% of users feel the access to information through internet very slow process while 39.06% of users felt they there was have lack of time and 23.26% of users felt that it was difficult to read from the screen.

**Thus the findings of the present study establish the sixth hypothesis.**

### 6.3 Findings of the study

From the discussions and hypothesis of the study the following findings have been derived

- 96.2% users from all the four institutions are using library and the remaining 3.79% are not using it.
- 97.67% of the research scholars, 96.82% of the faculty and 81.87% of the postgraduates are more aware about library's e-resources /services than 58.94% undergraduates. Most of the users (88%) from IIT, Delhi, 98.23% IIT, Roorkee are more aware in comparison to 36.29% users from TU, Patiala and 30.85% from PEC, Chandigarh.
- 70.37% users are aware and 29.63% of them do have awareness about e-resources/services provide by their library.
- From total survey it has been found that 57.92% users have visited their library website/homepage
- Most of the users (94.23%) from all the institutions are in favour of training and felt that with training e-resources can be used maximum.
- Users from both the IITs are more aware about INDEST/UGC-INFONET consortium, (85.87% IIT Roorkee and 71.39% IIT Delhi) as compared to (22.37%) PEC Chandigarh and 23.71% TU, Patiala.
- From total users of all the institutions 57.10% are aware about the INDEST/UGC-INFONET consortium and out of the users who are aware 55.50% are using INDEST/UGC-INFONET consortium.
- 99.22% of total users from all the institutions are were aware about the free e-journals on the internet.
- Above 80% users felt that they are comfortable with electronic information resources.
- The response rate was below 30%, which shows that very few users felt that e-resources can be replaced by print documents.
- Over all data shows that 53.19% respondents are using computer centre, 51.67% hostels, 30.96% departments and only 28.50% are using library.
- For writing paper, 57.20% of postgraduates, 56.28% of research scholars and 66.24% of faculty members used e-resources.

- A majority of postgraduates (77.76%), research scholars (84.19%) and faculty members (84.71%) are using e-resources for seminars.
- Majority of undergraduates (68.41%) and faculty (92.36%) are using e-resources for academic work as compared to undergraduates (48.97%) and research scholars (33.02%)
- A majority of faculty members (70.70%) are using use e-resources for writing projects as compared to other users.
- E-resources are used maximum for research work by 97.21% research scholars and 71.97% faculty members in comparison to undergraduates and postgraduates.
- Maximum uses of e-resources for research work at IIT, Delhi (45.21%).
- A majority of users i.e., 75.28% preferred to use documents in both the formats i.e., print as well as electronic.
- E-journals are used mostly 2/3 times a week by 35.47% users and occasionally by 39.41% of users.
- CD-ROM service is used maximum by users of all institutes occasionally as compared to other times.
- Internet is used daily and 2/3 time a week as compared to once a week and occasionally.
- It has been found that 51.15% users from IIT, Delhi, 36.60% from IIT, Roorkee, 17.53% from TU, Patiala and 14.65% from PEC, Chandigarh are using **current e-resources** for seeking information. It has been found that IIT, Delhi users are using current e-journals more as compared to users from other institutes.
- The **back volumes of e-journals** are used by 34.06% users from IIT, Delhi, 11.88% from IIT, Roorkee while 7.63% from TU, Patiala and 5.66% from PEC, Chandigarh. It has been found that IIT, Delhi users are using back volume of e-journals more as compared to users from other institutes.
- The **online data bases** are used almost by all the users from the four institutes. It has been seen that 57.82% users from IIT, Delhi, 46.55% from IIT, Roorkee, 52.16% users from TU, Patiala and 50.90% from PEC, Chandigarh are using on-line bases.
- Where as the usage of **video cassettes** is very less by all the users.
- **Internet websites** are used by 32.36% users from IIT, Delhi; 96.63% from IIT, Roorkee; 67.42% from TU, Patiala; and 13.37% from PEC Chandigarh. The data

indicates that users from IIT, Roorkee and TU, Patiala were using internet websites more for seeking information as compared users from IIT, Delhi and PEC, Chandigarh.

- **CD-ROM** service is used by 32.36% from IIT, Delhi; 31.62% from IIT, Roorkee .02% from TU, Patiala and 44.99% from PEC, Chandigarh. It has been found that IIT, Roorkee and TU, Patiala users are using CD-ROM services more as compared to IIT, Delhi and PEC, Chandigarh.
- The **OPAC** is used by 42.91% users from IIT, Delhi, 97.27% users from IIT Roorkee, 52.16% users from TU, Patiala and 50.90% users from PEC, Chandigarh.
- From the total users' data, 60.77% of users feel that the access to information through internet is a very slow process while 39.06% of users feel that they are short of time and 23.26% of users feel that it was difficult to read from the screen.
- The libraries of IIT's and TU are fully computerized where as PEC library is at its developing stage.
- The local area network (LAN) is spread over in all departments, centers, labs and well connected to all the hostels.
- Both the IIT's and TU users are being provided training through orientation programs where as the PEC users are given training only on demands.
- Internet facility has been provided to users in both the IIT's and TU at library where as in PEC this service is limited for staff only
- All the four institutions under study have designed their websites. Links through their institute websites have been provided to the library.
- Both the IITs and PEC are subscribing E-journals from INDEST consortium TU, Patiala subscribes to e-journals from INDEST and UGC-INFONET
- The collection of e-resources in all the institutions is increasing every year.

## 6.4 Conclusions

Following conclusions have been drawn from the finding of the study

- Users coming to the library have started decreasing due to internet and intranet services provided by institutes.
- Users have started using computer center, hostels and departments for accessing the information more as compared to the library

- Many users are not aware of the name of INDEST and UGC-INFONET consortium, e-resources and free e-journals/portals available on the net, but those who are aware are using these e-resources.
- Usage of e-resources has increased due to the awareness among the users.
- Users have started using e-resources and this shows that they have accepted electronic medium. Users have started feeling comfortable with electronic information.
- Users prefer to use the information in both the formats i.e., electronic as well as print, although they feel that electronic document can't replace the print document.
- Users felt that the electronic information saves the time, and they get required information, but slow speed of internet and vast information available are the barriers in seeking information.
- Internet and online catalogues are more used as compared to current and back volumes of e-journals. E-books are used minimum and the e-journals are mostly used for academic work.
- The impact on growth of collection and usage in the IIT's, TU and PEC indicates that every year there is an increase in the collection and usage of e-resources.
- Due to information technology (IT) the image of the libraries has improved and changed

## **6.5 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 technical institutions in India. Following suggestions/recommendation are derived out the study for other technical institutes.

### **1. Awareness about the e-resources**

- Library should subscribe to e-resources keeping in view 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.

## **2. Improvement in information technology services**

- 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,
- Technical staff or technically trained staff should be appointed to assist the users in accessing the information,
- There should be complete campus networking.
- Problems related to slow connectivity should be over come by upgrading the band width.

## **3. Administration/Management services**

- Building a library staff team with the appropriate skills.
- The library should organize a training program for the library professionals so that they are able to assist users and they can work with comfort in the technical environment.
- Joining consortium and other "buying clubs,"
- Determining and revising strategies for e-resource acquisition,
- Making co-ordination and co-operation with the academic departments and management of the institutions.
- Try to acquire related free e-resources from net.

## **4. Using RSS (Really Simply Syndication) and academic blogs**

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 utilized by many academic libraries.

## **5. Improvement in infrastructures/System and Space**

- The impact of print journals on infrastructure is managing the physical space for growth of the collection over time.

- Due to electronic information it is believed that space problem has been solved but still the space is the most important requirement for the print format, network, computer hardware/software and systems staffs are required to provide access to electronic resources.

#### **6. Document delivery/interlibrary loan services**

- The library's document delivery service which provides copies of articles with free or fee to the user/distant learners should be delivered at right time,
- Resource sharing can be done by making network with other libraries & intuitions.

#### **7. Circulation/Access/Reference Services**

- Better information can be provided about the existence of e-journals and their characteristics,
- Standards for presentation of use data,
- Easier methods of providing access to electronic journals either through cataloging or in list form,
- An assured solution to archiving,
- Reference staffs are responsible for materials selection in addition to the usual function of answering questions, training classes and performing public relations function such as promoting the availability of services,
- To identifying e-journal candidates for purchase, evaluating potential purchaser, helping students and faculty use the e-journals effectively, incorporating information about their required documents.

#### **6.6 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 view points, librarian 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.

## **6.7 Recommendations for Further Research**

The present study deals with use and impact of e-resources in technical institutions 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 over come. 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.

## References

Abdullah, S.A. (2000), "Factors Affecting International Students' Use of the Online Catalog and Other Information Sources," (Doctoral Dissertation, Florida State University), *Dissertation Abstracts International*, 61, 1663.

Abdul-Gader, A.H. (1996), "Usage Pattern and Productivity Impact of Computer Medicated Communications in a Developing Country; and Explanatory Study," *International Journal of Information Management*, 16(1), pp.17-22.

Abdulla, Rasha A. (2003), "The Uses and Gratifications of the Internet Among Arab Students in Egypt," Dissertation, University of Miami, DAI-A 65/01 (2003): 218. 7 July 2004. <http://wwwlib.uni.com/dissertations/fullcit/3119807>.

Al-Najran, T.N. (1998), "Internet Adoption and Use by Kuwait University Students: New Medium, Same Old Gratifications (Diffusion of Innovation)," (Doctoral Dissertation, Ohio State University), *Dissertation Abstracts International*, 59, 3684.

Ali, Naushad. (2005) "The Use of Electronic Resources at IIT Delhi Library: A study of Search Behaviours" *The Electronic Library*.23 (6), pp.691-700.

Al-Saleh, Yasir Nasser. (2004), "Graduate Students' Information Needs from Electronic Information Resources in Saudi Arabia," Dissertation, Florida State University, Summer 2004.

Annual Report 2006-07, IIT, Roorkee

Annual Report 2007-08, IIT, Roorkee

Arora, Jagdish and Agarwal, Pawan. (2003), "Indian National Digital Library in Engineering Sciences and Technology (INDEST) Consortium: Consortia-based subscription to Electronic resources for technical education system in India." In: Proceedings of CALIBER 2003 (eds.S.M. Salgar, et al.). Ahmedabad, India, INFLIBNET, pp. 271-290.

Ary, D.; Jacobs, L.; and Razauieh, A. (1996), *Introduction to Research in Education*, New York: Harcourt Brace College Publisher, 5<sup>th</sup> Edition.

Asefeh, Asemi and Nosrat Riyahiniya. "Awareness and Use of Digital Resources in the Libraries of Isfahan University of Medical Sciences, Iran." *The Electronic Library*, 25(3), pp316-327.

Babbie, E. (1986), *The Practice of Social Research*, Belmont CA: Wadsworth.

Babbie, E. (1995), *The Practice of Social Research*, Belmont CA: Wadsworth, 7<sup>th</sup> Edition.

Barnard, J.P. (2000), A Study of Internet and Library Use in an Academic Setting, Doctoral Dissertation, Arizona State University, *Dissertation Abstracts International*, 61 (021), 577.UMI no. 9962600).

Barnes, J.H. (1997), "One Giant Step Lead, One Small Step: Continuing the Migration to Electronic Journals" *Library Trends*, 15(3), pp. 104-115.

Bjork, Chorister Bo.; and Turk, Ziga. (2000), "A Survey of the Impact of the Internet on Scientific Publishing in Construction of it and Construction Management, July, 2 March 2004. <http://www.itan.org/2000/5/>

Brockington, Wanda Goins.(2003), “African-American College Students and Internet Use: A Study of Uses and Gratifications (Washington, D.C.),” *Dissertation, Howard University*, DAI-A, 64, p.111, 7 July 2004.  
<http://wwwlib.uni.com/dissertations/fullcit/3119615>.

Choukhande, Vaishali G.; and Kumar P.S.G. (2004), “Analytical Study of Information Needs and Use Pattern of Faculty Members and Research Scholars of Amravati University,” *ILA Bulletin*, 40 (3), pp.23-31.

Crawford, John C.; and Daye, Andrew. (2000), “A Survey of the Use of Electronic Services at Glasgow Caledonia University Library,” *The Electronic library*, 18(4), pp. 255-265.

Dadzie, Perpetua S. (2005), “Electronic Resources: Access and Usage at Ashesi University College,” *Campus-wide Information Systems*, 22(5), pp. 290-297.

Darries, Fatima. (2002), “The Impact of the Internet on Reference Services in Higher Education Libraries in South Africa,” *ELIS*.

De Groote, Sandra L.; and Dorrch, Josephine L. (2001), “Online Journals: Impact on Print Journals Usage”, *Bulletin of Medical Libraries Association*, 89(4), pp.372-378.

Dervin,B.; and Clark, K. (1987), “Asking Significant Questions: Alternative Tools for Information need and Accountability Assessments (ERIC Document Reproduction Service ED 286519),” Belmont, CA, Peninsula Library System

Doraswamy, M. (2005), “Familiarity and Use of the Available Electronic Information Resources by the Students in U.R Siddhartha Engineering College Library, Vijay Wada: A Survey,” *NACLIN*, pp.234-244

Duranceau, E.F. (ed.) (1996). "Old Wine in New Bottles: Defining electronic Serials." *Serials Review*, 22(1), pp. 69-79.

Edwards, C.E.; Day J.M.; and Walton, G. (1995), "IMPACT Project: The Impact on People of Electronic Libraries," *Aslib Proceedings*, 47 (9), pp.203-208.

Gibaldi, Joseph (2004), "*MLA Handbook for Writers of Research Papers.*" 6<sup>th</sup> edition Affiliated East- West Press, New Delhi, pp.1-361.

Gupta, S.P.(2002), "Statistical Methods," New Delhi, Sultan Chand and sons, Education Publishers, 31<sup>st</sup> Edition.

Harter, Stephen P. (1998), "Scholarly Communication and Electronic Journals: An Impact Study," *JASIS*, 49(6).

Herring, Susan Davis.(2002), "Use of Electronic Resources in Scholarly Electronic Journals: A Citation Analysis," *College and Research Libraries*, July, pp.334-340.

Heydet-kirsch, Patricia E. (2003), "The Use of the Internet with in the College Search Places of High School Juniors and Seniors," Dissertation University of Miami, DAI-A 65-01 (2003): 96. 8 July 2004. <http://wwwlub.uni.com/dissertatins/fulleit/3119901>.

Hickerson, Corey Allan. (2003), "Instructional Productivity and the Use of E-Mail and Websites," Dissertation University of Wginia, 2003. DAI-A 64/04, 5July 2004.<http://wwwlib.uni.com/disserations/fullict/3097290>

<http://www.aicte.com/policiesprog.html>

<http://www.scholarshipsindia.com/engineering.html>

<http://www.iitd.ac.in/library>

[http:// www.iitr.ac.in/library](http://www.iitr.ac.in/library)

[http:// www.tu.ac.in/library](http://www.tu.ac.in/library)

[http:// www.pec.ac.in/library](http://www.pec.ac.in/library)

Huntington, P., Nicholas, D., Jamali, H. R. and Tenopir, C. (2006), "Article Decay in the Digital Environment: An Analysis of Usage of OhioLINK by Date of Publication, Employing Deep Log Methods," *Journal of the American Society for Information Science and Technology*, 57(13): 1840–1851.

Hwong, Wei-Long. (2003), "Internet Learning: An Assessment of Students Internet Usage in one College in Taiwan (China)," Dissertation Spalding University, DAI\_64/01(2003):121. July 2004, <http://www.lib.uni.com/dissertations/fullcit/3077707>.

Hawkins, Clifford.; and Sorgi, Marco. (1993), "*Research: How to plan, Speak and Write About It*," New Delhi, Narosa Publishing House.

Ibrahim, Ahmed Elhafiz. (2004), "Use and User Perception of Electronic Resources in the United Arab Emirates University (UAEU)," *Libri*, 54, pp.18-29.

Julien, H. (1996), "A Content Analysis of the Recent Information Needs and Uses Literature," *Library and Information Science Research*, 18, pp.171-191.

Johnston, Chris. (2003), *Call to put research free on websites*. Times Higher Education Supplement, December 19, p.7

Kanwal, Ameen. (2008) "Barriers in Collection Sharing among Libraries of Pakistan: University Library Managers' Viewpoint", *Library and Information Science Research Electronic Journal*, 18 (1), March <http://libres.curtin.edu.au/>

Kelly, Kimberly B.; and Orr, Gloria J. (2003), "Trends in Distant Student Use of Electronic Resources: A Survey," *College and Research Libraries*, May, pp .176-190.

Krueger, Janice.; Ray Ron L.; and Knight, Lorrie. (2004), "Applying Web Usability Techniques to Assess Student Awareness of Library Web Resources," *The Journal of Academic Librarian Ship*, 30(4), July, pp. 285-293.

Kwon, Joec. (2003), "A Proposed Model for Use of the Internet and the WorldWide Web," Dissertation University of Alabama, DAI-A 64/12 (2003), 211, 7 July 2004. <http://wwwlib.uni.com/dissertations/fullcit/3115054>.

Kazmier, Leonard. J. (1988), "*Schaum's Outline Series: Theory and Problems of Business Statistics with Computer Application*," New York: McGraw-Hill book Company, 2<sup>nd</sup> Edition, pp.200-202.

Kothari, C.R.(2004), "*Research Methods and Technique*," New Delhi, New age international, 2<sup>nd</sup> Edition.

Kumar, Krishan.(1992), "*Research Methods in library and information science*," New Delhi, Har-Anand Publication

Lazinger, Susan S; Bar-Ila, Judit; and Peritz, Bluma C. (1998), "Internet Use by Faculty Members in Various Disciplines: A comparative case study," *The Journal of American Society for information science*, 48 (6), Dec., pp. 508-518.

Lenares, Deborah. (1999), "Faculty Use of Electronic Journals at Research Institution," ACRL Ninth National Conferences; Detroitmichaigan, April 8-11.

Library and Information Statistics Unit (LISU), Loughborough University Annual Library Statistics, 2003 Table 5.6a

Liew, Chern Li; Foo, Schubert, ; and Chemupati, K.R. (2000), "A Study of Graduate Student End-users: Use and Perception of Electronic Journals," *Online Information Review*, 24(4), pp. 302-315.

Lawley, E.L. (1999), "Making Sense of doctoral Student Attrition in Library and Information Science," Doctoral Dissertation, The University of Alabama, *Dissertation Abstracts International*, 61, no. OIA.

Meadow, C.T. (1988), "Back to Future: Making and Interpreting the Database Industry Timeline." *Database*, 11 (5), pp14-16.

Mogge, D. (1998). "ARL Directory Tracks Growth in E-publishing." *ARL Newsletter*, 196, pp.1-2.

Monopoli, Mari.; Nicholas, David.; Georgiou, Panagiotis.; and Karfiati, Marima. (2002), "A User-oriented Libraries: Case Study 'The Electronic journals' Service of the Library Information Service of University of Patras, Greece." *Aslib Proceeding*, 54(2), pp.103-107.

Miller, R.H. (2000), "Electronic Resources and Academic Libraries, 1980-2000: A Historical Perspective," *Library Trends*, 48(4), pp. 645-670.

Milne, Patricia. (1999), "Electronic Access to Information and its Impact on Scholarly Communication," *Academic Libraries*.

<http://www.csu.edu.au/special/online99/proceeding99/305b.htm>.

Momani, Hassan Ahmad. (2003), "Evaluation of the Nature, Extent, and Satisfaction with use of the internet by Applied Science and Technology Faculty Members in Jordon," Dissertation University of Pittsburg, *DAI-A* 64/12(2003):176.8, July 2004.

<http://wwwlib.uni.com/dissertations/fullcit/3117789>.

Monopli Maria.; Nicholas David.; Georgiou, Panagiotis.; and Korfiati, Marima. (2002), "A User Oriented Evaluation of Digital Libraries: A Case Study 'The Electronic Journals' services of the library and information service of the University of Petra, Greece," *Aslib Proceedings*, 54 (2), pp. 103-117.

Palmquist, R.; and Kim, K. (1998), "Modelling the Users of Information Systems: Some Theories and Methods," *The Reference Librarian*, 60, pp.3-25.

Parker, Betty., Plank, Richard E. (2000), "A uses and gratification perspective on the Internet as a new information. *American Business Review* 18 (2), pp. 43-49

Patton, M. (1990), *Qualitative Evaluation and Research Methods*, Newbury Park, CA; SAGE Publications

Palit, S.K. (1997) "Electronic Engineering Education in India" Proceedings of first Asia-Pacific forum on Engineering and Technology Education, Monash University, Clayton, Melbourne, Australia. pp. 50-54.

Palit, Sajal.K. (1998), "The Development of Engineering and Technical Education in India," *Global Journal of Engineering Education*, 2(3), pp317-326.

Rao,I.K.Ravichandra. (1997), "Impact of Recent Advancements in Information Technology on Collection Development,"*DESIDOC Bulletin of Information Technology*, 17(1), pp.3-6.

Ray, Kathryn and Day, Joan. (1998), "Student Attitudes Towards Electronic Information Resources." *Information Research*, 4(2),October, pp. 1-32.

Razaand, M.M and Upadhyay, A.K. (2006), "Usage of E-journals by Researchers in Aligarh Muslim University: A Study," *The International Information & Library Review*, 38 (3), September 2006, pp. 170-179.

Robinson, Janniew. (2005), "Internet Use Among African-American College Students: An Exploratory Study," *Dissertation*, George Washington University, DAI-A 65/12(2005): 150.9, Aug.2005.  
<http://wwwub.uni.com/hersertations/fullert/3156015>.

Rogers, Sally A (2001), "Electronic Journal Usage at Ohio State University." *College and Research Libraries*, Jan, pp.25-34.

Rusch-Feja, Dinan and Siebeky, Uta. (1999), "Evaluation of Usage and Acceptance of Electronic Journals," *D-lib. Magazine*, Oct.5, (10).

Samson, Sue.; Derry, Sebastian. ; and Eggleston, Holly. (2004), "Networked Resources, Assessment and Collection Development," *The Journal of Academic Librarianship*. 30(6), Nov, pp.476-481.

Schanffner,B.L(2001), "Electronic resources: A Wolf in Sheep Clothing?," *College and Research libraries*, 62 (3), pp. 239-249.

Siebenberg, Tammy R. Galbraith, Betty; and Brady, Eileen E. (2004), "Print versus Electronic Journal Use in three Sci./Tech Disciplines; What's' Going on Here?," *College and Research Libraries*, Sep, pp.427-438.

Smith, Erin T. (2003), "Changes in Faculty Reading Behaviors: The Impact of Electronic Journals on the University of Georgia," *The Journal of Academic Librarianship*, 29(3), May, pp.162-168.

Shoham, Snunith.; and Roitberg, Nurit. (2005), "From Electronic Library to a Learning Centre in the Academic Library: Integrating Traditional and New Use in the Library Work Station," *The Journal of Academic Librarianship*, July, 31(4).

Simmands, P.L. (2001), "Usage of Academic Libraries: The Role of Service Quality, Sources, and User Characteristics," *Library Trends*, 49(4), Spring, pp.626-634.

Taher, Mohamed.; and Davis, Donald Gordon Jr. (1994), "*Librarianship and library science in India.*" Concept Publishing Company, New Delhi, pp.108.

Ulrich (2008), *Ulrich's periodicals directory, 2009*. [www.bowker.com/index](http://www.bowker.com/index)

Verhoeven, S.M. (1990), Users' Surveys, *Encyclopedia of Library and Information Science*, 45, pp.373-399.

Verma., Rama ( 2002), "Collection development in libraries of Thapar Institute of Engg & Technology, IIT Delhi and IIT Roorkee." *Ph.D Dissertation*, Punjabi University, Patiala

Walster, D. (1996), "Technologies for information access in library and information centers," In D.H. Jonassen (Ed.), *Handbook of research for educational communications and Technology*, New York: Simon and Schuster Macmillan. pp. 720-752.

Waldman, Micaela. (2003), "Freshmen's Use of Library Electronic Resources and Self- efficacy," *Information Research*, 8(2), Jan.

Woo, Helen. (2005), "The 2004 User Survey at the University of Hong-Kong Libraries," *College and Research Libraries*, March. pp.115-135.

Woodward, Hazel.; Rowland Fytton.; Mckinight, Cliff.; Pritihett Carolyn.; and Meadows Jack. (1998), "Cafe 'Jus': An Electronic Journals User Survey." *Journal of Digital Information*, 1(3), <http://jodi.ecs.soton.ac.hik/Articles/uol/103/woodward/>

Yang, Shi-Wen. (2003), "Internet Use by Pre-Service Teachers in Elementary Education Instruction," *Dissertation*, Idaho State University, DAI-A 64/06 (2003):189.7, July 2004 <http://www.ub.uni.com/disertations/fullcit/3094895>

Yasir Naser Al, Saleh. (2004), "The Graduate Student's Information Needs from Electronic Information Resources in Saudi Arabia," *Doctoral Dissertation*, Florida State University School of Information Studies.

Zhang, Yin. (2001), "Scholarly Use of Internet-based Electronic Resources," *Journal of the American society for Information Science and Technology*, 52 (8), April, pp.628-664.

Zhang, D. (1999), "Using the Internet for Research: Factors that affect its Adoption and Utilization by Doctoral Students (Diffusion of Innovation, Graduate Students)," (Doctoral dissertation, Texas A&M Commerce-Commerce) *Dissertation Abstracts International*, 69, 1095.

**QUESTIONNAIRE FOR LIBRARIAN**

**General Information**

1. *Name of the Institution:*

---

2. *Complete Address:*

---

2.1. Telephone:

2.2. E-mail:

2.3 Fax:

2.4 Web Sites

3. *Librarian's Name with Education/Professional Qualifications:*

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4. *Annual Budget of the Institute.*

4.1 2003-2004 \_\_\_\_\_

4.2 2004-2005 \_\_\_\_\_

4.1 2005-2006 \_\_\_\_\_

5. *Budge Allocated to the Library*

5.1 2003-2004 \_\_\_\_\_

5.2 2003-2004 \_\_\_\_\_

5.3 2003-2004 \_\_\_\_\_

6. *Courses Offered and Annual Intake of Student*

6.1 Undergraduate Level: \_\_\_\_\_

6.2 Integrated Degree Level: \_\_\_\_\_

6.3 Post-graduate Level: \_\_\_\_\_

6.4 M.Phil Level: \_\_\_\_\_

6.5 Research Level: \_\_\_\_\_

6.6 Any Other: \_\_\_\_\_

7. *Library Holdings:*

Books		Journal (Current)		Back Volumes:		CD ROMs:	
Databases:		Stadard & Specifications		Technical Reports:		Video	
Microfilms/		E-journals		Microfiche		Audio	
Other (Sepcify)							

**8. No. of Registered Library Users**

- 8.1 UG \_\_\_\_\_ 8.2 PG \_\_\_\_\_  
8.3 Research \_\_\_\_\_ 8.4 Faculty \_\_\_\_\_  
8.5 Admin. Staff \_\_\_\_\_ 8.6 Supporting Staff \_\_\_\_\_  
8.7 Other \_\_\_\_\_

**9. If yes spread of Campus LAN: How spread out your Campus LAN is?**

- 9.1 Restricted to Computer Centre   
9.2 Restricted to Computer Centre + Library   
9.3 Number of Connection in Deptt./Centers/Labs/Units.   
9.4 All in Deptts/Centers/Labs./Units are well connected   
9.5 Besides Institute, the LAN reaches out to the hostels and Residence also

**10. Is your Library a member of a library network Yes/ No**

**11. If yes, Please mention the name:**

\_\_\_\_\_

**12. Which software you are using in your library**

\_\_\_\_\_

**13. Does your Library has a Web Site: Yes/No**

**Services**

**14. What are the e-resources in your library?**

- 14.1. \_\_\_\_\_ 14.2. \_\_\_\_\_ 14.3. \_\_\_\_\_  
14.4. \_\_\_\_\_ 14.5. \_\_\_\_\_ 14.6. \_\_\_\_\_

**15. Who are the main users of these E-resources?**

- UG Students  Research Scholar   
PG Students  Faculty

**16. What Measures have been taken to promote the use of the e-resources with in organization.**

- 16.1 Provide links from home page Yes/No  
16.2 Conduct orientation Programme for users Yes/No  
16.3 E-mail/Internet mailing link Yes/No  
16.4 Any other \_\_\_\_\_

17. *Do you provide following services using the state of-the-art information technology tools? (Please√)*

- |  |     |
|--|-----|
| Provide access to library OPAC                       | [ ] |
| Generate reminders for overdue books                 | [ ] |
| Provide recent additions list                        | [ ] |
| Provide individual alert services                    | [ ] |
| User can know their status of issue/return date etc. | [ ] |
| CD-ROM database services                             | [ ] |
| Contents pages services                              | [ ] |
| Electronic Reference service                         | [ ] |
| Online Access to databases                           | [ ] |
| Access to internet in the library                    | [ ] |
| Access to other library database                     | [ ] |
| Access to electronic journals service                | [ ] |
| Access to internet resources through library portals | [ ] |
| Any other services (Please Specify)_____             |     |

### **Users Training**

18. *Are you providing hands-on-training to the uses at your institute regarding e-resources*\_\_\_\_\_

### **User Implementation**

Implementations of IT in your library might have several implications on the users.

Please indicate the following in your case? (Please √)

#### **Advantages:**

- |  |     |
|--|-----|
| 1. Users satisfied with the automation of library activities   | [ ] |
| 2. Users visit library frequently                              | [ ] |
| 3. Users feel comfortable in locating resources in the library | [ ] |
| 4. Users are more and more demanding                           | [ ] |
| 5. Users are more quality conscious                            | [ ] |
| 6. Users have become more time conscious                       | [ ] |
| 7. Visibility of the library resources increased               | [ ] |
| 8. Any other (Please specify) _____                            |     |

**Disadvantages:**

- 1. Users feel uncomfortable with new systems [ ]
- 2. Numbers of users coming to the library has decreased [ ]
- 3. Users cannot use the system independently [ ]
- 4. Feel traditional systems are better for access due to complexity in use [ ]
- 5. Any other (Please specify)

**20** *With the introduction of IT in the library, the Image of the Library has*

Improved [ ] No. Change [ ] Decreased [ ]

**Users Statistics**

- 20.1. \_\_\_\_\_ 20.2. \_\_\_\_\_
- 20.3. \_\_\_\_\_
- 20.4. \_\_\_\_\_ 20.5. \_\_\_\_\_
- 20.6. \_\_\_\_\_

*Any other information that yours precious feel should be there, you are free to give suggestion regarding this.* \_\_\_\_\_

**Thanks for giving you time in completing this questionnaire.**

**QUESTIONNAIRE FOR USERS**

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**Questionnaire (For Research Work) for Students/Research Scholar/Faculty on “Use and Impact of Electronic Resources in Engineering and Technology Institution of India”**

**Your Feedback will be of great value please tick (√) and fill up (as needed) the following information.**

**The following information obtained will be kept confidential and will be used for study purposes only.**

---

***Demographics***

**1. Name** \_\_\_\_\_

**2. Gender:** Male  Female

**3. Age Group** 18-22  23-27  28-32  33-37   
38-42  43-47  48-Above

**4. Which Degree/ Qualification are you studying for?**  
UG  PG  ME/M.TECH  Ph.D

**5. If you are Faculty, Please indicate your academic rank.**  
Lecturer  Asstt. Prof  Associate Prof  Prof

**6. In which department/stream you are working?**  
Engineering  Sciences  Social Sciences  Any other

---

***Use of Library Services***

**7. Do you use your institute library?**  
Yes  No

**8. For what purpose you use library?**

Getting book issue /return	<input type="checkbox"/>
Consulting Periodicals /Journals	<input type="checkbox"/>
For Getting Photo copy	<input type="checkbox"/>
Consulting other resources	<input type="checkbox"/>
For time pass	<input type="checkbox"/>

**9. Are you satisfied with your institute’s library services?**  
Fully satisfied  Partial satisfied  unsatisfied

10. Are you aware of your library electronic resources/services?

Yes  No

11. Have you ever visited library website?

Yes  No

12. Is your library providing adequate training on how to use electronic resources?

Yes  No

13. Do you feel training is important to make maximum use of library Electronic resources and services?

Yes  No

---

### ***Computer Knowledge***

14. Do you have knowledge of using computer?

Yes  No

15. Do you use/browse Internet?

Yes  No

16. How much it is important to use the internet for getting information related to you subject / profession?

Less  More  Most Important  Not at all

17. Purpose for using/browsing internet websites:

Email	<input type="checkbox"/>	Finding Relevant Information	<input type="checkbox"/>
Career development	<input type="checkbox"/>	Entertainment	<input type="checkbox"/>
Research work	<input type="checkbox"/>	Other if any_____	

18. How often do you go online?

Most of the time	<input type="checkbox"/>	Once in a week	<input type="checkbox"/>
Occasionally	<input type="checkbox"/>	Daily	<input type="checkbox"/>

19. Do you feel computer literacy is important to use electronic resources?

Yes  No

---

### ***Frequency of use of electronic resources***

20. What format you prefer to use, for getting information?

Print  Electronic  Both

21. For what purpose(s) you use electronic resources?

Writing papers	<input type="checkbox"/>	Books	<input type="checkbox"/>	Projects	<input type="checkbox"/>
Preparing notes	<input type="checkbox"/>	To support academic work	<input type="checkbox"/>	Research work	<input type="checkbox"/>
Seminars	<input type="checkbox"/>	Other if any_____			

22. Are you having information regarding availability of free electronic journals on the net?

Yes  No

23. When ever you use internet/website /electronic resources you prefer to

Download the information and copy to CD / floppy   
Takes print out   
Only reading

24. How do you rate the quality of information you acquire from internet on World Wide Web (www)?

Poor  Good  High Quality

25. Frequency of using: Internet CD Rom services electronic journals

Daily	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
2-3 times in week	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Once a week	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Occasionally	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>

26. Where do you access information /electronic resources?

Computer centre	<input type="checkbox"/>	Library	<input type="checkbox"/>
Home	<input type="checkbox"/>	On-Campus Location	<input type="checkbox"/>
Off-campus location	<input type="checkbox"/>	Hostel	<input type="checkbox"/>
Department	<input type="checkbox"/>		

27. The UGC- INFONET electronic journals consortia subscribes to a number of electronic journals for your institutes are you aware of these resources?  
(This question is only for TIET, Patiala)

Yes  No

If yes, do you use these resources?

Yes  No

28. INDEST consortium subscribes to electronic journals, are you aware of these sources?

(This question is for IIT, Delhi; IIT, Roorkee and PEC, Chandigarh.

Yes  No

If yes do you use these resources?

Yes.  No

29. There are several electronic journals/portals that list electronic journals available freely/free access for e.g. [www.freemedicaljournal.com](http://www.freemedicaljournal.com) are you aware of such electronic journal/portals:

Yes  No

If yes please name a few

1.  
2.

**30. You seek information from**

- |                             |                          |                                     |                          |
|-----------------------------|--------------------------|-------------------------------------|--------------------------|
| Current electronic journals | <input type="checkbox"/> | Back volumes of electronic journals | <input type="checkbox"/> |
| On-line databases           | <input type="checkbox"/> | Electronics book                    | <input type="checkbox"/> |
| Video Cassettes             | <input type="checkbox"/> | On-line catalogue (OPAC)            | <input type="checkbox"/> |
| Internet website            | <input type="checkbox"/> | Electronic Mail                     | <input type="checkbox"/> |
| CD ROM/DVD                  | <input type="checkbox"/> |                                     |                          |

**31. Limitation/Barrier you feel for using the electronic resources:**

- |                              |                          |                               |                          |
|------------------------------|--------------------------|-------------------------------|--------------------------|
| Lack of time                 | <input type="checkbox"/> | No Knowledge of using         | <input type="checkbox"/> |
| Uncomfortable                | <input type="checkbox"/> | Access time is slow           | <input type="checkbox"/> |
| Cannot find what to look for | <input type="checkbox"/> | Unorganized                   | <input type="checkbox"/> |
| Not easy to use              | <input type="checkbox"/> | Difficult to read from screen | <input type="checkbox"/> |

**32. Are you comfortable with Electronic information resources?**

- |     |                          |    |                          |
|-----|--------------------------|----|--------------------------|
| Yes | <input type="checkbox"/> | No | <input type="checkbox"/> |
|-----|--------------------------|----|--------------------------|

**33. Do you feel Internet/electronic resources can replace print document?**

- |     |                          |    |                          |
|-----|--------------------------|----|--------------------------|
| Yes | <input type="checkbox"/> | No | <input type="checkbox"/> |
|-----|--------------------------|----|--------------------------|

**You are free to give suggestion/additional comments:**

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**Thanks for giving your precious time in completing this Questionnaire**

## **LIST OF RESEARCH PUBLICATIONS**

### **Publications in Reviewed/ Referred Journals**

1. Kaur, Baljinder and Verma, Rama. (2009), "Use and Impact of Electronic Journals in the Indian Institute of Technology, Delhi," *The Electronic Library*, Vol.72, (4)
2. Kaur, Baljinder and Verma, Rama. (2009), "Use of Electronic Information Resources: A Case Study of Thapar University, Patiala (Punjab) India)," *DESIDOC Journal of library and Information Science Technology*, Vol. 29(2), pp.67-74. March 2009.  
**Special Issue on Social Science Gateways**
3. Baljinder Kaur and Verma, Rama. (2008), "Awareness about Electronic Journals and their Usage among the Users: A Study" (With special reference to Punjab Engineering College, Chandigarh), *The Indian Journal of library and Information Science*, January. Vol.2 (3), Sept-Dec 2008, pp 113-120.
4. Baljinder Kaur and Verma, Rama. (2007), "Electronic Resources – Use and Awareness, in Indian Institutes of Engineering and Technology: A Survey," *53rd All India Library Conference; Osmania University, Hyderabad, December 13-16, 2007*, pp.84-93.
5. Verma, Rama and Baljinder Kaur. (2007), "Use and Impact of Electronic Resources in Indian Institutes of Technology in India: A Case Study", *EMPI, Digital library National Convention*, March 18-20, 2007, pp 26-33.
6. Baljinder Kaur and Verma, Rama. (2006), "Use of Electronic Resources at TIET Library Patiala: A Case Study" *ILA Bulletin*, Vol.42, No .3, July-Sept.