

**AWARENESS AND USE OF UGC-INFONET DIGITAL  
LIBRARY CONSORTIUM AMONG RESEARCH  
SCHOLARS OF UNIVERSITY LIBRARIES OF PUNJAB:  
A STUDY**

**Thesis**

Submitted for the Award of the Degree of

**Doctor of Philosophy**

in

**Library and Information Science**

Under the supervision of  
**Dr. S. K. Sonkar**  
Assistant Professor

Submitted by  
**Vishwas Jeet Rajbanshi**

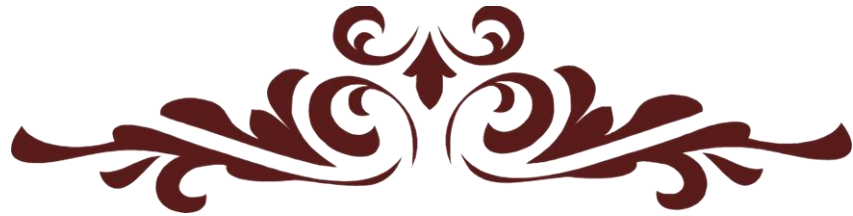


**Department of Library and Information Science  
(School for Information Science and Technology)  
Babasaheb Bhimrao Ambedkar University  
(A Central University)**

**Vidya Vihar, Raebareli Road, Lucknow-226025, Uttar Pradesh**

**Enrolment No:-753/13**

**Year 2017**



*Dedicated to  
My Parents*





# DECLARATION

I hereby declare that this thesis entitled “**AWARENESS AND USE OF UGC-INFONET DIGITAL LIBRARY CONSORTIUM AMONG RESEARCH SCHOLARS OF UNIVERSITY LIBRARIES OF PUNJAB: A STUDY**” submitted by me for the award of the Degree of Doctor of Philosophy in Library and Information Science to the Department of Library and Information Science, Babasaheb Bhimrao Ambedkar University, Lucknow is an outcome of my own efforts and is an original work. The contents of this thesis did not form a basis for the award of any previous degree to anyone else. It is also undertaken that the thesis is essentially free all kinds of plagiarism.

Date:

Place: Lucknow

**(Vishwas Jeet Rajbanshi)**

Research Scholar

Department of Library and Information Science

Babasaheb Bhimrao Ambedkar, Central University

Vidya Vihar, Raebareli Road, Lucknow-226025(U.P.)





बाबासाहेब भीमराव अम्बेडकर विश्वविद्यालय

(केन्द्रीय विश्वविद्यालय)

विद्या विहार, रायबरेली रोड, लखनऊ-226025

**BABASAHEB BHIMRAO AMBEDKAR  
UNIVERSITY**

(A Central University)

Vidya Vihar, Raebareli Road, Lucknow-226025

Letter No.-<sup>SB</sup>...../COE/BBAU/2015

Dated: 28/04/15

**Ph.D. Course Work Certificate**

This is to certify that **Mr. Vishwas Jeet Rajbanshi**, Enrollment No. 753/13 Ph.D. Research Scholar, Department of Library and Information Science of this University has successfully completed his Ph.D. Course work in the examination held during May, 2014.

  
(A.K. Maurya)

**Deputy Registrar (Exam.)**

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I wish to acknowledge **Prof. R.C. Sobti** Vice Chancellor, Babasaheb Bhimrao Ambedkar Central University, Lucknow for providing all the support, facilities and an excellent environment during the course of my doctoral study.

I wish to thank all my friends **Anjali Verma, Anubhav Shah, ShyamDeo Gond, and Mithilesh Kumar**, they have always supported me in all my personal and professional decisions.

I would also like to thank my brothers and sister for their unconditional love and support throughout my tenure.

In the end, I would like to thank everybody who was essential to the successful realization of my thesis .

Thank you all once again !

**Date:**

**Place: Lucknow**

**(VishwasJeetRajbanshi)**

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## PREFACE

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The study of “**Awareness and Use of UGC-INFONET Digital Library Consortium among Research Scholars of University Libraries of Punjab: A Study**”, is to analyse the awareness and usage of electronic resources by the research scholars of Panjab University-Patiala, Guru Nanak Dev University-Amritsar, Punjabi University-Patiala, Thapar University-Patiala and Central University of Punjab-Bathinda. Today, advancement of Information and communication technology has provided various types of e-resources that are readily available to the users at a click on their desktop. The study consists of six chapters well arranged in a coherent manner.

Chapter One presents the background of the present study, e-resources and services, statement of the problem, the significance of the study, objectives, hypothesis, limitations of the study, methodology, definition of the concepts used.

Chapter Two is related to literature review. It covers the development of consortia and explores the issues of awareness and usage of e-resources across the UGC-Infonet DLC platforms.

Chapter Three includes the meaning of library consortia; the consortium - History and development, objectives of library consortia; the scenario of the consortium in India. The chapter also covers the UGC-Infonet DLC and brief information about E-SodhSindhu.

Chapter Four deals with a historical outline of the selected University Libraries in Punjab State, and provides brief information about the Campus profile, teaching departments, centers and various sections of the library.

Chapter Five presents the analysis of the data received from the research scholar on awareness and use of UGC-Infonet DLC among research scholars of University Libraries of Punjab.

Chapter Six provides an overview of the major findings related to awareness and use of UGC-Infonet DLC, hypothesis testing and suggestions to increase the awareness and use of these e-resources and services by the scholars.

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## LIST OF ABBREVIATIONS

$\chi^2$	chi-square
CAS	Current Awareness Service
CD-ROM	Compact Disc Read Only Memory
CUP-B	Central University of Punjab, Bhatinda
DELNET	Developing Library Network
EDS	Electronic document supply
e-access	Electronic access
e-archive	Electronic archive
e-book	Electronic Book
e-catalogue	Electronic catalogue
e-content	Electronic content
e-databases	Electronic databases
e-edition	Electronic edition
e-form	Electronic form
e-journals	Electronic journals
e-learning	Electronic learning
e-mail	Electronic mail
e-reference	Electronic reference
e-resources	Electronic resources
e-scholarly	Electronic scholarly

e-theses	Electronic thesis
e-thesis	Electronic thesis
GNDU-A	Guru Nanak Dev University, Amritsar
HRD	Human Resource Development
ICT	Information and communication Technology
INDEST	Indian National Digital Library in Engineering Sciences and Technology
INFLIBNET	Information and Library Network
OPAC	Online Public Access Catalogue
PU-C	Panjab University, Chandigarh
PU-P	Punjabi University, Patiala
TU-P	Thapar University, Patiala
UGC	University Grant Commission
www	World Wide Web

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# DECLARATION

I hereby declare that this thesis entitled "AWARENESS AND USE OF UGC-INFONET DIGITAL LIBRARY CONSORTIUM AMONG RESEARCH SCHOLARS OF UNIVERSITY LIBRARIES OF PUNJAB: A STUDY" submitted by me for the award of the Degree of Doctor of Philosophy in Library and Information Science to the Department of Library and Information Science, Babasaheb Bhimrao Ambedkar University, Lucknow is an outcome of my own efforts and is an original work. The contents of this thesis did not form a basis for the award of any previous degree to anyone else. It is also undertaken that the thesis is essentially free all kinds of plagiarism.

Date: 24/12/18

Place: Lucknow



(Vishwas Jeet Rajbanshi)  
Research Scholar

Department of Library and Information Science  
Babasaheb Bhimrao Ambedkar, Central University  
Vidya Vihar, Raebareli Road, Lucknow-226025(U.P.)

**Dr. S. K. Sonkar**  
Assistant Professor  
Department of Library and Information Science

---

## **CERTIFICATE**

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The thesis submitted to Babasaheb Bhimrao Ambedkar University Lucknow satisfies all the requirements as stipulated in the *Doctor of Philosophy (PhD) regulations – 1999 as amended in 2010* and it is fit for submission and evaluation for the award of the degree of Doctor of Philosophy of the University.

Date: 24/12/18

  
Supervisor

  
Head of Department

I would also like to thank all faculty members of DLIS, B.B.A.U, Lucknow, especially **Prof. K. L. Mahawar, Prof. Shilpi Verma and Dr. R. K. Choudhary**, for their cooperation and valuable suggestions for the study and their help and guidance whenever required.

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In the end, I would like to thank everybody who was essential to the successful realization of my thesis.

Thank you all once again!

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Place: Lucknow



(Vishwas Jeet Rajbanshi)

# CHAPTER -1

## INTRODUCTION

---

*The economic benefit of consortia lies in the ability of libraries to take their budgets further, spending less and getting more.*

*- Maskell, 2008*

### 1.1 Background of the Study

The Library Consortiums are established in order to facilitate the sharing of knowledge resources that are located across fragmented locations worldwide. Networking and resource sharing are the two synergies that are explored across the library consortia (Okeagu & Okeagu, 2008). In literal terms, a library consortium is a group of two or more libraries that agree to share the resources to fulfil the common demand for knowledge-based resources (Bostick, 2001).

The users only determine the usability and purpose of such Consortia. It emphasizes the need of the libraries to hang together and observed that consortia based libraries are more efficient in the exploitation of ingrained e-resource collections through virtual e-catalogues (Allen & Hirshon, 1998). Such a setup has been observed to lower the acquisition and conservation cost as well as sustain revenue generation. Such mechanisms have been seen to possess a positive impact on academia publisher relations.

The historical evolution of ICT supported digital library consortia in India is facing similar challenges. Despite the investment of millions of rupees in the UGC-Infonet DLC facility, the user response is not as predicted and the usability of the platform across masses is still under the cloud. The global research on underutilization points towards the gaps either

across user's skills or in user-oriented training or on the part of the institution or across the user interfaces of such platforms.

The users and their identity, as well as information literacy levels, are not changing with the change in service provision technologies(Cox, 2000). The emphasis on ICT based interfaces in learning and knowledge sharing has put extra pressure on the users and librarians alike in familiarize the user with skills that enable better consortia usage. Further, these consortia have been observed to possess life cycles, beyond which they need regeneration as well as restructuring (Shachaf, 2003).

The libraries are entering the phase of collaborative knowledge sharing and learning. Space and time constraints about access and sharing of knowledge are giving way to technology-supported mechanisms that are facilitating anytime access to qualitative information for research, knowledge creation and transmission across the world (Esposito, 2013). The Indian libraries are no exception to changing the role of libraries in university's knowledge production endeavours. The usability and the awareness across research scholars and other library users is a matter of grave concern in developing economies with substantial digital divide(UNESCO, 2009).

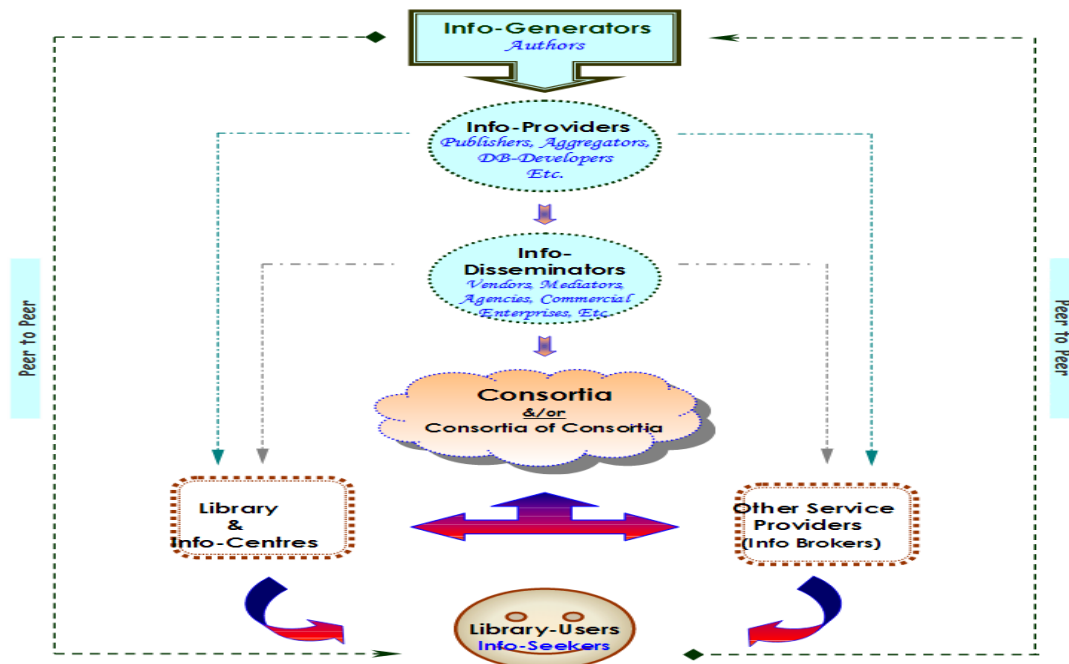
The academic study points regarding the loss of potential of the collaborative knowledge sharing networks and library consortiums; when the user is either unaware about the existence of such an option or the perceived user is not apt at effective use of such a mechanism (Reddy, 2004; Lee & Lin, 2005; Thong, Hong & Tam, 2002). The technology acceptance proportion is lower in developing economies in comparison with the advanced economies. The negligent or non-sustainable institutional efforts at promoting user's awareness and inculcating information literacy; are primarily viewed as potential constraints on effective usage of digital consortiums, institutional repositories and digital library

services((Johnson, Trabelsi & Fabbro, 2008; Tuominen, Savolainen & Taliya 2005; Peansupap& Walker, 2005).

In this context, the Indian libraries, especially the digital consortiums, institutional repositories and UGC-Infonet DLC are facing similar challenges concerning optimum usage(Reddy, 2004). The study found that research scholars information seeking and processing behaviours point towards the existence of the multiple aspects of human's information character and attributes. Such attributes across Indian scholars are not being addressed adequately on time (Reddy, 2004). The attempts regarding the academic interpretation of the user's acceptance of digital libraries have been nominal and non-convergent.

Similarly, the changes in the librarian's role in ICT diffusion in the library cannot be sidelined. The user's assessment of the usability of emerging digital repositories needs to be evaluated through the users attitude and perceptions regarding the usability and convenience of usage (Joo, Lin & Lu, 2011). The observed lack of awareness and usefulness of the emerging platforms like the INFLIBNET in the eyes of users makes a convincing case for research and evaluation concerning the UGC-Infonet DLC, the resident and visitor notions of the users can never avoid. The studies on youth's technology usage points towards the existence of resident and visitor psychologies that help us understand the platform usage intentions. As per the research, the resident tendencies foster the realinformation access, whereas the visitor tendencies lead to opinion formation and non-relevant usage of the previous technology setup (White & Cornu, 2011).It acts as the coordinator for the e-resource sharing at the national, regional and local levels (Pal & Das, 2008).

Figure:1.1 Information flow through Consortia

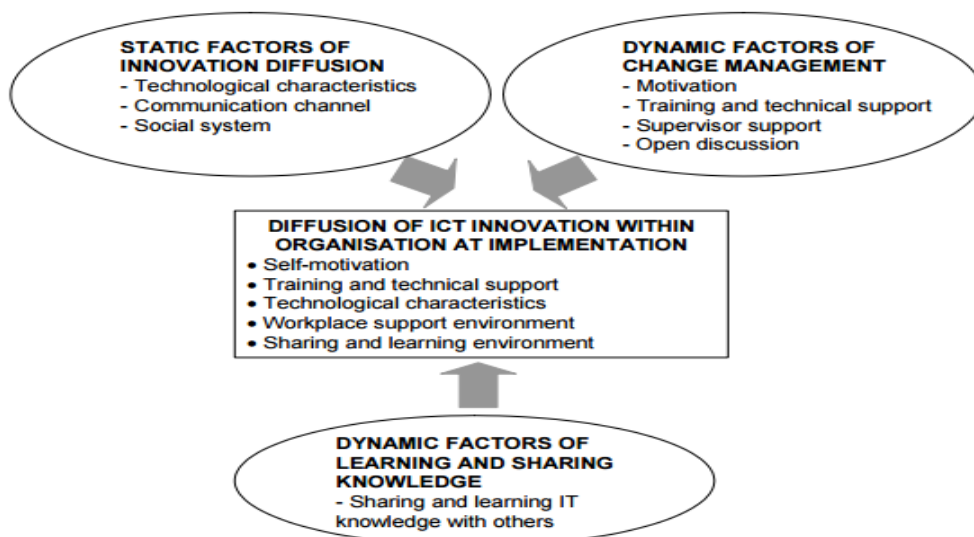


Source: <https://www.isical.ac.in/~serial/consortia/CBSOR-08.pdf>

As per the study, the resident users visualize the online technology-enabled libraries as the network of individuals or clusters that not only generate content but also allow the collaboration of knowledge across multiple platforms. The visitor tendencies rely on the manipulative image of the online modes of knowledge accession. The issue of technology adoption by the scholars can also not be a sideline. The context of technology acceptance and usage across the users is related to the aspect of the user's information and digital literacy and usage literature (Peansupap & Walker, 2005; Lee & Lin, 2005). Karahanna, Straub & Chervany(1999) study made a distinction between individuals' users' pre-adoption and post-adoption (continued use) beliefs and attitudes in a longer time perspective. The study observed the process of IT adoption and used as crucial for the realisation of the benefits of technology enabled services. The study further observed the incidence of the substantial difference concerning the determinants of the behavioural intentions, attitudes and respective norms. The study found that the attitude towards the technology platforms solely determines

the user's potential adopter intention to adopt a technology. The user's post-adoption attitudes reflect the incidence of the user's perceptions of the innovativeness of such platforms in information retrieval and search. The antecedents of the phenomenon of the sense-making and technology appropriation at the student's end are not that easy as it appears to be in general perspective. The study underlined the determinant role of the subjective norms, perceived behavioural controls, an individual's level of motivation, technology and the satisfaction (Lee & Lin, 2005).

**Figure: 1.2 Integration of factors related to ICT diffusion**



Source: [https://www.itcon.org/papers/2005\\_14.content.02646.pdf](https://www.itcon.org/papers/2005_14.content.02646.pdf)

Figure: 1.2 demonstrate the librarian's role in technology adoption and ICT diffusion in the library, as a part of the changing and evolving responsibility structure. The study considered the activities in the library periphery as well and pointed towards the use of ICT as a tool to bring more qualitative users to the library.

## 1.2 Problem Definition

The libraries have a long history of human existence. The traditional library mechanism is known to be a repository of a physical collection of books, journals, research works, magazines and newspapers (UNESCO, 2009).

The phenomenon of document creation was initially physical, and traditional inputs were paper, ink and bindings for restoring the longevity of the material described above. The scope for collaboration and knowledge sharing was minimal, and the scenario for access to the existing knowledge base was limited by the geography and physical presence of the research scholars (Gard & Keoleian, 2003; UNESCO, 2009; RIN & RLUK, 2011). In developing economies, the awareness and usability of such systems and mechanisms are rendered obsolete due to non-adequacy of the user's levels of information based literacy (Ramayah & Aafaqi, 2004; Ameen & Gorman, 2009; Esposito, 2013).

Despite the wider pan-national availability of the UGC-Infonet DLC<sub>2</sub>, these collaborative resource sharing networks are battling the practical usage and awareness across the segments for which they were devised. The scholars across the university libraries still find it difficult to use and regard it as an alternative to print resources available across the shelves in traditional libraries. Ever since the historical transition of libraries from stand-alone physical repositories to ICT based virtually connected and collaborative resource sharing arrangements, the user's acceptance and satisfaction generation; has not been a natural and desired process across the entire journey (Ameen & Gorman, 2009). The user's inertia to change also matters, as they still prefer the physical resources over digitally shared e-resources. It is due to the interface and the support mechanisms that make the evolving platforms acceptable and digestible.

The university libraries in Punjab state in Northern India are in a similar situation. The national research studies have earlier projected a lower acceptance and gross effective utilisation of the facility as mentioned earlier. The UGC, Delhi report on library consortia especially the UGC-Infonet DLC itself documents the state of affairs surrounding the non-effective usage of the aforesaid platform. This research focuses on the awareness and use of UGC-Infonet DLC, user's sense of satisfaction; in a bid to discover the challenges across the diverse stakeholders that contribute to the problem.

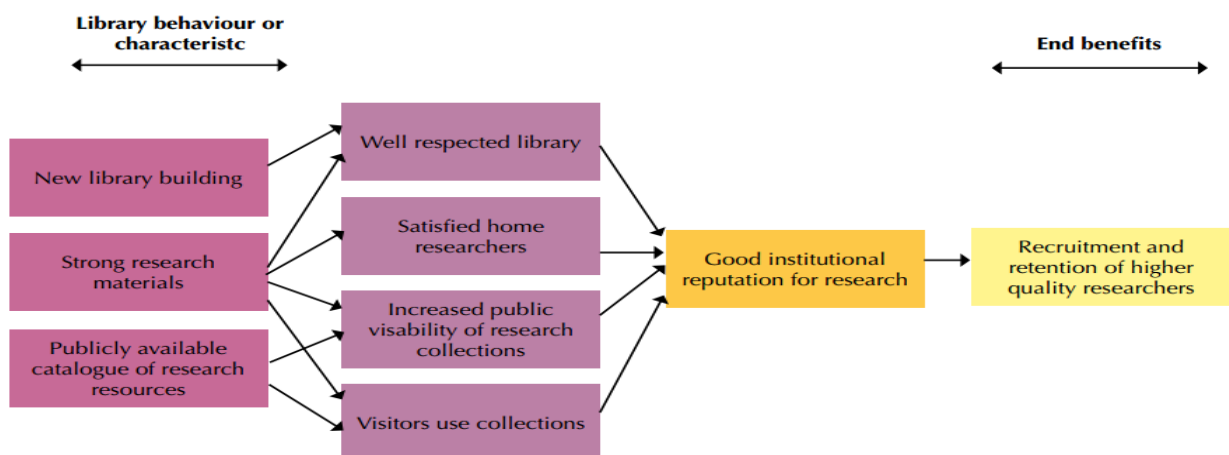
The study by Ani et al., (2016) on ICT based resource have been instrumental in enhancing the reach and usage, yet they are not free from the inherent problems. The increase in student enrolment, the rapid increase in the number of available e-journals, rising costs of maintaining the systems, ICT infrastructures and need for more ICT literate staff; further complicates the users seamless experiences and satisfaction about the usage of collaborative ICT based library networks.

The usage of e-resources across the UGC based collaborative resource sharing platforms like UGC-Infonet DLC have been observed to be lower in currency on account of diverse factors. The user, especially the scholars and the library users are still unaware or partially aware of the proper and adequate usage of the installed and the available infrastructure in the Indian libraries. Their reliance on the traditional print sources and inertias to change is another purpose that is hampering the acceptance of the e-resources across the mass level in India. Other causes for the dominantly lower usage have been the departmental and organizational contexts. The scholars perceptions of the organizational support concerning usage enhancement have been negative ever since the operationalization of these library assets. The e-resource usage has been observed to be low on account of the non-availability of supporting infrastructure like the consistent power supply and bandwidth

to sustain multiple logins to a system from one single place. The outdated installed hardware is another problematic area.

Recent research on library facilities in India by Tripathi & Jeevan(2013) documents the non-assistance by the library staff as the predominant reason for low usage and non-efficient usage of the facility. The report also documents the non-user friendliness of the existing public interfaces as another major reason for the abrupt low scope of the reliability of e-resources in research tasks. The research further pointed towards the crucial role of the standardization of practices for promoting healthy and wholesome e-resource usage in the Indian context in post-UGC-Infonet DLC era. The research underlined the need for usage statistics maintenance for tracking user performance and usage patterns across a period of study. The digital interfaces have been helpful in monitoring and tracking the content and contexts of downloads and the usage patterns and responses to various innovations being introduced on a time basis. Such a feedback monitoring system could be helpful in customizing the experience for users and thus enhancing their usage inclination and reliance on the e-resources in the future as well (Tripathi & Jeevan, 2013).

**Figure: 1.3 Good libraries help institutions to recruit and retain top researchers**



Source: <https://www.rluk.ac.uk/wp-content/uploads/2014/02/Value-of-Libraries-report.pdf>

In research across the libraries in the European nations, the library user behaviour concerning e-resources was observed (RIN & RLUK, 2011). The same study found that the libraries need to play a crucial role in the management of digital repositories, ensure the provision of high-quality data e-content and updated e-resources, consistently shape and promote active information search behaviours as well as enhance the current levels of library incomes. The research underlined a host of benefits for libraries increase in readership, lengthening of the duration of the stay of users, increase and consistency in footfalls across the library premises as well as reliable information search behaviours across the users of the digital libraries and the digital repositories.

### **1.3 Objectives of the Study**

The research objectives are intended to guide the research process and energies. This research on the awareness and user satisfaction of UGC-Infonet DLC among the research scholars focus on these distinct objectives:

- To find out the awareness and use of UGC-Infonet Digital Library Consortium among research scholars.
- To discover the collection, services and infrastructure available for access to e-resources.
- To investigate the usage pattern and satisfaction level of e-resource available under the UGC-Infonet Digital Library Consortium.
- To know the significance of e-resources v/s print resources and its impact on research.
- To find out the problems, prospects, measures and suggestions for improving the usage of UGC-Infonet Digital Library consortium in University Libraries of Punjab.

### 1.4 Hypothesis of the Study

The research hypothesis point to the exploration of the linkages between the user's levels of awareness and their sense of satisfaction about a library, concerning e-resources, about the impact of e-resources on research work along with the related issue of the problems faced by the users.

- Most of the research scholars are aware about UGC-Infonet digital library consortium and use e-resources.
- Majority of the research scholars are partially satisfied with electronic resources available in UGC-Infonet consortium.
- Electronic resources have more significant impact on research as compared to print resources.
- Some of the research scholars are facing problems in accessing e-resources available in UGC-Infonet Digital Library Consortium.

### 1.5 Significance of the Study

The study has immense significance in adding to the community's existing knowledge regarding the regional problems and challenges that might be of crucial importance in facilitating or restraining users' acceptance of the UGC-Infonet DLC in the future.

- The study assumes importance as the existing budgetary support for the UGC-Infonet DLC is higher, yet the ground level outcomes regarding adoption and by the scholars are not as per plans and expectations.
- The study is vital as it seeks to figure out the reasons that impact the lower usage, despite the higher than expected availability of the e-resources on the collaborative network.

- This study would help us to understand the lateral issues that constrain the creation and sustenance of consistent awareness across the research community about the UGC-Infonet DLC usage, existence and advantages.
- This study would expand the knowledge base concerning the issues and the problems faced at the regional level about the satisfactory usage of the facility. The study covers access to e-resources, post access usage factors, e-resource adequacy, device compatibility and other infrastructural aspects of the problem into consideration.
- The study encompasses the contrast between the researcher's preferences for print as well as e-resources and the resultant implications for overall user satisfaction.
- The study could be of vital importance to the librarians and library professionals as the users would be surveyed concerning the need for training, user-friendliness of interfaces as well as on-demand assistance availability.
- The study is significant for library and information sciences scholars as it opens up the regional context of problems that are encountered across the optimum usage of a collaborative resource network.
- The study seeks to examine the UGC-Infonet DLC facilities in light of the regional context and explores possible reasons of lower than expected satisfaction with aforesaid library consortia and concerning e-resource usage.

## **1.6 Methodology**

The phenomenon of research has been defined as “the more formal, systematic, intensive process of carrying on the scientific method of analysis (Cohen, Manion & Morrison, 2007). It involves a more systematic structure of investigation, usually resulting in a sort of formal record of procedures and a report of results or conclusions (O' Leary, 2004).

In the context of library and information sciences, research methods have concentrated around the bibliometrics analysis, discourse analysis, focus group studies, an interview, observation, field studies, the questionnaire-based surveys, conceptual model building, transaction log analysis or the webometrics (Chu, 2015). In this case, the research problem definition concentrates on finding out the awareness and use of UGC-Infonet DLC among scholars. This leads to the decision concerning choosing the mode for research. This study would be inductive as it relies on the generalisation of trends from the data hence collected. The research strategy and its appropriate choice are vital for the research to reach its meaningful conclusion. This study opts for the opinion based, the individual-driven approach to formalising their responses for generalisation of awareness and their respective satisfaction levels with concern to the UGC-Infonet DLC mechanisms.

The methodology of research includes all techniques employed by investigators to examine the research problem (Busha & Harter, 1980). It includes the method and techniques used for every step of research, i.e. the process of the literature search, data collection, data analysis, hypothesis testing and finally the method of data presentation (Koufogiannakis & Crumley, 2006). Thus, research methodology means a system of methods used for collecting data, information etc. for the solution of a problem identified for investigation (Heron, 1991).

### **1.6.1 Tools used for data collection and analysis**

The questionnaire, interview techniques has used in data collection is discussed below:

#### **1.6.1.1 Questionnaire**

The questionnaire tool was used to collect data related to the present research work. A single questionnaire was designed for scholars to obtain data about their awareness and use of

UGC-Infonet DLC, availability of infrastructure, searching and usage pattern, print resources v/s e-resources and various problems faced in accessing of e-resources.

### **1.6.1.2 Interviews**

The personal interaction with the scholars initiated and, Interview technique also employed in this present research study. Along with this, some telephonic deliberations were also made with the scholars of the concerned universities to clarify some of the concerns regarding UGC-Infonet DLC.

### **1.6.1.3 Data Analysis Techniques**

The whole work is based on a survey and filled questionnaires were received from the scholars and evaluated, categorised, codified and calculated with the help of the MS Excel spreadsheet application and individual responses recorded in MS word.

### **1.6.1.4 Survey population and sample**

The researcher attempted to ensure a composite sample that is indeed representative of the diverse academic disciplines by randomly selecting 30% from five universities. Random sampling eliminates subjective bias in the selection process and underlines the theories used to infer the sample results of the population. The sample's percentage of the total population investigated was less significant than obtaining a sample that was large.

In other words, the larger the absolute number of participants in the sample, the better are the chances of getting a composite and intensive sample that is representative of the population surveyed. Generally believed, the accuracy of the data is determined by the *absolute size* of the sample, rather than by the percentage.

**Table: 1.1 Survey populations and sample**

Name of the Universities	Total Scholar	Questionnaire distributed	Response received (%)	Response rate (%)
<b>Panjab University, Chandigarh</b>	1464	439 (30%)	262	59.68
<b>Guru Nanak Dev University, Amritsar</b>	602	181 (30%)	142	78.45
<b>Punjabi University, Patiala</b>	990	297 (30%)	252	84.84
<b>Thapar University, Patiala</b>	692	208 (30%)	146	70.19
<b>Central University of Punjab, Bhatinda</b>	168	50 (30%)	45	90.00
<b>Total</b>	<b>3916</b>	<b>1175 (30%)</b>	<b>847</b>	<b>72.08</b>

Although a certain percentage may not be necessary, it was convenient in this study to use 30% of the population or a total of 847 scholars at five universities. Further, the 30% produced large absolute numbers for the survey which are as follow: at Panjab University, Chandigarh, the total number of scholars are 1464 scholars, out of which 439 is 30% of the total, 602 scholars at Guru Nanak Dev University, Amritsar, out of which 181 is 30% of the total, 990 Scholars at Punjabi University, Patiala, out of which 297 is 30% of the total, 692 scholars at Thapar University, Patiala, out of which 208 is 30% of the total, 168 scholars at Central University of Punjab, Bhatinda, out of which 50 is 30% of the total.

#### **1.6.1.5 Standards followed for Bibliographic References**

Reference sources used in research work which is a necessary part of the study. It indicates the place of the source and exposes indebtedness to that source. Thus, all the references should be accurately acknowledged. For citing references in the present study, American Psychological Association (APA) 6th edition has followed.

#### **1.6.1.6 Statistical Tools and Techniques**

The statistical analysis of the data for the existing study done by using a simple Chi-Square test. The Chi-Square test is an important test of significance and is used to calculate an observed group of frequencies from the null hypothesis (Kothari, 2004). The level of

significance testing was set at 0.05. The statistical analysis of the data of the present study was done by using SPSS version 20 Software. Chi-Square Formula:

$$X^2 = \sum \frac{(O-E)^2}{E}$$

Where, O stands for observed frequency, E stands for expected frequency and  $\Sigma$ , summation. The researcher has fixed the 0.05 level of significance for the testing of the stated research hypothesis.

### 1.7 Scope and Limitations of the Study

The research task is an intellectual phenomenon and certainly involves some limitations that need to consider to get the desired outcomes. The research has its limitations regarding applicability, conceptualisation of the variables and the choice of the contexts. The resource constraints were dominant as the ingrained resources and time were limited and quantified. The limited geographical coverage could be another source of limitation as this study is limited to University Libraries of Punjab, which have a membership of UGC-Infonet DLC for access of e-resources. The segment population is scholars performing their research in the following universities. The present study confined to the libraries of the following universities:

- **Panjab University, Chandigarh**
- **Guru Nanak Dev University, Amritsar**
- **Punjabi University, Patiala**
- **Thapar University, Patiala**
- **Central University of Punjab, Bhatinda**

## 1.8 Definitions of Concepts

The definitions of the concepts used in the present study have given below:

### 1.8.1 Awareness

The ‘**awareness**’ interpreted as the users’ knowledge about the existence of a facility or a situation. In the context of UGC-Infonet DLC, the user’s awareness defined as the user’s prior knowledge concerning the existence and operation of a facility to access knowledge.

### 1.8.2 Use

The term ‘**use**’ has been used to find out the status to know the use of e-resources available under UGC-Infonet DLC to fulfill his/her (Research Scholar) purpose of research, usage pattern, publishing of books and research articles, the various problem faced, etc.

### 1.8.3 User

The term ‘**user**’ connotes to any individual or a group that interacts or is interested in accessing the information, journals, e-content, e-archives across such platforms. For this study, we limit our consideration to research scholars who consistently rely on the setup to proceed with the research activity.

### 1.8.4 UGC-Infonet DLC

The term ‘**UGC-Infonet DLC**’ means to denote UGC-Infonet digital library consortium which provides current as well as archival access to more than 7500+ core, peer-reviewed journals and 10 bibliographic databases from 26 publishers and aggregators in different disciplines to the Indian’s Universities, Institutions and colleges.

### 1.8.5 Research Scholar

The phrase ‘**Research Scholar**’ has been used to represent PhD scholars studying in the selected five University Libraries of Punjab. In the entire study, Research Scholars is represented as scholars.

### **1.8.6 University Libraries of Punjab**

The phrase ‘University Libraries of Punjab’ has been used to mean the libraries of five Universities of Punjab, which are as follows: - (1) Panjab University, Chandigarh. (2) Guru Nanak Dev University, Amritsar. (3) Punjabi University, Patiala. (4) Thapar University, Patiala. (5) Central University of Punjab, Bhatinda.

### **1.9 Structure of the Thesis**

The study arranged into the following six chapters.

#### **1.9.1 Chapter 1: Introduction**

This chapter includes the background of the present study, e-resources and services, statement of the problem, the significance of the study, objectives, hypothesis, limitations of the study, methodology, and definition of the existing concepts. This chapter includes the population, instruments used and methods used for data collection and analysis.

#### **1.9.2 Chapter 2: Literature Review**

In this chapter, an attempt has been made to review the related literature. This chapter covers the significance of knowledge production in modern societies, library e-resource acceptance and preferences, e-resource management perspective in consortia, UGC-Infonet DLC, awareness and use of UGC-Infonet DLC and problems, prospects, measures, and suggestions for improving the usage of e-resources available under UGC-Infonet DLC.

#### **1.9.3 Chapter 3: UGC INFONET: A Theoretical Framework**

This chapter incorporates the understanding of e-resources, the Consortium - History and development, Library Consortium and its features, types, advantage and limitations. It provides brief information about UGC-University Grant Commission, Delhi, role of UGC in UGC-Infonet DLC, INFLIBNET and role of INFLIBNET in UGC-Infonet DLC. This chapter contains the aims and objectives UGC-Infonet DLC, its benefits, features, coverage and

member universities. In the end it also provides concise information about E-Sodh Sindhu its aims and objectives.

#### **1.9.4 Chapter 4: University Libraries of Punjab: A Profile**

This chapter deals with a historical overview of the selected University Libraries in Punjab State, and provides brief information about the Campus profile, teaching departments, centers and various sections of the library. It also highlights the ICT infrastructure, status of library automation, information sources and electronic information services provided by these libraries.

#### **1.9.5 Chapter 5: Data Analysis and interpretation**

In this chapter, the data received from the research scholars have been tabulated and analysed. The data received from the scholar's divided into (i) Profile of the Scholars, (ii) Collection services and infrastructure adequacy available for access UGC-Infonet DLC, (iii) Awareness and use of UGC-Infonet DLC among reserach scholars, (iv) Usage pattern of e-resources availble under UGC-Infonet DLC, (v) Significance of E-resources v/s print resources and its impact on research, (vi) Problems, prospects, measures and suggestions for improving UGC-Infonet DLC.

#### **1.9.6 Chapter 6: Findings, Conclusion and Suggestions**

This chapter provides an overview of the major findings regarding the awareness and use of UGC-Infonet DLC and its services in the university libraries and the extent to which they are aware and use these sources and services. Based on the findings, hypothesis testing, suggestions have been put forth to enhance the collection of e-resources and services in university libraries as well as to develop the awareness and use of these e-resources and services by the scholars.

**1.9.7 Bibliography**

The list of the included bibliography is given in this part of the thesis.

**1.9.8 Appendices**

The last part of the thesis contains the appendices. In Appendix-I the questionnaire administered to the scholars, in Appendix-II, list of e-resources provided by the UGC-Infonet DLC.

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## CHAPTER 2

# LITERATURE REVIEW

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### 2.1 Introduction

This chapter focuses on the literature review associated with the factors that shape awareness and the usability of the UGC- Infonet DLC platforms perspective. The chapter elaborates on the significance of knowledge production in modern societies, Mechanisms in Print based traditional library, the essence of knowledge production in university libraries and details on the mechanisms in print and digital libraries. Further, the chapter discusses the Library e-resource acceptance and preferences, E-Resource management perspective in consortia, E-Resources awareness and use, Print and the E-resources. Then the subsequent section elaborates awareness and uses of UGC- Infonet DLC, Usage pattern and satisfaction level of e-resource under the UGC- Infonet DLC.

### 2.2 Significance of Knowledge Production in Modern Societies

#### 2.2.1 Theoretical Contexts

The knowledge production has been defined as the phenomenon of consistent regeneration of desired information that has significance for a man's economic and social development. The universities have been at the forefront of knowledge production across the history of mankind. The Mode 1 and Mode 2 systems of knowledge production that occurs across modern centres of knowledge creation have always remained a matter of intense debate and analysis(Esposito, 2013; Hessels & Lente, 2008).

As per review of existing literature on knowledge production systems, Mode 1 system relies on the determination of context within the contours of the academics and the research is carried out across the specified disciplines of study (Albert & McGuire, 2014). In contrast, the Mode 2 knowledge production system relies on the research being conducted in the context of relationships between academics and non-academics with a trans-disciplinary focus as well as heterogeneous skill base (Esposito, 2013).

The helix approach relies on the nexus between the university, industry and the government in knowledge production, yet this is impossible without the actual participation of the libraries and their resources. The review of existing by Esposito, (2013) literature points towards the transitions in knowledge production norms as well as the transition in libraries from being repositories of physical resources to digitally connected collaborative resources. Across these diverse modes of knowledge production, scholars face problems with regard to timely access to knowledge.

**Figure: 2.1 Attribute of Mode 1 and Mode 2 Knowledge Production**

<b>Mode 1</b>	<b>Mode 2</b>
Academic context	Context of application
Disciplinary	Transdisciplinary
Homogeneity	Heterogeneity
Autonomy	Reflexivity/social accountability
Traditional quality control (peer review)	Novel quality control

Source: <http://www.cdts.fiocruz.br/morel/ufrij2011/IEP851-Artigos/Hessels2008>

As the modes of knowledge production transforms from a standalone basis for a socially distributed system, the homogeneity of knowledge production is likely to give way to the

heterogeneous nature (Hessels & Lente, 2008). As such the knowledge production in modern societies under the transformed library infrastructure has changed invariably (Ameen & Gorman, 2009). The traditional role of the scholar in knowledge co-productions not aloof from the inherent challenges in terms of addressing power relations, inter-relating different perspectives on issues at stake and the promoting a sustainable orientation (Pohl, Rist, Zimmermann, Fry, Gurung, Schneider, Speranza, et.al. 2010).

### **2.2.2 Mechanisms in Print based traditional library**

The phenomenon of document creation was originally physical in nature and traditional inputs were paper, ink and the bindings for restoring the longevity of the aforesaid material (Gard & Keoleian, 2003; RIN & RLUK, 2011).

The knowledge management in such collections was limited to a person's use and limited in area and context The scope for collaboration and knowledge sharing was minimal and the scenario for access to existent knowledge base was limited by geography and physical presence of the scholars (UNESCO, 2009; Gard & Keoleian, 2003).

### **2.2.3 Mechanisms in Digital Library**

The digital library, has helped in giving wings to the existing knowledge. (Hessels & Lente, 2008). The scope for collaboration and sharing of knowledge has improved tremendously in the wake of digitalization and incorporation of ICT tools in library-based knowledge management. The digital library system devises the use of the technology and database management software to improve the search and access to knowledge across larger geographies in a networked manner. (RIN & RLUK, 2011; Reddy, 2004; Peansupap & Walker, 2005).

The extended role of digital libraries and digital knowledge-based ecosystems and networks in shaping the manner in which modern-day academic research is being undertaken (Thong, Hong & Tam, 2002). A study across developed economies affirmed the realization that the emerging digital ecosystems for knowledge management have in turn radically transformed the manner in which information could be accessed and processed across these platforms (Tuominen, Savolainen & Taliija, 2005; Fisher, Erdelez & McKechine, 2005).

The literature also points the growing reality that in developing economies the awareness and usability of such systems and mechanisms are rendered obsolete due to non-adequacy of user' levels of information based literacy (Ramayah & Aafaqi, 2004; Ameen & Gorman, 2009; Esposito, 2013). The user's information literacy is not an isolated phenomenon rather it is a vital determinant of the user's ability to successfully utilize the resources across the ICT based platforms (Albert & McGuire, 2014; Peansupap & Walker, 2005; Jeng, 2005).

#### **2.2.4 Knowledge production across collaborative Digital repositories**

The digital environments as conceptualized across open access digital repositories have been observed to facilitate mode 2 knowledge productions. Role of technologies in the ongoing evolution of research practices and observed that the open access repositories and ICT are a vital factor in mode 2 knowledge production as it involves and engages the researchers across trans-disciplinary levels of academic endeavour (Esposito, 2013; Hessels & Lente, 2008).

The research further acknowledged the reliance of mode 2 knowledge production on the information technology asset yet, the concerns were raised regarding the manner in which diverse subject domains are made to relate to technology for research. The individual researcher's motivations have undergone a sea-change in view of the manner in which the

knowledge is now being accessed and transmitted across these digital platforms (Esposito, 2013).

These digital repositories have been observed to possess benefits for scholars in terms of high quality of research enhanced visibility to upcoming research as well as an increase in income from research assets (RIN &RLUK, 2011),

Global studies vindicate the lateral and direct benefits from the effective management of these digital repositories in short as well as longer time frames. A study across British libraries revealed that the increased awareness of the users with regard to these digital repositories is beneficial for libraries in terms of the revenue generation as well as revenue diversification. Globally many such digital platforms exist, and they are reaping the benefits of sustainable funding for maintenance and development.

These digital platforms have been observed to support the new pedagogies of research in the form of collaborative learning, cultivating independent thinking as well as lifelong learning inclination (UNESCO, 2009). The support of scholars in terms of collaborative learning has been evident across the review of existing literature. Such platforms have been helpful in facilitating the user's access to the resources that are geographically scattered yet are useful in unknown manners.

### **2.3 Library E-Resource acceptance and preferences**

The increase in acceptance and usage of the e-resources has consequences for the acceptance and usage of the existing print resources. The study by Liu, (2006) across American university libraries explored the cross-usage of the print and e-resources across digital library consortia and concluded the existence of the dual use to meet the evolving information requirements of the scholars.

Libraries and librarians have been examined to promote the orientation with regard to e-resource usage across scholars with regard to collaboration, continuation, conversation, charting and composition of information search efforts in changing data retrieval mechanisms (Kuhlthau, 1997). The antecedents of the phenomenon of the sense-making and technology appropriation at student's end are not that easy as it appears to be in general perspective. The study underlined the determinant role of the subjective norms, perceived behavioural controls, the individual's levels of the motivation, technology-based appropriations and the resultant satisfaction as inter-related (Lee & Lin, 2005).

The resource usage practices have been observed to vary across segments on basis of the user characteristics and preconceived inclinations or perceptions with regard to the suitability of either the print or e-resources as anchors for research task (Ani, Ani, Ugwu, Nwachukwu, Obianuko, Ndaji & Maduchie, 2016). The ease of access and post access, retrieval mechanisms have been observed to impact the resource preferences in the context of libraries in emerging economies (Esposito, 2013). Studies on youth's technology usage points towards the existence of resident and visitor psychologies that help us understand the platform usage intentions. As per research, the resident tendencies foster the actual information access, whereas the visitor tendencies lead to opinion formation and non-relevant usage of the aforesaid technology setup (White & Le Cornu, 2011).

The friendliness of the user interfaces also impacts the intentions to prefer e-resources over the print resources. Joo, Lin & Lu (2011) identified some eighteen factors that were observed to shape the usability and learnability across users of academic library websites.

Other studies point the need for overcoming the user's resistance to change and increase their frequency of visits and collaborative usage (Peansupap & Walker, 2005; Nov & Ye, 2008; Wang, Li & Hsieh, 2013). The user's assessment of usability is thoroughly

guided by user's attitude and perceptions regarding the usability and convenience of usage (Joo, Lin & Loo, 2011). The quantification of such aspects seems to converge at these measures: simplicity, comfort, user-friendliness, control, readability, information adequacy, navigability, recognition, access time, relevancy, visual presentation and the consistency (Koohang, 2004). Another study on the usability assessment by Jeng (2005) interpreted the matter as involving the dimensions of the effectiveness, efficiency, satisfaction; in shaping the overall ease of use, an organization of information across the designated format, labelling characteristics and the visual appearance and scope for error correction.

Tsakonas & Papatheodorou, (2008) explored the issue of the system's response time and sustainability of scholars visit, in the context of the precision, recall value and the response generation.

The scholar preferences are also believed to be shaped by their respective levels of self-efficacies and social contexts. The scholar's self-efficacy based beliefs regarding the computer-based libraries and the information retrieval across such systems have long been a matter of intense debate and analysis. The study points towards substantial non-convergent views with regard to determinants of user's self-efficacy based beliefs in developing nations (Ingwersen, 1996).

The social support and the contextual factors have been observed to play a vital role in influencing the user's awareness as well as usage patterns in digital library interfaces. Another study observed the prevalence of the substantial impact of scholar's self-efficacy based beliefs on their subsequent perceptions regarding the usefulness and ease of use of ICT based mechanisms with regard to a research study (Anunobi & Okoye, 2008). The user's information needs have been the source of all activity originating from the user. Yet the activating mechanisms have never ever been explored substantially (Tuominen, Savolainen &

Talija, 2005). The role of intervening variables in shaping the user's awareness and potential development has never ever been explored in the context of developing economies (Esposito, 2013).

The user's social learning in such context needs supportive shaping and the role of the service provider institution is being observed as crucial across the literature (Ingwersen, 1996). The notion of the user's self-efficacy beliefs in the conceptualization of information seeking behaviour could help us understand the intricacies of the social learning perspective in the context of information usage. The study by Ong & Lai (2006) across males and females with regard to their respective levels of computer self-efficacies in the context of their perceptions of the digital library usage, it was observed that the substantial cross-gender differences do exist and that such differences could be detrimental in shaping the efforts of the libraries to familiarize the users with new system requirements. The user's outcome expectancy was observed to be shaped by the user's levels of computer-related self-efficacy in a bigger manner (Akinbobola & Adeleke, 2013). The absence or presence of the contextual support factor especially the supportive management of the library premises was observed to impact the likely outcome instances of computer-based digital libraries (Wang, Li & Hsieh, 2013).

The role of the library is changing and consolidating the user's preferences with regard to digital or the print resources; highlighted the emerging role of libraries as providers of exclusive support to users while offering the essential collaboration in research (LIBRARY, British 2012). The study underlined the need for developing the modern day libraries as the epicentre of information and knowledge exchange. Further, it focused on the transitions in the role of a librarian from supporters to collaborators in knowledge creation (Monroe-Gulick, O'Brien & White, 2013).

Akinbobola & Adeleke (2013) observed that the user's prior computer experience in association with the usability of the interface as well as the presence or absence of the supportive management help does impact the user's levels of self-efficacies with regard to computer access and sustainable usage. In a country like India with substantial digital divides, this computer-based self-efficacy of the users could be detrimental in impacting the overall computer usage and hence the usage of the digital repositories like the INFLIBNET and DSPACE (Reddy, 2004).

#### **2.4 E-Resource management perspective in consortia**

The approach towards optimum management of e-resources has been haphazard and ill-conceived in context of consortia. A study underlined the role of three major typologies in managing the digital resources in such consortia (Oza et al., 2002). The study suggested three distinct types of loosely knit arrangements, tightly-knit mechanisms and multi-type knit arrangements for managing the burgeoning collection of e-resources in emerging economies.

The e-resource management has been occasionally interpreted in the context of system knowledge management paradigm as well. A study underlined the role of the institutional knowledge management perspective in scoring a seamless usage and retrieval of such resources across a larger geography (Katsirikou, 2003). Research on the technology issues in library consortia mandated the essential role of technology platforms in managing the e-resources across the pan-national paradigm (Paul & Karisiddapa, 2003). (Narayanna & Goddar, 2002) studied on the resource management differences across sciences and non-sciences disciplines highlighted the emerging role of the disciplinary differences in the management of resource portfolio

The consortia based library mechanisms have witnessed investments in millions across acquisition of these precious e-resources, yet the non-convergent research regarding the user’s acceptance is a matter of deep concern. The attempts regarding an academic interpretation of the user’s acceptance of digital libraries have been nominal (Thong, Hong& Tam, 2002). The research further comprehended the interplay across system interface characteristics, organizational context and individual differences; a key towards understanding user behaviour. Thong, Hong & Tam (2002) further observed the incidence of relationships between the perceived usefulness and perceived ease of use as a vital determinant of user’s acceptance of digital libraries across research practices. The study also evaluated the impact of user’s responses on the e-resource management practices. The Knowledge Management Model in Libraries is being viewed as a novel approach towards the e-resource management with the aid of business philosophy(Bem&Coehlo, 2013). Collaborative tagging has been devised as a viable option for facilitating seamless e-resource usage and the respective resource management in libraries (George & Emma, 2006).

**Figure: 2.2 Peach’s electronic resources life cycle.**



Source: Pesch, Oliver. (2008). Library Standards and E-Resource Management: A Survey of Current Initiatives and Standrads Efforts. *Serials Librarian*. 55(3) doi:10.1080/03615260802059965.

The e-resource life cycle was devised to understand the intricacies of the institutional processes that are vital for the resource to be usage and sustainable in cross multiplication

(Pesch, 2008; Emery & Stone, 2013). Such a life cycle is being understood to possess vital consequences for the collection management and collection conservation across the multiple access points in library consortia usage.

#### **2.4.1 E-Resources awareness and use**

The study on the usage pattern of e-resources in seven technical institutions in North India, Vasistha (2014) found that the majority of the scholars are aware of e-resources 54% of the respondents admitted that they learn e-resources through hit and trial and 49% responded through the help of others. 58% of the respondents are not satisfied with the website interface of the library. 44% of the respondent access e-resources for research purposes followed by 34% respondents for writing scientific articles. 63% of the respondents admitted that e-resources had improved professional competence whereas 50% of the respondents found it has expedited the research process. Very few 29% of the respondents are satisfied with infrastructural facilities.

Rai & Thandavamoorthy (2014) conducted a Study to find out the use and impact of e-resources by the students, teachers and scholars of VTU affiliated Engineering Colleges of Karnataka. The study shows that 99 % respondent doesn't have the proper knowledge to use e-resources. 33.10% users admitted that e-resources had a bright future and would make an impact, whereas 38.34% disagree about in this matter. Respondents advocate that library staff should have proper knowledge and skills to use e-resources. They suggested that it was the responsibility of the librarian to impart proper training to users for efficient use of e-resources. They also recommended that the Library should subscribe more e-resources, keeping in view the priorities and preferences of users.

Basavaraja, & Jeyshankar (2014) conducted a study to examine the use of Electronic Resources (ER) and services among the students and faculty members of the IBS Business

School, Bangalore. It shows that the majority of students and faculty are the collection of printed books (88.48%) and E-books (47.88%) were adequate to meet their information needs. They found that the scattering of information in many sources (48.49%) and incomplete information/material (32.12%) were the major limitations in seeking information and respondents (22.42%) admitted that, they do not have the knowledge of using Web-OPAC facility. The majority of the respondents they required training and orientation program to know the sources and services available in the library.

Uses of e-resource are very popular among the students for their studies. Mostafa (2013) studied on the use and impact of e-resources on selected private universities in Bangladesh. The objective of the study to find out different types of e-resources, purpose and frequency and various problems faced by the students. 46% of the respondents were satisfied with the interface of the university library website whereas 29.3% of the respondents found unsatisfactory. The study further reveals that 60% of respondents use e-resources when required, 20.2% of the respondents use very often and 10.10% respondents use rarely. The study found that majority of the 41.41% respondents use for research purpose and 37.4% of the respondents use for education. It also further shows that 47.5% of the respondents think that e-resources would never diminish the traditional resources, whereas 28% of the respondents thinks it will replace the traditional resources. He suggests that proper infrastructure and training programs should also be conducted at regular intervals and should be revised as per requirement.

The survey, conducted by Natarajan, Suresh, Sivaraman, & Sevukan (2010) on the use and perception of e-resources on Annamalai University; the main objective was to know the awareness of e-resources among the users of the Annamalai University Library; to examine the effectiveness of e-resources in upgrading the faculty members and scholars in

their profession. The study found that the majority of faculty members were aware of e-journals (71.79%), e-newspapers (58.12%), and e-books (41.88%). A majority of scholars were also aware of e-journals (82.41%), e-newspapers (67.59%), e-theses (66.67%), and online databases (59.26%). The study also found that faculty members (58.97%) and Scholars (62.02%) were using e-resources, whereas faculty members (41.03%) and scholars (37.96%) were not using them. The result shows that 8.33% faculty members were not using e-resources due to non-familiarity with e-resources, 25% due to lack of subject coverage 10.42% faculty members due to lack of training.

The main objective of the survey by Nikam & Pramodini, (2007) was to find awareness, the extent of use and identify the alternative use of e-resources, e-journals and database by the community of Mysore University. It shows that e-resources, especially e-journals and databases are important sources of information. The study shows that only 31.5% users are aware of e-journals and 68.5% users are not aware. The study suggested that the users need constant guidance and training to make full use of e-resources in the university campus. It also highlights that librarians are the important pillar which plays an important role in helping the users to make the best use of the e-journals to a maximum extent.

#### **2.4.2 Print resources v/s E-resources**

The traditional library mechanism is known to be a repository of the physical collection of books, journals, research works, magazines and newspapers (UNESCO, 2009). The phenomenon of document creation was originally physical in nature and traditional inputs were paper, ink and the bindings for restoring the longevity of the aforesaid material (RIN & RLUK, 2011; Gard & Keoleian, 2003).

There are many substantial factors are existing while using both e-Resources and traditional (print) resources. They are given below:

**Table: 2.1 Difference between e-resources and traditional resources**

S. No.	E-Resources	Traditional Resources
01	Number of search options are available.	Direct searching is not possible of all text.
02	Online or virtual reference.	Reference is possible only on shelf search.
03	Available in all 365 days per year.	Available only at library opening hour.
04	Multi-user environment.	Only one user access.
05	The user can access their requirement by anywhere else.	The user access directly from the library only.
06	Indexing and abstracting service through a Direct link with full-text record	Not linked full text.
07	Reproduction is a printing method. Easy searching.	Reproduction is photocopying method, searching the required photocopy area is time consuming.
08	Edit any part of the text is easy.	There is no provision for editing.
09	The particular article may be download via internet is easy.	The particular article may be accessed from the hard copy.
10	Sometimes e-journals are not containing information like reviews, editorial, advertisements.	Print journals consists of information such as reviews, editorials, letters, advertisements.
11	Searching for articles is screen and the virtual one.	Searching is only physical.

<b>12</b>	In Circulation, document delivery, an Interlibrary loan is not required.	In circulation, document delivery or intercampus loan required.
<b>13</b>	Visual retrieval is time saving unable to physical retrieval. It depends on the availability of the network.	Physical retrieval. It consumes sometime for searching.
<b>14</b>	Immediate delivery with cheap cost.	Delivery is delay because of travel the material from one place to another place.
<b>15</b>	Some equipment is essential for using the e-resources.	Equipment are no need to use the print resources.

<http://www.lisbdnet.com/electronic-resources-vs-traditional-resources-library/>

The resource adequacy in the context of digital libraries has been interpreted as the ability of the institution to self-sustain the creation and usage of the aforesaid resources (Alicmas & Ramos, 2015; Ameen& Gorman, 2009). The UNESCO's report on the funding of sustainable higher education in the context of developing countries, stresses the significant role of public funding, adequate budgetary support and extensive infrastructure deployment; as critical to the success of online digital repositories (UNESCO, 2009).

Studies on the user's access management across online repositories also highlight the crucial role of an institution supported initiatives in promoting innovative space and digital space management practices (Chang, Lin, Chen & Chin, 2009). The library as an institution needs to develop alternate sources of revenue generation and digital repositories and associated infrastructure could be helpful in promoting commercial use of such databases and collaborative networks across the industry, government bodies and NGOs (Akussah, Asante, & Adu-Sarkodee, 2015). Such measures have been observed to enhance the sustainability of

Usage and cross multiplication of awareness of repositories across the region and beyond (Chang, Lin, Chen & Chin, 2009).

A study on the user-friendliness of interfaces concluded that the website usability and ease of use was a concern that severely impacts the user's initial experience and perceptions regarding library resource usage. Studies also point for the need for overcoming the user's resistance to change and increase their frequency of visit and the collaborative usage (Wang, Li & Hsieh, 2013; Nov & Ye 2008; Peansupap & Walker, 2005)

The majority of the people think that e-resources would take over the print resources and believe that it can be phased out in the future. Puttaswamy & Krishnamurthy (2014) aim of their study is to know the usage of e-resources by faculty members and scholars of Research Centres of Visvesvaraya Technological University (VTU), Belgaum, Karnataka. The study found that faculty members and scholars are accessing the e-resources for their research related work rather than teaching. The study found that, of 94% of the users depended on e-resources which are provided through the library and admitted it is more important for their study relatively than print resources. The majority of the 74% respondents refer to e-journals to keep abreast of current developments in their fields. The study lacks on the issues associated to use and awareness, the importance of print resources and various problems faced by the users in accessing e-resources.

Printed and e-resources depend mostly on the system they are using for these resources. The objective of Waghmare, Ramanna & Satishkumar (2014) was to understand can the internet replace the printed resources? The results show that 78% of the users admit that e-resources cannot replace the e-resource whereas 22% of the users admit it will replace it. The study further shows that the majority of the users have don't their own computers and only 30% of the users have their owned computers.

The paper by Parmar & Patel (2013) objective was to find out the awareness and usage, place of accessing and impact of e-resources by the undergraduate students, postgraduate students and faculty members of the S. K. Patel College of engineering, Visnagar (Gujrat). The study reveals that most of the 42% of the users prefer print resources due to its convenience. Majority of the users were from Mechanical Engineering department. Slow downloading and lack of awareness is the major drawbacks face by the users. They suggested that the library should compile e-resources along with the print version. High bandwidth internet connection is also required for easy downloading and accessing of e-resources. The study found that of the 29.26% of the users faces downloading is a major problem and 19.52% of the users faces a lack of awareness. The majority of the 71.95% users are satisfied with the e-resources available in the library and give more importance to e-resources. They suggested that librarians should give more emphasis on e-resources along with print resources.

Phuritsabam, Devi & Sagolsem (2011) conducted studies on the use of UGC-Infonet e-Journals by Scholars of Manipur University, Manipur, the study found that the majority of the 54% scholars uses the UGC-Infonet e-journals. 96% of the respondents stated that they required printed journals in addition to e-journals to complete their research work. They suggest that Manipur University Library should design and develop Multimedia presentation for UGC-Infonet e-resources for reference management and searching and for improving motivation towards the efficient and active use of e-journals available under UGC-Infonet DLC.

Gowda & Shivalingaih (2009) studied the attitudes of scholars towards the use of electronic information resources of six universities of Karnataka. The study found that

scholars prefer print resources. The study reveals that e-resources have made a huge impact on their studies, and they hope it will create positivity hope in searching the information.

Kumar & Kumar (2008) conducted Studies on the view and the use of e-resources and internet by the engineering, medical and management academics in Bangalore City, India. and found that 49.67% of respondents admitted that information locating and identifying is easier, whereas 49.33% respondents admitted that accessing information in electronic format is somewhat easier. The study further shows that 70.33% of respondents discovered that electronic information sources provide more comprehensive information. 64.67% of respondents required print resources along with electronic information sources. They suggested that it was the duty of library professionals to organize a training program for users. (yes)

Bar & Fink (2005) on their study found that more than 80% uses both printed and e-resources. It shows that still prints and e-resource are relevant to the users. The article informed the results of a survey on the use of printed and electronic journals in a science library and found that more than 80% of the respondents frequently use and prefer an electronic format, irrespective of their rank or age. The study further found that users were using e-resources frequently.

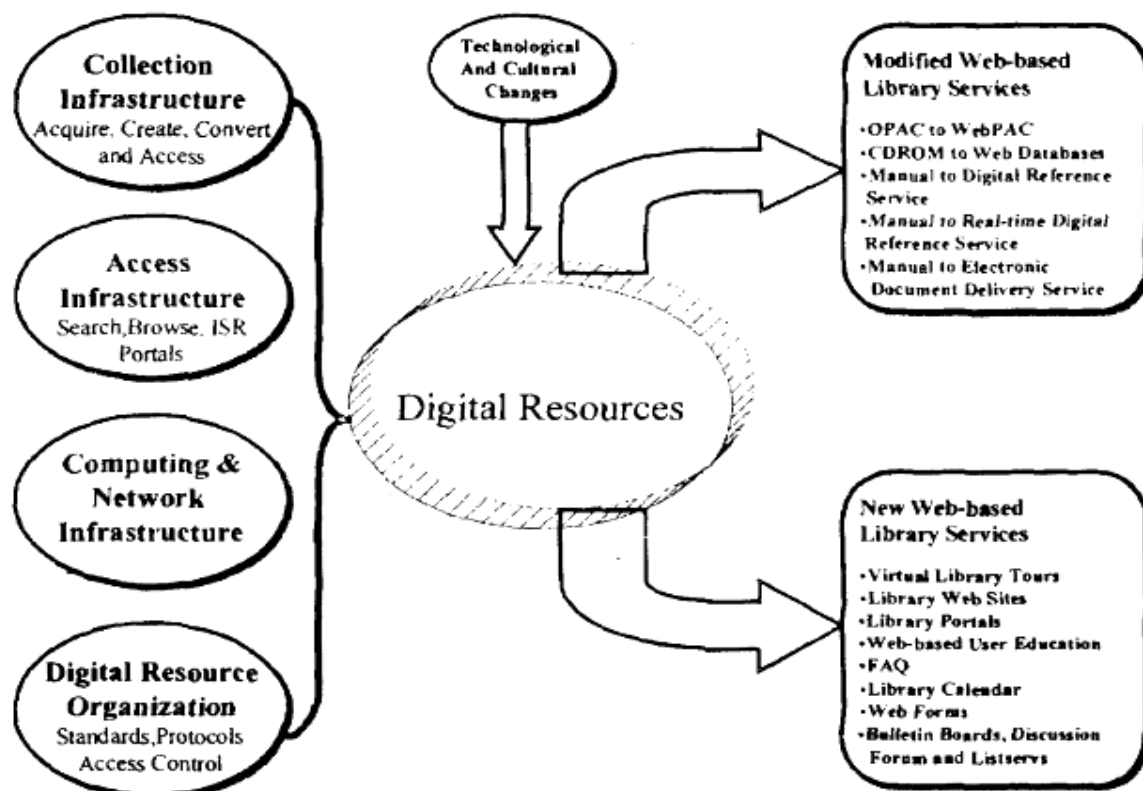
## **2.5 UGC-Infonet DLC**

### **2.5.1 Understanding UGC-Infonet DLC as library consortia**

Digital libraries and their tools, techniques and protocols; have been observed to evolve along with the change in the computing power as the digitalization of the networks. The resource sharing is determined by the extent of inter linkages and cross-networking. The idea of UGC- Infonet DLC relies on the similar philosophy of resource sharing, networking and collection leverage across multiple points of access; in order to give a boost to the research

productivity across the national institutions of higher learning (Arora, 2001). The collection infrastructure development in UGC-InfonetDLC is another challenging aspect of consortia management.

**Figure: 2.3 Elements of INFONET Digital library and collection infrastructure**

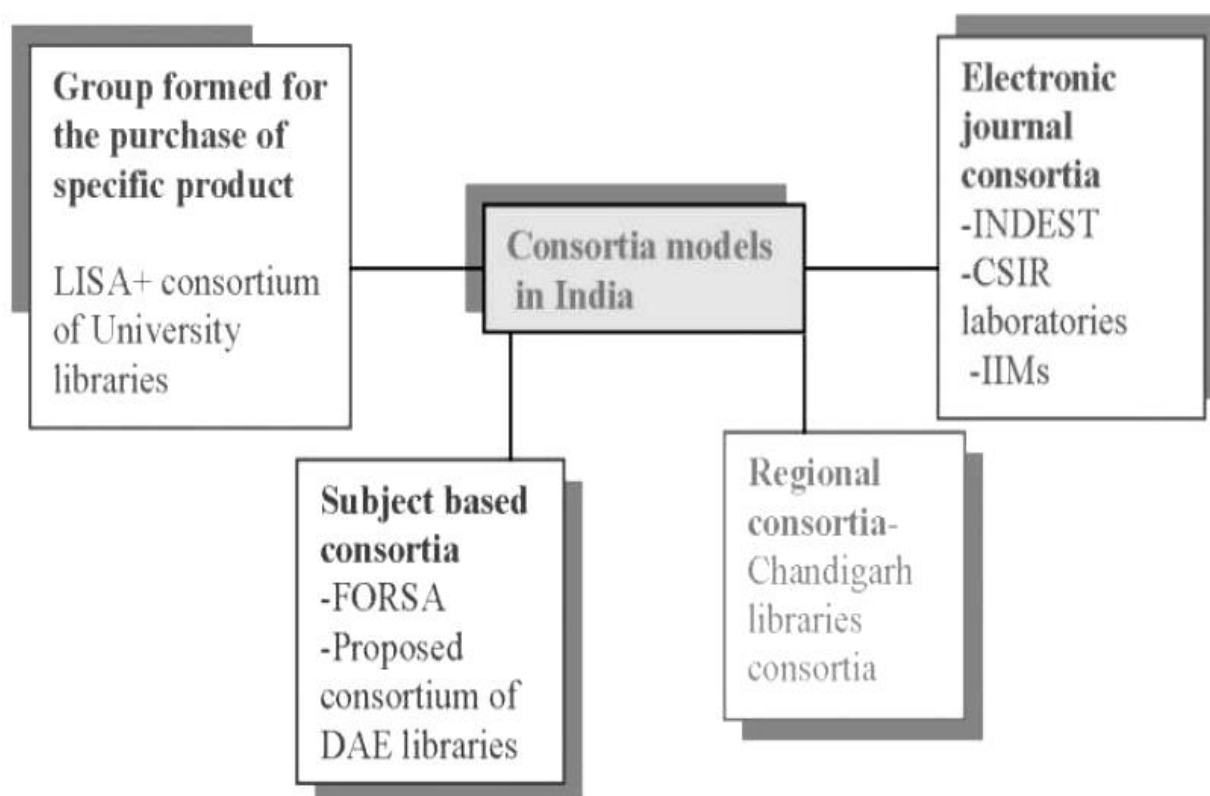


Source: <https://publications.drdo.gov.in/ojs/index.php/djlit/article/view/3547/4533>

The 24\*7 availability of the scholarly publications (Ranganathan, (2013), means a lot for advancing the cause of responsible and real-time research productivity in Indian libraries. The appropriate use of the platforms like the UGC-Infonet DLC, however, depends on the efficiency of the skills of the users. In a study across Nanyang Technological University, the usage of the information based e-resources was observed to be determined by the effectiveness of the user's skill sets and expertise in accessing and utilizing the ICT tools and applications (Majid & Alfia, 1999).

Ghosh, Biswas & Jeevan (2006) study focused on the interpretation of different types and models of mechanisms existing in India. The study evaluated the diverse consortia models on the basis of their constituency with regard to product specificity, region specificity, subject specificity and uses specificity.

**Figure: 2.4 Models of Consortia**



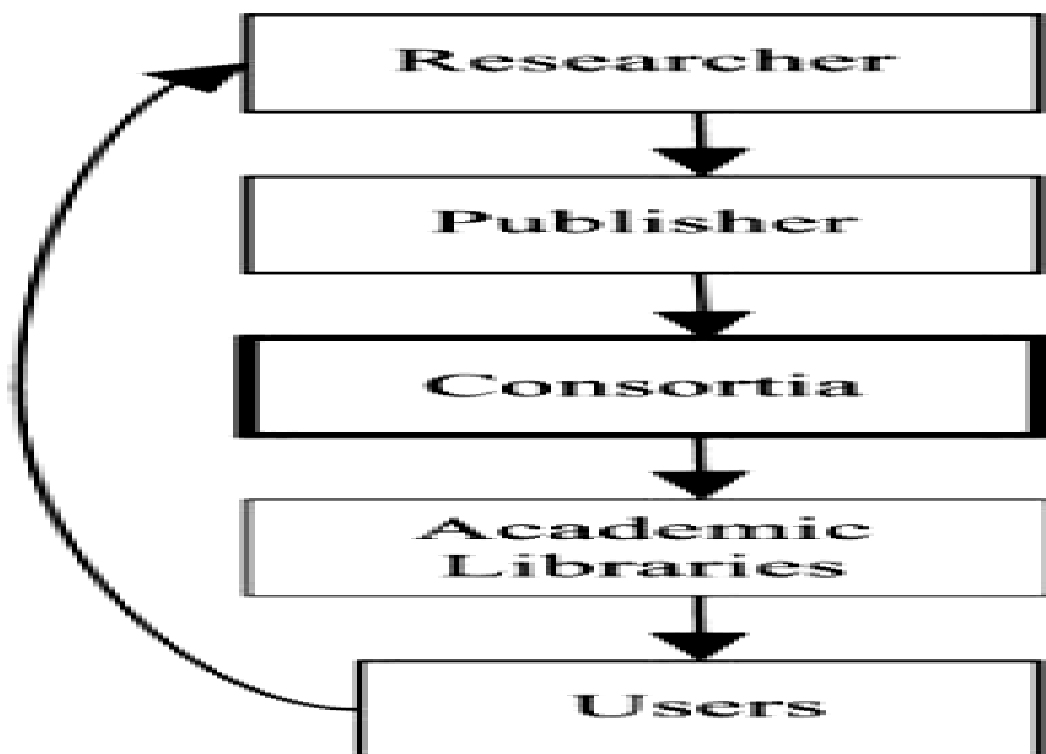
Source: [http://www.nkc.ac.in/uploaded\\_files/Consortium-Santosh%20C%20Hulagabali-Library.pdf](http://www.nkc.ac.in/uploaded_files/Consortium-Santosh%20C%20Hulagabali-Library.pdf)

Library consortia have been emerging across the developing countries as they aim at sharing the existing knowledge resources in e-form (Moghaddam & Talawar, 2009). Katsirikou, (2003) interpreted the knowledge management flows in the library consortia in the context of industrial practices. The study observed that knowledge management was a crucial aspect of the emerging library based consortia. The global availability of knowledge and the scaling of boundaries is an aspect that has been well promoted by collaborative

library networks. The users of the consortia become members of the global knowledge community on account of their access and use of the networks.

The library consortiums have been observed to impact the scholarly publishing cycle. The study observed that the university librarians foresaw the consortium implementation as supporting the logic of knowledge production in universities. The study further acknowledged the role of the consortia in expanding the role of libraries in the provision of information and knowledge for research activities in the universities. (yes)

**Figure: 2.5 Formations of Consortia**



Source: [http://www.nkc.ac.in/uploaded\\_files/Consortium-Santosh%20C%20Hulagabali-Library.pdf](http://www.nkc.ac.in/uploaded_files/Consortium-Santosh%20C%20Hulagabali-Library.pdf)(Maskell, 2008)

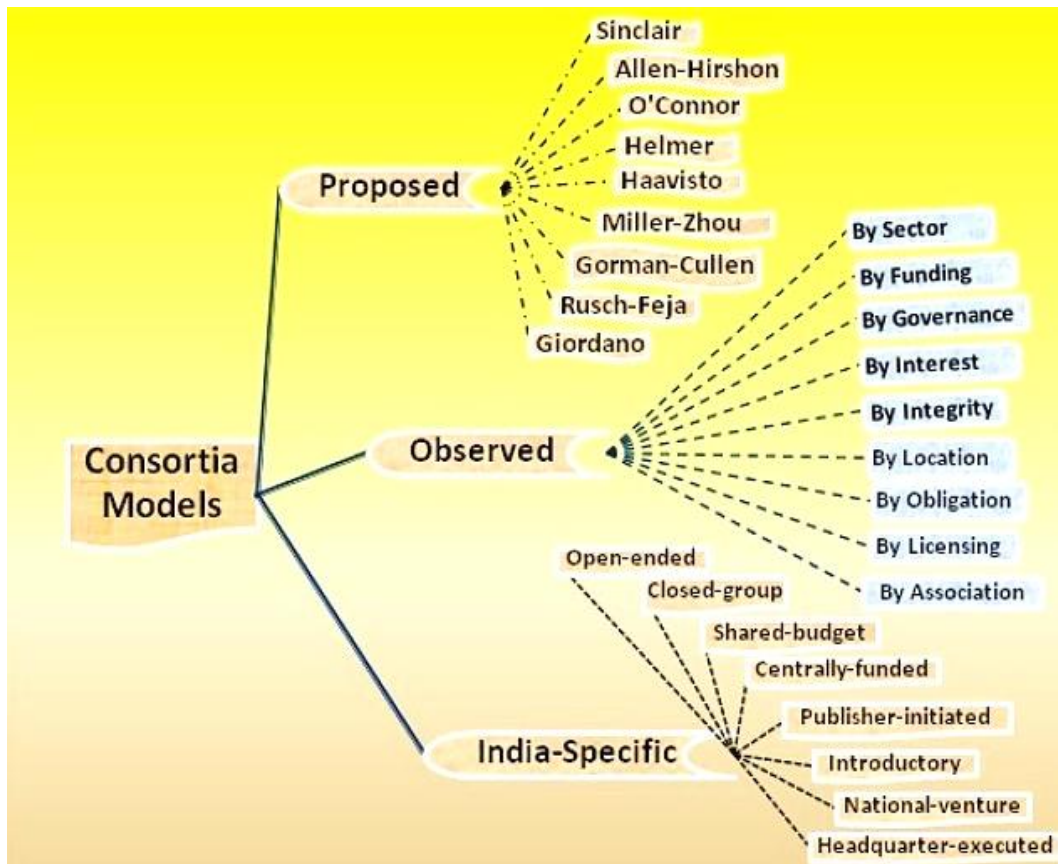
The collection building and provision of e-content has been rendered as the crucial aspect of UGC-Infonet DLC services. In a study across the preferences between the print and e-resources as they vie for collection inclusion, it was observed that the digital resources or the e-resources are evolving as the most prominent forms of access and usage across Indian

libraries (Pandita & Singh, 2016). The changing role of libraries highlighted the issue of guaranteeing access to knowledge as the prime challenge before a functional library system. The study further underlined the urgent need for change in the traditional roles of a library, keeping in view the growing emphasis on the trans-disciplinary requirements of academic research. The study concluded that the knowledge management for constructive knowledge creation was impossible without the development of a new relationship between changed libraries and the transformed needs of the scholar in the wake of the trans-disciplinary nature of research. In a study across American libraries, e-resources were observed to positively impact the functioning and the usage of the library facilities (White & Le Cornu 2011; Ungern & Lindquist, 1995). The existing university resource access environments have been observed to undergo a sea change in the aftermath of the introduction of modern ICT (Anunobi & Okoye, 2008; Tebbetts, 1991).

Gupta (2011) in his study across the Kurukshetra University library observed that the scholars in science discipline are attracted more towards the e-journals in comparison with the print ones. The study further concluded that the trend is observed when open access is made feasible. In totality, the trend is being observed only in case of the open access based e-content.

The rationale of collection management practices in containing the rising costs of subscription. The rising inclination of the students and the scholars towards the online versions in itself presents an opportunity for the library administrators to cut the cost associated with the physical subscription of the journals that are available in online mode (Thornton, 2000). Pal (2016) observed the various organizing models of library consortia in the context of developing nations and suggested the essence of consortia for the survival of the library as an institution.

Figure: 2.6 Models of Library Consortia



Source: <http://nopr.niscair.res.in/bitstream/123456789/35699/1/ALIS%2063%283%29%20194-202.pdf>

Kaul (2001) observed the relevance of knowledge management in developing countries. The research evaluated the patterns of information sharing in the emerging knowledge societies in the developing nations.

### 2.5.2 Awareness and use of UGC-Infonet DLC

The library as a mechanism is useless unless it is able to connect well with its ultimate users. The library and e-resources across the UGC-Infonet DLC are useless when the content is not usable across the scholars. The lack of awareness has been a widely explored construct the design of library services based on the user needs and observed the direct linkages between the unsatisfied user needs and the need for the libraries to reposition themselves (Song, 2009)

The study conducted by Ram & Karn (2014) on the study of UGC- Infonet E-Resources consortia in universities of eastern India study represent that the majority of 33% users are comfortable with e-resources remain 67% users are much comfortable with print resources. It shows that users are not much aware of e-resources. It reveals that the awareness of online journals is good, but users are not much aware of UGC-Infonet DLC. Study found that 29% of users use the manual catalogue card as a searching method, whereas 11% users use OPAC to search their information and 29% users take help of library staff in finding their resources. The study further shows to the satisfaction of users during user orientation program and still few users are not satisfied with the orientation program.

Chauhan & Mahajan (2014) assessed the impact of UGC-Infonet e-resources on social sciences faculty of universities and found that 67.6% of faculty are aware of the e-resources. They agreed that it had improved the quality of social science research in India. Faculty members preferred simple search techniques to find e-resources and very few use advance search techniques. The study further stated that 98.1% of faculty members use e-resources for article writing and research output production. They suggested that training is required in a regular interval.

The study conducted by Kumari & Lakshmi (2014) on the use of e-Journals through UGC-Infonet DLC by the Research Scholars of Sri Venkateswara University, Triupati: A study. The study reveals that a number of users were visiting the library daily and all the users were aware of the UGC-Infonet DLC. Most of the Scholars accessing e-journals for study and Research work. Most of the users access full-text Journal through Keyword Search method. All the respondents agreed that e-journal had a positive impact on their study, and maximum numbers of users were satisfied with internet facility. Others opined that e-

resources were better than print resources. It believes that UGC-Infonet DLC is a boon for them.

The study conducted by Kumar, Balasubramani & Amsavemi (2013) on use and impact of UGC-Infonet Consortium resources by the science scholars of Bharthidashan University, Tiruchirappalli: A Survey study reveals that UGC-Infonet DLC offers more than 7500 Journals, Open Access Journals and Bibliographic Databases. The study found that majority of 30% respondents using for research work and publishing articles. The study also found that users are expecting for most other services from UGC-Infonet DLC program like EDS service, electronic document supply services, current article alert services, SDI services. It was also found that the university library is the most preferred place to access resources followed by the Department, computer lab and no one access from outside the campus. The study shows the better and usage of UGC-Infonet resources at Bharthidashan University.

The study conducted by Gomathi (2013) on use of UGC-Infonet E-journals Consortium by the Faculty Members and Research Scholars of a Periyar University: A Study, study shows that a majority of 82% faculty members and 75% Research Scholars have indicated their awareness about the Consortium. 49% of faculty and 53% Research Scholars indicates that e-resources are better than the print version. 40% faculty members and 30% Research Scholars opined that UGC-Infonet DLC is excellent. The study suggested that the Consortium should make arrangements for supplying CDs of all archival access e-journals. The authority of the university should provide better infrastructure facilities and update internet facilities. The majority of respondents suggested that UGC-Infonet DLC should provide PDF files of the most of the journal Publisher. They also need expert assistance for library access.

The paper by Londhe & Deshpande (2013) focuses on the study of the usage of e-resources available through UGC-Infonet DLC of University of Pune users. The main aim was to know the searching strategies in the usage of e-resources and which e-resources are second hand to the maximum. The study reveals that usage of e-resources is increasing on the basis of usage trends of 13 full-text databases during 2007-2012 of the UGC-Infonet website. The study also shows that Subject-specific databases are highly in demand than multi-subject databases. The study would help the library science professional in decision making for the procurement of e-resources and databases.

Study Conducted by Thanuskodi (2012) on awareness and usage of UGC-Infonet DLC among faculty members of state universities in Tamil Nadu: A survey. The study shows that 94.4% of the science faculty members and 86.99% of social science faculty members were aware of the UGC-Infonet DLC. 34.15% of Social Science faculty and 31.06% of Science members search document through an online database. It reveals that science faculty member are more aware of than social science faculty members. The study recommended all the state should initiate to create awareness among faculty members. There is a need to update and include more numbers of journals and evaluate to UGC-Infonet DLC. The study further believes that it is one of the emerging tools kits for the libraries to serve better for its users. (yes)

The study conducted by Ahmad, Basha & Fatima (2012) on use of UGC-Infonet DLC by the research Scholars at the University of Delhi: A Survey. The study shows that 36% of Research Scholars aware of UGC-Infonet DLC. They access from their Departmental Lab, Computer Centre, and University Library. A majority of 85% of Scholars access e-journals through UGC-Infonet DLC and 47% of Scholars use to find information related to their area of specialization. Research Scholars use full-text e-journals of Emerald, Cambridge, Taylor

and Francis, Springer & Link, J-STOR and Project Muse. 42% Scholars use a field search technique followed by 27% using phrases, 28% Boolean operators. 70% of scholars are satisfied with the existing infrastructure to access e-resources, whereas 30% are not satisfied. There is a need to evaluate UGC-Infonet DLC e-journals.

The study conducted by Walmiki, Ramkrishnegowda & Prithviraj (2010) on awareness and use of UGC-Infonet DLC by the faculty members of the Karnataka State Universities. The study found that 39% of the faculty members were aware of UGC-Infonet DLC and use, whereas 86% of the faculty members were aware of but don't use and 24% of the faculty members were aware about the UGC-Infonet DLC. The study also reveals that 75% uses for writing a research article, research work and to keep up to date. 71% respondent are dissatisfied with slow internet and 50% raise the issue of a technical problem and 25% have no access to the UGC-Infonet DLC. The study suggested that University library should take necessary action to create awareness among faculty members about UGC-Infonet DLC. University library should focus on non-users to convert into actual users by orientation and training.

The study conducted by Mukherjee & Kumar (2010) on use of UGC-Infonet DLC e-journals by Research Scholar of the Banaras Hindu University, Varanasi: A study. The study shows that 55% respondent prefer to read print journals over e-resources. 33% responded said that they used e-resources to keep up to date themselves and 27% use e-journals regularly. 35% respondent found that they use the Google search engine to retrieve their needed information. It was also found that the central library is the popular place to search e-resources. 67% scholars are satisfied with the existing model of UGC-Infonet DLC. The study discussed that the prime objective consortium was to minimize the gap of a digital

divide. The university should improve the access possibility by the upgrading internet facilities, increasing nodes and enabling high speed connectivity.

The study conducted by Sujatha & Mudhol (2008) on the use of e-resources at the College of Fisheries, Mangalore, India. This study shows that the majority of 71% of the respondent state that they are having average skill in the use of computers where as 21% of the respondent opined above than average skill. Use of e-resources and library services are influenced by computer skill. It is also found that the faculty and scholars are more skilled in the using of computers. The study shows that the Majority of 79% respondent access e-resources and use the internet for subject specific information website. When the respondent was asked to rate overall satisfaction towards the access of e-resources than 96% of the respondent indicates that they are moderately to highly satisfied. The study suggests that college should organise orientation training program so that scholars can effectively access the e-resources available in the library.

### **2.5.3 Usage pattern and satisfaction level of e-resource under the UGC-Infonet DLC**

The incidence of relationships between the perceived usefulness and perceived ease of use as vital determinant of user's acceptance of digital libraries across research practices. The library mechanisms have witnessed investments in millions of dollars, yet the non-convergent research regarding user's acceptance is a matter of deep concern. The attempts regarding the academic interpretation of user's acceptance of digital libraries have been nominal (Thong, Hong & Tam, 2002). The research further comprehended the interplay across system interface characteristics, organizational context and individual differences; as the key towards understanding user behaviour.

The question of information literacy across library users has been defined as the socio-technical phenomenon involving information environments. Information literacy in

literal terms has been interpreted as the scholar's capability to consider the need for seamlessly access and evaluate the relevant information across digital platforms (Tuominen, Savolainen & Taliija 2005). The sustainable participation of scholars has always remained a core concern. As per a recent study of the American Library Association, information literacy across users could be interpreted as the user's skills or capabilities that help the users to identify their information requirements effectively and securely without external assistance.

The issue of sensitizing the library users has been observed to be a domain of the institutions in order to facilitate a sustainable footfall across the infrastructure usage (Wang, Li & Hsieh, 2013). The existing studies vindicate the role of the library's efforts in sustaining the frequency of the visit as well as shaping the user's perceptions regarding effective use of services (Carpenter, 2012; Lee & Lin, 2005).

The librarian's role has always been examined in the context of the institutional efforts and their sustainability in securing the user friendliness, technological infrastructures in developing nations. The timely and resource based implementation of user training and familiarization programs has long remained a matter of intense debate and analysis (Monroe-Gulick, O'Brien & White; 2013; Kuhlthau, 1997).

In a study on possible areas of user's learning orientation development in Ghanaian libraries, Akkussah, Asante & Adu-Sarkodee (2015) observed that the user's level of awareness regarding the content and context of e-resources available in the current setup are a determining factor. The libraries, hence need to organize user awareness sessions in order to familiarize the user with the complete portfolio of facilities being offered.

Das (2014) focuses on the awareness and use of UGC-Infonet Digital Library Consortium by the Postgraduate students of University of North Bengal. The paper examines the awareness, utilization and satisfaction level of the students regarding the consortium

resources. Lack of proper training is the major de-motivating cause in the proper usage of e-journals. It suggested that the library should organize and conduct awareness and training programs on a regular basis.

Mittal & Bala (2013) study on the use of e-resources by the research scholar, students and faculties in universities and colleges revealed that a majority of the respondents use e-resources for educational purposes and research work. It is also found from the analysis that most of the users are not giving enough facility for the use of e-resources

Another study on the usage pattern of e-resources in seven technical institutions in North India by Gupta (2011) and it shows that 33% of research scholars and faculty members read 3-5 articles in a week for the updating their study and research through the scientific literature.

Chang, Lin, Chen & Chin (2009) explored the application of the technology acceptance model towards a user's acceptance of a digital library system in developing countries. The study across sixteen library institutions spread across Asia, Latin America, South Africa and Central America revealed that the user's perceived ease of use of the digital library infrastructure had a significant impact on the user's quantum of time spent and the respective behaviour with regard to library based information search.

The study conducted on the use of the UGC- Infonet Consortium by the Faculty Members and Research Scholars of Department of Chemistry at Karnataka University by Kumbar, Vatnal, Hadagali & Patil (2006) reveals that a maximum number of chemists (87.5%) have got awareness about the UGC-Infonet program. The majority of the chemists (82.5%) felt that they are in need of a regular training programme to make effective use of UGC-Infonet program. The data reveals that the majority of the chemists (47.5%) have enough knowledge in using the web, including searching of different Databases.

Kumar, Sinha & Murthy (2006) conducted a study on developing E-Journals Consortium in India: a new approach for resource sharing in Digital and Network environment which revealed that e-journals brought new challenges before the library and information professionals to give full text access to its end users. The e-Journals are very much costly. The available funds for the institutions, which are either given by the UGC through MHRD, Govt. of India, or by State Government, are being reduced due to financial crisis and escalation in the price of printing cost and newsprint. Therefore the universities and national institutions like IITs, IIMs, CSIR Research Institute, are looking forward to consortia approach. Through consortium approach various prestigious E-Journals & E-Databases, etc. are centrally subscribing; successfully through INDEST Consortium, UGC-Infonet DLC, CSIR Consortium FORSA Consortium, IIMs Consortium, and IGCAR Consortium.

#### **2.5.4 Problems, prospects, measures and suggestions for improving the usage of e-resources available under the UGC-Infonet DLC**

Chanchinmawia & Verma (2016) surveyed to find out user awareness and uses of UGC-Infonet DLC by faculty members and research scholars in School of Physical Sciences, Mizoram University. A survey was conducted in the School of Physical Sciences, which consisting of three departments Chemistry, Mathematics & Computer Science and Physics. The main objective was to find the awareness, utilization and satisfaction with UGC-Infonet DLC and to find out the various problems faced by the users. It was found that 66% respondents (71% the faculties and 64% research scholar's) were aware while 34% of respondents were not aware with this consortium and its resources. The major problem of accessing is slow internet connectivity followed by lack of knowledge to use. They suggested

that awareness and training programs should organize for creating awareness and use of UGC-Infonet DLC.

Baladhandayutham & Balaji (2015) conducted study on the use of UGC- Infonet Journals by the Research Scholars and Students of Sociology and Political Science Departments in Madurai Kamaraj University, Madurai. The study was conducted to evaluate the usage of UGC- Infonet DLC journals by the research scholars and students of sociology and political science departments in Madurai Kamaraj University. It is found that 100% of the respondents are aware of the UGC- Infonet DLC journals, 40.84% of the respondents are aware the journals through library professionals. The main problems faced are the lack of knowledge to use UGC-Infonet DLC. They suggested that library authority should arrange training and orientation program to use UGC-Infonet DLC.

Joshi (2014) conducted a study on the Awareness and Use of UGC-Infonet DLC E-Resources in Universities of Gujarat State: A survey to find out the hurdles and problems faced by the users to access UGC-Infonet DLC e-resources and the majority of 66.47% admitted that the training program was lecture-oriented rather than practically oriented. She suggested that the library should focus on internet bandwidth and ICT infrastructure. She further suggested that the user program should be arranged in a small group for a particular subject so that they can know their e-resources available in a particular discipline.

Maharana, Das & Subrat (2013) conducted a study on Evaluating the Awareness and Usage of UGC-Infonet DLC by the Faculty Members: A Case Study of Odisha State Universities. The study reveals that the majority of readers i.e. 76.37% use for guiding research followed by 65.46% for publication and 56.37% for seminars/conferences. Similarly, most of the resources used by the faculty members for teaching purposes 85.46%, for publication 70.91% and for seminars/conferences 60% respectively. The main problems

faced by the users are a Poor infrastructure of the library and Low internet bandwidth. The paper does not provide any suggestion to improve this problem.

The study conducted by Chauhan, Chand & Kaur (2011) on the use of e-resources in Himachal Pradesh University, Shimla with special references to the UGC-Infonet DLC. The study revealed that the university has 7000+ full-text articles, and Cambridge university press is the prominent e-resources for the humanity and social Science. The study found that university does not have Local Area Network (LAN) facility on the campus. UGC-Infonet DLC lab is maintained by Central Library that gives nods to access the available resources to users on payment basis. There is a lack of awareness among the research scholars and faculty members regarding UGC-Infonet DLC. The Study suggested that universities should establish a departmental library, and library authority should provide orientation and training. Being as the monitoring agency INFLIBNET should take care of the problem of users.

## **2.6 Conclusion**

This chapter reviewed the existing academic literature across the nature and dimensions of library consortia, UGC-Infonet DLC based consortiums as well as the awareness and satisfaction based literature. The chapter reviewed the practices and the concepts with regard to the scholars awareness and the measures for user satisfaction. This chapter explores the diverse contexts of the development, awareness, usage and the challenges before the successful adoption of the UGC-Infonet DLC platforms in Indian context. It's evident that no single library can fulfil all the academic needs of the research scholars, yet the pan Indian deployment is not being observed as user-friendly as it was devised.



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## CHAPTER-3

### UGC-INOFNET DLC: A THEORETICAL FRAMEWORK

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#### 3.1 Changing contexts of cooperation

The term “cooperation” in the context of library connotes a meaning that exceeds the definition and scope. The term stands for working together to achieve a common goal. In the context of libraries, such cooperation and its meaning has evolved a lot over the times. In the age of physical and standalone libraries, the “cooperation” meant the sharing of physical resources, collections, databases and even the associated print resources. Such resources have been at the juncture of the success of library functioning since ages (Evans, 2002). Traditionally the library as a concept and cooperation as a phenomenon involves the cross sharing of limited and scarce resources to create value for the users.

In the library perspective, such cooperation could be beneficial in securing the modern library management across the distances and fulfilment of user’s distinct needs and aspirations (Alicmas & Ramos, 2015). The existing research points towards the prevalence of cooperation for the seamless functioning of library systems across the world and Indian context is no exception. The physical or the print resources have their own limitations regarding of usage, multiple accesses, multiplication of ingrained content and across distance transportation (Das, 2014). Though the print resources have traditionally been desired more by research scholars and existing user studies vindicate their beneficial role in promoting research activity in universities, yet their disadvantages restrict their free and long distance usage and transportation.

The advent of digital technologies, information management software and networking expertise, have profound applications in promoting the reach and cause of the library as an institution. The ICT has led to the creation of various resource sharing capabilities across the libraries. The emergence of digital content or the e-resources has marked a phase of revolution in the usage and spread of the library as an institution worldwide (Esposito, 2013). The term “e-resource” could be interpreted as involving e-journals, e-books, e-thesis, *etc.* These e-resources possess distinct advantages regarding of their respective storing, information dissemination and real time access to information in comparison with the so called traditional print resources.

Such a state of affairs encourages the existing libraries to adopt digital or these e-resources. The evolution of e-resources started in the 1960’s with the development of MARC format. The development and advancement of personal computers marked an enormous impact on the creation, transfer and storing of these e-resources. In 1990, the World Wide Web was introduced to the world by Tim Berners Lee enabled the users to share and use online resources. Subsequently, the libraries began to offer access to OPAC, e-journals, e-books and bibliographic database and full-text database through the web. With the advent of more advanced technology in the 20<sup>th</sup> century, it is more convenient, economical and user-friendly. In 2002 with the efforts of NISO and Digital Library Federation, e-resources have developed. They have published the e-resource management standard in 2004.

With the advent of globalization in the realm of education, there has been information explosion. The present decade has been dubbed as the information age (Anjaiah, 2014). E-resources in collaboration with the internet have become a sign of the modern age which is an invaluable tool for teaching, learning, and research. The library and information landscape has transformed with the onset of the digital era, and today traditional libraries have changed

their roles to serve as Knowledge Centres with priority on value-added electronic information services. The internet boom in India has become one of the major contributors to the economic growth of the country. The use of internet has increased more than 11 times in the last seven years. This rise has led to the growth of cyber cafes and internet parlours throughout India with easy accessibility and cost-effective services helped with the enhanced speed of the internet.

As such these academic libraries or university libraries not only provide knowledge depository for the universities, but also capture, organize and disseminate information to the universities community to conduct research. Thus, academic libraries play a vital role in ensuring the survival and growth of each university. In this context, the University Grants Commission (UGC) advocated the mechanism of ‘UGC-Infonet DLC’ to help the university libraries, with regard access to a large number of scholarly online journals be made available to the user community. UGC-Infonet DLC facilitates extensive cooperation regarding collection sharing, resource pooling, collection management, thesis repository management as well as real-time online journals and research publications as well.

### **3.2 Understanding e-resources**

E-resources are the resources that are available in the electronic or digital format and are easily accessible through computers, palmtops, laptops, mobiles, iPods etc. Such resources can comprise either the data (numbers, letters, graphics, images, audio and videos, graphical) or the programs (instructions, data and programs). As per the AACR glossary, “e-resource” is defined as any work encoded and made available for access through the use of a computer. It includes electronic data available from (1) remote access and (2) direct access (fixed media). In other words: Remote access refers to the use of e-resources via a computer network. The term “direct access” refers to the use of e-resources via carriers (e.g., discs/disks, cassettes,

cartridges) designed to be inserted into a computerized device or its auxiliary equipment. Tenopir (2000) has defined e-resources “as those electronic information resources and services that user accesses electronically via a computer network from inside the library or remotely to library”.

In the Indian library consortiums, such e-resources have been at the forefront of promoting the interdisciplinary and multidisciplinary research across multiple disciplines (Goria, 2012). Such resources have been observed to be subscribed in subject bundles or a complete package of the publishers as per the distinct requirements of the library users. Such e-resources have been further observed to foster a climate of resource flooding as the Indian libraries have been unable to interpret the users requirements on time to time basis. The study on e-resource usage further observed the existing environment as responsible for gradual or partial acceptance of such e-resources as the library staffs too lacks information and formal training about the appropriate method of accessing and managing the e-resources (Goria, 2012).

As per studies by Esposito (2013), the most crucial phase about e-resources is with regard to their acquisition. “Resource Acquisition” refers to any e-resource, remote or direct access, which (1) the library provides access through official contractual, licensed, or other agreements (any of these e-resources may or may not be owned by or housed at the library) or (2) the library receives through its acquisition process (e.g.; purchases, gift, exchange, copyright deposit, ISSN requests and transfer).

Similarly, the process of “Collection management” refers to the management of the diverse e-resources owned by the library and selected for the permanent collections. It may also include resources stored elsewhere for which the library has permanent ownership rights. “Links” refers to the pointers from the Library’s web resources or bibliographic records to

remotely access data. The associated phenomenon of “Resource Archival” refers to pointers from the library’s web resources or bibliographic records to remotely access data. “Resource Archives” refers to that process of maintenance in a secure and permanent digital repository managed by the Library or for the benefit of the Library. The above mentioned definitions underline the fact that these- resources are available in electronic format and accessible through electronic media. There are several reasons to validate the collection building and development of the e-resources in libraries. It can be summarized as follows:

- Ever rising price rate of the printed journals.
- Problem related to technological development.
- The long gap between publications of journals and its availability in the market

### **3.3 Consortium - History and Development**

According to Kopp (1998) during 1931 to 1970, 125 consortia were developed, 02 consortia during the period of 1931-1940, 03 consortia in 1941 to 1950, 05 consortia in the period of 1951 to 1960 and remaining 115 consortia during the period of 1961 to 1971. The concept of library consortia was started with the concept of library co-operation, interlibrary loan (ILL), library network, document delivery etc. It was started in 1980 when most of the libraries got automated by the computer for bibliographic processing and database searching. Internet and WWW enable the sharing of resources to the remote area through library consortia. With the development of ICT and library automation helps the library to set library consortia.

**Table: 3.1 Consortium in India**

Code	Name of the Consortium	Starting year
C1	CeRA (Consortium of e-Resources in Agriculture) <a href="http://cera.jccc.in/">http://cera.jccc.in/</a>	2007
C2	DBT e-Library Consortium (DeLCON) <a href="http://delcon.gov.in/">http://delcon.gov.in/</a>	2009
C3	Defence Research and Development (DRDO) E-Consortium <a href="http://dsl.drdo.gov.in/ejournals/">http://dsl.drdo.gov.in/ejournals/</a>	2009
C4	Electronic Resources in Medicine (ERMED) Consortium <a href="http://www.nmlermed.in/">http://www.nmlermed.in/</a>	2008
C5	Forum for Resource Sharing in Astronomy & Astrophysics (FORSA) Consortium <a href="http://ncralib1.nra.tifr.res.in/library/?q=content/forsa">http://ncralib1.nra.tifr.res.in/library/?q=content/forsa</a>	1982
C6	Health Sciences Library & Information Network (HELINET) Consortium <a href="http://www.rguhs.ac.in">http://www.rguhs.ac.in</a>	2003
C7	INDEST -AICTE Consortium <a href="http://panit.iitd.ac.in/indest/">http://panit.iitd.ac.in/indest/</a>	2003
C8	Ministry of Communications & Information Technology (MCIT) Library Consortium <a href="http://mcitconsortium.nic.in/">http://mcitconsortium.nic.in/</a>	2005
C9	National Knowledge Resource Consortium (NKRC) <a href="http://124.124.221.7/">http://124.124.221.7/</a>	2009
C10	UGC-INFONET Digital Library Consortium <a href="http://www.inflibnet.ac.in/econ/">http://www.inflibnet.ac.in/econ/</a>	2004

Source: <https://gistlibrary.files.wordpress.com/2017/09/98-98-1-pb1.pdf>

In the 1970's Online Computer Library Centre (OCLC), Research Library Group (RLG) and Washington Library Network (WLN) were the most successful consortia in the United States. Many other consortia were set up in the very short period of time they are:- Cape Library Cooperative –CALICO (1992), Illinois Library Computer System Organization – ILCISO (1980), China Academic Library and Information System – CALIS (1998) and many other London Libraries consortia in the UK, Consortia of University Libraries in Spain, Catalonia Consortium University libraries, Galician Libraries consortium etc. In India, Indian research, academic and technical and special libraries started sharing web-based resource FORSA Library Consortia, UGC-Infonet DLC, CSIR Consortia, HELINET Consortia etc.

### 3.3.1 Consortia

Consortia are created to expand the collaboration of resources which are commonly formed to increase the purchasing power of the collaborating institutions to expand the

resource availability and to offer automated services. A consortium is an association of two or more individuals, companies, organizations or governments (or any combination of these entities) with the objective of participating in a common activity or pooling their resources for achieving a common goal. The Consortium is a Latin word, meaning “partnership”, “association” or “society” and derives from consors ‘partner’, itself from con-‘together’ and sors ‘fate’, meaning owners of the means or comrade. According to Verzosa (2004) consortium is now the popular mode that brings together librarians and libraries for activities and objectives that cannot be as effectively undertaken individually. It may be called a “consortium,” a “network,” an “association,” or a “Virtual Library.” It may be informal, formal, or government-sponsored.

### 3.3.2 Library Consortium

Library consortium is a group of libraries that agree to pool their resources by allowing the user of each institution some type of access to resources of all other institutions. “It is a community of value-creating entities, generating value through an aggregation of library units within and across organizations. Library consortium is a “community (a cooperative) of two or more information agencies which have formally agreed to coordinate, cooperate or consolidate certain function” to achieve mutual objectives (Vel, 2012). It is an association of a group of libraries to achieve the joint benefits mutually. It provides a way for its members to conduct business in a comparative manner.

**Figure: 3.1 Evolutions of Consortia**



Source [http://www.nkc.ac.in/uploaded\\_files/Consortium-Santosh%20C%20Hulagabali-Library.pdf](http://www.nkc.ac.in/uploaded_files/Consortium-Santosh%20C%20Hulagabali-Library.pdf)

It is challenging and impossible for any single library, documentation, or information centres to procure and stocks hold all the information resources required by the patrons. That's why many libraries have started interlibrary loan, document delivery, library networks etc. to solve the problem of finance and resources. To overcome this problem many libraries, accept the concept of library consortia for resource sharing, maintaining cooperation and coordination among the libraries. The main goal of consortia is to go with each other to fulfill another requirement. Though library consortia have been created with narrow purpose, these can be turned into efficient instruments for sharing all types of library resources.

Consortia are commonly formed to increase the purchasing power of the collaborating institutions to expand the resource availability and to offer automated services. The phenomenon of a group of libraries coming together willingly and buying e-information is gaining importance for a decade. This new scenario along with new forms of selling and purchasing information has led to new pricing models. Publishers and vendors/aggregators find it convenient to address consortia matters collectively rather than dealing with individuals. During the last few years print editions of journals have been converted into e-editions and new ones are emerging in e-form and all are available for subscription with additional costs for e-access. Due to the exorbitant prices of e-journals, librarians are forced to create that negotiated bulk discount with publishers and publishers are willing to promote the sale of their products under consortia agreements.

### **3.3.2.1 Features of Library Consortium**

The main features of library consortium are as follows:

- ❖ It provides each organization and institutions with the capacity to share their resources without sacrificing the individuality of each member library.

- ❖ The collections of the consortium libraries enable each member library to support scholarly research for its users.
- ❖ Co-operative research and development in the application of ICT enhances service and realizes cost effectiveness.
- ❖ Staff development and interaction with a quality of service.
- ❖ It is the co-operative task to reduce the cost of purchase consortia. As a result, end users can take benefits of more resources than would be available through one library.
- ❖ To advance library services are provided with an emphasis on access to new E-resources including databases and services through the internet and www.
- ❖ To expand interlibrary searching at less cost is possible.
- ❖ Uncertainties in legal issues are handled with more confidence.

### 3.3.2.2 Types of Library Consortium

On the basis of characteristics consortia can be divided into various types, which are given below:

On the basis of type of libraries covered

- Consortia of multi-type libraries
- Consortia of same type libraries

On the basis of geographical area of coverage

- Local level consortia
- State level consortia
- National level consortia
- International level consortia

On the basis of subject/discipline covered

- Single discipline oriented consortia

- Multi-discipline oriented consortia

On the basis of type of organizational structure

- Loosely knit federation
- Tightly knit organization

On the basis of basis of formation

- Non-sponsored consortia
- Sponsored consortia

Any existing consortium may fall in more than one category.

### **3.3.2.3 Advantages of Library Consortium**

Library Consortium serves many advantages to the member libraries. Some of the advantages of the library consortia are given below:

- Consortia provide access of e-resources to a maximum numbers of member at lower rates.
- Monitoring and availability of various e-resources through usage statistics.
- Optimum utilization of library budget and funds;
- Availability of access 24x7 around the clock.
- It solves the problem of space, losing, shelving, binding, lending, and other aspects of the member libraries.
- It facilitates favorable agreements terms and conditions.
- It eliminates duplication of e-resources, staff efforts and saving of time.
- Better library service to the user like CAS and SDI
- Maintenance cost is less.

### 3.3.2.4 Limitations of Library consortium

The Limitations of a library consortium are given below.

- Unavailability of printed copies of e-resources.
- Legal issues involved in agreement, contracts and licensing.
- Require qualified and specialized staff in handling e-resources.
- It requires a huge amount of investment in licenses and information Communication technology.
- Copyright issues and misuse of research materials.
- Unreliable power supply, telecommunication links and slow bandwidth.
- Problems in backfile and unavailability of archiving.
- Only registered members can avail the facilities.
- Most of the users preferred print resources instead of e-resources.

### 3.3.2.5 Functions of Library consortium

The various functions of Library consortium are given below:

- Sharing of the collection.
- Licensing of e-contents.
- Preservation and Archiving.
- Sharing of union catalogues and online catalogues.
- Training and orientation programmes for library staff and users.
- Developing the interface of catalogues, databases and e-collection by creating portals for the member libraries.
- Setting up institutional repositories, e-print archives, e-theses collection, *etc.* for the participating members.

- Assisting to member libraries by creating and development of IT infrastructure.

### **3.4 UGC- University Grant Commission, Delhi**

The first initiatives to formulate a national system of education in India was proposed in the year 1944 on the report of the Central Advisory Board of Education on Post War Educational Development in India, also known as the Sargeant Report. After getting Independence under the Chairmanship of Dr. S. Radhakrishnan University Education Commission was set up in 1948 which is to report on Indian university education and suggest improvements and extensions that might be desirable to suit the present and future needs and aspirations of the country. They recommend that they could adopt the model of the University Grants Commission of the United Kingdom with a full-time Chairman and other members to be appointed from amongst educationists of repute. In the year 1952, The Union Government of India all the allocation of grants in aid to the Central Universities and other universities from public funds is distributed through the UGC. It was formally inaugurated by late Shri Maulana Abul Kalam Azad, the then Minister of Education, Natural Resources and Scientific Research on 28 December 1953. The UGC was full-fledged established in November 1956 as a statutory body of the Government of India through an Act of Parliament for the coordination, determination and maintenance of standards of university education in India. The Head office of the UGC is situated at Bahadur Shah Zafar Marg in New Delhi, with two additional bureaus operating from 35, Feroze Shah Road and the South Campus of University of Delhi as well. There is 47 Central Universities, 370 State Universities, 124 Deemed to be Universities, 282 Private Universities under the supervision of UGC (UGC, Genesis-2017).

### 3.4.1 Mandate of UGC (University Grant Commission, Delhi)

The two main responsibilities of UGC is to provide funds and that of coordination, determination and maintenance of standards in institutions of higher education. The mandates of UGC is given below: (UGC-Mandate, 2017)

- Prompting and Coordinating university education.
- Determining and maintain standards of teaching, examination and research in universities.
- Framing regulations on minimum standards of education.
- Monitoring developments in the field of collegiate and university education: disbursing grants to the universities and colleges.
- Serving as a vital link between the Union and state governments and institutions of higher learning.
- Advising the central and state governments on the measures necessary for improvement of university education.

### 3.4.2 Role of UGC in UGC-Infonet DLC

The UGC is responsible for constituting the National Steering Committee of the Consortium. It also accountable for making policies, monitoring the progress, coordinating with other Consortium in the country and to ensure a gradual decrease in subscription of print resources in the beneficiary institutions. The UGC also monitors usage of e-resources and its impact on research output in beneficiary universities (GUIDELINES FOR UGC-INFONET Digital Library Consortium during the XI Plan Period (2007-2012)).

### 3.5 INFLIBNET (Information and Library Network Centre)

“The Information and Library Network (INFLIBNET) Centre was established as a project of IUCAA in 1991 and was recognized and as an independent, autonomous Inter-University

Centre (IUC) of the University Grants Commission (UGC) in May 1996. Major activities and services of the Centre include automation of academic libraries and information centres, creation of union databases of resources (IndCat) available in academic libraries, promote resource sharing among academic libraries, promote information access and transfer, support scholarship, learning and academic pursuits. The Centre acts as a nodal agency for networking of libraries and information centres in universities, institutions of higher learning and R & D institutions in India with an aim to promote scholarly communication” (INFLIBNET @ a Glance, 2016).

### **3.5.1 Role of INFLIBNET in UGC-Infonet DLC**

The INFLIBNET Centre acts as a nodal agency for implementation, monitoring and execution of the entire programme through the committees. It coordinates all activities concerned with the negotiation, renewal of subscription of e-resources and subsequent trouble shooting on behalf of the Consortium. The Centre also promotes cooperation amongst member universities and facilitates better terms of references for use and preservation of subscribed e-resources. In brief, INFLIBNET is responsible for: (GUIDELINES FOR UGC-INFONET Digital Library Consortium during the XI Plan Period (2007-2012).

- Constitution of Negotiation Committee through its Governing Board;
- Negotiating rates of subscription and its terms and conditions;
- Ensures IP-based access of subscribed e-resources to beneficiary universities;
- Attend to the problems faced by universities and liaise with publishers to resolve such problems;
- Develop tutorials and promotion materials, impart training and technical support to member universities;

- Propagate the Consortium amongst other institutions so as to extend its benefits to other institutions by enrolling Associate Members;
- Evaluate subscribed e-resources and monitor its usage regularly;
- Signs license agreement for access to various e-resources on behalf of members;
- Maintain and update website of the Consortium;
- Organize awareness programme to promote e-resources;
- Improve cooperation and communication amongst member universities;
- Measure impact of access to e-resources on research output in beneficiary universities; and
- Present periodic report to the UGC on extent of usage of e-resources, economics of the consortium and its impact on research output.

### **3.6 UGC-Infonet DLC**

The advancement and development of ICT have a deep impact on the ways by which information is gathered, stored, accessed, retrieved and archived. It has changed the concept of society into an information society and has made a huge impact on their lives. It has given new jargons such as paperless society, e-resources, web portal/gateway and global digital library. The revolutionary changes in the technology have made the global village possible and the internet and www bridge the gap of distance, now it is no longer an obstacle in the accessing the required information. The modern function and services of libraries have undergone drastic changes from the traditional library. Now academic, public and special libraries have started various e-resources such as e-books, e-journals, CD-ROM, e-bibliography and databases along with printed resources. Libraries in developing countries like India are unable to offer required and relevant information to the users due to the financial crunch and limited budget.

Figure: 3.2 UGC-Infonet DLC website



Source: [https://www.researchgate.net/figure/Homepage-of-UGC-INFONET-Digital-Library-](https://www.researchgate.net/figure/Homepage-of-UGC-INFONET-Digital-Library-Consortium_fig1_265396481)

[Consortium\\_fig1\\_265396481](https://www.researchgate.net/figure/Homepage-of-UGC-INFONET-Digital-Library-Consortium_fig1_265396481)

The literature explosion in the recent times has made it impossible for a library to procure and store all the materials which are required by the users. To solve these problems, libraries have concentrated on sharing of their resources to the participating libraries and to the users. The Indian libraries have adopted various resource sharing activities such as the National Information System in Science and Technology (NISSAT), National Information Centres (NIC), library consortia, document delivery services and inter-library co-operation. The government has supported financial assistance for development of various networks such as ADINET, BALINET, BONET, DELNET, MALIBNET etc.

The DELNET and MALIBNET are the most dynamic and active networks for the creation of databases and other library activities. The evaluations of digitized material and e-resources have made resource sharing very easy, convenient and cost-effective. Under such circumstances, the emergence of a library consortium provides an effective system for many members to share knowledge through e-resources. The consortium is a group or a community

of two or more who agreed formally to co-operate and co-ordinate to achieve common goals or objectives.

The phenomenon of resource sharing drives the modern era spirit of library services. The cooperation aided by ICT interfaces enables the existing libraries to leverage their resources in a manner that each gets widened whereas the associated expenditures gets reduced. The basic premise behind the UGC-Infonet DLC appears to be the increase in availability of stored or acquired resources, extension in the range of accessibility of such resources across distances, substantial reduction in the relative cost of the provision as well as the promotion of better utilization of acquired library resources which are otherwise fragmented and useless. In other words, the ICT supported UGC-Infonet DLC supports the rationalization of responsibility of resource acquisition, purchase of the same resources across multiple libraries or points of access, substantial sharing of the burden of processing and indexing such resources, sharing of related library based-services as well as sharing of the associated human talent and expertise in the process as such.

The research-based competitiveness is bound to get a boost as the usage access is now a key concern instead of acquisition of the library resources. The onset of UGC-Infonet DLC is bound to create new and relatively novel cross institutional dependencies that are supported by mutual needs and aspirations of serving the user's curiosity across distances

The UGC-Infonet DLC has emerged as a boon to academic libraries in India. The consortium provides the facilities to access more than 12333 reputed academic journals. The consortium facilitates access to e-resources in academic libraries and signed an agreement with different publishers and accesses were provided under multiple sites licensing to academic institutes in different phases. Honourable Dr. APJ Abdul Kalam, the erstwhile

President of India, formally launched UGC-Infonet DLC on December 2003 (GUIDELINES FOR UGC-INFONET Digital Library Consortium during the XI Plan Period (2007-2012)).

The Consortium provides current as well as archival access to more than 7500+ core, peer-reviewed journals and 10 bibliographic databases from 26 publishers and aggregators in different disciplines. The programme has been implemented in a phased manner. In the first phase that began in 2004 and 50 universities who had Internet connectivity under the UGC-Infonet Connectivity programme of the UGC were included. In the second phase, 50 more universities were added to the programme in the year 2005. So far 209 Universities, 14 National Law schools and central universities that come under the purview of UGC have been provided differential access to subscribed e-resources.

These e-resources covers almost all subject disciplines including Arts, Humanities, Social Sciences, Physical Sciences, Chemical Sciences, Life Sciences, Computer Sciences, Mathematics and Statistics, etc. The UGC fully funds the program and executed by the INFLIBNET (Information and Library Network) Centre, Gandhi Nagar. The benefit of subscription to e-resources would also be extended to the colleges, to begin with the College for Potential with Excellence (CPE) and autonomous colleges. The Consortium has also launched its "Associate Membership Program" wherein private universities and other research organizations are welcomed to join the Consortium for selected e-resources (UGC-INFONET Digital Library Consortium | ICOLC Website, 2018). Membership of the Consortium is open to private or UGC-funded universities /colleges for one or more e-resources. The members would be required to sign an agreement with the UGC-INFONET DLC as well as with the publishers of e-resources that they wish to subscribe. The Consortium charges an annual membership fee of Rs. 5,000.00.

### 3.6.1 Aims and objectives of UGC-Infonet DLC

The prime objective of UGC-Infonet DLC is to supplement e-resources which include full text and bibliographic database to academic institutions at the less subscription fees. The main aim and objectives of the consortium is given below (GUIDELINES FOR UGC-INFONET Digital Library Consortium during the XI Plan Period (2007-2012):

- To provide access at affordable subscription rates to high quality and scholarly e-resources to the universities and colleges with trouble-free terms and conditions.
- To promote and create use of ICT in teaching and learning in the higher academic institution in India to access and use the scholarly content.
- To benefit the private universities and colleges.
- To deliver training to use and access e-resources to the users, librarians, research scholars, and faculty members to the academic institutions.
- To lay emphasis more on subscriptions of e-resources than to print resources.
- To motivate participating universities and colleges through co-operation of resource sharing and inter-library.
- To analyze the usage statistics of subscribed resources and to identify new e-resources to add under the consortium.
- To bring high standard and quality changes in teaching and learning, research to achieve the globalization challenge of higher education.
- To give more attention to the research publication productivity quality and quantity of the academic institution.

### 3.6.2 Benefits of UGC-Infonet DLC

The Consortia based subscription to e-resources is a viable solution for increasing the access to e-resources across institutions at a lower rate of subscription. (GUIDELINES FOR UGC-INFONET Digital Library Consortium during the XI Plan Period (2007-2012): Significant benefits of UGC-Infonet DLC are given below.

- It serves as a single window for the majority of universities for academic and research activities.
- It provides discounted rates to the members by 60% to 99%.
- Members can access e-resources instantly with perpetual access.
- It meliorates the quality of library services and reduces the cost of the subscription.
- The member institution is benefited in the research productivity through the access of international databases and full-text e-resources.
- J-Gate will help the consortium in sharing of print and e-resources to the institutions.
- The consortium provides the members reduced price ranging from 5% to 8% instead of 15% to 20% annual rising subscription cost.
- It offers suitable terms and agreements to single institutions for improved use, archival access and preservation of subscribed e-resources.

### 3.6.3 Features of UGC-Infonet DLC

- It uses fiber optical links to bridge national scalable Architecture.

- Broadband and SCPC technology is supported is incorporated by a Wide Area Network (WAN) satellite.
- Its network is monitored by ample Network Management systems.
- It is well connected with academic and research networks from all over the world.
- It is supporting strong firewalls and intrusion detecting systems for database security and protection from the virus.
- It has consecrated Data Centre for Web Hosting, e-journals and Mail Boxes.
- It is imparting and accomplished education with Distance and virtual learning through Broadband Multimedia and Video channels.

#### **3.6.4 Coverage of UGC-Infonet DLC**

The UGC-Infonet DLC covers all the major subjects (Appendix-II, List of full-text e-resources and Bibliographic databases) which are taught in the curriculum of Indian universities registered under the University Grants Commission, New Delhi. E-journals are categorized in the 48% collection related to Science and Technology, 46% related to Social Sciences and remaining 6% collections related to Arts and Humanities. The available literature in the consortium is associated with research articles, reviews, and abstracting databases cover, under scholarly journals. It also provides the facility of access to current resources with archival literature depending upon the terms and conditions and availability of the publishers (Arora & Trivedi, (2010).

#### **3.6.5 Members of the UGC-Infonet DLC**

In the year 2004, under phase 1 fifty (50) universities (35 under 12 (B)/2 (f) State Universities, 11 Central Universities, 4, Deemed Universities) were acknowledged and selected for accessing e-resources under the UGC-Infonet DLC. These universities were selected on the basis of static IP network infrastructure to access e-resources. The first fifty

universities were selected on the basis of existing infrastructures, number of scientific research, the number of enrolled research scholars and internet connectivity and facilities in the campus. National Negotiation Committee of five members was given accountability and responsibility for selection, negotiation and identification of e-resources (GUIDELINES FOR UGC-INFONET Digital Library Consortium during the XI Plan Period (2007-2012).

In the year 2005 fifty (50) universities (39 under 12 (B) / 2 (f) State Universities, 6 Central Universities, 5 Deemed Universities (Receiving Plan Grants from UGC) are added under UGC-Infonet DLC Programme through network infrastructure to access the selected e-resources. These universities were having less number of students, academic programmes and inadequate ICT infrastructure. UGC has spent around 25 crores on the addition of these universities and for subscribing more new e-resources.

In the year 2006, ninety-nine (99) specialized institution and smaller universities (63 under 12 (B) / 2 (f) State Universities, 23 Central Universities, 13 Deemed Universities (Receiving Plan Grants from UGC) (13) were covered under this programme. These are National Law Schools, Indian Institute of Population Science, Tata Institute of Social Science, Central Institute of English and Foreign Language, Gokhale Institute of Political and Economics, Sanskrit and Urdu universities. These universities were allowed to access few resources according to their field of specialization.

The Associate Membership programme is recently launched by the UGC-Infonet DLC to provide access to e-resources to private universities and other academic institutions at highly discounted rates of subscription with better terms and conditions. These institutions have the choice to choose e-resources according to their requirements. Now, two hundred fourteen (214) private universities and academic institutions (1 Central Universities, 58 Centrally Funded Technological Institute, 5 under 2 (f) State Universities, 5 Open University,

25 Private Universities, 97 Others, 23 Deemed Universities (Sec 3) have registered under the Consortium as associate members and many other requests are under process. Fourteen National law school and six IUCs and other intuitions are becoming its member.

### **3.7 E-ShodhSindhu**

On the recommendations of an expert committee, the Ministry of Human Resource Development has created e-ShodhSindhu by merging three consortia, which are UGC-Infonet DLC, NLIST and INDEST-AICTE Consortium. Now it will provide current with archival access to more than 15,000 core and peer-reviewed journals, 135000 e-books, 42 resources and 16 databases to 66 CFTIs, 222 Universities, 72 Technical Institutions and 4500 colleges of India (E-ShodhSindhu- About, 2017).

#### **3.7.1 Aims and Objectives of e-ShodhSindhu**

The main objective of e-ShodhSindhu is to provide access to full-text, bibliographic and factual databases of qualitative e-resources at lower rate subscription to higher education academic institutions in India. The main objectives of the e-ShodhSindhu are given below: (E-ShodhSindhu- aims and objectives, 2017).

- To establish e-ShodhSindhu through three MHRD funded Consortia by augmenting and strengthening activities and services to higher education through e-resources.
- To develop a strong collection of e-resources such as e-books, e-journals and its archives for continuous access.
- To examine and promote e-resources to universities, colleges and technical institutions through awareness and training programs.
- To serve subscription-based scholarly information to its members.
- To facilitate scholarly content through subject portals and subject gateways to its members.

- To make a bridge for digital divide for the make and upliftment of information rich society.
- To make other institutions such as open universities and MHRD funded institutions accessible of e-resources under e-ShodhSindhu.
- To make a collaborative effort of additional activities and services this was not in earlier consortia.
- To develop a significant building of the National Electronic Library.

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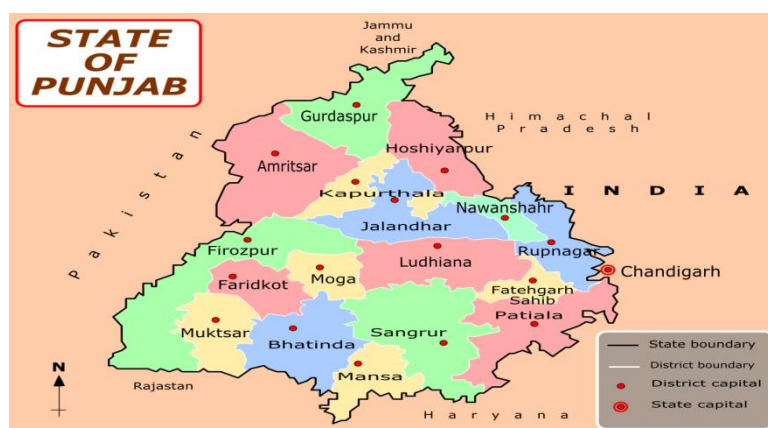
## CHAPTER 4

### UNIVERSITY LIBRARIES OF PUNJAB: A PROFILE

#### 4.1 Introduction

The Punjab name is derived from the two Persian words, panj (five), and aab (water, having reference to the five rivers concerning the five rivers which confer on the country) (Kaur, 2015). The northern Himalayan ranges and Pakistan surround it on its eastern side. It has a long history consequence and ample cultural heritage. The people of Punjab are known as Punjabis, and they speak the Punjabi language. The main religions in the area are Sikhism, Hinduism and Islam. The region has been attacked and ruled by many different empires and races such as Aryans, Persians, Greeks, Egyptians, Afghans and Mongols. In the 15<sup>th</sup> century, Guru Nanak Dev Ji founded the Sikh religion in the Punjab, and Maharaja Ranjit Singh transformed Punjab into a secular and powerful state. In the 19<sup>th</sup> century, the British rule led to the emergence of numerous heroic Punjabi freedom fighters. In 1947 at the end of British government it was split into two, that is, Pakistan and India (Punjab-India, 2017; Khan, 2009).

Figure No: 4.1 Political Map of Punjab state



Source [https://en.wikipedia.org/wiki/Faridkot,\\_Punjab#/media/File:Punjab\\_district\\_map.png](https://en.wikipedia.org/wiki/Faridkot,_Punjab#/media/File:Punjab_district_map.png)

Table: 4.1 University Libraries of Punjab at a Glance

Profile	UNIVERSITIES				
	PU-C	GNDU-A	PU-P	TU-P	CUP-B
<b>Year of the establishment</b>	1947	1969	1962	1956	2009
<b>Name of the Library</b>	A.C. Joshi Library	Bhai Gurdas Library	Bhai Kahn Singh Nabha Library	Nava Nalanda Central Library	University Library
<b>Year of establishment of Library</b>	1958	1970	1963	1956	2009
<b>Website Address</b>	<a href="http://library.puchd.ac.in/">http://library.puchd.ac.in/</a>	<a href="http://library.gndu.ac.in/">http://library.gndu.ac.in/</a>	<a href="http://www.punjabuniiversity.ac.in/Pages/Page.aspx?dse nc=Library">http://www.punjabuniiversity.ac.in/Pages/Page.aspx?dse nc=Library</a>	<a href="http://library.thapar.edu/">http://library.thapar.edu/</a>	<a href="http://cup.edu.in/library.php">http://cup.edu.in/library.php</a>
<b>Librarian/In charge</b>	Dr. Rashmi Yadav	Prof. S. K. Sharma	Dr. Jagtar Singh	Dr. SeemaBawa	Dr. Bhupinder Singh
<b>Email</b>	librarian@pu.ac.in	-----	<a href="mailto:jagtardeep@gmail.com">jagtardeep@gmail.com</a>	hcl@thapar.edu	bhupinderlib@cup.ac.in
<b>Campus LAN</b>	Yes	Yes	Yes	Yes	Yes
<b>Contact Number</b>	0172-2548159	01334-214404	0175-3046152	0175-2393141	0164-2864140

## 4.2 Brief Profile of the Universities under Study

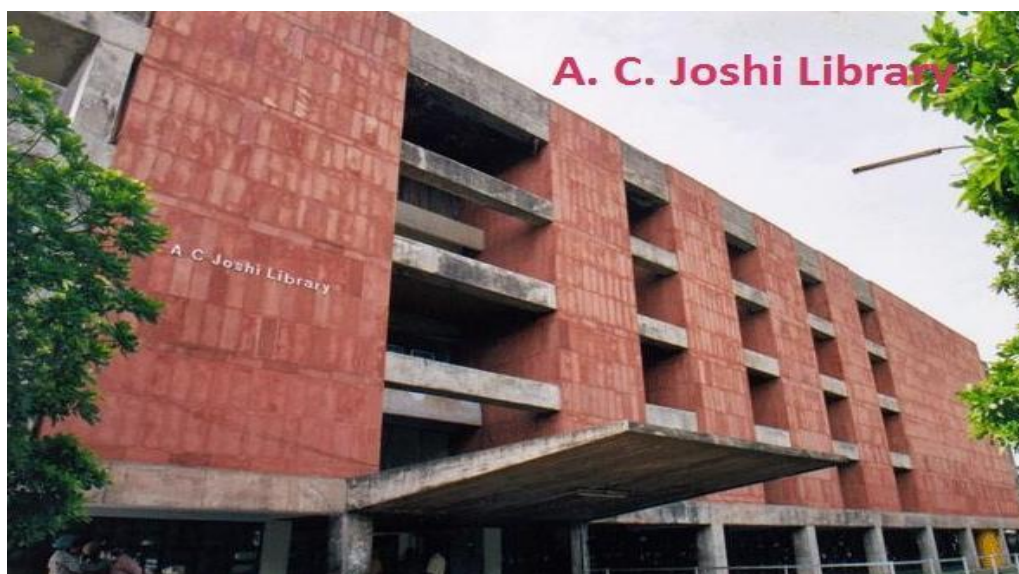
### 4.2.1 Panjab University - Chandigarh

Panjab University-Chandigarh is the one of the oldest universities in India. It has the excellence in teaching and research in the field of science and technology, humanities, social sciences, performing arts and sports. The Panjab University is associated with the global structure and national character, which attracts students and faculties from all over the country and different parts of the world. The university was established in 1882 at Lahore (now in Pakistan) since its inception. After the partition of India in 1947, the university functions without a campus of its own. Hoshiarpur, Jalandhar, Delhi and Amritsar were the teaching departments, and Solan functioned as the administrative office of the university. The university was relocated in 1956 at Chandigarh under the guidance of the Legendary Le Corbusier; the Pierre Jeanneretle designed the red stone of the university. It has 78 teaching and research departments and four chairs for the research at Chandigarh campus. The university has been conceived to meet the academic, administrative, sports/recreational, residential and other needful things for the growth of the university. It is located in sector 14 and sector 25 in Chandigarh. The University has its own Shopping Centre, Health Centre, Bank, Post office, Swimming Pool, Gymnasium, Sports Grounds, Botanical Gardens, well-maintained parks, Open Air Theatre, Guest Houses, Faculty House, Seminar Complexes, Alumni House, Community Centre and School have been provided. Besides these facilities, the University Campus has eight hostels for boys, nine hostels for girls, a Working Women Hostel and two sports hostels “Profile of Panjab University - Panjab University”, Chandigarh, India”, 2016).

#### 4.2.1.1 A.C. Joshi Library

The foundation stone of the library was laid by Dr S. Radhakrishnan, the then Vice President of India in 1958. The library of the Panjab University was named officially as A.C. Joshi library of an illustrious Vice-Chancellor of this university, Shimla in the year 1947 in the U.S club after the partition of the country in 1947. The university shifted to Chandigarh, the new capital of Punjab in 1955-56. The then Prime Minister of India Pt. Jawaharlal Nehru formally inaugurated the library premises. The five-storied library building was made of red stone and concrete of modern principles of architecture. The two main reading halls show the panoramic view of Shivalik hills natural surroundings. The library building equipped with computer and communication network with centrally air-conditioned with a seating capacity of 500 readers, users can access more than six lakhs volumes “A.C. Joshi Library Panjab University Chandigarh India”, 2016)

**Image: 4.1 A. C. Joshi Library-(Panjab University, Chandigarh)**



Source: <http://webopac.puchd.ac.in/W27/>

#### 4.2.1.2 Library Services of A.C. Joshi Library

The library has a collection of more than 6.4 lakhs of publications which include books, bound volumes of journals, theses/dissertations, rare books, reports, government documents, back files of Newspapers and a valuable collection of 1490 manuscripts. The reference desk is on the first floor of the library. OPAC facility is available to the users. The library is fully computerized and well interconnected to the campus network facility of LAN and WI-FI internet for accessing e-mail and e-resources. SLIM 21 software is to handle the advance search; My info browse, arrivals, expected, Journal list, Media list, show my basket (“A.C. Joshi Library Panjab University Chandigarh India”, 2016)

The Library subscribes to more than 600 current periodicals. It also has nineteenth century back volumes of periodicals. Mathematical publications & Mathematical Reviews facilitate access to 225 Online and print full-text journals through MathSciNet. The library is a member of INDEST Consortium and UGC-Infonet DLC and access to around 5000 online full-text journals. The library has a various section such as circulation, reference and readers, Advisory service, Display of Books/Exhibitions, Acquisition, Periodical, Technical, Computer etc.(A.C. Joshi Library Panjab University Chandigarh India”, 2016)

#### 4.2.2 Guru Nanak Dev University – Amritsar

Guru Nanak Dev University, Amritsar is both residential and an affiliating university. It was established to mark the 500<sup>th</sup> birth anniversary of Sri Guru Nanak Dev Ji on November 24, 1969. The main objectives of the Guru Nanak Dev University is to make provision to transmit education and prompt research in the humanities, learned professions, sciences, especially of applied nature and technology. The motto of the University as engraved on its emblem Guru's wisdom illumines all speaks of the vision and idealism for which the University stands. The university is spread over a stretch of 500 acres towards the west of the City and presents a

picture of modern architecture. The University has 35 academic departments at the University Campus and 148 affiliated colleges and 71 Associate Institutes (“Guru Nanak Dev University”, 2016).

The UGC, New Delhi has declared University with Potential for Excellence to set up Centers of Advanced Studies in Chemistry, Physics, Environmental Sciences and Comparative Literature. The University is accredited with A Grade CGPA of 3.5 out of 4 which is higher for any University by the National Assessment and Accreditation Council and got 12<sup>th</sup> rank by the Academic Staff College, NAAC, Bengaluru (“Guru Nanak Dev University”, 2016)

It is the first university in the region for adopting online admission, online counselling and Credit-Based Evaluation System. According to India Today Magazine through their survey, the University has risen to 16<sup>th</sup> rank in the top 50 universities of the country and bagged 11<sup>th</sup> position, out of the 500 universities in science publications. The University has won the highest sports Award in the country, the Maulana Abul Kalam Azad Trophy, for a record of 21 times, a National champion for eight times and winner of Inter-University Youth Festival National Championship in the year 2012. The University has also won the North Zone Inter-University Cultural Championship for the 12 times this year (“Guru Nanak Dev University”, 2016).

#### **4.2.2.1 Bhai Gurdas Library**

The Guru Nanak Dev University, Amritsar Central library has named great Sikh scholar Bhai Gurdas, who had the privilege of dictating from fifth Sikh, Guru Arjan Dev Ji. The university library building was laid on March 1970. It is centrally located and well connected with all the departments. The five-storied pyramid shaped library building is a marvel and masterpiece of architecture and easily visible from the main entrance gate on the

Grand Trunk Road. It is the active member of UGC-Infonet DLC, INFLIBNET, INDEST, DELNET, SCOPUS, IEEE Explore, free books and journals. The library has a total collection of 470875 documents (“Guru Nanak Dev University”, 2016)

**Image: 4.2 Bhai Gurdas Library-(Guru Nanak Dev, Amritsar)**



Source: <http://www.amritsar.org/colleges+educational+institutes+in+amritsar/guru-nanak-dev-university.php>

#### **4.2.2.2. Library services of Bhai Gurdas Library**

The library opens Monday to Friday 9 am to 9 pm, Saturdays, Sundays and other holidays 9 am to 5 pm, it remains closed on 26<sup>th</sup> January and 15<sup>th</sup> August. The library is fully computerized. The library subscribed 116 Foreign journals, 244 Indian journals and 150 journals as a gift. Bhai Gurdas Library has a precious and productive collection of around 1516 rare manuscripts. These manuscripts are related to Punjab's rich cultural and heritage, religion, Punjab history, medicine in Hindi (64), Sanskrit (28), Urdu and Persian (129) as well as Gurmukhi script. They are a fountain of information and motivation for scholars and learners from Punjab. These manuscripts have been digitized and microfilmed with catalogues for future references, use and store. It has compiled in 5 volumes according to Manuscript Number, Title, Author, calligrapher, Time, Pages, and General description. It provides CAS to the students, research scholars and faculty members for the new addition of

books under the new arrival corner. The library has a section of Prof. Pritam Singh, Microfilming, Digital, Punjabi reference library, and Rare Books & Manuscript. E-resources are available through INFLIBNET, INDEST, DELNET, SCOPUS, IEEE Explore (“Guru Nanak Dev University”, 2016).

Through DELNET it helps the faculty and scholars to procure their required books, articles and documents. They also provide Interlibrary loan services to the users. The library has its computer section, which is responsible for housekeeping operation, bibliographic services, cataloguing, database along with Barcoding in the computer section. Xeroxing facilities are available at the library to cater to the needs of the users. The library has installed two machines in the library premises. Through INDEST library is subscribing more than 416 Journals. Almost all the subjects are covered under these e-journals (“GNDU E-resources Library”, 2016)

The library provides the accessing of more than 7500 e-journals under the membership of the UGC-Infonet e-journals Consortium Programme. The university has set up 22 departmental libraries (14 Individual Libraries, 5 Multi-disciplined Libraries, 3 Libraries maintained by the departments) for easy access to reading materials “Guru Nanak Dev University” 2016).

#### **4.2.3 Punjabi University - Patiala**

The Punjabi University was established in 30<sup>th</sup> April 1962 primarily with the primary objective for development and betterment of Punjabi language, art and culture. The university has achieved a significant dimension and respected as a unique pillar in the area of education and research in the country. The University has emerged as a multi-faceted and multi faculty educational institution for the development of higher education and research in the field of humanities, Arts, Sciences, Engineering etc. The university has, more than 14000 students are

getting education and guidance from 1500 learned teachers on the mastery of their areas. The campus of the university is situated at the distance of 7 km from the central city on the Patiala- Chandigarh road. The campus is very peaceful and away from the noise of the town and traffic, situated in the area of 316 acres. The architecture of the university presents a spectacular sight of beautiful buildings. It has 65 teaching and research department in campus five regional Centre's, six Neighbourhood campuses and 166 affiliated colleges to it ("Punjabi University, Patiala", 2018).

#### **4.2.3.1 Bhai Kahn Singh Nabha Library**

The university's main library is known as Bhai Kahn Singh Nabha, which was established in 1963. It has a rich collection of more than 500000 volumes with a subscription of more than 600 journals. The university main library is very spacious and has a capacity of nearly 400 readers to access the resources available for reading. The library provides a particular room for the students to read in the calm and comfortable atmosphere. The library stock more than 420000 volumes and subscribed more than 600 reputed journals on various subjects. The library is associated and actively participating in INFLIBNET programme such as UGC-Infonet DLC. It disseminates a database of 200000 documents through OPAC (Online Public Access Catalogue) through online. The scholar and subject expert for the development of research and academic can browse, download, as well print. The library is automated with internet facility; it has a database of 200000 documents along with current and backsets Periodicals ("Punjabi University, Patiala", 2016)

#### **4.2.3.2 Library services of Bhai Kahn Singh Nabha Library**

The library has two reference desks (Reference section and Punjabi reference library) which serve the reference resources such as atlases, bibliographies, biographical, dictionaries, directories, encyclopaedias, gazetteers, map, thesauri etc. Book exhibitions and book displays

**Image: 4.3 Bhai Kahn Singh Nabha Library -(Punjabi University, Patiala)**



Source: <http://www.punjabiuniversity.ac.in/Pages/Page.aspx?dsenc=Library>

are organised during the event of seminars, conferences and refresher courses. The university computer has a LAN which is well connected through the central library for providing databases, email, download files and other e-resources to the students, researchers, faculties and other staffs for of scholarly communication, correspondence and information delivery purpose. The library provides the OPAC to the users for online accessing of library resources. Dr. Ganda Singh Punjabi Reference library was set up with a rich collection on Punjab history, culture, Sikhism, Punjabi Language and literature. Eminent historians and literature of about 70000 documents are kept in the library (“Punjabi University, Patiala”, 2016)

#### **4.2.4 Thapar University - Patiala**

Thapar University was formerly known as Thapar Institute of Engineering and Technology University, established in 1956 by the great captions of Indian Industry, the Late Lal Karam Chand Thapar with the collaboration between the state of PEPSU (Patiala and East Punjab States Union), the Central Government and the Patiala Technical Education Trust (PTET). It represents the best example of a joint venture between the public and the private sector in Higher Technical Education. Today it is recognized as the premier Deemed University of engineering and technology of the Northwestern region of India. It offers

academic programs under 3 units Schools (6), Departments (8), Centres (8). It has School of Management, Chemistry & Biochemistry, Energy and Environment, Humanities & Social Sciences, Mathematics and Physics & Materials Science. The University has various Departments such as Chemical Engineering, Civil Engineering, Computer Science & Engineering, Biotechnology, Electrical Instrumentation Engineering, Electronics & Communication Engineering and Mechanical Engineering. It is situated on more than 250 acres of land (“Thapar University, Patiala”, 2018).

#### **4.2.4.1 Nava Nalanda Central Library**

The Central Library Thapar Institute of Engineering & Technology is housed in a centrally air conditioned spacious premises covering an area of 25,000 square feet with its collection of over 89746 books. It is the heart of academic services, and therefore, become a central place in academic and research activities. The main library is open for 24 hours, and circulation desk is available between 8.00 am to 8.30 pm. Book bank facility is maintained by the grant from the state and central government, and it is given to the weaker section students for the whole semester. OPAC system is used in the searching of various e-resources available in the available. It helps the users to search by author’s name, keyword or title etc. It can be searched through a browser from the terminal on the university campus. Compilation of bibliography is prepared on the demand for the users. The bi-monthly newsletter of various happenings in Thapar University is compiled, edited and uploaded online. The book which is not available in the library is procured from other sources. Reservation of books is also available. Photocopy of various research papers is acquired from other libraries, and they are as follows :-(1) J.R.D. Tata Memorial Library at Indian Institute of Science (IISc) Bangalore, (2) Panjab University, Chandigarh, (3) Banaras Hindu University, Varanasi, (4) University of Hyderabad, Hyderabad, (5) Jawaharlal Nehru

University, New Delhi. (6) Tata Institute of Social Sciences, Mumbai. The library has an adequate collection of more than 60,000 printed resources which include books, textbooks, standards, thesis and dissertations arranged in open access (“Nava Nalanda Central Library”, 2016).

**Image: 4.4 Nava Nalanda Central Library - (Thapar University, Patiala)**



Source:<http://www.thapar.edu/placements/gallery/nava-nalanda-central-library?page=2&sort=Gallery.id&direction=ASC>

#### **4.2.4.2 Library services of Nava Nalanda Central Library**

Library services are available to students, faculty and staff of TIET, the staff of other institutions in the Campus free of charge. The Central Library Thapar Institute of Engineering & Technology is functioning 24x7 modes. The regular library services are available from 8:00 a.m. till 8:30 p.m. but during examinations Services are available on Sundays also. The library has 1373 Journals of different disciplines; eBooks are subscribed through THINK TANK from Pearson, IEEE/Wiley eBook, IEEE Standards, EBSCOHOST e-Books, World e-Book library collection (access to over lac books) along with other e-Books subscription. It also provides the facilities of Kindle-Books, Citation Databases, Bibliographic Databases and Journal Citation Reports to the users. Open Access Resources provides the accessing of NPTEL local Chapter, MIT, MOOC, Open Access Books, Open Access Journals, Open Access Thesis and Dissertations. The library provides the reference

service, Photocopying, Bibliography compilation, Newstrack (Newspaper clippings from daily Newspapers), Inter-Library Loan (ILL), Document supply, Services from INFLIBNET. The library is fully automated, and all circulation and lending operations are handled by Library Management System by automated in the form of email and SMS. The OPAC is internet enabled and can be searched remotely. To improve the library services, users can send an email at suggestions@thapar.edu or drop in the suggestion box kept in the Library (“Nava Nalanda Central Library”, 2016).

#### **4.2.5 Central University of Punjab – Bhatinda**

The Central University of Punjab (Bhatinda) was established in the 20<sup>th</sup> March through the Central Universities Act 2009. It started functioning in April 2009 from the camp office and again shifted to the city campus. Its main campus of 500 acres is getting ready near Bhatinda. It ranked 65<sup>th</sup> out of 3565 institutions of higher learning as per the National Institutional Ranking framework (NIRF) of MHRD in the year 2016 and ranked in the band of 115-120 in the year 2017 (Annual Report 2016-17). The newly set up central university of Punjab is expected to achieve new academic horizon in India. It is planned to be a multi-facility and multi-faculty university with a best infrastructural support system for teaching and research. It has 9 Schools such as Basic and Applied Sciences, Education, Engineering & Technology, Environment & Earth Sciences, Global relations, Health Sciences, Languages, Literature and Culture, Legal Studies & Governance, Social Sciences (“Central University of Punjab”, 2016).

##### **4.2.5.1 Central Library-Central University of Punjab – Bhatinda**

The library collection consists of 36606 Books, 71 print Journals, 9327 e-journals, 426 Thesis and Dissertation, 21 Newspaper and 451 CD-ROM/DVD. The library is fully centralised with elegant modular furniture. The resources available in the central library of

the university fulfil the learning and research requirements of teachers and students. It is a member of the UGC-Infonet DLC and subscribing to 8900 full-text online journals access from American Chemical Society, American Physical Society, Annual Reviews, Cambridge University Press, Institute of Physics, JSTOR, Oxford University Press, Project Muse, Royal Society of Chemistry, Sage, Science Direct, Science Online, Springer Link, Taylor & Francis, Wiley-Blackwell etc. List of Publishers are attached. Apart from UGC-Infonet it also subscribes full-text database including CMI, Prowess, States of India, Indiatat.com, DELNET Online, ISID (The Institute for Studies in Industrial Development), JCCC (J-Gate Custom Content for Consortium), Hein Online, Manuparta, SciFinder Evaluation, SCOPUS, Web of Science etc. The central library provides automated self-service facility to the students by Radio Frequency Identification (RFID) and Electro Magnetic Security System (EMSS). Users can access resources via advanced Online Public Access Catalogue (OPAC) and Reprographic system (“Central University of Punjab”, 2016;<http://cup.edu.in/library.php>)

**Image: 4.5 Central Library- (Central University of Punjab, Bhatinda)**



Source: <http://cup.edu.in/library.php>

#### **4.2.5.2 Library services of Central Library**

The University Library provides Reprographic services, Reference Service, Inter-library Loan (ILL), CAS, SDI and Binding service. The Library is fully automated with SLIM21 (Library Management Software) software for the various housekeeping operations of the library. The library facilitates online Public Access Catalog (OPAC) system for the

online searching of various library resources available in the library. The library is equipped with the Radio Frequency Identification (RFID) with 1,024-2,048 bits memory to enable cataloging and circulation, Tattle Tapes security strips for the security to the library resources, Pad Staff Workstation (PSW), Electromagnetic Detection System (EDS) offering state-of-the-art protection to help secure valuable library materials, Self-Check system facilitating for self-issuing, self-return and self-renewal by the users of the library. The library has various sections such as General Book, Text Book, Reference Book, Regional Book, Donated Book and Braille. The Library has 26 Computers, 01 servers, 01 Printer for library users, 01 Xerox machine, 01 Book eye Scanner for the library infrastructure (“Central University of Punjab”, 2016).

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## CHAPTER-5

### DATA ANALYSIS AND INTERPRETATION

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#### 5.1 Introduction

The purpose of the research was to interpret the scholar's awareness and usage patterns of the UGC-Infonet DLC across the University Libraries of Punjab. The primary focus of the study was to find out the awareness and use of UGC-Infonet DLC among research scholars. The other related discussion was on the discovery of the collection, services and infrastructure available for access of e-resources. The research also focused on the investigation of the usage pattern and the satisfaction level of e-resource. Finally, the study focused on the examination of the increasing significance of e-resources v/s print resources and its impact on research, across the scholars in the five universities of Punjab. The research also focused on finding out the problems, prospects, measures and suggestions for improving the usage of UGC-Infonet DLC in University Libraries of Punjab. The study vindicated the various earlier research studies on the matter concerned.

#### 5.2 Survey Administration and Response Ratio

The study relied on the survey questionnaire for collecting the primary data. The survey was conducted using a structured questionnaire circulated among 1175 Scholars from the different departments of the University Libraries of Punjab. The responses of 847 scholars have been considered for the study with the response rate of 72.08% was observed despite the limitations of time and space as well as resources (Chapter 1; Table: 1.1). Such a response ratio has been regarded as encouraging in the earlier research and studies on the sector and the aspects of the topic assumed for research activity.

A random sample method was used for the selection of scholars and interaction with those who were available in the libraries, departments, hostels and computer centres of the universities during the survey. The responses received from the research scholars are presented in the form of tables, analyzed and interpreted by using a simple method of calculation and Chi-square test.

The response generation pattern in itself confers a lot of information about the library usage in the respective centres of excellence across Chandigarh, Patiala, Amritsar and Bhatinda. Further the higher response ratio from Panjab University, Chandigarh connotes the raised levels of library related awareness in the research scholars. That is a separate aspect that whether this awareness is about the library as a whole or particular about the e-resources. The Punjabi University, Patiala attracted next maximum numbers of responses. This in other ways also connotes more substantial footfall and dependence of the scholars on the library infrastructure in these areas. These responses were sought despite the initial resistance of the scholars to participate. The scholars were primarily made aware regarding the need for research exercise and finally the responses were secured on the basis of their consent.

### **5.3 Profile of the scholars**

The profiles of the scholars surveyed in general. It is divided into gender, age group and subject streams.

#### **5.3.1 Gender-wise classification**

Table: 5.1 describe the gender wise scholars according to their respective universities.

**Table: 5.1 Gender-wise classification**

Gender	UNIVERSITY					Grand Total
	PU-C	GNDU-A	PU-P	TU-P	CUP-B	
<b>Male</b>	<b>88</b> (33.59)	<b>61</b> (42.96)	<b>90</b> (35.71)	<b>53</b> (36.30)	<b>31</b> (68.89)	<b>323</b> (38.13)
<b>Female</b>	<b>174</b> (66.41)	<b>81</b> (57.04)	<b>162</b> (64.29)	<b>93</b> (63.70)	<b>14</b> (31.11)	<b>524</b> (61.87)
<b>Total</b>	<b>262</b>	<b>142</b>	<b>252</b>	<b>146</b>	<b>45</b>	<b>847</b>

Source: Primary Data (Figures within parenthesis are %age)

Table 5.1 indicates that a total of 847 scholars was surveyed, which included 323 males and 524 females. The above data shows that the female scholars have participated in large number than male scholars which are 61.87% and 38.13% respectively

### 5.3.2 Age-group wise scholars

Table 5.2 describes the age group wise scholars of the study according to their respective universities.

**Table: 5.2 Age Group-wise**

Age-Group	UNIVERSITY					Grand Total
	PU-C	GNDU-A	PU-P	TU-P	CUP-B	
<b>21-25</b>	<b>84</b> (32.06)	<b>20</b> (14.08)	<b>82</b> (32.54)	<b>20</b> (13.70)	<b>07</b> (15.55)	<b>213</b> (25.15)
<b>26-30</b>	<b>152</b> (58.02)	<b>98</b> (69.01)	<b>150</b> (59.52)	<b>111</b> (76.03)	<b>35</b> (77.78)	<b>546</b> (64.46)
<b>31-35</b>	<b>22</b> (8.40)	<b>23</b> (16.20)	<b>18</b> (7.14)	<b>14</b> (9.59)	<b>03</b> (6.67)	<b>80</b> (9.45)
<b>36-40</b>	<b>02</b> (0.76)	<b>00</b> ----	<b>02</b> (0.79)	<b>00</b> ----	<b>00</b> ----	<b>04</b> (0.47)
<b>41-45</b>	<b>02</b> (0.76)	<b>01</b> (0.70)	<b>00</b> ---	<b>01</b> (0.68)	<b>00</b> ----	<b>04</b> (0.47)
<b>Total</b>	<b>262</b>	<b>142</b>	<b>252</b>	<b>146</b>	<b>45</b>	<b>847</b>

Source: Primary (Figures within parenthesis are %age)

The table 5.2 shows that the majority of the scholars surveyed were within the age group of 26-30 years, 58.02% scholars in **PU-C**, 69.01% scholars in **GNDU-A**, 59.52%

scholars in **PU-P**, 76.03% scholars in **TU-P** and 77.78% scholars in **CUP-B**. In the age group of 21-25 years, there were 32.06% scholars from **PU-C**, 14.08% scholars from **GNDU-A**, 32.54% scholars from **PU-P**, 13.70% scholars from **TU-P** and 15.55% scholars from **CUP-B**. Whereas within the age group of 31-35 years, 8.40% scholars were from **PU-C** followed by 16.20% scholars from **GNDU-A**, 7.14% scholars from **PU-P**, 9.59% scholars from **TU-P** and 6.67% scholars from **CUP-B**. In the age group of 36-40 years, there were 0.76% scholars from **PU-C** and 0.79% scholars from **PU-P**. Between the age groups of 41-45 years, 0.76% scholars from **PU-C**, 0.70% scholars from **GNDU-A**, and 0.68% scholars from **TU-P**.

The above data shows that out of the total 847 scholars 64.46% of them belong to the age group of 26-30 years, 25.15% of them come under the age group of 21-25 years, 9.45% of them under the age group 31-35 years, 0.47% scholars of come under the age group of 36-40 years and 41-45 years equally. It concluded that the majority of the scholars are found to be with the age group of 26-30 years.

### 5.3.3 Subject discipline wise scholars

Table 5.3 describes the subject discipline wise study according to their respective universities.

**Table: 5.3 Subject discipline wise scholars**

Subject Discipline	UNIVERSITIES					Grand Total
	PU-C	GNDU-A	PU-P	TU-P	CUP-B	
<b>Applied Sciences</b>	<b>74</b> (28.24)	<b>34</b> (23.94)	<b>66</b> (26.19)	<b>36</b> (24.66)	17 (26.67)	<b>227</b> (26.80)
<b>Basic Sciences</b>	<b>69</b> (26.34)	<b>37</b> (26.06)	<b>59</b> (23.41)	<b>30</b> (20.58)	10 (22.22)	<b>205</b> (24.20)
<b>Social Sciences</b>	<b>54</b> (20.61)	<b>33</b> (23.24)	<b>60</b> (23.81)	<b>42</b> (28.77)	08 (17.78)	<b>197</b> (23.26)
<b>Arts</b>	<b>65</b> (24.81)	38 (26.76)	<b>67</b> (26.59)	38 (26.03)	10 (33.33)	<b>218</b> (25.74)
<b>Total</b>	<b>262</b>	<b>142</b>	<b>252</b>	<b>146</b>	<b>45</b>	<b>847</b>

Source: Primary Data (Figures within parenthesis are %age)

Table 5.3 portrays the subject discipline of the scholars included in the study. It divided in

four streams, i.e., Applied Sciences, Basic Sciences, Social Sciences and Arts. Most of the 26.80% scholars related to Applied sciences followed by 25.74% scholars related to Arts, 24.20% scholars related to Basic Sciences and 23.26% Scholars related to Social Sciences.

#### 5.4 Collection, services and infrastructure adequacy available for access UGC-Infonet DLC

##### 5.4.1 The frequency of scholars visits the library

The scholars were asked a question to know their frequency of library visit. The responses varied as mentioned here:

**Table: 5.4 The frequency of scholars visits the library**

Frequency of visit to library	UNIVERSITIES					Grand Total
	PU-C	GNDU-A	PU-P	TU-P	CU-B	
<b>Daily</b>	<b>92</b> (35.11)	<b>34</b> (23.94)	<b>30</b> (11.90)	<b>23</b> (15.75)	<b>30</b> (66.67)	<b>209</b> (24.68)
<b>Weekly</b>	<b>94</b> (35.88)	<b>61</b> (42.96)	<b>92</b> (36.51)	<b>38</b> (26.03)	<b>09</b> (20.00)	<b>294</b> (34.71)
<b>Fortnightly</b>	<b>12</b> (4.58)	<b>03</b> (2.11)	<b>14</b> (5.56)	<b>07</b> (4.79)	<b>01</b> (2.22)	<b>37</b> (4.37)
<b>Monthly</b>	<b>24</b> (9.16)	<b>15</b> (10.56)	<b>50</b> (19.84)	<b>49</b> (33.56)	<b>02</b> (4.44)	<b>140</b> (16.53)
<b>Rarely</b>	<b>40</b> (15.27)	<b>29</b> (20.42)	<b>66</b> (26.19)	<b>29</b> (19.86)	<b>03</b> (6.67)	<b>167</b> (19.72)
<b>Total</b>	<b>262</b>	<b>142</b>	<b>252</b>	<b>146</b>	<b>45</b>	<b>847</b>
<p><b>Chi-Square Calculated Value (<math>X^2</math>)= 132.10,</b>  <b>Degree of freedom = 16.0</b>  <b>and p value = 2.51E-20 (<math>\leq 0.05</math> significant)</b>  <b>Chi-square Critical Value (Tabulated Value) = 26.296</b></p>						

Source: Primary Data (Figures within parenthesis are %age)

The above table 5.4 shows the frequency of visiting the library by the scholars. In **PU-C**, the highest 35.88% scholars visit library weekly. This is followed by 35.11% visit daily, 15.27% visit rarely, 9.16% visit monthly, and 4.58% visit fortnightly. In **GNDU-A**, the highest 42.96% scholars visit library weekly followed by 23.94% visit daily, 20.42% visit rarely, 10.56% visit monthly and 2.11% visit fortnightly. In **PU-P** the highest 36.51%

scholars visit library weekly followed by 26.19% visit rarely, 19.84% visit monthly, 11.90% visit daily and 5.56% visit fortnightly. In **TU-P** the highest 33.56% scholars visit library monthly followed by 26.03% visit weekly, 19.86% visit rarely, 15.75% visit daily and 4.79% visit fortnightly. Lastly, in **CUP-B** the highest 66.67% scholars visit the library daily followed by 20.00% visit weekly, 6.67% visit rarely, 4.44% visit monthly and 2.22% visit fortnightly

The above data demonstrates that majority of 34.71% scholars visit library weekly followed by 24.68% visit daily, 19.72% visit rarely, 16.53% visit monthly, 4.37% visit fortnightly. So the result shows that the majority of the scholars visit the library weekly.

The observations point towards a trend that is discouraging for the concept of libraries to flourish. The gaps in the frequency of scholars visits are enormous. It may be due to the facilities like internet, and other e-resources are available at their departments, campus, hostels, or reading rooms to access this facility. The library should find out ways and means by initiating innovative services and facilities for the scholars. The teachers have a prominent role to play in this regard by giving assignments and project work to the scholars (Chauhan & Mahajan, 2014)

The observation has vital conclusions from the library science literature as well as practitioners. The prevalent incidence of monthly or fortnightly visits across **GNDU-A**, **CUP** and **TU-P**; point towards the different academic workloads and miscellaneous influences on the student's time allocation patterns across the university campus. Some reasons that are reducing the frequency of visit could be either resident in declining student's inclination or the quality of the offering in the library setup.

The lack of awareness regarding the optimum usage might be another issue. The lack of interest in library facilities and non-inclination towards career across scholars could be

other reasons behind the inadequate response to library features across the universities excluding the ones at **PU-C** and **PU-P**. The existing culture across institutions could be contributing factor in such a scenario. The misguided career aspirations across the scholar's community could be the other reason for poor frequency of a library visit.

The above data was analyzed using the Chi-Square test. The results found that the significant variation with regard to scholar's frequency of visitors to the library. The results of chi square test indicated that the **Chi-Square Calculated Value ( $X^2$ ) = 132.10**, which is greater than its chi-square tabulated value

#### 5.4.2 Purpose of visit to the Library

The scholars, responses with regard to their purpose of visiting the library are summarized here.

**Table: 5.5 Purpose of visit to the library**

Purpose of visit to the library	UNIVERSITIES					Grand Total
	PU-C	GNDU-A	PU-P	TU-P	CUP-B	
Issue and return of books	144 (41.62)	80 (42.11)	150 (43.10)	104 (52.00)	30 (38.96)	508 (43.76)
Searching online information	104 (30.06)	51 (26.84)	114 (32.76)	70 (35.00)	26 (33.77)	365 (31.44)
Consulting print resources (Journals/Research/News paper/Reference etc.)	72 (20.81)	42 (22.11)	54 (15.52)	17 (8.50)	10 (12.99)	195 (16.80)
Any other	26 (7.51)	17 (8.95)	30 (8.62)	09 (4.50)	11 (14.29)	93 (8.01)
<b>Total</b>	<b>346</b>	<b>190</b>	<b>348</b>	<b>200</b>	<b>77</b>	<b>1161</b>
<b>Chi-Square Calculated Value (<math>X^2</math>)= 29.69,</b> <b>Degree of freedom = 12.0</b> <b>and p value = 0.0031 (<math>\leq</math>.05 significant)</b> <b>Chi-square Critical Value (Tabulated Value) = 21.02</b>						

Source: Primary Data (Figures within parenthesis are %age)

The above table 5.5 demonstrates the variations in the motives behind the visit to the library. It's evident that the **PU-C** exhibits, the highest 41.62% scholars visit for issue and

return of books followed by 30.06% for searching online information, 20.81% for consulting print resources and 7.51% for any other purpose. In **GNDU-A** highest 42.11% scholars visit the library for the issue and return of books followed by 26.84% for searching online information, 22.11% for consulting print resources and 8.95% for any other purpose. In **PU-P** the highest 43.10% scholars visit the library for the issue and return of books followed by 32.76% for searching online information, 15.52% visited the library for consulting print resources and 8.62% visit for any other purpose. In **TU-P** the highest 52.00% scholars visit the library for the issue and return of books followed by 35.00% for searching online information, 8.50% for consulting print resources and 4.50% for any other purpose. In **CUP-B**, the highest 38.96% scholars visit for issue and return of books, followed by 33.77% for searching online information, 14.29% for any other purpose and 12.99% for consulting print resources.

The response demonstrates the purpose of visiting the library by the scholars of University Libraries of Punjab, it shows that 43.76% visit library for the issue and return of books which is the highest, followed by 31.44% for searching online information, 16.80% for consulting print resources, 8.01% for any other purpose. It shows that the majority of the scholars visit library to issue and return of books.

It shows that the majority of the scholars visit the library to borrow and return books. The observations could be an eye opener when the policy makers are keen on the digitalization of libraries. The observations point towards the dominant image of the libraries as physical repositories. The traditional image of a library as physical store for books and newspapers is still a big hit across the users and new images regarding the digital offshoots are yet to materialize.

Thus, it is observed from the above analysis that the majority of the scholars visit and use library mostly for the purpose of borrowing and returning books and least percentage of scholars visit for any other purpose. This in other words consolidates the evidence regarding the perception of library as merely a source of physical books and reference journals. Newspaper reading and preparing for national level competitive examinations figures as another prominent reason to visit the libraries. The same trends reflected across major libraries surveyed.

The above data was analyzed using Chi-Square test. The results found that the significant variation with regard to the scholars purpose of visit to the library. The results of chi square test indicated that the **Chi-Square Calculated Value ( $X^2$ ) = 29.69**, which is greater than its chi-square tabulated value.

#### 5.4.3 Adequacy of e-resources collection in the library

In response to the query with regard to the adequacy of e-resources collection in the library, these replies were observed.

**Table: 5.6 Adequacy of e-resources collection in the Library**

Adequacy of e-resources	UNIVERSITIES					Grand Total
	PU-C	GNDU-A	PU-P	TU-P	CUP-B	
<b>Yes</b>	<b>194</b> (74.05)	<b>94</b> (66.20)	<b>158</b> (62.70)	<b>118</b> (80.02)	<b>39</b> (86.67)	<b>603</b> (71.19)
<b>No</b>	<b>68</b> (25.95)	<b>48</b> (33.80)	<b>94</b> (37.30)	<b>28</b> (19.18)	<b>06</b> (13.33)	<b>244</b> (28.81)
<b>Total</b>	<b>262</b>	<b>142</b>	<b>252</b>	<b>146</b>	<b>45</b>	<b>847</b>
Chi-Square Calculated Value ( $X^2$ )= 23.49, Degree of freedom = 4.0 and p value = 0.0001 ( $\leq 0.05$ significant) Chi-square Critical Value (Tabulated Value) = 9.48						

Source: Primary Data (Figures within parenthesis are %age)

The view of scholars regarding the adequacy and availability of infrastructure facilities to access e-resources has a huge impact, as the adequate infrastructure can improve the prospects for optimum utilization of their services. Therefore, it is necessary to identify

whether the present infrastructure for accessing e-resources at the University Libraries of Punjab is capable in disseminating information to the scholars in their study and research work. In response to the query, adequacy of e-resources in the library, it was found from the table 5.6 that 74.05% scholars in **PU-C**, 66.20% in **GNDU-A**, 62.70% in **PU-P**, 80.82% in **TU-P** and 86.67% in **CUP-B** responded positively and said that they are satisfied with the e-resources. Whereas remaining 25.95% scholars in **PU-C**, 33.80% in **GNDU-A**, 37.30% in **PU-P**, 19.18% in **TU-P** and 13.33% in **CUP-B** gave negative responses and said that they are not satisfied with the e-resources available in their respective libraries.

It is evident from the above data that 71.19% scholars answered in affirmative and responded to 'YES', whereas other 28.81% scholars said 'NO'. On the whole, it can be concluded that the infrastructural support for accessing UGC-Infonet DLC is good because the majority of the scholars are found to be satisfied.

The above data was analyzed using Chi-Square test. The results found that the significant variation with regard to adequacy of e-resources collection in the library. The results of chi-square test indicated that the **Chi-Square Calculated Value ( $X^2$ ) = 23.49**, which is greater than chi-square tabulated value.

#### **5.4.4 The adequacy of e-journal collection in the library**

In response to a question with regard to the adequacy of e-journal collection in the library, these variable replies was noticed.

**Table: 5.7 The adequacy of e-journal available in the library**

Adequacy of e-journals	UNIVERSITIES					Grand Total
	PU-C	GNDU-A	PU-P	TU-P	CUP-B	
<b>Very adequate</b>	<b>80</b> (30.53)	<b>38</b> (26.76)	<b>30</b> (11.90)	<b>30</b> (20.55)	<b>09</b> (20.00)	<b>187</b> (22.08)
<b>Adequate</b>	<b>158</b> (60.31)	<b>78</b> (54.93)	<b>172</b> (68.25)	<b>105</b> (71.92)	<b>31</b> (68.89)	<b>544</b> (64.23)
<b>Inadequate</b>	<b>24</b> (9.16)	<b>14</b> (9.86)	<b>36</b> (14.29)	<b>06</b> (4.11)	<b>02</b> (4.44)	<b>82</b> (9.68)
<b>Very inadequate</b>	<b>00</b> (-----)	<b>04</b> (2.82)	<b>10</b> (3.97)	<b>01</b> (0.68)	<b>02</b> (4.44)	<b>17</b> (2.01)
<b>Don't know</b>	<b>00</b> (-----)	<b>08</b> (5.63)	<b>04</b> (1.59)	<b>04</b> (2.74)	<b>01</b> (2.22)	<b>17</b> (2.01)
<b>Total</b>	<b>262</b>	<b>142</b>	<b>252</b>	<b>146</b>	<b>45</b>	<b>847</b>
Chi-Square Calculated Value ( $X^2$ )= 66.52, Degree of freedom = 16.0 and p value = 4.03E-08 ( $\leq 0.05$ significant) Chi-square Critical Value (Tabulated Value) = 26.296						

Source: Primary Data (Figures within parenthesis are %age)

The resource adequacy in terms of availability of sufficient online and digitized e-journals; is a complex matter before the scholars. The above table 5.7 shows the responses with regard to adequacy of e-journal available in the University libraries of Punjab. In case of **PU-C**, the highest 60.31% scholars agree that their library has adequate access to e-journal, followed by 30.53% found it very adequate, 9.16% found it inadequate. None of the scholars said that e-journals available in the library are very inadequate and they don't know about it. In case of **GNDU-A**, the highest 54.93% scholars agree that the library has adequate access to e-journals, followed by 26.76% found it very Adequate, 9.86% found it inadequate, 5.63% responded they don't know and 2.82% found it very inadequate. In case of **PU-P**, the highest 68.25% scholars agree that the library has adequate access to e-journals, followed by 14.29% found it inadequate, 11.90% found it very adequate, 3.97% found it very inadequate and 1.59% responded they don't know. In case of **TU-P**, the highest 71.92% scholars agree that the library has adequate access to e-journals, followed by 20.55% found it very adequate, 4.11% found it inadequate, 2.74% responded they don't know and 0.68% found it very Inadequate. In case of **CUP-B**, the highest 68.89% scholars agree that the library has

adequate access to e-journals, followed by 20.00% found it very adequate, 4.44% found it very inadequate and inadequate equally and 2.22% responded that they don't know.

The above data shows that 64.23% scholars found that the library has an adequate collection of e-journal, followed by 22.08% found it very adequate, 9.68% found it inadequate, 2.01% found very inadequate and 2.01% responded that they don't know. On the whole, it can be deduced that e-journal collection in the University Libraries of Punjab is adequate.

The above data was analyzed using Chi-Square test. The results found that the significant variation with regard to adequacy of e-journal collection in the library. The results of chi square test indicated that the **Chi-Square Calculated Value ( $X^2$ )= 66.52**, which is greater than chi-square tabulated value.

#### 5.4.5 Adequacy of e-database collection in the library

In response to query with regard to the adequacy of e-database available in the library, the responses varied as follows:

**Table: 5.8 Adequacy of e-database collection in the library**

Adequacy of e-databases	UNIVERSITIES					Grand Total
	PU-C	GNDU-A	PU-P	TU-P	CUP-B	
Very adequate	40 (15.27)	24 (16.90)	20 (7.94)	17 (11.64)	04 (8.89)	105 (12.40)
Adequate	154 (58.78)	52 (36.62)	140 (55.56)	81 (55.48)	29 (64.44)	456 (53.84)
Inadequate	56 (21.37)	36 (25.35)	70 (27.78)	18 (12.33)	06 (13.33)	186 (21.96)
Very inadequate	00 (-----)	05 (3.52)	06 (2.38)	01 (0.68)	01 (2.22)	13 (1.53)
Don't know	12 (4.58)	25 (17.61)	16 (6.35)	29 (19.86)	05 (11.11)	87 (10.27)
<b>Total</b>	<b>262</b>	<b>142</b>	<b>252</b>	<b>146</b>	<b>45</b>	<b>847</b>
<b>Chi-Square Calculated Value (<math>X^2</math>)= 73.40,</b> <b>Degree of freedom = 16.0</b> <b>and p value = 2.52E -09 (<math>\leq</math>.05 significant)</b> <b>Chi-square Critical Value (Tabulated Value) = 26.296</b>						

Source: Primary Data (Figures within parenthesis are %age)

The above table 5.8 shows the adequacy of e-database collection in the library. In case of **PU-C**, 58.78% scholars agree that the library has adequate access of e-databases, followed by 21.37% found it inadequate, 15.27% found it very adequate, 4.58% responded they don't know and none of the scholars found very inadequate. In case of **GNDU-A**, the highest 36.62% scholars agree that the library has adequate access to e-databases, followed by 25.35% found it inadequate, 17.61% responded they don't know, 16.90% found it very adequate and 3.52% found it very inadequate. In case of **PU-P**, the highest 55.56% scholars agree that the library has adequate access to e-databases, followed by 27.78% found it inadequate, 7.94% found it very adequate, 6.35% responded they don't know and 02.38% found it very inadequate. In case of **TU-P**, the highest 55.48% scholars agree that the library has adequate access to e-databases, followed by 19.86% responded they don't know, 12.33% found it inadequate, 11.64% found it very adequate and 0.68% found it very inadequate. In case of **CUP-B**, the highest 64.44% scholars agree that the library has adequate e-databases, followed by 13.33% found it inadequate, 11.11% Scholars that they don't know, 8.89% found it very adequate and 2.22% found it very inadequate.

The above data shows that 53.84% scholars found that the library has adequate access to e-databases, followed by 21.96% found it inadequate, 12.40% found it very adequate, 10.27% responded that they don't know, 1.53% found it very inadequate. On the whole, it can be deduced that e-database collection in the University libraries of Punjab is adequate.

The above data was analyzed using Chi-Square test. The results found that the significant variation with regard to adequacy of e- database collection in the library. The results of chi square test indicated that the **Chi-Square Calculated Value ( $X^2$ )= 73.40**, which is greater than chi-square tabulated value.

### 5.4.6 Adequacy of e-book collection in the library

In context to queries with regard to the adequacy of e-book collection in the library, the responses varied as follows:

**Table: 5.9 Adequacy of e-book collection in the Library**

Adequacy of e-book	UNIVERSITIES					Grand Total
	PU-C	GNDU-A	PU-P	TU-P	CUP-B	
<b>Very adequate</b>	<b>38</b> (14.50)	<b>24</b> (16.90)	<b>22</b> (8.73)	<b>35</b> (23.97)	<b>10</b> (22.22)	<b>129</b> (15.23)
<b>Adequate</b>	<b>134</b> (51.15)	<b>50</b> (35.21)	<b>110</b> (43.65)	<b>58</b> (39.73)	<b>15</b> (33.33)	<b>367</b> (43.33)
<b>Inadequate</b>	<b>82</b> (31.30)	<b>39</b> (27.46)	<b>94</b> (37.30)	<b>32</b> (21.92)	<b>12</b> (26.67)	<b>259</b> (30.58)
<b>Very inadequate</b>	<b>06</b> (2.29)	<b>11</b> (7.75)	<b>16</b> (6.35)	<b>07</b> (4.79)	<b>06</b> (13.33)	<b>46</b> (5.43)
<b>Don't know</b>	<b>02</b> (0.76)	<b>18</b> (12.68)	<b>10</b> (3.97)	<b>14</b> (9.59)	<b>02</b> (4.44)	<b>46</b> (5.43)
<b>Total</b>	<b>262</b>	<b>142</b>	<b>252</b>	<b>146</b>	<b>45</b>	<b>847</b>
Chi-Square Calculated Value ( $X^2$ )= 73.27, Degree of freedom = 16.0 and p value = 2.66 E-09 ( $\leq 0.05$ significant) Chi-square Critical Value (Tabulated Value) = 26.296						

Source: Primary Data (Figures within parenthesis are %age)

The above table 5.9 shows the adequacy of e-book collection in the library. In case of **PU-C**, the highest 51.15% scholars agree that the library has an adequate e-book collection, followed by 31.30% found it inadequate, 14.50% found it very adequate, 2.29% found it very inadequate, and 0.76% responded that they don't know. In case of **GNDU-A**, the highest 35.21% scholars agree that the library has an adequate e-book collection, followed by 27.46% found it inadequate, 16.90% found it very adequate, 12.68% responded that they don't know, and 7.75% found it very inadequate. In case of **PU-P**, the highest 43.65% scholars agree that the library has an adequate e-book collection, followed by 37.30% found it inadequate, 8.73% found it very adequate, 6.35% found it very inadequate, and 3.97%

responded that they don't know. In case of **TU-P**, the highest 39.73% scholars agree that the library has an adequate e-book collection, followed by 23.97% found it very adequate, 21.92% found it inadequate, 9.59% responded that they don't know and 4.79% found it very inadequate. In case of **CUP-B**, the highest 33.33% scholars agree that library has an adequate e-book collection, followed by 26.67% found it it inadequate, 22.22% found it very adequate, 13.33% found it very inadequate, 04.44% responded that they don't know.

The above data reveals that 43.33% scholars found that the library has adequate access to e-books, followed by 30.58% found it inadequate, 15.23% found it very adequate, 5.43% found it very inadequate and said that they don't know equally. On the whole, it can be deduced that e-book collection in the University Libraries of Punjab is adequate.

The above data was analyzed using Chi-Square test. The results found that the significant variation with regard to adequacy of e- book collection in the library. The results of chi square test indicated that the **Chi-Square Calculated Value ( $X^2$ )= 73.27**, which is greater than chi-square tabulated value.

#### **5.4.7 Adequacy of e-scholarly internet source collection in the library**

In response to the question regarding the adequacy of e-scholarly internet source collection in the library, these replies were observed:

**Table: 5.10 Adequacy of e-scholarly internet source collection in the Library**

Adequacy internet resources	UNIVERSITIES					Grand Total
	PU-C	GNDU-A	PU-P	TU-P	CUP-B	
Very adequate	50 (19.08)	27 (19.01)	34 (13.49)	20 (13.70)	08 (17.78)	139 (16.41)
Adequate	152 (58.02)	46 (32.39)	120 (47.62)	95 (65.07)	28 (62.22)	441 (52.07)
Inadequate	56 (21.37)	40 (28.17)	82 (32.54)	09 (6.16)	04 (8.89)	191 (22.55)
Very inadequate	00 (-----)	06 (4.23)	04 (1.59)	03 (2.05)	02 (4.44)	15 (1.77)
Don't know	04 (1.53)	23 (16.20)	12 (4.76)	19 (13.01)	03 (6.67)	61 (7.20)
<b>Total</b>	<b>262</b>	<b>142</b>	<b>252</b>	<b>146</b>	<b>45</b>	<b>847</b>
Chi-Square Calculated Value ( $X^2$ )= 105.09, Degree of freedom = 16.0 and p value = 3.81E-15 ( $\leq 0.05$ significant) Chi-square Critical Value (Tabulated Value) = 26.296						

Source: Primary Data (Figures within parenthesis are %age)

The above table 5.10 shows the adequacy of e-scholarly internet source collection in the library. In case of **PU-C**, the highest 58.02% scholars agree that the library has adequate e-scholarly internet source collection in the library, followed by 21.37% found it inadequate, 19.08% found it very adequate, 1.53% responded that they don't know. In case of **GNDU-A**, the highest 32.39% scholars agree that the library has adequate e-scholarly internet source collection in the library, followed by 28.17% found it inadequate, 19.01% found it very adequate, 16.20% responded that they don't know, and 4.23% found it very inadequate. In case of **PU-P**, the highest 47.62% scholars agree that the library has adequate e-scholarly internet source collection in the library, followed by 32.54% found it inadequate, 13.49% found it very adequate, 4.76% responded that they don't know and 1.59% found it very inadequate. In case of **TU-P**, the highest 65.07% scholars agree that the library has adequate e-scholarly internet source collection in the library, followed by 13.70% found it very adequate, 13.01% responded that they don't know 6.16% found it

inadequate and 2.05% found it very inadequate. In case of **CUP-B**, the highest 62.22% scholars agree that library adequate e-scholarly internet source collection in the library, followed by 17.78% found it very adequate, 8.89% found it inadequate, 6.67% responded that they don't know and 4.44% found it very inadequate.

The above data reveals that, 52.07% agree that the library has adequate e-scholarly internet source collection in the library, followed by 22.55% found it inadequate, 16.41% found it very adequate, 7.20% responded that they don't know and 1.77% found it very inadequate on the whole, it can be deduced that e-scholarly internet source collection in the University Libraries of Punjab is adequate.

The above data was analyzed using the Chi-Square test. The results found that the significant variation with regard to resource adequacy of e- scholarly internet source collection in the library. The results of chi-square test indicated that the **Chi-Square Calculated Value ( $X^2$ )= 105.09**, which is greater than chi-square tabulated value.

#### 5.4.8 Adequacy of e-reference source collection in the library

In response to the question regarding the adequacy of e-references source collection in the library, these replies were noticed:

**Table: 5.11 Adequacy of e-reference source collection in the library**

Adequacy e-references	UNIVERSITIES					Grand Total
	PU-C	GNDU-A	PU-P	TU-P	CUP-B	
<b>Very adequate</b>	<b>44</b> (16.79)	<b>26</b> (18.31)	<b>24</b> (9.52)	<b>22</b> (15.07)	<b>06</b> (13.33)	<b>122</b> (14.40)
<b>Adequate</b>	<b>134</b> (51.15)	<b>50</b> (35.21)	<b>126</b> (50.00)	<b>84</b> (57.53)	<b>24</b> (53.33)	<b>418</b> (49.35)
<b>Inadequate</b>	<b>70</b> (26.72)	<b>34</b> (23.94)	<b>74</b> (29.37)	<b>20</b> (13.70)	<b>10</b> (22.22)	<b>208</b> (24.56)
<b>Very inadequate</b>	<b>06</b> (2.29)	<b>08</b> (5.63)	<b>14</b> (5.56)	<b>01</b> (0.68)	<b>01</b> (2.22)	<b>30</b> (3.54)
<b>Don't know</b>	<b>08</b> (3.05)	<b>24</b> (16.90)	<b>14</b> (5.56)	<b>19</b> (13.01)	<b>04</b> (8.89)	<b>69</b> (8.15)
<b>Total</b>	<b>262</b>	<b>142</b>	<b>252</b>	<b>146</b>	<b>45</b>	<b>847</b>

Chi-Square Calculated Value ( $X^2$ )= 62.30,  
Degree of freedom = 16.0  
and p value = 2.13E-07 ( $\leq 0.05$  significant)  
Chi-square Critical Value (Tabulated Value) = 26.296

Source: Primary Data

(Figures within parenthesis are %age)

The table 5.11 shows the adequacy of the e-reference source collection in the library. In case of **PU-C**, the highest 51.15% scholars agree that the library has an adequate collection of e-reference source collection in the library, followed by 26.72% found it inadequate, 16.79% found it very adequate, 3.05% responded that they don't know and 2.29% found it very inadequate. In case of **GNDU-A**, the highest 35.21% scholars agree that the library has an adequate collection of e-reference resources source in the library, followed by 23.94% found it inadequate, 18.31% found it very adequate, 16.90% responded that they don't know, and 5.63% found it very inadequate. In case of **PU-P**, the highest 50.00% scholars agree that the library has an adequate collection of e-reference source in the library, followed by 29.37% found it inadequate, 9.52% found it very adequate, 5.56% responded that they don't know and 5.56% found it very inadequate. In case of **TU-P**, the highest 57.53% scholars agree that the library has an adequate collection of e-reference source in the library, followed by 15.07% found it very adequate, 13.70% found it inadequate, 13.01% responded don't know and only 0.68% found it very inadequate. In case of **CUP-B**, the highest 53.33% scholars agree that the library has an adequate collection of e-reference source in the library followed by 22.22% found it inadequate, 13.33% found it very adequate, 8.89% responded they don't know, and 2.22% found it very inadequate.

The above data shows that 49.35% scholars agree that the library has an adequate collection of e-reference source followed by 24.56% found it inadequate, 14.40% found it very adequate, 8.15% responded that they don't know and 3.54% found it very inadequate. On the whole, it can be deduced that e-reference source collection in the University libraries of Punjab is adequate.

The above data was analyzed using the Chi-Square test. The results found that the significant variation with regard to the adequacy of e-reference source collection in the

library. The results of the chi-square test indicated that the **Chi-Square Calculated Value** ( $X^2$ )= **62.30**, which is greater than chi-square tabulated value.

#### 5.4.9 Adequacy of e-theses collection in the library

The scholar's responses with regard to the adequacy of e-theses collection in the library varied as follows:

**Table: 5.12 Adequacy of e-theses collection in the library**

Adequacy e-thesis	UNIVERSITIES					Grand Total
	PU-C	GNDU-A	PU-P	TU-P	CUP-B	
Very adequate	34 (12.98)	22 (15.49)	20 (7.94)	29 (19.86)	08 (17.78)	113 (13.34)
Adequate	112 (42.75)	58 (40.84)	134 53.17	78 (53.42)	20 (44.44)	402 (47.46)
Inadequate	100 (38.17)	37 (26.06)	72 28.57	24 (16.44)	10 (22.22)	243 (28.69)
Very inadequate	12 (4.58)	08 (5.63)	12 4.76	05 (3.42)	01 (2.22)	38 (4.49)
Don't know	04 (1.53)	17 (11.97)	14 5.56	10 (6.85)	06 (13.33)	51 (6.02)
<b>Total</b>	<b>262</b>	<b>142</b>	<b>252</b>	<b>146</b>	<b>45</b>	<b>847</b>
<b>Chi-Square Calculated Value (<math>X^2</math>)= 56.39,</b> <b>Degree of freedom = 16.0</b> <b>and p value = 2.10E-06 (<math>\leq 0.05</math> significant)</b> <b>Chi-square Critical Value (Tabulated Value) = 26.296</b>						

Source: Primary Data (Figures within parenthesis are %age)

The table 5.12 shows the e-theses collection in the library. In case of **PU-C**, the highest number of scholars, that is, 42.75% agree that the library has an adequate collection of e-theses, followed by 38.17 found it inadequate, 12.98% found it very adequate, 4.58% found it very inadequate and 1.53% responded that they don't know. In case of **GNDU-A**, the highest number of scholars, that is, 40.84% agree that the library has an adequate collection of e-theses, followed by 26.06% found it inadequate, 15.49% found it very adequate, 11.97% responded that they don't know, and 5.63% found it very Inadequate. In case of **PU-P**, the highest number of scholars, that is, 53.17% agree that the library has an adequate collection of e-theses, followed by 28.57% found it inadequate, 7.94% found it very adequate, 5.56% responded that they don't know and 4.76% found it very inadequate. In case of **TU-P**, the

highest number of scholars, that is, 53.42% scholars agree that the library has an adequate collection of e-theses, followed by 19.86% found it very adequate, 16.44% found it inadequate, 6.85% responded that they don't know and 3.42% found it very inadequate. In case of **CUP-B**, the highest number of scholars, that is, 44.44% scholars agree that the library has an adequate collection of e-theses, followed by 22.22% found it inadequate, 17.78% found it very adequate, 13.33% responded that they don't know and 2.22% found it very inadequate.

The above data shows that 47.46% agree that the library has an adequate collection of e-theses, followed by 28.69% found it inadequate, 13.34% found it very adequate, 6.02% responded that they don't know and 4.49% found it very inadequate. On the whole, it can be deduced that e-theses collection in the University libraries of Punjab is adequate

The above data was analyzed using the Chi-Square test. The results found that the significant variation with regard to the adequacy of the e-theses collection in the library. The results of the chi-square test indicated that the **Chi-Square Calculated Value ( $X^2$ )= 56.39**, which is greater than chi-square tabulated value.

#### **5.4.10 Services related to e-resources provided by the library**

In response to the question with regard to the services related to e-resources provided by the library, these replies were observed:

**Table: 5.13 Services related to e-resources provided by the library**

Services related to e-resources	UNIVERSITIES					Grand Total
	PU-C	GNDU-A	PU-P	TU-P	CU-B	
EDS Service	108 (36.00)	65 (39.16)	76 (29.46)	71 (44.38)	20 (39.22)	340 (36.36)
CAS Service	72 (24.00)	28 (16.87)	38 (14.73)	28 (17.50)	13 (25.49)	179 (19.14)
SDI Service	12 (4.00)	03 (1.81)	04 (1.55)	00 -----	05 (9.80)	24 (2.57)
Any others Services (OPAC/Overdue/Ask Librarian/Reprographic)	108 (36.00)	70 (42.17)	140 (54.26)	61 (38.13)	13 (25.49)	392 (41.93)
<b>Total</b>	<b>300</b>	<b>166</b>	<b>258</b>	<b>160</b>	<b>51</b>	<b>935</b>
Chi-Square Calculated Value ( $X^2$ )= 48.80, Degree of freedom = 12.0 and p value = 2.26E-06 ( $\leq 0.05$ significant) Chi-square Critical Value (Tabulated Value) = 21.02						

Source: Primary Data (Figures within parenthesis are %age)

The table 5.13 shows the library services related to e-resources provided by the library. In case of **PU-C**, the highest number of scholars, that is, 36.00% said that the library provides any other services, 36% said EDS service followed by, 72% said CAS service, and 4.00% said SDI service. In case of **GNDU-A**, the highest number of scholars, that is, 42.17% said library provides other services followed by 39.16% said EDS service, 16.87% said CAS and 1.81% said SDI service. In case of **PU-P**, the highest number of scholars, that is, 54.26% said library provides any other service followed by 29.46% said EDS service, 14.73% said CAS and 1.55% said SDI service. In case of **TU-P**, the highest number of scholars, that is, 44.38% said library provides EDS service followed by 38.13% said other services, 17.50% said CAS. In case of **CUP-B**, the highest number of scholars, that is, 39.22% said that the library provides EDS, followed by 25.49% said use other service, 25.49% scholars use CAS and 9.80% said SDI service.

The above data demonstrate the services related to e-resources provided by the University Libraries of Punjab, shows that, majority of 41.93% scholars, use any other service followed by 36.36% said EDS, 19.14% use CAS and 2.57% said SDI service.

The above data was analyzed using Chi-Square test. The results found that the significant variation with regard to services related to e-resources provided by the library. The results of chi square test indicated that the **Chi-Square Calculated Value ( $X^2$ )= 48.80**, which is greater than chi-square tabulated value.

#### 5.4.11 Computers for accessing e-resources in the library/ Department

The responses with regard to scholars use of computers for accessing e-resources in the library/Department evoked these responses:

**Table: 5.14 Computers for accessing e-resources in the library**

Computers for accessing e-resources	UNIVERSITIES					Grand Total
	PU-C	GNDU-A	PU-P	TU-P	CUP-B	
<b>Yes</b>	<b>224</b> (85.50)	<b>136</b> (95.77)	<b>232</b> (92.06)	<b>133</b> (91.10)	<b>43</b> (95.56)	<b>768</b> (90.67)
<b>No</b>	<b>38</b> (14.50)	<b>06</b> (4.23)	<b>20</b> (7.94)	<b>13</b> (8.90)	<b>02</b> (4.44)	<b>79</b> (9.33)
<b>Total</b>	<b>262</b>	<b>142</b>	<b>252</b>	<b>146</b>	<b>45</b>	<b>847</b>
Chi-Square Calculated Value ( $X^2$ )= 14.55, Degree of freedom = 4.0 and p value = 0.0057 ( $\leq 0.05$ significant) Chi-square Critical Value (Tabulated Value) = 9.48						

Source: Primary Data (Figures within parenthesis are %age)

The table 5.14 shows the availability of computers for accessing e-resources in the library/department. It was found that 85.50% scholars in **PU-C**, 95.77% scholars in **GNDU-A**, 92.06% scholars in **PU-P**, 91.10% scholars in **TU-P** and 95.56% scholars in **CUP-B** responded positively and said that they are having computers for accessing e-resources. In contrast, the remaining 14.50% scholars in **PU-C**, 4.23% scholars in **GNDU-A**, 7.94% scholars in **PU-P**, 8.90% scholars in **TU-P** and 4.44% scholars in **CUP-B** said that they don't have computers for accessing e-resources in the library/department.

The above data shows that a majority of 90.67% scholars admitted that they have computers for accessing e-resources and 9.33% scholars admitted that they don't have

computers. On the whole, it can be deduced that University libraries of Punjab have adequate computers in the library/department for accessing e-resources.

The above data was analyzed using Chi-Square test. The results found that the significant variation with regard to computers for accessing e-resources in the library. The results of chi square test indicated that the **Chi-Square Calculated Value ( $X^2$ )= 14.55**, which is greater than chi-square tabulated value.

#### 5.4.12 Internet connections available for accessing e-resources

With regard to the query in context of availability of internet connections for accessing e-resources, the scholars varied negligibly as observed here:

**Table: 5.15 Internet connections available for accessing e-resources**

Internet connection	UNIVERSITIES					Grand Total
	PU-C	GNDU-A	PU-P	TU-P	CUP-B	
Wi-Fi	250 (94.33)	136 (94.44)	252 99.21	140 (95.23)	44 (89.79)	822 (95.69)
Leased line	15 (5.66)	08 (5.55)	02 (0.78)	07 (4.76)	05 (10.20)	37 (4.31)
Li-Fi	00 (-----)	00 (-----)	00 (----)	00 (----)	00 (-----)	00 (-----)
<b>Total</b>	<b>265</b>	<b>144</b>	<b>254</b>	<b>147</b>	<b>49</b>	<b>859</b>
Chi-Square Calculated Value ( $X^2$ )= 13.56, Degree of freedom = 4.0 and p value = 0.0088 ( $\leq 0.05$ significant) Chi-square Critical Value (Tabulated Value) = 9.48						

Source: Primary Data (Figures within parenthesis are %age)

The table 5.15 shows the differential responses about internet connection availability and sustainability of accessing e-resources. In response to the query about internet connection, it was found that 94.33% scholars in **PU-C**, 94.44% scholars of **GNDU-A**, 99.21% scholars of **PU-P**, 95.23% scholars of **TU-P** and 89.79% scholars of **CUP-B** informed about Wi-Fi connection. Whereas the remaining 5.66% scholars of **PU-C**, 5.55% scholars of **GNDU-A**, 0.78% scholars of **PU-P**, 4.76% scholars of **TU-P** and 10.20%

scholars of **CUP-B** scholars informed about leased line connection. None of the scholars from the University libraries of Punjab informed about Li-Fi connection.

The above data shows that the highest percentage of the scholars 95.69% have Wi-Fi connection and 4.31% have informed about leased line connection for accessing e-resources in the campus. However, it is interesting to note that none of the scholars told about Li-Fi connection.

The above data was analyzed using the Chi-Square test. The results found that the significant variation with regard to an internet connection and bandwidth availability in the Library. The results of chi-square test indicated that the **Chi-Square Calculated Value ( $X^2$ )= 13.56**, which is greater than chi-square tabulated value.

#### 5.4.13 Collection of e-resources under UGC Infonet DLC

In response to the question regarding the adequacy of the collection of e-resources under UGC Infonet DLC, these replies emerged:

**Table: 5.16 Collection of e-resources under UGC-Infonet DLC**

Collection	UNIVERSITIES					Grand Total
	PU-C	GNDU-A	PU-P	TU-P	CUP-B	
Yes	136 (77.27)	67 (69.07)	144 (76.60)	70 (75.27)	23 (63.89)	440 (74.58)
No	40 (22.73)	30 (30.93)	44 (23.40)	23 (24.73)	13 (36.11)	150 (25.42)
Total	176	97	188	93	36	590
Chi-Square Calculated Value ( $X^2$ )= 4.82, Degree of freedom = 4.0 and p value = 0.306 ( $\geq 0.05$ non-significant) Chi-square Critical Value (Tabulated Value) = 9.48						

Source: Primary Data (Figures within parenthesis are %age)

The opinion of scholars regarding the collection of e-resources available under UGC-Infonet DLC various disciplines and subjects play a vital role because adequate e-resources will provide effective help to the scholars in their study and research work. As revealed from table 5.16, it can be put forth that majority of the 77.27% scholars of PU-C, 69.07% scholars of GNDU-A, 76.60% scholars of PU-P, 75.27% scholars of TU-P and 63.89% scholars of

**CUP-B** answered affirmatively and they are satisfied with the collection of e-resources available under UGC-Infonet DLC whereas 22.73% scholars of **PU-C**, 30.93% scholars of **GNDU-A**, 23.40% scholars of **PU-P**, 24.73% scholars of **TU-P** and 36.11% scholars of **CUP-B** said that they are not satisfied with the collection of e-resources under UGC-Infonet DLC.

The above data reveals that a majority of 74.58% scholars from University Libraries of Punjab are satisfied with the collection of e-resources available under UGC Infonet DLC whereas 25.42% scholars are not satisfied at all.

The above data was analyzed using the Chi-Square test. The results found that the non-significant variation with regard to the collection of e-resources under UGC-Infonet. The results of chi-square test indicated that the **Chi-Square Calculated Value ( $X^2$ )= 4.82**, which is smaller than chi-square tabulated value.

#### 5.4.14 Collection of e-resources under the UGC-Infonet DLC supports research

In response to a question about scholar's satisfaction about the existing collection of e-resources available under UGC-Infonet DLC, these responses cropped up:

**Table: 5.17 Collection of e-resources under UGC-Infonet supports research**

Collection of e-resources	UNIVERSITIES					Grand Total
	PU-C	GNDU-A	PU-P	TU-P	CUP-B	
Access to wider range of information	116 (36.48)	54 (30.51)	120 (39.22)	57 (33.53)	27 (35.53)	374 (35.72)
Expedite research process	80 (25.16)	41 (23.16)	78 (25.49)	39 (22.94)	13 (17.11)	251 (23.97)
Improve professional competence	52 (16.35)	46 (25.99)	46 (15.03)	46 (27.06)	20 (26.32)	210 (20.06)
Fast access of Information	70 (22.01)	36 (20.34)	62 (20.26)	28 (16.47)	16 (21.05)	212 (20.25)
<b>Total</b>	<b>318</b>	<b>177</b>	<b>306</b>	<b>170</b>	<b>76</b>	<b>1047</b>
<p><b>Chi-Square Calculated Value (<math>X^2</math>)= 21.26,</b>  <b>Degree of freedom = 12.0</b>  <b>and p value = 0.0468 (<math>\leq 0.05</math> significant)</b>  <b>Chi-square Critical Value (Tabulated Value) = 21.02</b></p>						

Source: Primary Data (Figures within parenthesis are %age)

The above 5.17 shows the collection of e-resources under the UGC-Infonet DLC supports research. In case of **PU-C**, the highest number of scholars, that is, 36.48% admit that there is access to a wider range of information followed by 25.16% admit expedite research process, 22.01% admit fast access of Information and 16.35% admit that it improves professional competence. In case of **GNDU-A**, the highest number of scholars, that is, 30.51% admit that there is access to a wider range of information followed by 25.99% admit that it improves professional competence, 23.16% admit expedite the research process and 20.34% admit it is a fast access of Information. In case of **PU-P**, the highest number of scholars, that is, 39.22% admit that there is accesses to a wider range of information followed by 25.49% admit expedite research process, 20.26% admit fast access of information and 15.03% admit that it improves professional competence. In case of **TU-P**, the highest number of scholars, that is, 33.53% admit that there is access to a wider range of information followed by 27.06% admit it improves professional competence, 22.94% expedite the research process and 16.47% fast access of information. In case of **CUP-B**, the highest number of scholars, that is, 35.53% admit that there is access to a wider range of information followed by 26.32% admit it improve professional competence, 21.05% admit fast access of information and 17.11% admit expedite research process.

The above data shows the highest number of scholars from University Libraries of Punjab, that is, 35.72% admit that there is access to a wider range of information followed by 23.97% admit that it expedites research process, 20.25% admit that it serves fast access of Information and 20.06% admit it improves professional competence.

The above data was analyzed using Chi-Square test. The results found that the significant variation with regard to collection of e-resources in regard to research supports.

The results of chi square test indicated that the **Chi-Square Calculated Value ( $X^2$ )= 21.26**, which is greater than chi-square tabulated value.

## 5.5 Awareness and use of UGC-Infonet DLC among research scholars

### 5.5.1 Scholars awareness regarding UGC-Infonet DLC

The respondents were questioned with regard scholar's awareness regarding awareness about the emerging UGC Infonet DLC.

**Table: 5.18 Scholars awareness regarding UGC-Infonet DLC**

Awareness regarding UGC-Infonet DLC	UNIVERSITIES					Grand Total
	PU-C	GNDU-A	PU-P	TU-P	CUP-B	
<b>Yes</b>	<b>176</b> (67.18)	<b>97</b> (68.31)	<b>188</b> (74.60)	<b>93</b> (63.70)	<b>36</b> (80.00)	<b>590</b> (69.66)
<b>No</b>	<b>86</b> (32.82)	<b>45</b> (31.69)	<b>64</b> (25.40)	<b>53</b> (36.30)	<b>09</b> (20.00)	<b>257</b> (30.34)
<b>Total</b>	<b>262</b>	<b>142</b>	<b>252</b>	<b>146</b>	<b>45</b>	<b>847</b>
<b>Chi-Square Calculated Value (<math>X^2</math>)= 8.53,</b> <b>Degree of freedom = 4.0</b> <b>and p value = 0.073 (<math>\geq .05</math> non-significant)</b> <b>Chi-square Critical Value (Tabulated Value) = 9.487</b>						

Source: Primary Data (Figures within parenthesis are %age)

The responses to the scholar's awareness, coded regarding "yes" or "no", were observed. Regarding the background of UGC and INFLIBNET, it is worth mentioning here that it is an autonomous body of higher learning in the country which has initiated a program of the Digital Library Consortium to provide e-access over the internet to higher education in India. Awareness is a pre-requisite for effective accessing of e-resources; therefore, scholars were asked whether they know about the UGC-Infonet DLC available in their library. In response to the question with regard to scholar's awareness of the UGC-Infonet DLC, it was found in the table 5.18 that 67.18% scholars of **PU-C**, 68.31% scholars of **GNDU-A**, 74.60% scholars of **PU-P**, 63.70% scholars of **TU-P** and 80.00% scholars of **CUP-B** responded positively and said that they are well aware with regard to the UGC-Infonet DLC. Whereas remaining 32.82% scholars of **PU-C**, 31.69% scholars of **GNDU-A**, 25.4% scholars of **PU-P**,

36.30% scholars of **TU-P** and 20.00% scholars of **CUP-B** responded that they are not aware of the UGC-Infonet DLC available in their respective libraries.

The above data shows that 69.66% scholars are aware as compared to negative response from 30.34% scholars. It shows that the majority of the scholars are aware of UGC-Infonet DLC. In an informal interaction, the respondents do acknowledge that the awareness levels are impacted by training interventions sponsored by the library administration. The substantial regional variations concerning awareness levels of the scholars point towards the scholars rising awareness across Panjab University, Chandigarh and Punjabi University, Patiala in Northern India. The task of interpreting “library culture” with the responses would be rather difficult. In terms of the differences and fluctuations between “yes” and “no”, the Central University of Punjab, Bhatinda respondents projected the minimum possible gap, whereas the scholars across the Punjabi University, Patiala exhibited the maximum possible gap in terms of the responses.

The above data was analyzed using the Chi-Square test. The results found that the non-significant variation with regard to scholar’s awareness regarding UGC-Infonet DLC. The results of chi-square test indicated that the **Chi-Square Calculated Value ( $X^2$ )= 8.53**, which is smaller than its chi-square tabulated value.

#### **5.5.1 (a) Scholars source of information regarding UGC-Infonet DLC**

A question was asked to the scholars to know the sources through which they became aware of UGC-Infonet DLC. The replies given by them are shown in below Table.

**Table: 5.18 (a) Scholars source of Information regarding UGC-Infonet DLC**

Sources (UGC-Infonet DLC)	UNIVERSITY					Grand Total
	PU-C	GNDU-A	PU-P	TU-P	CUP-B	
Library Professionals	48 (21.43)	34 (27.87)	56 (26.17)	45 (39.13)	17 (39.53)	200 (27.86)
Library website	84 (37.50)	23 (18.85)	48 (22.43)	26 (22.61)	09 (20.93)	190 (26.46)
Friends	82 (36.61)	54 (44.26)	90 (42.06)	42 (36.52)	16 (37.21)	284 (39.55)
Any other (Newsletters/Poster/Orientation/INFLIBNET etc.)	10 (4.46)	11 (9.02)	20 (9.34)	02 (1.74)	01 (2.33)	44 (6.13)
<b>Total</b>	<b>224</b>	<b>122</b>	<b>214</b>	<b>115</b>	<b>43</b>	<b>718</b>
<b>Chi-Square Calculated Value (X<sup>2</sup>) = 39.09,</b> <b>Degree of freedom = 12.0</b> <b>and p value = 0.0001 (≤.05 significant)</b> <b>Chi-square Critical Value (Tabulated Value) = 21.02</b>						

Source: Primary Data (Figures within parenthesis are %age)

There are various sources through which scholars become aware of the UGC-Infonet DLC like Library Professionals, Library website, Friends, or any other sources (Newsletters/Poster/Orientation/INFLIBNET etc.). Table 5.18 (a), shows the scholars source of information regarding UGC-Infonet DLC, it is revealed that majority of the 37.50% scholars of **PU-C**, through the Library website followed by 36.61% through friends, 21.43% through library professionals and very few 4.46% through other sources. In case of **GNDU-A**, the majority of 44.26% scholar's sources of awareness is through friends followed by 27.87% through library professionals, 18.85% through the library website and very few 9.02% through any others. In case of **PU-P**, the majority of 42.06% scholar's sources of awareness is through friends followed by 26.17% through library professionals, 22.43% through the library website and very few 9.34% through any others. In case of **TU-P**, the majority of 39.13% scholar's sources of awareness is through library professionals followed by 36.52% through friends, 22.61% through the library website and very few 1.74% through any other source. In case of **CUP-B**, the majority of 39.53% scholar's sources of awareness is

through library professionals followed by 37.21% through friends, 20.93% through the library website and very few 2.33% through any other source.

It can be thus said that majority scholars of **PU-C** are aware of UGC-Infonet DLC through the library website, in **GNDU-A** and **PU-P** through friends, in **TU-P** and **CUP-B** through library professionals. Contrary to this, very few scholars of all University Libraries of Punjab are aware of the same through any other source (Newsletters/Poster/Orientation/INFLIBNET etc.).

The overall complete investigation shows that the majority of the scholars of University Libraries of Punjab, i.e., 39.55% know through friends followed by 27.86% through Library professionals, 26.46% through Library website and very few 6.13% through any other source. The library professional, friends and the library's website all collectively shape the scholar's levels of the awareness, regarding the UGC-Infonet DLC.

It is self-evident from the analysis that the friends constitute a viable source of information for awareness regarding the existence of the UGC-Infonet DLC. It is clear from the above analysis that the most accepted method of getting the essential expertise for using e-journals is a discussion with friends and guidance from co-research colleagues/ teachers or supervisors because most of the time they discuss with them regarding their research (Gupta, 2011).

It's evident that the digital literacy along with the peer network and effective friend circle helps rise in the scholars awareness about digital library consortia. The observation has consequences in terms of implementing change management in the context of libraries because of ongoing technology enablement of the library mechanisms. The usage and awareness creation across the future is impossible without the active consideration of

functional library website and effective tapping of user's friend base across social media to create a win-win situation for the user and the librarian (Chauhan & Mahajan, 2014).

The above data was analyzed using the Chi-Square test. The results found that the significant variation with regard to scholars source of information regarding UGC-Infonet DLC. The results of chi-square test indicated that the **Chi-Square Calculated Value ( $X^2$ )= 39.09**, which is greater than its chi-square tabulated value.

### 5.5.2 Place of accessing and use of UGC-Infonet DLC

The scholars were asked to specify the place of accessing UGC-Infonet DLC.

**Table: 5.19 Place of accessing and use of UGC-Infonet DLC**

Place of accessing	UNIVERSITIES					Grand Total
	PU-C	GNDU-A	PU-P	TU-P	CUP-B	
<b>Department</b>	<b>130</b> (52.00)	<b>59</b> (46.83)	<b>120</b> (44.12)	<b>51</b> (45.13)	<b>36</b> (33.33)	<b>396</b> (45.57)
<b>University Library</b>	<b>88</b> (35.20)	<b>48</b> (38.10)	<b>100</b> (36.76)	<b>44</b> (38.94)	<b>46</b> (42.59)	<b>326</b> (37.51)
<b>Hostel</b>	<b>28</b> (11.20)	<b>19</b> (15.08)	<b>50</b> (18.38)	<b>15</b> (13.27)	<b>23</b> (21.30)	<b>135</b> (15.54)
<b>Any other (Internet café/ Home etc.)</b>	<b>04</b> (1.60)	<b>00</b> (-----)	<b>02</b> (0.74)	<b>03</b> (2.65)	<b>03</b> (2.78)	<b>12</b> (1.38)
<b>Total</b>	<b>250</b>	<b>126</b>	<b>272</b>	<b>113</b>	<b>108</b>	<b>869</b>
Chi-Square Calculated Value ( $X^2$ )= 19.85, Degree of freedom = 12.0 and p value = 0.0701 ( $\geq 0.05$ non-significant) Chi-square Critical Value (Tabulated Value) = 21.02						

Source: Primary Data (Figures within parenthesis are %age)

The table 5.19 portrays the place of accessing UGC-Infonet DLC by the scholars. In **PU-C**, the majority of scholars, that is, 52% are accessing from their respective departments followed by 35.20% access from the University library, 11.20% from their hostel and very few 1.60% from any other place. In **GNDU-A**, the majority of scholars, that is, 46.83% access from their respective department, 38.10% from the University library, 15.08% from their hostel and none of the scholars access from any other place. In **PU-P**, the majority of Scholars, that is, 44.12% access from their respective departments followed by 37.76% from the University library, 18.38% access from their hostel and very less 0.74% from any other

place. In **TU-P**, the majority of the scholars, that is 45.13% access from their department, 38.94% access from the University library, 13.27% access from their hostel and 2.65% access from any other place. In **CUP-B**, the majority of the scholars, that is, 42.59% access from the University Library, 33.33% access from their department, 21.30% access from their hostel and 2.78% access from any other place.

The above data indicates that the majority of the scholars of **PU-C**, **GNDU-A**, **PU-P** and **TU-P** scholars access from their respective departments and scholars of **CUP-B** from University Library. It is inferred that the highest number of scholars from University libraries of Punjab, that is, 45.57% access from the department, 37.51% access from the University library, 15.54% access from the hostel and 1.38% access from any other place.

The above data was analyzed using the Chi-Square test. The results found that the non-significant variation with regard to the place of accessing UGC Infonet DLC. The results of chi-square test indicated that the **Chi-Square Calculated Value ( $X^2$ )= 19.85**, which is smaller than chi-square tabulated value.

### 5.5.2 (a) Purpose of using UGC-Infonet DLC

In response to the question regarding the scholars purpose of using UGC-Infonet DLC, the following responses were observed:

**Table: 5.19 (a) Purpose of using UGC-Infonet DLC**

Purpose of using UGC-Infonet DLC	UNIVERSITIES					Grand Total
	PU-C	GNDU-A	PU-P	TU-P	CUP-B	
<b>Publishing Articles</b>	<b>46</b> (17.97)	<b>30</b> (24.19)	<b>66</b> (22.15)	<b>40</b> (21.28)	<b>19</b> (24.05)	<b>201</b> (21.27)
<b>Update subject knowledge</b>	<b>54</b> (21.09)	<b>42</b> (33.87)	<b>58</b> (19.46)	<b>56</b> (29.79)	<b>23</b> (29.11)	<b>233</b> (24.66)
<b>Study and Research work</b>	<b>156</b> (60.94)	<b>52</b> (41.94)	<b>172</b> (57.72)	<b>92</b> (48.94)	<b>35</b> (44.30)	<b>507</b> (53.65)
<b>Any other</b>	<b>00</b> (----)	<b>00</b> (----)	<b>02</b> (0.67)	<b>00</b> (----)	<b>02</b> (2.53)	<b>04</b> (0.42)
<b>Total</b>	<b>256</b>	<b>124</b>	<b>298</b>	<b>188</b>	<b>79</b>	<b>945</b>

Chi-Square Calculated Value ( $X^2$ )= 33.52,  
Degree of freedom = 12.0  
and p value = 0.0008 ( $\leq 0.05$  significant)  
Chi-square Critical Value (Tabulated Value) = 21.02

Source: Primary Data (Figures within parenthesis are %age)

The table 5.19 (a) shows the purpose of using e-resources under UGC-Infonet DLC. In **PU-C** the majority of 60.94% scholars used the facility for study and research work followed by 21.09% used to update subject knowledge, 17.97% used for publishing articles. In **GNDU-A**, the majority of 41.94% scholars used for study and research work followed by 33.87% used to update subject knowledge, 24.19% used for publishing articles. In **PU-P** the majority of 57.72% scholars used for study and research work followed by 22.15% used for publishing articles, 19.46% used to update subject knowledge and only 0.67% used for any other purpose. In **TU-P** the majority of 48.94% scholars used for study and research work followed by 29.79% used to update subject knowledge, 21.28% used for publishing articles. In **CUP-B** the majority of 44.30% scholars used for study and research work followed by 29.11% used to update subject knowledge, 24.05% used for publishing articles and only 2.53% used for any other purpose. The analysis reveals that majority of the scholars, i.e. **PU-C, GNDU-A, PU-P, TU-P** and **CUP-B** use e-journals for study and research work.

The above data shows that the majority of scholars, 53.65% scholars use the facility for the purpose of the study and research work followed by 24.66% used to update subject knowledge, 21.27% used for publishing articles and only 0.42% used for any other purpose.

The above data was analyzed using the Chi-Square test. The results found that the significant variation with regard to scholars purpose of using UGC-Infonet Digital Library Consortium. The results of chi-square test indicated that the **Chi-Square Calculated Value** ( $X^2$ )= **33.52**, which is greater than its chi-square tabulated value.

### **5.5.2 (b) Reason for non-usage of UGC-Infonet DLC**

In response to the scholar's reason for not using UGC-Infonet DLC, the following observations were recorded.

**Table: 5.19 (b) Reason for non-usage of UGC-Infonet DLC**

Reason for non-usage of UGC-Infonet DLC	UNIVERSITIES					Grand Total
	PU-C	GNDU-A	PU-P	TU-P	CUP-B	
UGC-Infonet not accessible in department	08 (7.14)	04 (7.27)	12 (14.63)	03 (5.45)	00 (----)	27 (8.63)
Prefer reading print journals	16 (14.29)	20 (36.36)	14 (17.07)	07 (12.73)	01 (11.11)	58 (18.53)
Technical difficulties in using online journals	00 (----)	05 (9.09)	00 (----)	03 (5.45)	01 (11.11)	09 (2.88)
Lack of relevant information sources	16 (14.29)	04 (7.27)	10 (12.20)	10 (18.18)	00 (----)	40 (12.78)
No journal related to my field of research	02 (1.79)	04 (7.27)	00 (----)	01 (1.82)	00 (----)	07 (2.24)
Lack of knowledge to use	60 (53.57)	16 (29.09)	44 (53.66)	24 (43.64)	04 (44.44)	148 (47.28)
Any other	10 (8.93)	02 (3.64)	02 (2.44)	07 (12.73)	03 (33.33)	24 (7.67)
<b>Total</b>	<b>112</b>	<b>55</b>	<b>82</b>	<b>55</b>	<b>09</b>	<b>313</b>
Chi-Square Calculated Value ( $X^2$ )= 36.41, Degree of freedom = 24.0 and p value = 1.06 E-05 ( $\leq 0.05$ significant) Chi-square Critical Value (Tabulated Value) = 36.41						

Source: Primary Data (Figures within parenthesis are %age)

The table 5.19 (b) shows the reason for not using UGC-Infonet DLC. In **PU-C**, the highest number of scholars, that is, 53.57% do not use due to lack of knowledge to use followed by 14.29% due to prefer reading print journals and due to lack of relevant information sources equally, 8.93% due to any other reason and 07.14% due to non-accessibility of UGC-Infonet DLC in the department, 1.79% due to no journal available related to their field of research. In **GNDU-A**, the highest number of scholars, that is, 36.36% scholars do not use due to prefer reading print journals followed by 29.09% due to lack of knowledge to use, 9.09% due to technical difficulties in using online journals, 07.27% due to non-accessibility of UGC-Infonet DLC in the department, due to lack of relevant information sources do not use, and due to no journal available related to their field of research equally and 3.64% due to any other reason. In **PU-P**, the highest number of scholars, that is, 53.66% do not use due to lack of knowledge to use followed by 17.07% due to prefer reading print journals, 14.63% due to non-accessibility of UGC-Infonet DLC in the department, 12.20%

due to lack of relevant information sources, 02.44% due to any other reason. In **TU-P**, the highest number of scholars, that is, 43.64% do not use due to lack of knowledge to use followed by 18.18% due to lack of relevant information sources, 12.73% due to prefer reading print journals and due to any other reason equally, 5.45% due to non-accessibility of UGC-Infonet DLC in the department and due to technical difficulties in using online journals do not use the consortium equally and only 1.82% due to no journal available related to their field of research. In **CUP-B**, the highest number of scholars, that is, 44.44% do not use due to lack of knowledge to use followed by 33.33% due to any other reason, 11.11% due to prefer reading print journals, and due to technical difficulties in using online journals equally.

The above data reveal the reason for not using UGC-Infonet DLC by the scholars, highest number is 47.28% due to lack of knowledge to use, 18.53% due to prefer reading print journals, 12.78% due to lack of relevant information sources, 08.63% due to non-accessibility of UGC-Infonet DLC in the department, 07.67% due to any other reason, 2.88% due to technical difficulties in using online journals and 2.24% due to no journal available related to their field of research.

The research observations vindicated earlier studies that prior orientation of the users is essential to foster better usage practices. As per the recent study of the American Library Association, information literacy across users could be interpreted as the user's skills or capabilities that help the users to identify their information requirements effectively and securely without external assistance. The interpretation of the emerging Computing skills of research scholars has remained an unexplored construct in the library and information sciences research ((Tuominen, Savolainen & Taliija, 2005: Bates, 2010).

The research across British libraries vindicated the crucial role of the library management in impacting the e-resource usage efficiency in a post digitalization era

(LIBRARY, British, 2012). The use of e-resources in libraries is not limited to developed economies, as emerging economies like India is also on the similar roadmap for unleashing the power of technology in library and information management (Reddy, 2004). The Indian libraries and the staff have been observed to be under a fix over the content and context of user awareness programs and their successful implementation (Reddy, 2004).

The above data was analyzed using the Chi-Square test. The results found that the significant variation with regard to scholar's reason for not using UGC-Infonet DLC. The results of chi-square test indicated that the **Chi-Square Calculated Value ( $X^2$ )= 36.41**, which is equal to chi-square tabulated value.

### 5.5.3 Scholars awareness of e-resources available under UGC-Infonet DLC

The scholars were asked to specify the awareness of e-resources available under UGC-Infonet DLC as illustrated below.

**Table: 5.20 Scholars awareness of e-resources available under UGC-Infonet DLC**

E-resources	UNIVERSITIES					Grand Total
	PU-C	GNDU-A	PU-P	TU-P	CUP-B	
<b>e-journals</b>	<b>152</b> (36.54)	<b>85</b> (36.80)	<b>144</b> (36.18)	<b>78</b> (31.84)	<b>28</b> (27.45)	<b>487</b> (34.99)
<b>e-books</b>	<b>82</b> (19.71)	<b>51</b> (22.08)	<b>72</b> (18.09)	<b>47</b> (19.18)	<b>17</b> (16.67)	<b>269</b> (19.32)
<b>Full text e-resources</b>	<b>82</b> (19.71)	<b>37</b> (16.02)	<b>78</b> (19.60)	<b>43</b> (17.55)	<b>18</b> (17.65)	<b>258</b> (18.53)
<b>Open Access resources</b>	<b>52</b> (12.50)	<b>41</b> (17.75)	<b>80</b> (20.10)	<b>55</b> (22.45)	<b>26</b> (25.49)	<b>254</b> (18.25)
<b>Bibliographic databases</b>	<b>48</b> (11.54)	<b>17</b> (7.36)	<b>24</b> (6.03)	<b>22</b> (8.98)	<b>13</b> (12.75)	<b>124</b> (8.91)
<b>Total</b>	<b>416</b>	<b>231</b>	<b>398</b>	<b>245</b>	<b>102</b>	<b>1392</b>
<b>Chi-Square Calculated Value (<math>X^2</math>)= 29.01,</b> <b>Degree of freedom = 16.0</b> <b>and p value = 0.023 (<math>\leq 0.05</math> significant)</b> <b>Chi-square Critical Value (Tabulated Value) = 26.296</b>						

Source: Primary Data (Figures within parenthesis are %age)

The table 5.20 that shows awareness of e-resources available under UGC-Infonet DLC. It was found that 36.54% scholars of **PU-C**, 36.80% scholars of **GNDU-A**, 36.18% scholars of **PU-P**, 31.84% scholars of **TU-P** and 27.45% scholars of **CUP-B** are aware of e-journals. Whereas, 19.71% scholars of **PU-C**, 22.08% scholars of **GNDU-A**, 18.09% scholars of **PU-P**, 19.18% scholars in **TU-P** and 16.67% scholars in **CUP-B** are aware of e-books. While 19.71% scholars of **PU-C**, 16.02% scholars of **GNDU-A**, 19.60% scholars of **PU-P**, 17.55% scholars of **TU-P** and 17.65% scholars of **CUP-B** are aware of full text e-resources.

It also indicates that 12.50% scholars of **PU-C**, 17.75% scholars of **GNDU-A**, 20.10% scholars of **PU-P**, 22.45% scholars of **TU-P** and 25.49% scholars of **CUP-B** are aware of open access resources. While 11.54% scholars of **PU-C**, 7.36% scholars of **GNDU-A**, 6.03% scholars of **PU-P**, 8.98% scholars of **TU-P** and 12.75% scholars of **CUP-B** are aware of the full bibliographic database.

The above data depicts that the highest number of 34.99% scholars aware of e-journals followed by 19.32% aware of e-books, 18.53% aware of full text e-resources, 18.25% aware of open access resources and 8.91% aware of bibliographic databases. It is found that the e-journals and e-books are the most accessed resources by the scholars in their University libraries of Punjab.

The earlier studies also vindicated the prominent role of the scholars in shaping the overall research and library usage trends across India and the world (Chauhan & Mahajan, 2014). The high incidence of respondent's awareness with regard to the availability of e-journals across the modern technology platforms and the digital consortia in other ways point towards an era of online collaboration of knowledge that is unstoppable in the near future. The library science studies in the near future in Indian context will need to emphasize the

consideration of the user's consideration for e-journals for sustainable library and infrastructure usage (Pandita & Singh, 2016).

The above data was analyzed using Chi-Square test. The results found that the significant variation with regard to scholar's awareness of e-resources available under the UGC-Infonet DLC. The results of chi square test indicated that the **Chi-Square Calculated Value ( $X^2$ ) = 29.01**, which is greater than its chi-square tabulated value.

### 5.5.3 (a) Commonly accessed e-journals under UGC-Infonet DLC

The responses to a scholar's choice of commonly accessed e journals are shown here:

**Table: 5.20 (a) Commonly accessed e-journals under UGC-Infonet DLC**

Publishers	UNIVERSITES					Total
	PU-C	GNDU-A	PU-P	TU-P	CUP-B	
American Chemical Society	11 (4.45)	09 (4.46)	10 (3.22)	07 (4.29)	04 (5.00)	41 (4.09)
American Institute of Physics	12 (4.86)	08 (3.96)	11 (3.54)	06 (3.68)	03 (3.75)	40 (3.99)
American Physical Society	10 (4.05)	06 (2.97)	10 (3.22)	07 (4.29)	05 (6.25)	38 (3.79)
Annual Reviews	05 (2.02)	04 (1.98)	06 (1.93)	04 (2.45)	02 (2.50)	21 (2.09)
Cambridge University Press	06 (2.43)	05 (2.48)	08 (2.57)	05 (3.07)	03 (3.75)	27 (2.69)
Economic & Political Weekly	13 (5.26)	12 (5.94)	11 (3.54)	10 (6.13)	05 (6.25)	51 (5.08)
Emerald	22 (8.91)	30 (14.85)	21 (6.75)	09 (5.52)	04 (5.00)	86 (8.57)
Institute of Physics	11 (4.45)	08 (3.96)	15 (4.82)	08 (4.91)	03 (3.75)	45 (4.49)
JCCC	10 (4.05)	11 (5.45)	14 (4.50)	06 (3.68)	04 (5.00)	45 (4.49)
JSTOR	24 (9.72)	12 (5.94)	23 (7.40)	10 (6.13)	05 (6.25)	74 (7.38)
Oxford University Press	16 (6.48)	12 (5.94)	17 (5.47)	10 (6.13)	04 (5.00)	59 (5.88)
Project Euclid	08 (3.24)	05 (2.48)	08 (2.57)	04 (2.45)	02 (2.50)	27 (2.69)
Royal Society of Chemistry	22 (8.91)	21 (10.40)	25 (8.04)	10 (6.13)	06 (7.50)	84 (8.37)
Science Direct (10 Subject Collection)	14 (5.67)	06 (2.97)	40 (12.86)	19 (11.66)	10 (12.50)	89 (8.87)
Springer Link	20 (8.10)	16 (7.92)	26 (8.36)	12 (7.36)	07 (8.75)	81 (8.08)
Taylor & Francis	16 (6.48)	10 (4.95)	14 (4.50)	09 (5.52)	04 (5.00)	53 (5.28)
Project Muse	02	02	01	03	02	10

	(0.81)	(0.99)	(0.32)	(1.84)	(2.50)	(1.00)
<b>Web of Science</b>	<b>04</b> (1.62)	<b>03</b> (1.49)	<b>05</b> (1.61)	<b>02</b> (1.23)	<b>01</b> (1.25)	<b>15</b> (1.50)
<b>Wiley-Blackwell</b>	<b>15</b> (6.07)	<b>06</b> (2.97)	<b>14</b> (4.50)	<b>07</b> (4.29)	<b>04</b> (5.00)	<b>46</b> (4.59)
<b>Others</b>	<b>06</b> (2.43)	<b>16</b> (7.92)	<b>32</b> (10.29)	<b>15</b> (9.20)	<b>02</b> (2.50)	<b>71</b> (7.08)
<b>Total</b>	<b>247</b>	<b>202</b>	<b>311</b>	<b>163</b>	<b>80</b>	<b>1003</b>
<b>Chi-Square Calculated Value (<math>X^2</math>)= 70.16,</b> <b>Degree of freedom = 76.0</b> <b>and p value = 0.667 (<math>\geq 0.05</math> non-significant)</b> <b>Chi-square Critical Value (Tabulated Value) = 97.35</b>						

Source: Primary Data (Figures within parenthesis are %age)

The table 5.20(a) shows the various e-resources accessed through UGC-Infonet DLC is published by different publishers which are frequently used by Scholars. It is observed that a majority of 8.87% scholars prefer Science Direct followed by 8.57% preferred Emerald, 8.37% preferred Royal Society of Chemistry, 8.08% preferred Springer Link and 7.08% prefer other Publishers whereas very few 1.00% preferred Project Muse.

The above data was analyzed using the **Chi-Square test**. The results found that the non-significant variation with regard to scholars commonly accessed e-journals under UGC-Infonet DLC. The results of chi-square test indicated that the **Chi-Square Calculated Value ( $X^2$ ) = 70.16**, which is smaller than chi-square tabulated value.

#### 5.5.4 Scholars frequency of accessing UGC-Infonet DLC

A question was asked to the scholars to know their frequency of accessing UGC-Infonet DLC. The replies given by them are shown here:

**Table: 5.21 Scholars frequency of accessing UGC-Infonet DLC**

Frequency	UNIVERSITIES					Grand Total
	PU-C	GNDU-A	PU-P	TU-P	CU-B	
<b>Daily</b>	<b>42</b> (23.86)	<b>26</b> (26.80)	<b>48</b> (25.53)	<b>35</b> (37.63)	<b>22</b> (61.11)	<b>173</b> (29.32)
<b>Weekly</b>	<b>68</b> (38.64)	<b>38</b> (39.18)	<b>52</b> (27.66)	<b>21</b> (22.58)	<b>07</b> (19.44)	<b>186</b> (31.53)
<b>Monthly</b>	<b>62</b> (35.23)	<b>25</b> (25.77)	<b>76</b> (40.43)	<b>33</b> (35.48)	<b>06</b> (16.67)	<b>202</b> (34.24)
<b>Occasionally</b>	<b>04</b> (2.27)	<b>08</b> (8.25)	<b>12</b> (6.38)	<b>04</b> (4.30)	<b>01</b> (2.78)	<b>29</b> (4.91)
<b>Total</b>	<b>176</b>	<b>97</b>	<b>188</b>	<b>93</b>	<b>36</b>	<b>590</b>
Chi-Square Calculated Value ( $X^2$ )= 40.45, Degree of freedom = 12.0 and p value = 0.0001 ( $\leq 0.05$ significant) Chi-square Critical Value (Tabulated Value) = 21.02						

Source: Primary Data (Figures within parenthesis are %age)

The table 5.21 shows the frequency of accessing UGC-Infonet DLC. In **PU-C** the majority of 38.64% scholars access on a weekly followed by 35.23% access on a monthly, 23.86% access daily and very few 2.27% access occasionally. In **GNDU-A**, the majority of 39.18% scholars access on a weekly followed by 26.80% access daily, 25.77% access on a monthly and 08% access occasionally. In **PU-P** the majority of 40.43% scholars access on a monthly basis, followed by 27.66% accessing on a weekly basis, 25.53% accessing the same on a daily basis and 6.38% accessing occasionally. In **TU-P** a majority of 37.63% scholars access on daily, followed by 35.48% accessing it monthly, 22.58% accessing the facility on a weekly basis and 4.30% accessing occasionally. In **CUP-B** the majority of 61.11% scholars accessed the facility on daily, followed by 19.44% accessing on a weekly, 16.67% accessing every month and 2.78% accessing only occasionally.

The above data depicts that the most significant percentage of the scholars, that is, 34.24% access UGC-Infonet DLC on a monthly basis, whereas 31.53% access weekly, 29.32% access daily and 4.91% access occasionally.

In the context of UGC-Infonet DLC usage, the trends and early indicators from this research are disturbing for the academic literature. The lesser tendency of the scholars for

daily usage of the facility points towards the challenges or the barriers that exist either across the scholars side or the service provider's side. Another viable inference is with regard to the seriousness of the scholars with regard to the library facilities.

The above data was analyzed using the Chi-Square test. The results found that the significant variation with regard to scholars frequency of accessing UGC-INFONET DLC. The results of chi-square test indicated that the **Chi-Square Calculated Value ( $X^2$ )= 40.45**, which is greater than its chi-square tabulated value.

### 5.5.5 Number of journals accessed under UGC Infonet DLC

In response to a question regarding a number of journals accessing under UGC Infonet DLC, the following variations were observed:

**Table: 5.22 Number of journals accessed under UGC Infonet DLC**

Access	UNIVERSITIES					Grand Total
	PU-C	GNDU-A	PU-P	TU-P	CUP-B	
Less than 5 journals	130 (74.71)	71 (73.20)	130 (69.15)	63 (67.74)	24 (66.67)	418 (71.09)
6-10 journals	36 (20.69)	13 (13.40)	46 (24.47)	18 (19.35)	08 (22.22)	121 (20.58)
More than 10 journals	08 (4.60)	13 (13.40)	12 (6.38)	12 (12.90)	04 (11.11)	49 (8.33)
Total	174	97	188	93	36	588
Chi-Square Calculated Value ( $X^2$ )= 14.08, Degree of freedom = 8.0 and p value = 0.0797 ( $\geq 0.05$ non-significant) Chi-square Critical Value (Tabulated Value) = 15.50						

Source: Primary Data (Figures within parenthesis are %age)

The table 5.22 shows the number of journals available under UGC Infonet Digital Library Consortium accessed by the Scholars. In **PU-C** the majority of 74.71% scholars access less than 5 journals followed by 20.69% access 6-10 journals and 4.60% access more than 10 journals. In **GNDU-A**, the majority of 73.20% scholars access less than 5 journals followed by 13.40% access 6-10 journals and 13.40% access more than 10 journals. In **PU-P** the majority of 69.15% scholars access less than 5 journals followed by 24.27% access 6-10

journals and 6.38% access more than 10 journals. In **TU-P** the majority of 67.74% scholars access less than 5 journals followed by 19.35% access 6-10 journals and 12.90% access more than 10 journals. In **CUP-B** the majority of 66.67% scholars access less than 5 journals followed by 22.22% access 6-10 journals and 11.11% access more than 10 journals.

The above data shows that the highest percentage of the scholars, that is, 71.09% access less than 5 journals, 20.58% access 6-10 journals, 8.33% access less than more than 10 journals.

The above data was analyzed using the Chi-Square test. The results found that the non-significant variation with regard to a number of journals accessed under UGC Infonet DLC. The results of chi-square test indicated that the **Chi-Square Calculated Value ( $X^2$ )= 14.08**, which is smaller than chi-square tabulated value.

## 5.6 Usage pattern of e-resources available under UGC- Infonet DLC

### 5.6.1 Scholars preferred mode of accessing e-resources

In response to the scholars preferred mode of accessing the collection of e-resources, these responses figured out.

Table: 5.23 Scholars preferred mode of accessing e-resources

Access	UNIVERSITIES					Grand Total
	PU-C	GNDU-A	PU-P	TU-P	CUP-B	
Searching	26 (14.77)	21 (21.65)	34 (18.09)	22 (23.66)	10 (27.78)	113 (19.15)
Browsing	22 (12.50)	13 (13.40)	18 (9.57)	07 (7.53)	01 (2.78)	61 (10.34)
Both	128 (72.73)	63 (64.95)	136 (72.34)	64 (68.82)	25 (69.44)	416 (70.51)
Total	176	97	188	93	36	590
Chi-Square Calculated Value ( $X^2$ )= 9.74, Degree of freedom = 8.0 and p value = 0.283 ( $\geq 0.05$ non-significant) Chi-square Critical Value (Tabulated Value) = 15.50						

Source: Primary Data

(Figures within parenthesis are %age)

The table 5.23 shows the scholars with regard to their access of e-resource available in UGC-Infonet DLC. In case of **PU-C**, the highest number of scholars, that is, 72.73% access

through both (searching and browsing) options, 14.77% preferred searching option and 12.50% preferred browsing option. In case of **GNDU-A**, the highest number of scholars, that is, 64.95% access through both (searching and browsing) options, 21.65% preferred searching option and 13.40% preferred browsing option. In case of **PU-P**, the highest number of scholars, that is, 72.34% access through both (searching and browsing) options, 18.09% preferred searching option and 9.57% preferred browsing option. In case of **TU-P**, the highest number of scholars, that is, 68.82% access through both (searching and browsing) options, 23.66% preferred searching option and 7.53% preferred browsing option. In the case of **CUP-B**, the highest number of scholars, that is, 69.44% access through both (searching and browsing) options, 27.78% preferred searching option and 2.78% preferred browsing option.

The above data inferred that the University Libraries of Punjab, a majority of 70.51% scholars preferred both (searching and browsing) option, followed 19.15% preferred searching option, 10.34% preferred browsing option.

The above data was analyzed using the Chi-Square test. The results found that the non-significant variation with regard to mode of accessing e-resources. The results of chi-square test indicated that the **Chi-Square Calculated Value ( $X^2$ )= 9.74**, which is smaller than chi-square tabulated value.

### **5.6.2 Scholars general searching approach in accessing e-resources**

In response to the question regarding scholars general searching approach, these responses filtered out.

**Table: 5.24 Scholars general searching approach in accessing e-resources**

Searching Approach	UNIVERSITIES					Grand Total
	PU-C	GNDU-A	PU-P	TU-P	CUP-B	
<b>Author</b>	<b>60</b> (21.73)	<b>40</b> (24.69)	<b>78</b> (24.22)	<b>43</b> (25.60)	<b>11</b> (17.74)	<b>232</b> (23.43)
<b>Article Title</b>	<b>98</b> (35.50)	<b>64</b> (39.51)	<b>128</b> (39.75)	<b>59</b> (35.11)	<b>24</b> (38.71)	<b>373</b> (37.68)
<b>Keywords</b>	<b>106</b> (38.40)	<b>54</b> (33.33)	<b>114</b> (35.40)	<b>63</b> (37.50)	<b>26</b> (41.94)	<b>363</b> (36.67)
<b>Any other</b>	<b>12</b> (4.34)	<b>04</b> (2.47)	<b>02</b> (0.62)	<b>03</b> (1.79)	<b>01</b> (1.61)	<b>22</b> (2.22)
<b>Total</b>	<b>276</b>	<b>162</b>	<b>322</b>	<b>168</b>	<b>62</b>	<b>990</b>
Chi-Square Calculated Value ( $X^2$ )= 13.87, Degree of freedom = 12.0 and p value = 0.309 ( $\geq 0.05$ non-significant) Chi-square Critical Value (Tabulated Value) = 21.02						

Source: Primary Data (Figures within parenthesis are %age)

The table 5.24 shows the scholars with regard to their searching approach. It concludes that the 21.73% scholars of **PU-C**, 24.69% scholars of **GNDU-A**, 24.22% scholars of **PU-P**, 25.60% scholars of **TU-P** and 17.74% scholars of **CUP-B** searched through Author. 35.50% scholars of **PU-C**, 39.51% scholars of **GNDU-A**, 39.75% scholars of **PU-P**, 35.11% scholars of **TU-P** and 38.71% scholars of **CUP-B** searched through article title. Even though 38.40% scholars of **PU-C**, 33.33% scholars of **GNDU-A**, 35.40% scholars of **PU-P**, 37.50% scholars of **TU-P** and 41.94% scholars of **CUP-B** search by Keywords. However, modest 4.34% scholars of **PU-C**, 2.47% scholars of **GNDU-A**, 0.62% scholars of **PU-P**, 1.79% scholars of **TU-P** and 1.61% scholars of **CUP-B**, use any other method.

The above data shows regarding searching approach used for UGC-Infonet DLC of all the 5 Universities of Punjab. The highest 37.68% scholars search by inserting the name of the title of the article. This is followed by 36.67% scholars who use keywords search, 23.43% scholars use author approach and 2.22% scholars use any other searching approach.

The above data was analyzed using the Chi-Square test. The results found that the non-significant variation with regard to scholars general searching approach in UGC-Infonet DLC. The results of chi-square test indicated that the **Chi-Square Calculated Value ( $X^2$ )= 13.87**, which is smaller than chi-square tabulated value.

### 5.6.3 Scholars general browsing approach in accessing e-resources

In response to the question regarding the scholars general browsing approach of e-resources available under the following variations were observed:

**Table: 5.25 Scholars general browsing approach in accessing e-resources**

Browsing Approach	UNIVERSITIES					Grand Total
	PU-C	GNDU-A	PU-P	TU-P	CUP-B	
<b>Journal title</b>	<b>138</b> (51.88)	<b>69</b> (44.23)	<b>146</b> (45.91)	<b>76</b> (50.33)	<b>37</b> (48.05)	<b>466</b> (48.14)
<b>Date of Publication</b>	<b>26</b> (9.77)	<b>22</b> (14.10)	<b>48</b> (15.09)	<b>16</b> (10.60)	<b>13</b> (16.88)	<b>125</b> (12.91)
<b>Table of content</b>	<b>20</b> (7.52)	<b>14</b> (8.97)	<b>32</b> (10.06)	<b>10</b> (6.62)	<b>07</b> (9.09)	<b>83</b> (8.57)
<b>Author</b>	<b>76</b> (28.57)	<b>50</b> (32.05)	<b>92</b> (28.93)	<b>42</b> (27.81)	<b>18</b> (23.38)	<b>278</b> (28.72)
<b>Any other</b>	<b>06</b> (2.26)	<b>01</b> (0.64)	<b>00</b> (-----)	<b>07</b> (4.64)	<b>02</b> (2.60)	<b>16</b> (1.65)
<b>Total</b>	266	156	318	151	77	968
Chi-Square Calculated Value ( $X^2$ )= 25.35, Degree of freedom = 16.0 and p value = 0.063 ( $\geq .05$ non-significant) Chi-square Critical Value (Tabulated Value) = 26.296						

Source: Primary Data (Figures within parenthesis are %age)

The table 5.25 indicates respondents with regard to their browsing approach. It portrays that 51.88% scholars of **PU-C**, 44.23% scholars of **GNDU-A**, 45.91% scholars of **PU-P**, 50.33% scholars of **TU-P** and 48.05% scholars of **CUP-B** search by journal title. Even though 9.77% scholars of **PU-C**, 14.10% scholars of **GNDU-A**, 15.09% scholars of **PU-P**, 10.60% scholars of **TU-P** and 16.88% scholars of **CUP-B** search by date of publication. It

show that 7.52% scholars of **PU-C**, 8.97% scholars of **GNDU-A**, 10.06% scholars of **PU-P**, 6.62% scholars of **TU-P** and 9.09% scholars of **CUP-B** search by table of contents. The table demonstrate 28.57% scholars of **PU-C**, 32.05% scholars of **GNDU-A**, 28.93% scholars of **PU-P**, 27.81% scholars of **TU-P** and 23.38% scholars of **CUP-B** search by author. However, modest 2.26% scholars of **PU-C**, 0.64% scholars of **GNDU-A**, 4.64% scholars of **TU-P** and 2.60% scholars of **CUP-B** use any other method.

The above data summarize response regarding browsing approach used for UGC-Infonet DLC of the selected 5 Universities of Punjab. 48.14% scholars preferred journal title search which is the highest. This is followed by 28.72% scholars use author approach, 12.91% scholars use date of Publication to search, 8.57% scholars use table of contents and 1.65% scholars use any other approach.

The above data was analyzed using the Chi-Square test. The results found that the non-significant variation with regard to scholars general browsing approach in UGC Infonet DLC. The results of chi-square test indicated that the **Chi-Square Calculated Value ( $X^2$ )= 25.35**, which is smaller than chi-square tabulated value.

#### **5.6.4 Scholars search techniques to find e-resources**

In response to the question regarding the commonly used search techniques, the responses to the question were monitored.

**Table: 5.26 Scholars search techniques to find e-resources**

Search techniques	UNIVERSITIES					Grand Total
	PU-C	GNDU-A	PU-P	TU-P	CUP-B	
<b>Simple Search</b>	<b>148</b> (59.68)	<b>86</b> (72.88)	<b>164</b> (69.49)	<b>74</b> (59.68)	<b>36</b> (57.14)	<b>508</b> (64.39)
<b>Boolean</b>	<b>26</b> (10.48)	<b>09</b> (7.63)	<b>12</b> (5.08)	<b>20</b> (16.13)	<b>07</b> (11.11)	<b>74</b> (9.38)
<b>Truncation</b>	<b>06</b> (2.42)	<b>00</b> (-----)	<b>00</b> (-----)	<b>02</b> (1.61)	<b>02</b> (3.17)	<b>10</b> (1.27)
<b>Phrases</b>	<b>28</b> (11.29)	<b>05</b> (4.24)	<b>10</b> (4.24)	<b>10</b> (8.06)	<b>09</b> (14.29)	<b>62</b> (7.86)
<b>Field Searching</b>	<b>38</b> (15.32)	<b>18</b> (15.25)	<b>48</b> (20.34)	<b>18</b> (14.52)	<b>09</b> (14.29)	<b>131</b> (16.60)
<b>Any other</b>	<b>02</b> (0.81)	<b>00</b> (-----)	<b>02</b> (0.85)	<b>00</b> (-----)	<b>00</b> (-----)	<b>04</b> (0.51)
<b>Total</b>	<b>248</b>	<b>118</b>	<b>236</b>	<b>124</b>	<b>63</b>	<b>789</b>
<b>Chi-Square Calculated Value (<math>X^2</math>)= 43.01,</b> <b>Degree of freedom = 20.0</b> <b>and p value = 0.002 (<math>\leq 0.05</math> significant)</b> <b>Chi-square Critical Value (Tabulated Value) = 31.41</b>						

Source: Primary Data (Figures within parenthesis are %age)

There are different search techniques are commonly applied by the scholars to search the existing databases for one's field of interest. The most significant and often the most intricate aspect of search is advanced search strategy. The search techniques used to find e-resources has been presented in table 5.26, which demonstrates that in case of **PU-C**, a majority of 59.68% scholars use the simple search, followed by 15.32% scholars use field searching, 11.29% scholars use phrases, 10.48% scholars use Boolean, 2.42% scholars use truncation and 0.81% scholars use any other approach. In **GNDU-A**, simple search is the most preferred search technique used to find e-resources i.e. 72.88% followed by 15.25% scholars use field searching, 07.63% scholars use Boolean and 04.24% scholars use phrases.

As regards to **PU-P**, the highest number of scholars, that is, 69.49% use simple search followed by 20.34% scholars use field searching, 5.08 % scholars use Boolean, 4.24% scholars use phrases and 0.85% scholars use any other search technique to find e-resources.

In case of **TU-P**, 59.68% scholars use simple search which is the highest, 16.13% scholars use Boolean, 14.52% scholars use field searching, 8.06% scholars use phrases and 1.61% uses truncation approach. In **CUP-B**, majority of 57.14% scholars use simple search, 14.29% scholars use field searching use phrases, 11.11% scholars use Boolean and 3.17% scholars use truncation approach.

After the data analysis, it is found that scholars in **PU-C, GNDU-A, PU-P, TU-P** and **CU-B** consider simple search as the most popular technique for retrieving journal articles whereas truncation is the least preferred method among the **PU-C, GNDU-A, PU-P, TU-P** and **CUP-B**.

The above data summarizes response of the scholars regarding search techniques used to find e-resources under UGC-Infonet DLC of the selected 5 universities of Punjab. 64.39% scholars preferred simple search which is the highest. This is followed by 16.60% scholars who use field searching approach, 9.38% scholars use Boolean, 7.86% scholars use phrases, 1.27 % scholars use truncation and 0.51% scholars use any other approach.

The above data was analyzed using the Chi-Square test. The results found that the significant variation with regard to search techniques to find e-resources. The results of chi-square test indicated that the **Chi-Square Calculated Value ( $X^2$ )= 43.01**, which is greater than chi-square tabulated value.

#### **5.6.5 Devices used for access of e-resources**

With regard to the diversity of devices being used by scholars for accessing e-resources, these responses were observed:

**Table: 5.27 Devices used for access of e-resources**

Device used for reading full text	UNIVERSITIES					Grand Total
	PU-C	GNDU-A	PU-P	TU-P	CUP-B	
<b>Laptop</b>	<b>162</b> (61.36)	<b>83</b> (55.70)	<b>172</b> (65.65)	<b>88</b> (64.23)	<b>42</b> (53.16)	<b>547</b> (61.39)
<b>Desktop</b>	<b>60</b> (22.73)	<b>44</b> (29.53)	<b>62</b> (23.66)	<b>35</b> (25.55)	<b>25</b> (31.65)	<b>226</b> (25.36)
<b>Mobile</b>	<b>36</b> (13.64)	<b>20</b> (13.42)	<b>26</b> (9.92)	<b>12</b> (8.76)	<b>11</b> (13.92)	<b>105</b> (11.78)
<b>I-pad</b>	<b>06</b> (2.27)	<b>02</b> (1.34)	<b>02</b> (0.76)	<b>02</b> (1.46)	<b>01</b> (1.27)	<b>13</b> (1.46)
<b>Any other</b>	<b>00</b> (-----)	<b>00</b> (-----)	<b>00</b> (-----)	<b>00</b> (-----)	<b>00</b> (-----)	<b>00</b> (-----)
<b>Total</b>	<b>264</b>	<b>149</b>	<b>262</b>	<b>137</b>	<b>79</b>	<b>891</b>
<b>Chi-Square Calculated Value (<math>X^2</math>)= 11.23,</b> <b>Degree of freedom = 12.0</b> <b>and p value = 0.5092 (<math>\geq 0.05</math> non-significant)</b> <b>Chi-square Critical Value (Tabulated Value) = 21.02</b>						

**Source: Primary Data (Figures within parenthesis are %age)**

The table 5.27 shows the devices used for accessing e-resources by the scholars. In **PU-C**, a large number of scholars i.e. 61.36% use laptops to read e-resources, followed by (22.73%) use desktops, 13.64% use mobiles and very few 2.27% use I-pads. In **GNDU-A**, a large number of scholars i.e. 55.70% use laptops to read e-resources, followed by 29.53% use desktops, 13.42% use mobiles and very few 1.34% use I-pads. In **PU-P**, a large number of scholars i.e. 65.65% use laptops to read e-resources, followed by 23.66% use desktops, 9.92% use mobiles and very few 0.76% use I-pads. In **TU-P**, a large number of scholars i.e. 64.23% use laptops to read e-resources, followed by 25.55% use desktops, 8.76% use mobiles and very few 1.46% use I-pads. In **CUP-B**, a large number of scholars i.e. 53.16% use laptops to read e-resources, followed by 31.65% use desktops, 13.92% use mobiles and very few 1.27% use I-Pads.

The above data shows that majority of scholars, that is, 61.39% use laptops followed 25.36% use desktops, 11.78% use mobiles and 1.46% use I-pads and none of them use any other medium for accessing UGC-Infonet DLC.

The above data was analyzed using the Chi-Square test. The results found that the non-significant variation with regard to diversity of devices used for access of e-resources. The results of chi-square test indicated that the **Chi-Square Calculated Value ( $X^2$ )= 11.23**, which is smaller than chi-square tabulated value.

### 5.6.6 Scholars pattern of reading full-text e-journals

In response to the question regarding the scholars pattern of reading full-text, these responses cropped up:

**Table: 5.28 Scholars pattern of reading full-text e-journals**

pattern of reading full-text journals	UNIVERSITIES					Grand Total
	PU-C	GNDU-A	PU-P	TU-P	CUP-B	
Computer Screen	32 (18.18)	18 (18.56)	38 (20.21)	18 (19.35)	10 (27.78)	116 (19.66)
Printouts	26 (14.77)	17 (17.53)	36 (19.15)	12 (12.90)	05 (13.89)	96 (16.27)
Both (Computer Screen & Print out)	118 (67.05)	62 (63.92)	114 (60.64)	63 (67.74)	21 (58.83)	378 (64.07)
Total	176	97	188	93	36	590
<p><b>Chi-Square Calculated Value (<math>X^2</math>)= 4.53,</b>  <b>Degree of freedom = 8.0</b>  <b>and p value = 0.806 (<math>\geq 0.05</math> non-significant)</b>  <b>Chi-square Critical Value (Tabulated Value) = 15.50</b></p>						

Source: Primary Data (Figures within parenthesis are %age)

The devices used for reading the full text by the scholars are given in the table 5.28. In **PU-C**, a large number of scholars i.e. 67.05% read articles through computer screen and printouts followed by 18.18 read through the computer screen and 14.77% use printouts. In **GNDU-A**, a large number of scholars i.e. 63.92% read articles through the computer screen and printouts, 18.56% use computer screen and 17.53% use printouts. In **PU-P**, a large number of scholars i.e. 60.64% read articles through the computer screen and printouts, 20.21% use computer screen and 19.15% use printouts. In **TU-P**, a large number of scholars i.e. 67.74% read articles through the computer screen and printouts, 19.35% use computer screen and 12.90% use printouts. In **CUP-B**, a large number of respondents i.e. 58.83% read

articles through computer screen and printouts, 27.78% use computer screen and 13.89% use printouts.

It is observed from the above data, that among all respondents of selected five University of Punjab, a large number i.e. 64.07% scholars read e-resources by using both computer screen and printouts, followed by 19.66% read through the computer screen and 16.27% read through printouts.

The above data was analyzed using the Chi-Square test. The results found that the non-significant variation with regard to the scholar's pattern of reading full-text e-journals. The results of chi-square test indicated that the **Chi-Square Calculated Value ( $X^2$ )= 4.53**, which is smaller than chi-square tabulated value.

### 5.6.7 The commonly preferred formats to read e-resources

With regard to the question for scholars preferred format of reading e-resources, these replies were observed:

**Table: 5.29 The commonly preferred formats to read e-resources**

Format	UNIVERSITIES					Grand Total
	PU-C	GNDU-A	PU-P	TU-P	CUP-B	
<b>PDF</b>	<b>174</b> (75.00)	<b>93</b> (76.86)	<b>192</b> (83.48)	<b>91</b> (75.83)	<b>45</b> (77.59)	<b>595</b> (78.19)
<b>DOC</b>	<b>28</b> (12.07)	<b>11</b> (9.09)	<b>14</b> (6.09)	<b>15</b> (12.50)	<b>04</b> (6.90)	<b>72</b> (9.46)
<b>PPT</b>	<b>16</b> (6.90)	<b>11</b> (9.09)	<b>14</b> (6.09)	<b>05</b> (4.17)	<b>04</b> (6.90)	<b>50</b> (6.57)
<b>HTML</b>	<b>14</b> (6.03)	<b>06</b> (4.96)	<b>10</b> (4.35)	<b>09</b> (7.50)	<b>05</b> (8.62)	<b>44</b> (5.78)
<b>Any other</b>	<b>00</b> (-----)	<b>00</b> (-----)	<b>00</b> (-----)	<b>00</b> (-----)	<b>00</b> (-----)	<b>00</b> (-----)
<b>Total</b>	<b>232</b>	<b>121</b>	<b>230</b>	<b>120</b>	<b>58</b>	<b>761</b>
Chi-Square Calculated Value ( $X^2$ )= 12.03, Degree of freedom = 12.0 and p value = 0.443 ( $\geq 0.05$ non-significant) Chi-square Critical Value (Tabulated Value) = 21.02						

Source: Primary Data (Figures within parenthesis are %age)

The various formats (PDF, HTML, DOC, and PPT) for reading e-resources are shown in the table 5.29. From the analysis, it is observed that majority of the scholars i.e. 75.00% in **PU-C** preferred PDF followed by 12.07% preferred DOC, 6.90% preferred PPT, 6.03% preferred HTML. In **GNDU-A**, the majority of the 76.86% scholars preferred PDF followed by 9.09% preferred DOC, 9.09% preferred PPT, 4.96% preferred HTML. In **PU-P**, the majority of the 83.48% scholars preferred PDF followed by 6.09% preferred DOC, 6.09% preferred PPT, 4.35% preferred HTML. In **TU-P**, the majority of the 75.83% scholars preferred PDF followed by 12.50% preferred DOC, 7.50% preferred HTML, 4.17% preferred PPT. In **CUP-B**, the majority of the 77.59% scholars preferred PDF followed by 8.62% preferred HTML, 6.90% preferred DOC and PPT equally.

It is observed that a majority of 78.19% scholars prefer PDF format followed by 9.46% preferred DOC, 6.57% preferred PPT, 5.78% preferred HTML. The PDF format is preferred by a large number of scholars because most of the e-journals are easily available in PDF format and the various visualizations like the graphics, charts, images, tables, etc. are clear as compared to the other formats. PDF uses less computer memory and appearance of the original article is maintained.

The above data was analyzed using the Chi-Square test. The results found that the non-significant variation with regard to scholars commonly preferred formats to read e-journals. The results of chi-square test indicated that the **Chi-Square Calculated Value** ( $X^2$ )= **12.03**, which is smaller than chi-square tabulated value.

### **5.6.8 Scholars pattern of using E-resources**

In response to the question regarding the scholars pattern of using e-resources, these responses emerged:.

**Table: 5.30 Scholars pattern of using E-resources**

Pattern of using e-resources	UNIVERSITIES					Grand Total
	PU-C	GNDU-A	PU-P	TU-P	CUP-B	
Read online, download and print	80 (27.97)	50 (32.05)	98 (36.57)	54 (36.24)	27 (36.00)	309 (33.08)
Read Full-text online	68 (23.78)	31 (19.87)	52 (19.40)	40 (26.85)	17 (22.67)	208 (22.27)
Read online and Print	38 (13.29)	28 (17.95)	52 (19.40)	20 (13.42)	12 (16.00)	150 (16.06)
Read Abstract only	48 (16.78)	25 (16.03)	32 (11.94)	16 (10.74)	08 (10.67)	129 (13.81)
Download and print without reading	20 (6.99)	09 (5.77)	18 (6.72)	11 (7.38)	05 (6.67)	63 (6.75)
Download without reading	32 (11.19)	13 (8.33)	16 (5.97)	08 (5.37)	06 (8.00)	75 (8.03)
<b>Total</b>	<b>286</b>	<b>156</b>	<b>268</b>	<b>149</b>	<b>75</b>	<b>934</b>
Chi-Square Calculated Value ( $X^2$ )= 22.51, Degree of freedom = 20.0 and p value = 0.313 ( $\geq 0.05$ non-significant) Chi-square Critical Value (Tabulated Value) = 31.41						

Source: Primary Data (Figures within parenthesis are %age)

The table 5.30 shows the variations across the scholars with regard to their pattern of using e-resources. It is revealed, that in **PU-C** majority of the scholars, that is, 27.97% read online, download and print articles for their research work, followed by 23.78% read full-text online, 16.78% read abstract only, 13.29% read online and print articles, 11.19% download without reading and 6.99% download and print without reading. In **GNDU-A**, the majority of the scholars, that is, 32.05% read online, download and print, 19.87% read full-text online, 17.95% read online and print, 16.03% read abstract only, 8.33% download without reading and 5.77% download and print without reading. In **PU-P**, 36.57% scholars read online, download and print, which is the highest, 19.40% read full-text online, 19.40% read online and print, 11.94% read abstract only, 6.72% download and print without reading and 5.97% download without reading. In **TU-P**, 36.24% scholars read online, download and print, which is the highest, 26.85% read full-text online, 13.42% read online and print, 10.74% read abstract only, 7.38 % download and print without reading and 5.37% download without reading. In **CUP-B**, 36.00% scholars read online, download and print, which is the highest,

22.67% read full-text online, 16.00% read online and print, 10.67% read abstract only, 8.00% download without reading and 6.67 % download and print without reading.

The above data depicts that majority of the scholars of University Libraries of Punjab, that is, 33.08% read online, download and print, 22.27% read full-text online, 16.06 % read online and print, 13.81% read abstract only, 8.03% download without reading and 6.75% download and print without reading.

The above data was analyzed using the Chi-Square test. The results found that the non-significant variation with regard to the scholar's pattern of using e-resources. The results of chi-square test indicated that the **Chi-Square Calculated Value ( $X^2$ )= 22.51**, which is smaller than chi-square tabulated value.

### 5.6.9 Scholars level of satisfaction with the UGC-Infonet DLC interface

In response to the scholar's level of satisfaction with the consortia's interface, following responses were observed:

**Table: 5.31 Scholars level of satisfaction with the UGC-Infonet DLC interface**

Satisfaction	UNIVERSITIES					Grand Total
	PU-C	GNDU-A	PU-P	TU-P	CUP-B	
<b>Satisfied</b>	<b>98</b> (55.68)	<b>58</b> (59.79)	92 (48.94)	<b>42</b> (45.16)	<b>14</b> (38.89)	<b>304</b> (51.53)
<b>Partially satisfied</b>	<b>60</b> (34.09)	<b>35</b> (36.08)	<b>88</b> (46.81)	<b>42</b> (45.16)	<b>19</b> (52.78)	<b>244</b> (41.36)
<b>Unsatisfied</b>	<b>18</b> (10.23)	<b>00</b> (-----)	<b>06</b> (3.19)	<b>00</b> (-----)	<b>00</b> (-----)	<b>24</b> (4.07)
<b>Don't know</b>	<b>00</b> (-----)	<b>04</b> (4.12)	<b>02</b> (1.06)	<b>09</b> (9.68)	<b>03</b> (8.33)	<b>18</b> (3.05)
<b>Total</b>	<b>176</b>	<b>97</b>	<b>188</b>	<b>93</b>	<b>36</b>	<b>590</b>
<b>Chi-Square Calculated Value (<math>X^2</math>)= 60.49,</b> <b>Degree of freedom = 12.0</b> <b>and p value = 1.84E-08 (<math>\leq 0.05</math> significant)</b> <b>Chi-square Critical Value (Tabulated Value) = 21.02</b>						

Source: Primary Data (Figures within parenthesis are %age)

User friendly interface refers to the ease with the use of UGC-Infonet DLC website which can be easily accessed and used by the research scholars. The table 5.31 shows in **PU-C** the majority of the scholars, that is, 55.68% are satisfied with user friendly interface. This is followed by 34.09% are partially satisfied and 10.23% are unsatisfied. In case of **GNDU-A**, the majority of the scholars, that is, 59.79% are satisfied with user friendly interface. This is followed by 36.08% are partially satisfied and 4.12% responded that they don't know. In case of **PU-P**, the majority of the scholars, that is, 48.94% are satisfied with user friendly interface, which is the highest. This is followed by 46.81% are partially satisfied, 3.19% are unsatisfied and 01.06% responded that they don't know. In case of **TU-P** the highest number of scholars, that is, 45.16% are satisfied with user friendly interface. This is followed by 45.16% are partially satisfied, 9.68% responded don't know. In case of **CUP-B** the highest number of scholars, that is, 52.78% are partially satisfied with user friendly interface. This is followed by 38.89% are satisfied and 8.33% respondents favoured" don't know".

Therefore, it can be analyzed from the above table regarding user friendly interface of UGC-Infonet DLC, which reveals that a considerable number of users in **PU-C**, **GNDU-A**, **PU-P**, **TU-P** and **CUP-B** rate that they are satisfied with the user interface and very few scholars from **PU-C** (10.23%) and **PU-P** (3.19%) are unsatisfied with the user interface.

As regards to whole the population of the University Libraries of Punjab, it is observed that 51.52% scholars are satisfied with user friendly interface, which is the highest. This is followed by 41.35% are partially satisfied, 4.06% are unsatisfied and 3.05 responded they don't know.

Akinbobola & Adeleke (2013) observed that the user's prior computer experience in association with the usability of the interface as well as the presence or absence of the supportive management help does impact the user's levels of self-efficacies with regard to

computer access and sustainable usage. In a country like India with substantial digital divides, this computer based self-efficacy of the users could be detrimental in impacting the overall computer usage and hence the usage of the digital repositories like the INFLIBNET and DSPACE (Reddy, 2004).

The user's outcome expectancy was observed to be shaped by the user's levels of computer related self-efficacy in a bigger manner (Akinbobola & Adeleke, 2013). The absence or presence of contextual support factor especially the supportive management at the library premises, was observed to impact the likely outcome instances of computer based digital libraries (Wang, Li & Hsieh, 2013). The partial satisfaction as noticed in the current findings point to the urgent need for revising and reworking the user friendliness of the content and the interfaces through which the facilities are accessed.

The above data was analyzed using the Chi-Square test. The results found that the significant variation with regard to the user's level of Satisfaction with the consortia's interface. The results of chi-square test indicated that the **Chi-Square Calculated Value** ( $X^2$ )= **60.49**, which is greater than chi-square tabulated value.

#### **5.6.10 (a) Satisfaction with the full text e-resources available through UGC-Infonet DLC**

In response to scholar's satisfaction with the full text e-resources available through UGC-Infonet DLC, the following responses were observed:

**Table: 5.32 (a) Satisfaction with available full text e-resources available through UGC-Infonet DLC**

Satisfaction	UNIVERSITIES					Grand Total
	PU-C	GNDU-A	PU-P	TU-P	CUP-B	
<b>Highly Satisfied</b>	<b>32</b> (18.18)	<b>14</b> (14.43)	<b>24</b> (12.77)	<b>15</b> (16.12)	<b>07</b> (19.44)	<b>92</b> (15.59)
<b>Satisfied</b>	<b>110</b> (62.50)	<b>64</b> (65.98)	<b>132</b> (70.21)	<b>55</b> (59.13)	<b>20</b> (55.55)	<b>381</b> (64.58)
<b>Partially Satisfied</b>	<b>28</b> (15.91)	<b>16</b> (16.49)	<b>24</b> (12.77)	<b>21</b> (22.58)	<b>08</b> (22.22)	<b>97</b> (16.44)
<b>Dissatisfied</b>	<b>06</b> (3.41)	<b>03</b> (3.09)	<b>08</b> (4.26)	<b>01</b> (1.07)	<b>01</b> (2.77)	<b>19</b> (3.22)
<b>Highly Dissatisfied</b>	<b>00</b> (-----)	<b>00</b> (-----)	<b>00</b> (-----)	<b>01</b> 1.07	<b>00</b> (-----)	<b>01</b> (0.17)
<b>Total</b>	<b>176</b>	<b>97</b>	<b>188</b>	<b>93</b>	<b>36</b>	<b>590</b>
Chi-Square Calculated Value ( $X^2$ )= 15.90, Degree of freedom = 16.0 and p value = 0.460 ( $\geq 0.05$ non-significant) Chi-square Critical Value (Tabulated Value) = 26.296						

Source: Primary Data (Figures within parenthesis are %age)

The table 5.32 (a) (list of full-text e-resources available under UGC-Infonet DLC is mentioned in Appendix II) shows the respondent satisfaction regarding full-text e-resources. In case of **PU-C** the highest number of scholars, that is, 62.50% are satisfied. This is followed by 18.18% are highly satisfied, 15.91% are partially satisfied, 3.41% are dissatisfied. In case of **GNDU-A**, the highest number of scholars, that is, 65.98% are satisfied, followed by 16.49% partially satisfied, 14.43% are highly Satisfied and 03.09% are dissatisfied. In case of **PU-P** the highest 70.21% scholars are satisfied, followed by 12.77% scholars partially satisfied and highly satisfied equally, and 04.26% are dissatisfied. In case of **TU-P** the highest number of scholars that is, 59.13% are satisfied, followed by 16.12% are highly satisfied, 22.58% are partially satisfied, and 1.08% are dissatisfied and highly dissatisfied equally. In case of **CUP-B** the highest number of scholars, that is, 55.56% are satisfied with full text e-resources, followed by 22.22% are partially satisfied, 19.44% are highly satisfied and 2.78% are dissatisfied.

Therefore, from the above data, it is observed that the level of satisfaction with regard to the full-text e-resources available through UGC-Infonet DLC, the highest number of 64.58% scholars are satisfied, followed by 16.44% are partially satisfied, 15.59% are highly satisfied, 3.22% are dissatisfied and only 0.17% is highly dissatisfied.

The above data was analyzed using Chi-Square test. The results found that the non-significant variation with regard to satisfaction level with available full text e-resources through UGC-Infonet. The results of chi square test indicated that the **Chi-Square Calculated Value ( $X^2$ )= 15.90**, which is smaller than chi-square tabulated value.

#### 5.6.10 (b) Satisfaction regarding Bibliographic database available through UGC-Infonet DLC

The question with regard to scholars satisfaction regarding Bibliographic database evoked these responses:

**Table: 5.32 (b) Satisfaction regarding Bibliographic database available through UGC-Infonet DLC**

Satisfaction	UNIVERSITIES					Grand Total
	PU-C	GNDU-A	PU-P	TU-P	CUP-B	
<b>Highly Satisfied</b>	<b>14</b> (7.95)	<b>10</b> (10.31)	<b>10</b> (5.32)	<b>09</b> (9.67)	<b>03</b> (8.33)	<b>46</b> (7.80)
<b>Satisfied</b>	<b>76</b> (43.18)	<b>39</b> (40.21)	<b>106</b> (56.38)	<b>50</b> (53.76)	<b>16</b> (44.44)	<b>287</b> (48.64)
<b>Partially Satisfied</b>	<b>72</b> (40.91)	<b>44</b> (45.36)	<b>68</b> (36.17)	<b>32</b> (34.40)	<b>16</b> (44.44)	<b>232</b> (39.32)
<b>Dissatisfied</b>	<b>14</b> (7.95)	<b>04</b> (4.12)	<b>04</b> 2.13	<b>02</b> (2.15)	<b>01</b> (2.78)	<b>25</b> (4.24)
<b>Highly Dissatisfied</b>	<b>00</b> (-----)	<b>00</b> (-----)	<b>00</b> (-----)	<b>00</b> -----	<b>00</b> ----	<b>00</b> ----
<b>Total</b>	<b>176</b>	<b>97</b>	<b>188</b>	<b>93</b>	<b>36</b>	<b>590</b>
Chi-Square Calculated Value ( $X^2$ )= 19.30, Degree of freedom = 12.0 and p value = 0.0815 ( $\geq$ .05 non-significant) Chi-square Critical Value (Tabulated Value) = 21.02						

Source: Primary Data (Figures within parenthesis are %age)

The table 5.32(b) (**list of Bibliographic databases available under the UGC-Infonet DLC is mentioned in Appendix II**) shows the level of satisfaction with the Bibliographic Database e-resources available through UGC-Infonet DLC. In case of PU-C, the highest number of scholars, that is, 43.18% are satisfied with Bibliographic Database e. This is followed by 40.91% are partially satisfied, 7.95% are highly satisfied and dissatisfied equally. In case of **GNDU-A**, the highest 45.36% scholars are partially satisfied. This is followed by 40.21% are satisfied, 10.31% are highly satisfied, 04.12% are dissatisfied. In case of **PU-P**, the highest number of 56.38% are satisfied, 36.17% are partially satisfied, 5.32% are highly satisfied, 02.13% are dissatisfied. In case of **TU-P**, the highest number of scholars, that is, 53.76% are satisfied. This is followed by 34.40% are partially satisfied, 9.67% are highly satisfied, 2.15% are dissatisfied. In case of **CUP-B**, the highest number of scholars, that is, 44.44% scholars are satisfied and partially satisfied equally, followed by 8.33% are highly satisfied and only 02.78% scholars is dissatisfied.

Therefore, the level of satisfaction with the Bibliographic Database available through UGC-Infonet DLC of University Libraries of Punjab can be analyzed from the above data which shows that the highest number of 48.64% scholars are satisfied, followed by 39.32% are partially satisfied, 7.80% scholars are highly satisfied 4.24% are dissatisfied and no one finds highly dissatisfied.

The above data was analyzed using the Chi-Square test. The results found that the non-significant variation with regard to satisfaction levels regarding Bibliographic Database available through UGC-Infonet DLC. The results of chi square test indicated that the **Chi-Square Calculated Value ( $X^2$ )= 19.30**, which is smaller than chi-square tabulated value.

## 5.6.10 (c) Satisfaction regarding the open access resources available through UGC

## Infonet DLC

The question with regard to the scholars satisfaction with open access resources evoked these variable responses:

Table: 5.32 (c) Satisfaction with regard to Open Access Resource

Satisfaction	UNIVERSITIES					Grand Total
	PU-C	GNDU-A	PU-P	TU-P	CUP-B	
Highly Satisfied	12 (6.82)	12 (12.37)	24 (12.77)	16 (17.20)	04 (11.11)	68 (11.53)
Satisfied	126 (71.59)	57 (58.76)	130 (69.15)	51 (54.83)	20 (55.56)	384 (65.08)
Partially Satisfied	38 (21.59)	23 (23.71)	20 (10.64)	21 (22.58)	08 (22.22)	110 (18.64)
Dissatisfied	00 (-----)	03 (3.09)	12 (6.38)	05 (5.37)	04 (11.11)	24 (4.07)
Highly Dissatisfied	00 (-----)	02 (2.06)	02 (1.06)	00 (-----)	00 (-----)	04 (0.68)
Total	176	97	188	93	36	590
Chi-Square Calculated Value ( $X^2$ ) = 40.03, Degree of freedom = 16.0 and p value = 0.0008 ( $\leq 0.05$ significant) Chi-square Critical Value (Tabulated Value) = 26.29						

Source: Primary Data (Figures within parenthesis are %age)

The table 5.32(c) (list of Open access available under UGC-Infonet DLC is mentioned in Appendix II) shows the level of satisfaction with the Open access resources available through UGC-Infonet DLC. In case of **PU-C**, a majority of the scholars 71.59% are satisfied. This is followed by 21.59% are partially satisfied, and 6.82% are highly satisfied. In case of **GNDU-A**, the majority, that is, 58.76% scholars are satisfied. This is followed by 23.71% are partially satisfied, 12.37% are highly satisfied, 3.09% are dissatisfied and 2.06% are highly dissatisfied. In case of **PU-P**, the majority, that is, 69.15% scholars are satisfied. This is followed by 12.77% are highly satisfied, 10.64% are partially satisfied, 6.38% are dissatisfied and 1.06% are highly dissatisfied. In case of **TU-P**, the majority, that is, 54.83%

scholars are satisfied. This is followed by 22.58% are partially satisfied, 17.20% are highly satisfied, 5.37% are dissatisfied. In case of **CUP-B**, the majority of the scholars, that is, 55.56% are satisfied. This is followed by 22.22% are partially satisfied, 11.11% are highly satisfied and dissatisfied respectively.

Therefore, it can be analyzed from the above data that the levels of satisfaction with the Open access resources available through UGC-Infonet DLC; 65.08% scholars are satisfied, followed by 18.64% are partially satisfied, 11.53% are highly satisfied, 4.07% are dissatisfied and only 0.68% are highly dissatisfied.

The above data was analyzed using the Chi-Square test. The results found that the significant variation in satisfaction with regard to Open Access Resource available through UGC-Infonet DLC. The results of the chi-square test indicated that the **Chi-Square Calculated Value ( $X^2$ )= 40.03**, which is greater than its chi-square tabulated value.

## 5.7 Significance of E-Resources V/S Print Resources and its Impact on Research

### 5.7.1 Scholars preferences for print v/s e-resources

In response to the question regarding the scholar's choices of their preferences for using printed and e-resources, these replies were noticed:

**Table: 5.33 Scholars preference for print v/s e-resources**

Preferences	UNIVERSITIES					Grand Total
	PU-C	GNDU-A	PU-P	TU-P	CUP-B	
<b>Printed</b>	<b>62</b> (23.66)	<b>35</b> (24.65)	<b>64</b> (25.40)	<b>30</b> (20.55)	<b>09</b> (20.00)	<b>200</b> (23.61)
<b>Electronic</b>	<b>58</b> (22.14)	<b>25</b> (17.61)	<b>56</b> (22.22)	<b>39</b> (26.71)	<b>10</b> (22.22)	<b>188</b> (22.20)
<b>Both (Printed &amp; Electronic)</b>	<b>142</b> (54.20)	<b>82</b> (57.75)	<b>132</b> (52.38)	<b>77</b> (52.74)	<b>26</b> (57.78)	<b>459</b> (54.19)
<b>Total</b>	262	142	252	146	45	847
<b>Chi-Square Calculated Value (<math>X^2</math>)= 4.57,</b> <b>Degree of freedom = 8.0</b> <b>and p value = 0.802 (<math>\geq 0.05</math> non-significant)</b> <b>Chi-square Critical Value (Tabulated Value) = 15.50</b>						

Source: Primary Data (Figures within parenthesis are %age)

The availability of e-resources along with print resources is an advantage for the scholars as they have a choice to use these resources as per their convenience. The scholars were asked whether they prefer e-resources or print resources or both of them and it is revealed from the table 5.33 it shows that the majority of the scholars i.e. 54.20% in **PU-C** access both printed and e-resources followed by 23.66% preferred printed resources and 22.14% preferred e-resources. In **GNDU-A**, majority of 57.75% scholars access both printed and e-resources followed by 24.65% preferred printed resources and 17.61% preferred e-resources. In **PU-P**, a majority of 52.38% access both printed and e-resources followed by 25.40% preferred printed resources and 22.22% preferred e-resources. In **TU-P**, a majority of 52.74% scholars access both printed and e-resources followed by 26.71% preferred e-resources and 20.55% preferred printed resources. In **CUP-B**, majority of 57.78% scholars access both printed and e-resources followed by 22.22% preferred e-resources and 20.00% preferred printed resources.

The above data shows that the majority of 54.19% scholars preferred both printed and e-resources, followed by 23.61% preferred printed resources and 22.20% preferred e-resources.

The student's changing inclination towards the e-resources could be on account of ease of access, ease of usage and information management and the relative ability of the files being carried around in the form of PDF documents in their pen drives. The ease of retrieval of information across digital formats renders their usage in contrast with the print forms of resources in modern day libraries (Gupta, 2011).

This observation has significant relevance for the librarians and the library science students as they should know the impact of ICT tools and technologies on user's information behaviors and their respective propensities to switch towards the use of electronic channels instead of traditional physical channels for information search and retrieval. Despite the

lower and different levels of information literacy, the ICT usage is increasing in the India and the respective demand for the e-resources and the e-content, would thus rise in times to come. This observation has implications for library infrastructure management as well. The rise of e-resource usage would require instalment of more secure and fool proof information retrieval infrastructure. Another research on the digital collection building practices in the Indian libraries across the institutions of higher learning vindicated the rising trend of digital resources as dominant form of present day library procurements in India and this trend is estimated to continue in near future as well (Pandita & Singh, 2016).

The above data was analyzed using the Chi-Square test. The results found that the non-significant variation with regard to scholar's preferences for e-resources and print resources. The results of chi-square test indicated that the **Chi-Square Calculated Value** ( $X^2$ )= 4.57, which is smaller than chi-square tabulated value.

### 5.7.2 (a) Impact of e-resources on quality of the research

A question was asked to the scholars to know the impact of e-resources on the quality of research. The replies given by them are shown below

**Table: 5.34 (a) Impact of e-resources on quality of research**

Impact of E-resources	UNIVERSITIES					Grand Total
	PU-C	GNDU-A	PU-P	TU-P	CUP-B	
<b>High Impact</b>	<b>134</b> (51.15)	<b>80</b> (56.34)	<b>146</b> (57.94)	<b>83</b> (56.85)	<b>28</b> (62.22)	<b>471</b> (55.61)
<b>Moderate impact</b>	<b>112</b> (42.75)	<b>56</b> (39.44)	<b>94</b> (37.30)	<b>54</b> (36.99)	<b>15</b> (33.33)	<b>331</b> (39.08)
<b>Very little impact</b>	<b>10</b> (3.82)	<b>05</b> (3.52)	<b>10</b> (3.97)	<b>09</b> (6.16)	<b>01</b> (2.22)	<b>35</b> (4.13)
<b>Not at all</b>	<b>02</b> (0.76)	<b>00</b> (----)	<b>00</b> (----)	<b>00</b> (----)	<b>00</b> (----)	<b>02</b> (0.24)
<b>Do not know</b>	<b>04</b> (1.53)	<b>02</b> (0.70)	<b>02</b> (0.79)	<b>00</b> (----)	<b>01</b> (2.22)	<b>09</b> (1.06)
<b>Total</b>	<b>262</b>	<b>142</b>	<b>252</b>	<b>146</b>	<b>45</b>	<b>847</b>
<p style="text-align: center;">Chi-Square Calculated Value (<math>X^2</math>)= 12.76,  Degree of freedom = 16.0  and p value = 0.689 (<math>\geq 0.05</math> non-significant)  Chi-square Critical Value (Tabulated Value) = 26.296</p>						

Source: Primary Data (Figures within parenthesis are %age)

The table 5.43(a) shows the impact of e-resources on quality of research. In case of **PU-C** majority of the scholars, that is, 51.15% view that e-resources have high impact on the quality of research, followed by 42.75% considers moderate impact, 3.82% considers very little impact, 1.53% responded they don't know and 0.76% opines that print resources have no impact at all. In case of **GNDU-A** majority of the scholars, that is, 56.34% view that e-resources have a high impact on the quality of research, followed by 39.44% consider the moderate impact, 3.52% consider the very little impact and 0.70% responded they don't know. In case of **PU-P**, the majority, that is, 57.94% scholars consider high impact, followed by 37.30% consider the moderate impact, 3.97% consider the very little impact and 0.79% responded they don't know. In case of **TU-P** most scholars, that is, 56.85% responded that e-resources have high impact on the quality of research, followed by 36.99% consider the moderate impact, 6.16% consider very little impact. In case of **CUP-B** the majority of the scholars, that is, 62.22% consider the high impact, followed by 33.33% consider the moderate impact, 2.22% very little impact and don't know equally.

The above data shows the impact of e-resources on the quality of research, it is inferred that the highest number of scholars, that is, 55.61% consider that e-resources have high impact followed by 39.08% consider the moderate impact, 4.13% consider very little impact, 1.06% responded don't know and only 0.24% have no impact. This is clearly indicated that e-journal consortia have a significant impact on the research.

The above data was analyzed using the Chi-Square test. The results found that the non-significant variation with regard to the impact of e-resources on the quality of research. The results of chi-square test indicated that the **Chi-Square Calculated Value ( $X^2$ )= 12.76**, which is smaller than chi-square tabulated value.

### 5.7.2 (b) Impact of print resources on quality of research

A question was asked to the scholars to know the impact of print resources on quality of research. The replies given by them are shown below.

**Table: 5.34 (b) Impact of print resources on quality of research**

Impact of Print resources	UNIVERSITIES					Grand Total
	PU-C	GNDU-A	PU-P	TU-P	CUP-B	
<b>High Impact</b>	<b>144</b> (54.96)	<b>72</b> (50.70)	<b>126</b> (50.00)	<b>75</b> (51.37)	<b>20</b> (44.44)	<b>437</b> (51.59)
<b>Moderate impact</b>	<b>108</b> (41.22)	<b>65</b> (45.77)	<b>120</b> (47.62)	<b>63</b> (43.15)	<b>23</b> (51.11)	<b>379</b> (44.75)
<b>Very little impact</b>	<b>08</b> (3.05)	<b>04</b> (2.82)	<b>06</b> (2.38)	<b>07</b> (4.79)	<b>01</b> (2.22)	<b>26</b> (3.07)
<b>Not at all</b>	<b>00</b> (----)	<b>00</b> (-----)	<b>00</b> (----)	<b>01</b> (0.68)	<b>00</b> (----)	<b>01</b> (0.12)
<b>Do not know</b>	<b>02</b> (0.76)	<b>01</b> (0.70)	<b>00</b> (----)	<b>00</b> (----)	<b>01</b> (2.22)	<b>04</b> (0.47)
<b>Total</b>	<b>262</b>	<b>142</b>	<b>252</b>	<b>146</b>	<b>45</b>	<b>847</b>
Chi-Square Calculated Value ( $X^2$ )= 15.06, Degree of freedom = 16.0 and p value = 0.520 ( $\geq 0.05$ non-significant) Chi-square Critical Value (Tabulated Value) = 26.296						

Source: Primary Data (Figures within parenthesis are %age)

The table 5.34(b) shows the impact of print resources on the quality of research. In case of **PU-C**, the majority, that is, 54.96% scholars consider the high impact of print resources on the quality of research, followed by 41.22% consider the moderate impact, 3.05% consider very little impact, 0.76% responded they don't know. In case of **GNDU-A**, the majority, that is, 50.70% scholars consider high impact, followed by 45.77% consider the moderate impact, 2.82% consider very little impact and 0.70% responded they don't know. In case of **PU-P**, the majority, that is, 50.00% scholars consider high impact, followed by 47.62% consider the moderate impact and 2.38% consider very little impact. In case of **TU-P**, the majority, that is, 51.37% scholars consider high impact, followed by 43.15% consider the moderate impact, 4.79% consider very little impact and only 0.68% opines that it has no

impact at all. In case of **CUP-B** the majority, that is, 51.11% scholars consider the moderate impact, followed by 44.44% consider high Impact, 2.22% consider very little impact and responded they don't know equally.

The above data shows the impact of print resources on the quality of research, it is inferred that the majority, that is, 51.59% scholars consider that print resources have high impact on the quality of research, followed by 44.75% consider the moderate impact, 3.07% consider very little impact, only 0.12% responded that they don't know and 0.47% scholars opines that print resources have no impact on quality of research at all.

The above data was analyzed using the Chi-Square test. The results found that the non-significant variation with regard to impact of print resources on the quality of research. The results of chi-square test indicated that the **Chi-Square Calculated Value ( $X^2$ )= 15.06**, which is smaller than chi-square tabulated value.

## Impact of E-resources and print resources on the basis of Publication

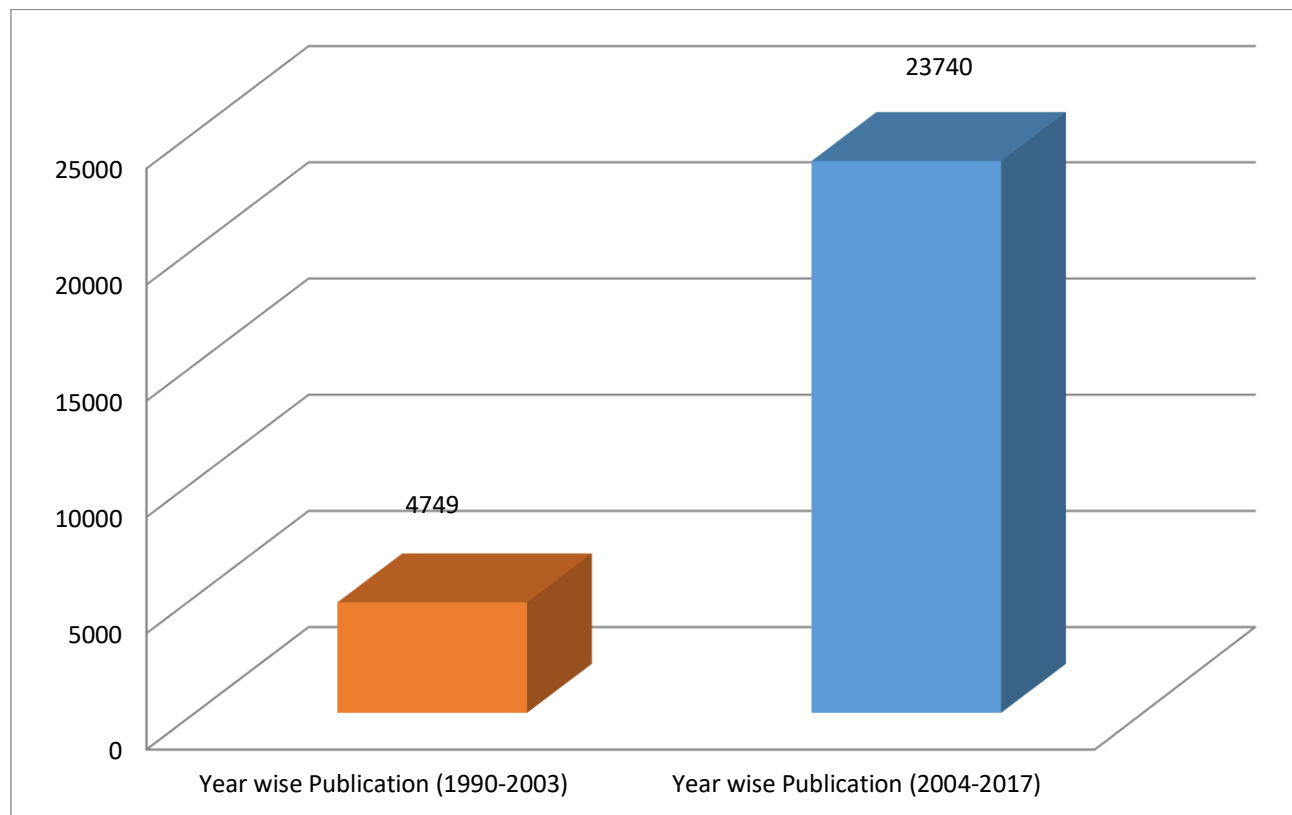
Table: 5.34 (c) Before UGC-Infonet DLC (1990-2003)

Year	UNIVERSITIES WISE PUBLICATION					Total
	PU-C	GNDU-A	PU-P	TU-P	CUP-B	
1990	175	64	43	3	0	285
1991	159	58	37	2	0	256
1992	141	44	29	6	0	220
1993	127	38	34	6	0	205
1994	146	38	25	10	0	219
1995	150	55	23	5	0	233
1996	192	85	47	8	0	332
1997	198	80	39	13	0	330
1998	224	79	39	13	0	355
1999	212	91	52	22	0	377
2000	195	116	51	21	0	383
2001	256	103	55	16	0	430
2002	321	145	61	31	0	558
2003	332	141	43	50	0	566
<b>Total</b>	<b>2828</b>	<b>1137</b>	<b>578</b>	<b>206</b>	<b>0</b>	<b>4749</b>

Table No. 5.33 (d) After UGC-Infonet DLC (2004-2017)

Year	UNIVERSITIES WISE PUBLICATION					Total
	PU-C	GNDU-A	PU-P	TU-P	CUP-B	
2004	355	175	55	53	0	638
2005	444	182	56	70	0	752
2006	448	230	133	81	0	892
2007	476	215	154	88	0	933
2008	497	259	205	114	0	1075
2009	571	280	231	193	0	1275
2010	643	295	240	211	2	1391
2011	798	327	293	352	3	1773
2012	820	345	329	358	15	1867
2013	894	393	331	474	17	2109
2014	1015	438	339	566	56	2414
2015	961	447	335	615	67	2425
2016	1332	526	431	695	123	3107
2017	1109	498	473	846	163	3089
<b>Total</b>	<b>10363</b>	<b>4610</b>	<b>3605</b>	<b>4716</b>	<b>446</b>	<b>23740</b>

Source: - The data has been collected and accessed on 20<sup>th</sup> July from <https://www.scopus.com/home.uri> (INFLIBNET Centre, Gandhi Nagar-Gujrat)

**Figure: 5.1 Publication before UGC-Infonet DLC (1990-2003) and After UGC-Infonet DLC (2004-2017)**

The table 5.33(c) and table 5.33(d) and figure 5.1 shows that the total publication of University libraries of Punjab. The study period has been split into two blocks that is 1990-2003 (before UGC-Infonet DLC) and 2004-2017 (after UGC-Infonet DLC). It shows that during 1990-2003 (before UGC-Infonet DLC), PU-C produced 2828 Publication, GNDU-A produced 1137 Publication, PU-P produced 578 Publication, TU-P produced 206 Publication, CUP-B produced no any Publication whereas 2004-2017 (after UGC-Infonet DLC), PU-C produced 10363 Publication, GNDU-A produced 4610 Publication, PU-P produced 3605 Publication, TU-P produced 4716 Publication and CUP-B produced 446 Publication. The overall analysis shows that during UGC-Infonet DLC the publication has increased from 4749 Publications to 23740 Publications. It shows that the UGC-Infonet DLC has made a significant impact on scholarly research publications.

### 5.7.3 Usefulness of print resources v/s e-resources

A question has been asked to the scholars as to know e-resources are more useful as compared to print resources for various purposes., these responses were captured:

**Table: 5.35 Usefulness of print resources v/s e-resources**

Usefulness	UNIVERSITIES					Grand Total
	PU-C	GNDU-A	PU-P	TU-P	CU-B	
Yes/E-Resource	<b>190</b> (72.52)	<b>104</b> (73.24)	<b>190</b> (75.40)	<b>103</b> (70.55)	<b>28</b> (62.22)	<b>615</b> (72.61)
No/Print Resource	<b>42</b> (16.03)	<b>35</b> (24.65)	<b>46</b> (18.25)	<b>29</b> (19.86)	<b>16</b> (35.56)	<b>168</b> (19.83)
Do not know	<b>30</b> (11.45)	<b>03</b> (2.11)	<b>16</b> (6.35)	<b>14</b> (9.59)	<b>01</b> (2.22)	<b>64</b> (7.56)
<b>Total</b>	<b>262</b>	<b>142</b>	<b>252</b>	<b>146</b>	<b>45</b>	<b>847</b>
Chi-Square Calculated Value ( $X^2$ )= 24.33, Degree of freedom = 8.0 and p value = 0.002 ( $\leq 0.05$ significant) Chi-square Critical Value (Tabulated Value) = 15.50						

Source: Primary Data (Figures within parenthesis are %age)

Though the availability and economic access to both print and e-resources is feasible for the modern day researcher, yet the responses varied across the five universities chosen for research. In response to the query of usefulness of e-resources as compared to print resources, it was found from the table 5.35 that in **PU-C**, the majority of 72.52% scholars said 'Yes', followed by 16.03% said 'No' and 11.45% said that they 'Don't know'. In case of **GNDU-A**, the majority of 73.24% scholars said 'Yes' followed by 24.65% said 'No' and 2.11% said that they 'Don't know'. In case of **PU-P**, the majority of 75.40% scholars said 'Yes' followed by 18.25% said 'No' and 6.35% said that they 'Don't know'. In case of **TU-P**, the majority of 70.55% scholars said 'Yes' followed by 19.86% said 'No' and 9.59% said that they 'Don't know'. In case of **CUP-B**, the majority of 62.22% scholars said 'Yes' followed by 35.56% said 'No' and only 2.22% said that they 'Don't know'.

The above data depicts that a sizable majority of 72.61% scholars said 'Yes' followed by 19.83% said 'No' and 7.56% said that they 'Don't know'. It indicates that all the scholars of 5 universities agreed that e-resources are more useful as compared to print resources.

The above data was analyzed using the Chi-Square test. The results found that the significant variation with regard to scholars preferences for e-resources and print resources. The results of chi-square test indicated that the **Chi-Square Calculated Value ( $X^2$ )= 24.33**, which is greater than chi-square tabulated value.

### 5.7.3 (a) Reasons for using e-resources as compared to print resources

A question has been asked to the scholars as to know the reasons for using e-resources., the responses were observed as follows:

**Table: 5.35(a) Reasons for using e-resources**

Reasons for using e-resources	UNIVERSITIES					Grand Total
	PU-C	GNDU-A	PU-P	TU-P	CUP-B	
Availability	156 (33.91)	75 (30.61)	128 (32.00)	78 (30.83)	25 (36.23)	462 (32.38)
Archiving	44 (9.56)	25 (10.20)	30 (7.50)	35 (13.83)	08 (11.59)	142 (9.95)
Convenience	112 (24.34)	64 (26.12)	94 (23.50)	58 (22.92)	17 (24.64)	345 (24.18)
Perpetual Access	32 (6.96)	21 (8.57)	22 (5.50)	15 (5.93)	03 (4.35)	93 (6.52)
Searching- browsing	116 (25.21)	60 (24.29)	122 (30.50)	67 (26.48)	16 (23.19)	381 (26.70)
Any other	00 (-----)	00 (-----)	04 (1.00)	00 (-----)	00 (-----)	04 (0.28)
<b>Total</b>	<b>460</b>	<b>245</b>	<b>400</b>	<b>253</b>	<b>69</b>	<b>1427</b>
Chi-Square Calculated Value ( $X^2$ )= 24.82, Degree of freedom = 20.0 and p value = 0.208 ( $\geq 0.05$ non-significant) Chi-square Critical Value (Tabulated Value) = 31.41						

Source: Primary Data (Figures within parenthesis are %age)

The table 5.35(a) shows various reasons for using e-resources as compared to print resources. In **PU-C** the majority of 33.91% scholars use due to availability, followed by 25.21% use because of searching- browsing, 24.34% use because of convenience, 9.56% use

because of archiving and 6.96% because of perpetual access. In **GNDU-A**, the majority of 30.61% scholars use because of availability followed by 26.12% because of convenience, 24.29% use because of searching- browsing, 10.20% because of archiving and 8.57% because of perpetual access. In **PU-P** the majority of 32.00% scholars use because of availability followed by 30.50% because of searching- browsing, 23.50% because of convenience, 7.50% because of archiving, 5.50% because of perpetual access and 1.00% because of any other reasons. In **TU-P** the majority of 30.83% scholars use because of availability followed by 26.48% because of searching- browsing, 22.92% because of convenience, 13.83% because of archiving and 5.93% because of perpetual access. In **CUP-B** the majority of 36.23% scholars use because of availability followed by 24.64% because of convenience, 23.19% because of searching-browsing, 11.59% because of archiving and 4.35% because of perpetual access.

The above data shows that a majority of 32.38% scholars from all five universities are using e-resources because of availability followed by 26.70% because of searching-browsing, 24.18% because of convenience, 9.95% because of archiving, 6.52% because of perpetual access and 0.28% use for any other reason. Overall, the reasons such as availability, convenience and searching and browsing influenced the scholars to access the e-resources. The other reasons which also could not be ignored by the scholars were archiving and perpetual access.

The above data was analyzed using the Chi-Square test. The results found that the non-significant variation with regard to scholars reason for using e-resources. The results of chi-square test indicated that the **Chi-Square Calculated Value ( $X^2$ )= 24.82**, which is smaller than chi-square tabulated value.

## 5.7.4 (a) Scholars frequency of using e-journal

A question has been asked to the scholars as to know the frequency of using e-journal.

**Table: 5.36 (a) Scholars frequency of using e-journal**

Frequency of using e-journal	UNIVERSITIES					Grand Total
	PU-C	GNDU-A	PU-P	TU-P	CU-B	
All the time	146 (55.73)	67 (47.18)	160 (63.49)	78 (53.42)	26 (57.78)	477 (56.32)
Most of the time	102 (38.93)	53 (37.32)	80 (31.75)	56 (38.36)	17 (37.78)	308 (36.36)
Rarely	14 (5.34)	21 (14.79)	12 (4.76)	11 (7.53)	00 ---	58 (6.85)
Never	00 ----	01 (0.70)	00 ----	01 (0.68)	02 (4.44)	04 (0.47)
<b>Total</b>	262	142	252	146	45	847
<p><b>Chi-Square Calculated Value (<math>X^2</math>)= 43.32,</b>  <b>Degree of freedom = 12.0</b>  <b>and p value = 1.99E-05 (<math>\leq 0.05</math> significant)</b>  <b>Chi-square Critical Value (Tabulated Value) = 21.02</b></p>						

Source: Primary Data (Figures within parenthesis are %age)

As depicted in the table 5.36(a) in **PU-C**, the highest 55.73% scholars are using e-journal All the time, followed by 38.93% using Most of the time, 5.34% using rarely. In **GNDU-A**, the highest 47.18% scholars are using e-journal all the time, followed by 37.32% using most of the time, 14.79% using rarely and 0.70 said they never used. In **PU-P** the highest 63.49% scholars are using e-journal all the time, followed by 31.75% using most of the time, 4.76% using rarely. In **TU-P** the highest 53.42% scholars are using e-journal all the time followed by 38.36% using most of the time, 7.53% using Rarely and 0.68 said they never used. In **CUP-B** the highest 57.78% scholars are using e-journal all the time, followed by 37.78% using most of the time and 4.44% said they never used.

The above data demonstrate the frequency of using e-journals by the scholars, it shows that majority 56.32% scholars using all the time, 36.36% using most of the time, 6.85% using rarely and 0.47% said they never used.

The above data was analyzed using the **Chi-Square test**. The results found that the significant variation with regard to frequency of using e-journal. The results of chi-square test indicated that the **Chi-Square Calculated Value ( $X^2$ ) = 43.32**, which is greater than its chi-square tabulated value

#### 5.7.4 (b) Scholars frequency of using print journal

A question has been asked to the scholars as to know the frequency of using print journal.

**Table: 5.36 (b) Scholars frequency of using print journal**

Frequency of using Print journal	UNIVERSITIES					Grand Total
	PU-C	GNDU-A	PU-P	TU-P	CUP-B	
All the time	26 (9.92)	24 (16.90)	36 (14.28)	18 (12.32)	03 (6.67)	107 (12.63)
Most of the time	130 (49.61)	75 (52.81)	124 (49.20)	80 (54.79)	25 (55.55)	434 (51.23)
Rarely	106 (40.45)	41 (28.87)	90 (35.71)	48 (32.87)	17 (37.77)	302 (35.65)
Never	00 (-----)	02 (1.40)	02 (0.79)	00 (----)	00 (-----)	04 (0.47)
<b>Total</b>	<b>262</b>	<b>142</b>	<b>252</b>	<b>146</b>	<b>45</b>	<b>847</b>
<p><b>Chi-Square Calculated Value (<math>X^2</math>)= 15.55,</b>  <b>Degree of freedom = 12.0</b>  <b>and p value = 0.2127 (<math>\geq 0.05</math> non-significant)</b>  <b>Chi-square Critical Value (Tabulated Value) = 21.02</b></p>						

Source: Primary Data (Figures within parenthesis are %age)

As depicted in the table 5.36(b) in **PU-C**, the highest 49.61% scholars are using the print journal most of the time, followed by 40.45% using rarely, 9.92% using all the time. In **GNDU-A**, the highest 52.81% scholars are using print journal most of the time followed by 28.87% using rarely, 16.90% using all the time and 1.40% said they never used. In **PU-P** the

highest 49.20% scholars are using the print journal most of the time, followed by 35.71% using rarely, 14.28% using all the time and 0.79% said they never used. In **TU-P** the highest 54.79% scholars are using the print journal most of the time, followed by 32.87% using rarely and 12.32% using all the time. In **CUP-B** the highest 55.55% scholars are using the print journal most of the time, followed by 37.77% using rarely and 6.67% using all the time.

The above data demonstrate the frequency of using print journals, it shows that majority 51.23% scholars using most of the time, 35.65% using rarely, 12.63% using all the time and 0.47% said they never used. So the result shows that the majority of the scholars use a print journal most of the time.

The above data was analyzed using the **Chi-Square test**. The results found that the non-significant variation with regard to frequency of using print journal. The results of chi-square test indicated that the **Chi-Square Calculated Value (X<sup>2</sup>) = 15.55**, which is smaller than chi-square tabulated value.

### 5.7.5 Quality of content in e-resources compared to print resources

A question has been asked to the scholars as to know the quality of content in e-resources compared to print resources.

**Table: 5.37 Quality of content in e-resources compared to print resources**

Content	UNIVERSITIES					Grand Total
	PU-C	GNDU-A	PU-P	TU-P	CU-B	
Better than print	96 (36.64)	53 (37.32)	94 (37.30)	58 (39.73)	17 (37.78)	318 (37.54)
Same as print versions	116 (44.27)	60 (42.25)	112 (44.44)	59 (40.41)	19 (42.22)	366 (43.21)
Not better than print	22 (8.40)	15 (10.65)	30 (11.90)	17 (11.64)	07 (15.56)	91 (10.74)
Not sure	28 (10.69)	14 (9.86)	16 (6.35)	12 (8.22)	02 (4.44)	72 (8.50)
Total	262	142	252	146	45	847
Chi-Square Calculated Value (X <sup>2</sup> )= 7.49, Degree of freedom = 12.0 and p value = 0.8234 (≥.05 non-significant) Chi-square Critical Value (Tabulated Value) = 21.02						

Source: Primary Data

(Figures within parenthesis are %age)

As depicted in the table 5.37 in case of **PU-C** the highest 44.27% agreed it is same as print versions followed by 36.64% agreed it is better than print, 10.69% are not sure and 8.40% agreed it is not better than print. In case of **GNDU-A** the highest 42.25% agreed it is same as print versions followed by 37.32% agreed it is better than print, 10.65% agreed it is not better than print and 9.86% are not sure. **PU-P** the highest 44.44% agreed it is same as print versions followed by 37.30% agreed it is better than print, 11.90% agreed it is not better than print and 6.35% are not sure. **TU-P** the highest 40.41% agreed it is same as print versions followed by 39.73% agreed it is better than print, 11.64% agreed it is not better than print and 8.22% are not sure. **CUP-B** the highest 42.22% agreed it is same as print versions followed by 37.78% agreed it is better than print, 15.56% agreed it is not better than print and 4.44% are not sure.

The above data summarizes the content of e-resources compared to print resources by the scholars of University Libraries of Punjab. The table depicts that the highest 43.21% scholars agreed it is same as print versions followed by 37.54% agreed it is better than print, 10.74% agreed it is not better than print and 8.50% are not sure. It shows that there is not such a big difference in quality of content between e-resources and print resources.

## **5.8 Problems, prospects, measures and suggestions for improving UGC-Infonet DLC**

### **5.8.1 Scholars problem while accessing e-resources**

The question regarding the scholars perception of the problems experienced during the course of accessing the e-resources across UGC-Infonet DLC, these responses were observed:

**Table: 5.38 Scholars problem while accessing e-resources**

Problem while accessing e-resources	UNIVERSITIES					Grand Total
	PU-C	GNDU-A	PU-P	TU-P	CUP-B	
Yes	98 (55.68)	65 (67.01)	118 (62.77)	59 (63.44)	28 (77.77)	368 (62.37)
No	78 (44.32)	32 (32.99)	70 (37.23)	34 (36.55)	08 (22.22)	222 (37.63)
<b>Total</b>	<b>176</b>	<b>97</b>	<b>188</b>	<b>93</b>	<b>36</b>	<b>590</b>
Chi-Square Calculated Value ( $X^2$ )= 7.94, Degree of freedom = 4.0 and p value = 0.093 ( $\geq 0.05$ non-significant) Chi-square Critical Value (Tabulated Value) = 9.487						

Source: Primary Data (Figures within parenthesis are %age)

In response to the query, problem while accessing e-resources, it was found from the table 5.38, that 55.68% scholars in **PU-C**, 67.01% scholars in **GNDU-A**, 62.77% scholars in **PU-P**, 63.44% scholars in **TU-P** and 77.77 % scholars in **CU-B** responded by saying ‘Yes’, it means they are facing problems in accessing e-resources. Whereas remaining 44.32% scholars in **PU-C**, 32.99% scholars in **GNDU-A**, 37.23% scholars in **PU-P**, 36.55% scholars in **TU-P** and 22.22% scholars in **CUP-B** responded by saying ‘NO’, it means they are not facing any problem in accessing e-resources.

It is observed from above data that 62.37% scholars said ‘Yes’, that is, they face problems while accessing e-resources, whereas, 37.63% scholars said they don’t face any problem by saying ‘NO’. It can be due to the lack of awareness and proper training that scholars are unable to use e-resources available through UGC-Infonet DLC in their respective universities; proper awareness programs would help scholars to use e-resources effectively in a better way.

The above data was analyzed using the Chi-Square test. The results found that the non-significant variation with regard to scholars perceptions of the problems faced while accessing e-resources. The results of chi-square test indicated that the **Chi-Square Calculated Value ( $X^2$ )= 7.94**, which is smaller than chi-square tabulated value.

### 5.8.1 (a) Various Problems in accessing the e-resources across UGC-Infonet DLC

On being asked to share their opinion about the problems in accessing the e-resources across UGC-Infonet DLC, these responses were noticed:

**Table: 5.38 (a) Various Problems in accessing the e-resources across UGC-Infonet DLC**

Problem in accessing e-resources	UNIVERSITIES					Grand Total
	PU-C	GNDU-A	PU-P	TU-P	CUP-B	
Internet speed	66 (46.48)	52 (61.90)	94 (47.47)	30 (50)	21 (56.76)	263 (50.48)
No remote Access	32 (22.54)	07 (8.33)	38 (19.19)	17 (28.33)	05 (13.51)	99 (19.00)
Inadequate e-resources	30 (21.12)	15 (17.86)	44 (22.22)	08 (13.33)	09 (24.32)	106 (20.35)
Inadequate infrastructure	12 (8.45)	06 (7.14)	12 (6.06)	05 (8.33)	02 (5.41)	37 (7.10)
Any other	02 (1.41)	04 (4.76)	10 (5.05)	00 (---)	00 (---)	16 (3.07)
<b>Total</b>	<b>142</b>	<b>84</b>	<b>198</b>	<b>60</b>	<b>37</b>	<b>521</b>
Chi-Square Calculated Value ( $X^2$ )= 23.46, Degree of freedom = 16.0 and p value = 0.102 ( $\geq 0.05$ non-significant) Chi-square Critical Value (Tabulated Value) = 26.29						

Source: Primary Data (Figures within parenthesis are %age)

The table 5.38(a) shows the various problems in accessing e-resources. In case of **PU-C** the majority, that is, 46.48% scholars face internet speed problem followed by 22.54% face no remote access problem, 21.12% face the problem of inadequate e-resources, 8.45% face inadequate infrastructure, and 1.41% face any other problem. In case of **GNDU-A** majority, that is, 61.90% scholars face internet speed problem followed by 17.86% face the Inadequate e-resources problem 8.33% no remote Access, 7.14% face Inadequate infrastructure, and 4.76% face any other problem. In case of **PU-P** the majority, that is, 47.47% scholars face Internet speed problem, followed by 22.22% face the inadequate e-resources, 19.19% ace no remote access problem, 6.06% face inadequate infrastructure, and 5.05% face any other

problem. In case of **TU-P** the majority, that is, 30.00% scholars face Internet speed problem followed by 28.33% who face no remote access problem, 13.33% face the inadequate e-resources, 8.33% face inadequate infrastructure. In case of **CUP-B** the majority, that is, 56.76% scholars face Internet speed problem followed by 13.51% face no remote access problem, 24.32% face the inadequate e-resources and 5.41% face inadequate infrastructure.

The above data depicts that the majority of scholars from University libraries of Punjab, that is, 50.48% face internet speed problem, followed by 20.35% face no remote access, 19.00% face inadequate e-resources, 7.10% face inadequate infrastructure and 3.07% face any other problem.

The above data was analyzed using the Chi-Square test. The results found that the non-significant variation with regard to various problems in accessing the e-resources across UGC-Infonet DLC. The results of chi-square test indicated that the **Chi-Square Calculated Value ( $X^2$ )= 23.46**, which is smaller than chi-square tabulated value

### 5.8.2 Scholars opinions with regard to problems faced while using e-resources

On being asked to specifically categorize the problems being faced during access to the UGC-Infonet DLC, the scholars varied as such:

**Table: 5.39 Scholars opinions with regard problems faced while using e-resources**

Problem in using e-resources	UNIVERSITIES					Grand Total
	PU-C	GNDU-A	PU-P	TU-P	CUP-B	
Reading on computer	104 (42.62)	46 (35.38)	120 (44.44)	54 (40.91)	23 (37.10)	347 (41.41)
Displaced Images	24 (9.84)	05 (3.85)	14 (5.19)	08 (6.06)	03 (4.84)	54 (6.44)
Copying	22 (9.02)	10 (7.69)	22 (8.15)	03 (2.27)	03 (4.84)	60 (7.16)
Downloading	74 (30.33)	55 (42.31)	90 (33.33)	61 (46.21)	29 (46.77)	309 (36.87)
Printing	12 (4.92)	06 (4.62)	14 (5.19)	05 (3.79)	03 (4.84)	40 (4.77)
Any other	08 (3.28)	08 (6.15)	10 (3.70)	01 (0.76)	01 (1.61)	28 (3.34)
<b>Total</b>	<b>244</b>	<b>130</b>	<b>270</b>	<b>132</b>	<b>62</b>	<b>838</b>

Chi-Square Calculated Value ( $X^2$ )= 31.56,  
Degree of freedom = 20.0  
and p value = 0.048 ( $\leq 0.05$  significant)  
Chi-square Critical Value (Tabulated Value) = 31.41

Source: Primary Data

(Figures within parenthesis are %age)

The table 5.39 shows the problems faced while using e-resources. In case of **PU-C**, the majority of the scholars, that is, 42.62% face the problem of reading on the computer followed by 30.33% face the downloading problem, 9.84% face problem of displaced images, 9.02% face copying problem, 4.92% facing printing problem and 3.28% facing Any other. In case of **GNDU-A**, the majority of the scholars, that is, 42.31% face downloading problem, followed by 35.38% face problem of reading on the computer, 7.69% face Copying problem, 06.15% face any other problem, 4.62% face printing problem and 3.85% face problem of displaced images. In case of **PU-P** the majority of the scholars, that is, 44.44% face problem of reading on the computer followed by 33.33% face downloading problem, 8.15% face copying problem, 5.19% face problem of displaced images and face printing problem equally and 3.70% face any other problem. In case of **TU-P** the majority of the scholars, that is, 46.21% face downloading problem followed by 40.91% face problem of reading on the computer, 6.06% face displaced images problem, 3.79% face printing problem, 2.27% face copying problem and 0.76% face any other problem. In case of **CUP-B** the majority of the scholars, that is, 46.77% face downloading problem, followed by 37.10% face problem of reading on a computer, 4.84% face copying problem, face printing problem and face displaced image problem equally and only 1.61% face any other problem.

The above data summarizes various problems in using e-resources in the selected 5 Universities of Punjab. The table depicts that majority of the scholars, that is, 41.41% face the problem of reading on the computer, followed by 36.87% face downloading problem, 7.16% face copying problem, 6.44% face displaced image problem, 4.77% scholars face printing problem and 3.34% face any other problem.

The above data was analyzed using the Chi-Square test. The results found that the significant variation with regard to the scholars specification of problems in using e-

resources. The results of chi-square test indicated that the **Chi-Square Calculated Value** ( $X^2$ )= **31.56**, which is greater than chi-square tabulated value.

### 5.8.3 Scholars opinions about future prospects of e-resources available under UGC Infonet DLC

In response to the query on the scholars opinions about future prospects of e-resources available under UGC Infonet DLC, these responses emerged:

**Table: 5.40 Future prospects of e-resources under UGC Infonet DLC**

Future and prospects of e-journals	UNIVERSITIES					Grand Total
	PU-C	GNDU-A	PU-P	TU-P	CUP-B	
Co-exist with print	88 (50.00)	65 (67.01)	126 (67.02)	54 (58.06)	21 (58.33)	354 (60.00)
Replace the print	30 (17.05)	17 (17.53)	24 (12.76)	17 (18.27)	04 (11.11)	92 (15.59)
Supplement	28 (15.91)	06 (6.19)	20 (10.63)	12 (12.90)	07 (19.44)	73 (12.37)
Don't know	30 (17.05)	09 (9.28)	18 (9.57)	10 (10.75)	04 (11.11)	71 (12.03)
<b>Total</b>	<b>176</b>	<b>97</b>	<b>188</b>	<b>93</b>	<b>36</b>	<b>590</b>
Chi-Square Calculated Value ( $X^2$ )= 19.77, Degree of freedom = 12.0 and p value = 0.071 ( $\geq 0.05$ non-significant) Chi-square Critical Value (Tabulated Value) = 21.02						

Source: Primary Data (Figures within parenthesis are %age)

The table 5.40 shows the future prospects of e-resources available under UGC Infonet DLC. In case of **PU-C** majority of 50.00% scholars accept that it will co-exist with print followed by 17.05% accept that it will replace the print and 17.05% responded that they don't know, 15.91%, accept that it will supplement. In case of **GNDU-A** majority of 67.01% scholars accept that it will co-exist with print followed by 17.53% accept that it will replace the print, 9.28% responded that they don't know and 6.19%, accept that it will supplement. In case of **PU-P** majority of 67.02% scholars accept that it will co-exist with print followed by 12.76% accept that it will replace the print, 10.63%, accept that it will supplement and 9.57% responded that they don't know. In case of **TU-P** majority of 58.06% scholars accept that it will co-exist with print followed by 18.27% accept that it will replace the print, and 12.90%

accept that it will supplement and 10.75% responded that they don't know. In case of CUP-B majority of 58.33% scholars accept that it will co-exist with print followed by 19.44% accept that it will supplement, 11.11% accept that it will replace the print, and 11.11% responded that they don't know.

The above data show that 60.00% scholars accept that it will co-exist with print, followed by 15.59% accept that it will replace the print, 12.37% accept that it will supplement and 12.03% responded that they don't know. This indicates that e-resources would co-exist with print.

The above data was analyzed using the Chi-Square test. The results found that the non-significant variation with regard to scholars opinions about future prospects of e-resources available under UGC Infonet DLC. The results of chi-square test indicated that the **Chi-Square Calculated Value ( $X^2$ ) = 19.77**, which is smaller than chi-square tabulated value.

#### 5.8.4 Scholars requirement of awareness / training programs on using e-resources under UGC-Infonet DLC

On being asked about the requirement of training programs on using e-resources, these answers were observed:

**Table: 5.41 Scholars requirement of awareness / training programs on using e-resources under UGC-Infonet DLC**

User awareness or training programs	UNIVERSITIES					Grand Total
	PU-C	GNDU-A	PU-P	TU-P	CUP-B	
Yes	206 (78.63)	115 (80.99)	192 (76.19)	114 (78.08)	35 (77.78)	662 (78.16)
No	56 (21.37)	27 (19.01)	60 (23.81)	32 (21.92)	10 (22.22)	185 (21.84)
Total	262	142	252	146	45	847

Chi-Square Calculated Value ( $X^2$ ) = 1.27,  
Degree of freedom = 4.0  
and p value = 0.865 ( $\geq 0.05$  non-significant)  
Chi-square Critical Value (Tabulated Value) = 9.487

Source: Primary Data (Figures within parenthesis are %age)

In view of this, the question was raised to scholars whether user awareness or training programs to use e-resources are required or not. The reason behind this is that they probably are familiar with the skills and techniques for accessing e-resources through UGC-Infonet DLC. The table 5.41 shows that 78.63% scholars of **PU-C**, 80.99% scholars of **GNDU-A**, 76.19% scholars of **PU-P**, 78.08% scholars of **TU-P** and 77.78% scholars of **CUP-B** need user awareness or training programs to use e-resources. Whereas, 21.37% scholars of **PU-C**, 19.01% scholars of **GNDU-A**, 23.81% scholars of **PU-P**, 21.92% scholars of **TU-P**, 22.22% scholars of **CUP-B** are of the view that there is no need of training at all.

The above data, reveals that 78.16% scholars wanted training to use e-resources under UGC-Infonet DLC. However, remaining 21.84% scholars stated that the training program is not required. The librarian's participation and voluntary contribution have been observed to possess implications for pay satisfaction, self-satisfaction as well as user satisfaction.

The above data was analyzed using Chi-Square test. The results found that the non-significant variation with regard to the scholars requirement of user awareness / training programs on using e-resources. The results of chi square test indicated that the **Chi-Square Calculated Value** ( $X^2$ )= 1.27, which is smaller than chi-square tabulated value.

#### **5.8.4 (a) Frequency of awareness / training programs to use e-resources**

On being asked about the opinion on the suitable frequency for conduct of such training programs, the responses varied in following manner:

**Table: 5.41(a) Frequency of awareness / training programs to use e-resources**

Frequency of user awareness/training prog.	UNIVERSITIES					Grand Total
	PU-C	GNDU-A	PU-P	TU-P	CUP-B	
<b>Weekly</b>	<b>44</b> (21.36)	<b>26</b> (22.61)	<b>40</b> (20.83)	<b>01</b> (0.88)	<b>02</b> (5.71)	<b>113</b> (17.07)
<b>Monthly</b>	<b>76</b> (36.89)	<b>56</b> (48.70)	<b>66</b> (34.38)	<b>43</b> (37.72)	<b>13</b> (37.14)	<b>254</b> (38.37)
<b>Occasionally</b>	<b>78</b> (37.86)	<b>33</b> (28.70)	<b>84</b> (43.75)	<b>68</b> (59.65)	<b>14</b> (40.00)	<b>277</b> (41.84)
<b>Any other</b>	<b>08</b> (3.88)	<b>00</b> (----)	<b>02</b> (1.04)	<b>02</b> (1.75)	<b>06</b> (17.14)	<b>18</b> (2.72)
<b>Total</b>	<b>206</b>	<b>115</b>	<b>192</b>	<b>114</b>	<b>35</b>	<b>662</b>
Chi-Square Calculated Value ( $X^2$ )= 77.85, Degree of freedom = 12.0 and p value = 1.06E-11 ( $\leq 0.05$ significant) Chi-square Critical Value (Tabulated Value) = 21.02						

Source: Primary Data (Figures within parenthesis are %age)

The table 5.41(a) reveals the suitable frequency of user awareness or training programs to use e-resources that 21.36% scholars from **PU-C**, 22.61% from **GNDU-A**, 20.83% from **PU-P**, 0.88% from **TU-P** and 5.71% from **CUP-B** require training on a weekly basis. Although, 36.89% scholars from **PU-C**, 48.70% from **GNDU-A**, 34.38% from **PU-P**, 37.72% from **TU-P** and 37.14% from **CUP-B** required training on a monthly basis. It is observed that the majority i.e. 37.86% scholars from **PU-C**, 28.70% from **GNDU-A**, 43.75% from **PU-P**, 59.65% from **TU-P** and 40.00% from **CUP-B** require training occasionally. On the contrary, very few 3.88% scholars from **PU-C**, 1.04% from **PU-P**, 1.75% from **TU-P** and 17.14% from **CUP-B** require training at any other time.

The above data shows that maximum 41.84% scholars need training occasionally, followed by 38.37% who need training on a monthly basis, 17.07% need on a weekly basis and very few 2.72% need training at any other time. The user's computer-based self-efficacy has been observed as the key factor that influences the frequency of visit, the pattern of time spent as well as user's experiences regarding the new technology-based setup (Hines, 2013).

The above data was analyzed using the Chi-Square test. The results found that significant variation with regard to frequency of user awareness/training programs to use e-resources. The results of chi-square test indicated that the **Chi-Square Calculated Value** ( $X^2$ )= **77.85**, which is greater than chi-square tabulated value.

### 5.8.5 Scholars opinions regarding improvement in the usage of e-resources

This question was the most participative one. The responses were not only limited to the options mentioned in the questionnaire rather out of the box solutions were devised to sort out the problem being faced by them. The following table shows the variations in the responses to the options presented to them.

**Table: 5.42 Scholars opinions regarding improvement in the usage of e-resources**

Suggestions	UNIVERSITIES					Grand Total
	PU-C	GNDU-A	PU-P	TU-P	CUP-B	
Practical based seminar and workshops	190 (22.09)	111 (22.07)	200 (23.80)	110 (20.99)	36 (19.78)	647 (22.24)
Article alert service	136 (15.81)	85 (16.90)	188 (22.38)	91 (17.37)	30 (16.48)	530 (18.22)
Inform the users frequently	136 (15.81)	76 (15.11)	110 (13.09)	66 (12.60)	27 (14.84)	415 (14.27)
Computer with high internet speed	112 (13.02)	78 (15.51)	116 (13.80)	79 (15.08)	25 (13.74)	410 (14.09)
Web based guided tour or online instructions	108 (12.56)	59 (11.73)	88 (10.47)	73 (13.93)	24 (13.19)	352 (12.10)
Digital Archival facilities	86 (10.00)	40 (7.95)	72 (8.57)	44 (8.40)	18 (9.89)	260 (8.94)
Proactive e-mail based content page	92 (10.70)	54 (10.71)	66 (7.85)	61 (11.64)	22 (12.09)	295 (10.14)
Any Other	00 (-----)	00 (----)	00 (----)	00 (-----)	00 (-----)	00 (-----)
<b>Total</b>	<b>860</b>	<b>503</b>	<b>840</b>	<b>524</b>	<b>182</b>	<b>2909</b>
<p style="text-align: center;"><b>Chi-Square Calculated Value (<math>X^2</math>)= 31.30,</b>  <b>Degree of freedom = 24.0</b>  <b>and p value = 0.145 (<math>\geq 0.05</math> non-significant)</b>  <b>Chi-square Critical Value (Tabulated Value) = 36.41</b></p>						

Source: Primary Data (Figures within parenthesis are %age)

The table 5.42 shows the scholars opinions regarding improvement in the usage of e-resources under UGC-Infonet DLC. In case of **PU-C**, the majority, that is, 22.09% scholars suggested practical based seminar and workshops, 15.81% suggested article alert service and inform the users frequently option equally, 13.02% suggested computers with high internet speed, 12.56% suggested web based guided tour or online instructions, 10.70% suggested proactive e-mail based content page and 10.00% suggested digital archival facilities. In case of **GNDU-A**, the majority, that is, 22.07% scholars suggested practical based seminar and workshops, 16.90% suggested Article alert service, 15.51% suggested computers with high internet speed, 15.11% suggested Inform the users frequently, 11.73% suggested web based guided tour or online instructions, 10.71% suggested proactive e-mail based content page and 7.95% suggested digital archival facilities. In case of **PU-P**, the majority, that is, 23.80% scholars suggested practical based seminar and workshops, 22.38% suggested article alert service, 13.80% preferring computer with high internet speed, 13.09% suggested inform the users frequently option 10.47% preferring web based guided tour or online instructions, 8.57% suggested digital archival facilities and 7.85% suggested proactive e-mail based content page. In **TU-P**, the majority, that is, 20.99% scholars suggested practical based seminar and workshops, 17.37% suggested article alert service, 15.08% suggested computer with high internet speed, 13.93% suggested web based guided tour or online instructions 12.60% suggested inform the users frequently option 11.64% suggested proactive e-mail based content page and 8.40% scholars suggested digital Archival facilities. In **CUP-B**, the majority, that is, 19.78% scholars suggested practical based seminar and workshops, 16.48% preferring article alert service, 14.84% suggested inform the users frequently option, 13.74% suggested computer with high internet speed, 13.19% suggested web based guided tour or

online instructions, 12.09% suggested proactive e-mail based content page and 9.89% suggested digital archival facilities.

The above data shows that the majority of the research scholars, that is, 22.24% prefers practical based seminar and workshops, 18.22% prefer article alert service, 14.27% prefer the service of frequent information to the users, 14.09% prefer a computer with high internet speed 12.10% prefer web based guided tour or online instructions, 10.14% prefer proactive e-mail based content page and 8.94% prefer digital archival facilities.

The above data was analyzed using the Chi-Square test. The results found that the non-significant variation with regard to scholars opinions regarding improvement in the usage of e-resources. The results of chi-square test indicated that the **Chi-Square Calculated Value ( $X^2$ )= 31.30**, which is smaller than chi-square tabulated value.

The findings are consistent with earlier studies on this aspect of user access. Other research also highlighted some of the commonly faced problems as user's lack of knowledge regarding the use, lack of sufficient internet nodes in the university library, lack of sustainable access, frequent power cut, slow internet bandwidth access, lack of assistance by library staff and the lack of training (Walmiki, Ramkrishnegowda & Prithviraj, 2010). The user's computer based self-efficacy has been observed as the key factor that influences the frequency of visit, pattern of time spent as well as user's experiences regarding the new technology based set up (Hines, 2013).

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## CHAPTER-6

### FINDINGS, CONCLUSION AND SUGGESTIONS

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#### 6.1 Introduction

This user study based research explored the awareness and use of UGC-Infonet DLC among scholars. At the same time, the study attempted to discover the collection, services and infrastructure available for access to e-resources. Along with this, the study assessed the usage pattern and satisfaction level of e-resources available under the UGC-Infonet DLC. It focused on the significance of e-resources v/s print resources and its impact on research. Further the current study scrutinized the problems, prospects, measures and suggestions for improving the usage of UGC-Infonet DLC in the university libraries of Punjab.

It is natural for the Indian libraries, especially the digital consortiums, institutional repositories and UGC Infonet DLC to face challenges about optimum usage (Reddy, 2004). The attempts regarding the academic interpretation of the user's awareness and usage of digital libraries have been nominal and non-convergent. It's definite that the libraries are changing and that they have to change with the changing user's aspirations. White & Le Cornu (2012) in their research on the changing role of libraries highlighted the issue of guaranteeing access to knowledge; as the prime challenge before a functional library system. The study further underlined the urgent need for change in the traditional roles of a library, keeping in view the growing emphasis on the trans-disciplinary requirements of academic research. The matter of fact is that the change across Indian libraries, especially those across India is taking a longer than expected time in familiarizing the users with appropriate usage methodologies (Reddy, 2004).

## 6.2 Summary of the findings from the questionnaire

This study discovers several findings and these are summarised as under various headings:

The study found that a majority of 61.87% female scholar has responded the question by comparing 38.13% male scholar, (Table: 5.1).

The study shows that the majority of the scholars of University Libraries of Punjab age, is between 26-30 and very least (0.47%) is in the age group of 36-40 and 41-45 equally, (Table: 5.2).

The study reveals that most of the scholars participated are from the streams of Applied Sciences (26.80%) followed by Arts (25.74%), Basic Sciences (24.20%) and Social Sciences (23.26%), (Table: 5.3).

The study shows that the majority of the 34.71% scholars visit the library weekly and least 19.72% visit rarely. Most of the scholars of PU-C, GNDU-A, PU-P, TU-P visit weekly and the scholars of CUP-B visit daily, (Table: 5.4).

It was noted that the majority of the 43.76% scholars visiting the library for the issue and return of book and 8.01% scholars use for any other purposes. The reason may be the scholars prefer accessing e-resources from their respective departments, hostel, etc., (Table: 5.5).

It is concluded from the study that the infrastructural support for accessing e-resources in the University Libraries of Punjab are excellent because the majority of the 71.19% scholars said “YES” are found to be satisfied. It also shows that still, some 28.81% scholars said “NO” and found inadequate, (Table: 5.6).

The study found that a majority of 64.23% scholars found e-journal collection adequate, 2.01% scholars found the collection very inadequate and that they don't know about it equally, (Table: 5.7).

The study shows that a majority of 53.84% scholars agree that the library has adequate access to e-databases and a negligible proportion 1.53% scholars viewed that access to e-databases is inadequate, (Table: 5.8).

The study inferred that the highest 43.33% of scholars agree that the library has adequate access to e-books, 5.43% scholars found very inadequate and said that they don't know equally. It also found that Scholars of PU-C (31.30%), GNDU-A (27.46%), PU-P (37.30%), TU-P (21.92%) and CUP-B (26.67%) responded e-books are inadequate, (Table: 5.9).

The study found that the highest number of 52.07% scholars agrees that the library has adequate access to e-scholarly internet sources, and very few 1.77% scholars found Inadequate. 21.37 Scholars of PU-C, 28.17 scholars of GNDU-A and 32.54% scholars of PU-P founds e-scholarly internet resources inadequate, (Table: 5.10).

The study shows that the highest number of 49.35% scholars agree that the library has adequate access to e-references resources but, still, 8.15% scholars and 3.53% scholars said they Don't know and very inadequate respectively. So even the scholars of PU-C (26.72%), GNDU-A (23.94%), PU-P (29.37%) and CUP-B (22.22%) founds reference resources inadequate, (Table: 5.11).

The study shows that 47.46% scholars agree that the library has adequate e-theses, and 28.69% scholars found it inadequate, 4.49% found very inadequate. So still, most of the scholars from PU-C, GNDU-A and PU-P found that the library has inadequate e-theses, (Table; 5.12).

The study found that a majority of 41.93% scholars said the library provides any other services (OPAC/Overdue/Ask Librarian/Reprographic) followed by 36.36% scholars said EDS and least 2.57% scholars said SDI services. It is clear that still most of the scholars are not using the services offered by the library (Table: 5.13).

It was noted that a majority of 90.67% scholars admitted that they have computers for accessing e-resources in the library, computer centre, computer lab, hostel etc., and 9.33% scholars admitted that they do not have computers, (Table: 5.14).

The study found that all the University Libraries of Punjab provide internet connections for accessing e-resources through Wi-Fi (95.69%) and leased line (4.31%). The However, it is interesting to note that none of the scholars informed about Li-Fi connection, (Table: 5.15).

The study found that a majority of 74.58% scholars are satisfied with the collection of e-resources available under UGC Infonet DLC whereas 25.42% scholars are not satisfied at all, (Table: 5.16).

The study reported that 35.72% of the scholars said it helped with access to a wider range of information, followed by 23.97% said it expedites research process, 20.06% said it improves professional competence and 20.25% fast access of Information, (Table: 5.17).

The study shows that 69.66% of the scholars are aware and 30.34% scholars are not aware of UGC-Infonet DLC. The 32.82% scholars of PU-C, 31.69% of scholars GNDU-A, 25.40% scholars of PU, 36.30% scholars of TU-P and 20.00% scholars of CUP-B are not aware of the UGC-Infonet DLC, (Table: 5.18).

The study found that the 37.50% of the scholars source of awareness regarding UGC-Infonet DLC is through Library website, 44.26% scholars of GNDU-A and 42.06% scholar's of PU-P through friends, 39.13% scholars of TU-P and 39.53% scholar's of CUP-B through the library professionals. The overall majority of the source through friends/colleagues followed by library professionals and library websites, (Table: 5.18 (a)).

The study found that the majority of the scholars of PU-C, GNDU-A, PU-P and TU-P access from their respective departments and scholars of CUP-B from the university library. The highest number of 45.57% scholars access from the department, and very less 1.38% scholars access from any other place. Thus, it

can be assumed that most of the scholars access UGC-Infonet DLC from their respective departments, (Table: 5.19).

- The study reported that 53.65% of the scholars are mainly using UGC-Infonet DLC for study and research work followed by 24.66% for updating subject knowledge, 21.27% for publishing articles and only 0.42% used for any other purpose. This shows that it has made a huge impact on scholar's study and research work, (Table: 5.19 (a)).
- The study found that the majority of the 47.28% scholars do not use UGC-Infonet DLC due to the lack of knowledge to use and very least 2.24% scholars due to no journal related to their field of research. The primary concern is lack of knowledge to use, and it is the responsibility of the Library to impart training to the scholars, (Table: 5.19 (b)).
- The study reported that a majority of 34.99% scholars is aware of e-journals and very few 8.91% scholars are aware of Bibliographic database available under UGC-Infonet DLC. It shows that e-journals are more popular among scholars due to the primary source of information, (Table: 5.20).
- The study found that a majority of 8.87% scholars prefer Science Direct followed by 8.57% preferred Emerald and 1.00% preferred Project Muse. The majority of the Scholars of PU-C prefer Royal Society of Chemistry, Emerald and Springer Link, Scholars of GNDU-A prefers Emerald, Scholars of PU-P, TU-P and CUP-B prefer Science Direct, (Table: 5.20 (a)).
- The study found that largest number of scholars, that is, 34.24% access UGC-Infonet DLC on a monthly basis and very least number 4.91% scholars use occasionally. It shows that Scholars used the consortium, according to their requirements. The scholars of TU-P, CUP-B accesses daily by comparing to the other scholars of PU-C, GNDU-A on a weekly basis and Scholars of PU-P on a monthly basis, (Table: 5.21).

- The study found that the highest percentage of the scholars, that is, 71.09% access less than 5 journals and the least number of 8.33% access less than more than 10 journals. However, it is interesting to note that the very few scholars are using more than 10 journals, (Table: 5.22).
- The study found that a majority of the 70.51% scholars from PU-C, GNDU-A, PU-P, TU-P and CUP-B preferred both (searching and browsing) options and the least number of 10.34% scholars preferred browsing options, (Table: 5.23).
- The study shows that 37.68% scholars search by inserting the name of the title of the article, which is the highest and the least numbers of 2.22% scholars use any other approach. Scholars of PU-C (38.40%), TU-P (37.50%) and CUP-B (41.94%) prefer Keywords and scholars of GNDU-A (39.51%) and PU-P (39.75%) prefer article title, (Table: 5.24).
- As regards to the browsing approach in accessing e-resources, it was found that Journal title, which is used by a greater number of 48.14% scholars and very few 1.65% scholars used any other source. It shows that scholars find journal title more credibility and authentic than to other browsing approaches, (Table: 5.25).
- The study reveals that the majority of 64.39% scholars use simple search and very least 0.51% scholars use any other approach. Overall, it shows that scholars do not have the proper knowledge expertise to search e-resources, (Table: 5.26).
- The study found that majority of scholars, that is, 61.39% use laptops, 25.36% use desktops and very little 1.46% use I-pad device for accessing e-resources. It observed that scholars had shown diverse opinion about the devices for accessing e-resources, but the overall laptop emerged as the most popular and widely used device by scholars (Table: 5.27).
- The study reveals that the majority of the 64.07% scholars read e-resources by using both computer screen and printouts, followed by 19.66% scholars read through the computer screen and 16.27% scholars read through printouts, (Table: 5.28).

- The study revealed that the majority of scholars (78.19%) prefer PDF format and very few scholars (5.78%) prefer HTML format to read e-journals in the University Libraries of Punjab, (Table: 5.29).
- The study found that 33.08% scholar's use e-resources to read online, download and print whereas very few 6.75% scholars download and print without reading. It assumes that scholars first read if he/she found useful for their research, then they download and print, (Table: 5.30).
- The study found that the majority of the 51.53% scholars acclaimed that they are satisfied with the user-friendly interface of UGC-Infonet DLC and very few 3.05% scholars admitted that they don't know. It also reveals that the majority of the 52.78% scholars of CUP-B, 46.81% scholars of PU-P and 45.16% Scholars of TU-P is partially satisfied, (Table: 5.31).
- The study reveals that the majority of the 64.58% scholars expressed that they are satisfied with the full-text e-resources available through UGC-Infonet DLC and only 0.17% scholars is highly dissatisfied. (Table: 5.32(a)).
- The study found that the highest number of 48.64% scholars is satisfied with the Bibliographic databases available through UGC-Infonet DLC and no one find highly dissatisfied. It also reveals that scholars of GNDU-A (45.36%) found partially satisfied as compared with scholars of PU-C (43.18%), PU-P (56.38%) and TU-P (53.76%) found satisfied. The scholars of CUP-B (44.44%) equally found satisfied and partially satisfied, (Table: 5.32 (b)).
- It was found that a majority of 65.08% scholars are satisfied with the open access resources available through UGC-Infonet DLC and least 0.68% scholars are highly dissatisfied, (Table: 5.32 (c))
- It is found that a majority of 54.19% scholars preferred both printed and e-resources, 22.20% scholars preferred the e-resources and 23.61% scholars preferred printed resources (Table: 5.33).

- The study revealed from the table: 5.34 (a) indicates that the highest number of scholars, that is, 55.61% consider that e-resources have a high impact on the quality of research and very least 0.24% consider not at all. Whereas from the table: 5.34 (b) indicates that 51.59% scholars consider that print resources have high impact on the quality of research very least 0.12% said not at all. Table 5.33 (c) and 5.33 (d) shows that during UGC-Infonet DLC (Year 2004 - 2017) the publication has increased from 4749 Publications to the 23740 Publications in the University Libraries of Punjab.
- The study found that e-resources are more useful as compared to print resources. It reveals that a majority of 72.61% scholars said 'Yes' followed by 19.83% scholars said 'No' and 7.56% scholars said that they 'Don't know, (Table: 5.35).
- The study reveals that most of the scholars prefer e-resources due to availability (32.38%) followed by searching and browsing (26.70%), Convenience (24.18%) and very few (0.28%) influenced to access the e-resources, (Table: 5.35 (a).
- The result from the table: **5.36 (a)** found that in the case of frequency of using E-journal majority of the 56.32% scholars uses all the time and very few 0.47% scholars said they never use whereas, from the table: **5.36 (b)** found that in the case of frequency of using the print journal from the table that the majority of the 51.23% scholars uses most of the time and very few 0.47% scholars uses never. The data show that the majority of the scholars using e-journal most of the time compare to print journal.
- The study reveals that the scholars opinion about the quality of content in e-resources compared to print resources, 43.21% scholar's agreed it is same as print versions followed by 37.54% scholar's agreed it is Better than print, 10.74% scholar's agreed it is Not better than print and 8.50% are not sure, (Table: 5.37).

- The study reveals that a majority of 62.37% scholars said 'Yes', that is, they face problems while accessing e-resources, whereas 37.63% scholars said they do not face any problem by saying 'NO'. Overall, it shows that the scholars face problems while accessing e-resources, (Table:5.38).
- The study found that the majority, that is, 50.48% scholars face internet speed problem followed by 20.35% scholars found inadequate e-resources and very least 3.07% scholars say any other reasons. It shows that internet speed is very low in all the University Libraries of Punjab, (Table: 5.38(a)).
- The study demonstrates that the highest 41.41% scholars face problems while reading on the computer and 36.87% scholar's face in downloading. (Table: 5.39).
- The scholars opinions about future prospects for e-resources available under UGC Infonet DLC, the study found that a majority of 60.00% scholars accept that it will co-exist with print, followed by 15.59% scholars responded it would replace the print and very few 12.03% scholars answered that they do not know. It shows that print resources are also required for future prospects, (Table: 5.40).
- It was observed from the study that the majority of the 78.16% scholars said YES for user's awareness/training programs on using e-resource under UGC-Infonet DLC. Still, 21.84% said NO and do not require training programs, (Table: 5.41).
- The study found that a maximum of 41.84% scholars needs training occasionally, followed by 38.37% scholars need on a monthly basis and 2.72% need at any other time. The highest scholars from PUC-P, PU-P, TU-P and CUP-B need training on occasionally and scholars of GNDU-A required on a monthly basis, (Table: 5.41 (a)).
- The study found that 22.24% scholars prefer practical based seminar and workshops, 18.22% scholars prefer article alert service and very few 8.94% prefer digital archival facilities in the usage of e-resources under UGC-Infonet DLC. (Table: 5.42).

### 6.3 Findings that can be leveraged

There is no doubt that UGC-Infonet DLC as a collaborative library system has its unique advantages. These advantages are useless unless they are known and utilized by the masses well in time during their visit to libraries. There is an urgent need for raising the awareness levels of the scholars regarding UGC-Infonet DLC as well as about the use of e-resources over the print resources in research and academic activities. The findings across chapter five points towards the need for an institutionalized approach towards awareness creation across the stakeholders with full participation of library and its staff as well.

The collection of e-resources under the UGC-Infonet DLC needs subsequent updating, and its usage is to be enhanced and consolidated. The resource adequacy levels were questioned and, the preference of scholars for print and digital sources were examined. The findings point toward the need for consolidating resource base, ensuring resource adequacy along with searchable and downloadable ease was stressed.

Not so satisfactory results were noticed about user satisfaction with the services available in the University Libraries of Punjab. Some pointed towards the non-friendly nature of the interfaces; others pointed towards the lack of library preparedness in assisting the scholars, whereas a section of scholars pointed towards the non-arrangement of training.

The user dissatisfaction was observed to be emerging from the lack of training provisions, the lack of multilingual search algorithms, not aware regarding optimum database search mechanisms, non-availability of the requisite bandwidth. The supremacy and collaborative advantage of the UGC-Infonet DLC need leverage across the masses, especially the scholars if the mission is to be realized in the Indian context. The organizational initiatives for

preparing the scholars with requisite skills are missing and, user's information literacy needs are not being addressed properly. No efforts have been made to change the user's perceptions regarding library and transition of libraries from stand-alone physical repositories to online collaborative networks where global knowledge can be accessed.

The scholar's viewpoint needs to be redressed that the resources accessed across UGC-Infonet DLC, are different in content and manner from traditional books and the photocopy type approach towards collecting research articles for research work. E-resources need to be downloaded, saved and stored for later on retrieval and printout, to render them usable. This aspect of usage and training needs focus if the scholars are consistent with UGC-Infonet DLC usage. This study suggests that the use of e-resources could enhance effectiveness, efficiency, and ability to quickly access the necessary information. It would assist the researcher in benefiting from this huge volume of digitized information.

It will help to improve the quality of research and also encourage using these e-resources for their assignments and projects. Since there is a significant relationship between computer literacy and the use of e-resources and services, it is desirable that adequate emphasis should be given to developing computing skills among scholars through the user education program. Thus the scholars having better computing skills can be more benefited from the ever-increasing volume of digital information. Finally, if they are computer literate and knowledgeable about search techniques, they will start using e-resources more frequently and confidently. University Libraries of Punjab should convert the non-users scholars into actual users by educating them about the potentiality of the UGC-Infonet DLC e-resources for their academic activities.

It is clear from the analysis that the success rate to the adoption of e-resources is increasing through the acceptance is gradual. The emerging e-journal based consortia are assisting and speeding up the research activities and are in the equal range of being preferred along with the print sources of information. The user's awareness levels are gradually increasing yet are lower than expectations. It is a welcome respite that the user's interest is being created. The amazing technological advancements have also opened new horizons for information creation, duplication, storage, access, distribution, and presentation. The pace at which information sources are being produced and converted into electronic form is marvelous. Digitization of information is resulting in access to an unbelievable quantity of expensive information. The human intellect previously hidden from the masses is now rendered accessible to all.

The libraries should subscribe more and more e-resources through national and international consortia rather than those are available through UGC-Infonet DLC like INDEST consortia, CSIR consortia and many more along with a reputed publisher based e-resources those are readily available in the market. Most of the libraries are accessing e-resources only through UGC-Infonet DLC, which are very few numbers, so the scholars are not getting their required e-resources. University Libraries of Punjab should take a leading role to create awareness among scholars about the UGC-Infonet DLC by conducting training programs, workshops, audio-visual presentations, demonstrations, etc. on a regular basis. The authority of University Libraries of Punjab should support the libraries in every possible way, and Board members should cooperate in this regard.

## 6.4 Result of Hypothesis

### Hypothesis Testing (Chi-Square Test)

**H1: Most of the research scholars are aware about UGC- Infonet digital library consortium and use e-resources.**

**Null Hypothesis H<sub>0</sub>:** There is no significant difference between research scholars about awareness of UGC- Infonet digital library consortium and use of e-resources.

**Alternative Hypothesis H<sub>1</sub>:** There is a significant difference between research scholars about awareness of UGC- Infonet digital library consortium and use of e-resources.

**Chapter 5; Table 5.18** indicates the hypothesis results with applying Single Table Formula of Chi-Square on awareness of UGC- Infonet digital library consortium and use of e-resources. The Chi-square calculated value is 8.53, which is smaller than Chi-Square critical tabulated value. The results of hypothesis testing found no significant differences between most of the research scholars about awareness of UGC- Infonet digital library consortium and use of e-resources. Therefore, the null hypothesis has been proved and accepted  **$X^2 = 8.53$ , and p value = 0.073 ( $\leq 0.05$  significant).**

**H2: Majority of the research scholars are partially satisfied with e-resources available in UGC-Infonet consortium.**

**Null Hypothesis H<sub>0</sub>:** There is no significant difference between majorities of research scholar regarding partially satisfied with e-resources available in UGC-Infonet consortium.

**Alternative Hypothesis H<sub>1</sub>:** There is a significant difference between majorities of research scholar regarding partially satisfied e-resources available in UGC-Infonet consortium.

**Chapter 5; Table 5.32(a)** indicates the hypothesis results with applying Single Table Formula of Chi-Square on partially satisfied with e-resources available in UGC- Infonet consortium. The Chi-square calculated value is 15.90, which is smaller than Chi-Square critical tabulated value. The results of hypothesis testing found no significant differences majorities of research scholar regarding partially satisfied with e-resources available in UGC- Infonet consortium. Therefore, the null hypothesis has been proved and accepted  **$X^2 = 15.90$ , and p value = 0.460 ( $\leq 0.05$  significant)**.

**H3: Electronic resources have more significant impact on research as compared to print resources.**

**Null Hypothesis H<sub>0</sub>:** There is no significant impact of e-resources as compared print resource.

**Alternative Hypothesis H<sub>1</sub>:** There is a significant impact of e-resources as compared print resource.

**Chapter 5; Table 5.34(a)** indicates the hypothesis results with applying single table Formula of Chi-Square on a significant impact of e-resources as compared print resource. The Chi-square calculated value is 12.76, which is smaller than Chi-Square critical tabulated value and in **Chapter 5; Table 5.34(b)** the chi-square calculated value is 15.06, which is also smaller than Chi-Square critical tabulated value. The results of hypothesis testing found no significant impact of e-resources as compared print resources. Therefore, the null hypothesis has been proved and accepted. **Table 5.34(a)** shows  **$X^2 = 12.76$ , and p value = 0.689 ( $\leq 0.05$  significant)** and **Table 5.34(b)** shows  **$X^2 = 15.06$ , and p value = 0.520 ( $\leq 0.05$  significant)**

**H4: Some of the research scholars are facing problems in accessing e-resources available in UGC-Infonet Digital Library Consortium.**

**Null Hypothesis H<sub>0</sub>:** There is no significant difference between research scholars' regarding problems in accessing e-resources, available in UGC-Infonet Digital Library Consortium.

**Alternative Hypothesis H<sub>1</sub>:** There is significant difference between research scholars' regarding problems in accessing e-resources, available in UGC-Infonet Digital Library Consortium.

**Chapter 5; Table 5.38** indicates the hypothesis results with applying single table Formula of Chi-Square on problems in accessing e-resources, available in UGC-Infonet Digital Library Consortium. The Chi-square calculated value is 7.94, which is smaller than Chi-Square critical tabulated value. The results of hypothesis testing found no significant differences between research scholars' regarding problems in accessing e-resources, available in UGC-Infonet Digital Library Consortium. Therefore, the null hypothesis has been proved and accepted  **$X^2 = 7.94$ , and  $p$  value = 0.093 ( $\leq 0.05$  significant).**

## **6.5 Conclusion**

The Science based international Journals are being preferred across five universities as the most accessed content. In other words, intends to infer that the non-available premium research inclined journals is access at a rate faster than Indian ones. In other words, it can be deduce that the infrastructure to support accessing UGC-Infonet DLC in the Libraries is good because the scholars are satisfied. This indirectly point to more use of the system based content across the science and engineering students in comparison with scholars from the social sciences, humanities, literature and library sciences. This might be an outcome of better equipped

departmental libraries or the lesser enrolment of scholars in doctoral programs or the existence of some other source of information in the department as well.

The collection adequacy is a related aspect and the trends point towards the satisfactory rankings of the observations about the overall resource adequacy. The readiness of the respective institutions and library setups is not in competition with each other. The scholars pointed towards the gaps in infrastructure readiness of institutional libraries.

The library readiness is a major question in itself. The infrastructure availability, librarian training and resource adequacy believed to shape the user's experiences. In the context of this, our findings point to satisfactory levels of resource adequacy across five university libraries, yet the user-friendliness and system availability and internet bandwidth were not that satisfactory. The collection, preservation, expansion and updating is essential to attract and retain research scholars towards e-resource based platforms. The weekly or bimonthly monitoring practices, though absent in Indian context, needs subsequent implementation for the best possible usage of e-resources across scholars. The finding and conclusions are in line with existing research on the operational inefficiencies about collection management practices in the Indian context. Bureaucratic work cultures and centralization could be obvious reasons for this neglected state of affairs in the University Libraries of Punjab.

The University Libraries of Punjab project a comparatively high awareness level of nearly eighty percent. The enhanced awareness is a welcome respite as the collaborative library consortia as such is useless unless put to good use by the scholars. It is being devised for aiding the research process and, the high awareness regarding the existence of such a system is an

aspect that could lay the foundation for further improvement and betterment of existing mechanisms

The most striking observation is that the scholars across the five chosen university of higher learning are the lack of skills and efficiency across the scholars optimum usage. The scholars opinions as expressed stressed the need for awareness sessions and proper training for skill development. The library's role in creating awareness is highlighted indirectly. The findings point toward the weekly usage of UGC-Infonet DLC facilities. Though this is not something satisfactory yet the weekly usage needs translation into the bi-weekly affair. The user's awareness regarding free access to e-resources is on the rise as per the study. The friends and library websites observed to play a key role in this exercise as such in the University Libraries of Punjab. It found that the e-journals and e-books are the most accessed resources by the scholars.

The highest percentage of the research scholars access at least five different journals across the general usage across the network. This, in other words, connotes that the usage is increasing, though it may take some time on account of raising the awareness, friend circle, peer network as well as increased user-friendliness of interfaces; as observed in research. Regarding the user's opinions, a majority of the scholars depict seamless online browsing and content exploration skills, which need to be refined to render them more useful. The question of user-friendliness of the interfaces was a deep concern as initially observed. The study acknowledged that only half of the scholars are satisfied with the user interface. The level of satisfaction of the user is about the full-text e-resources available through UGC-Infonet DLC is only sixty percent which has a potential to rise on the increase.

The scholar' perceptions about non-assistance by the operational staff and non-cooperation about search algorithm customization could be obvious reasons for such a pattern of library facility usage in the University Libraries of Punjab. The general national trends point toward the lower and non-satisfactory usage tendencies across the points of access in libraries and the other compatible devices like the laptops and personal desktops of the scholars. The user's computer-based self-efficacy has been observed as the key factor that influences the frequency of the visit, the pattern of time spent as well as the user's experiences regarding the new technology-based setup (Hines, 2013).

As predicted, that the rise in the use of digital media will influences the currency of print resources, this observation observed as true in the context of our findings from across the University Libraries of Punjab. The impact of e-resources on the quality of research, it found that 55.61% consider e-resources have a high impact on the quality of research followed by 39.08% who regard the impact as a moderate one.

Regarding assessment of the impact of print resources on the quality of research, it is inferred across the user study, that the majority, 51.59% scholars consider that e-resources have a high impact on the quality of research followed by 44.75% who regard the moderate impact. This is indicated that e-journal consortia have a significant impact on the research work in all the areas of discipline. Another strange observation was regarded to perceptions of the scholars and preference for both e-resources and print resources. The e-resource usage is still not a priority across a section of library scholars. The research scholars still regard it as a source in addition to print resources not as a source that is worth depending and reliable.

## **6.6 The suggestions for improving the usage of UGC-Infonet DLC**

Based on the suggestions given by the scholars and by the findings of the study, the following suggestions and inputs are present to improve and maximize the utility of e-resources available through UGC-Infonet DLC across the University Libraries of Punjab:

### **6.6.1 Collection Services and Infrastructure Adequacy**

- The library authorities and management of PU-C, GNDU-A, PU-P, TU-P and CUP-B should take necessary steps to motivate the scholars to visit the library frequently.
- The University Libraries of Punjab should provide a computer system with high-speed computer terminals installed in the various departments, departmental libraries, computer laboratories, and central Library, etc.
- The library may provide Article Alert Service, and Proactive e-mail based content pages of select e-journals for the scholars and the same may be made available on the library website for future reference.
- To improve library services, new gadgets such e-book readers, self-help kiosk, QR codes, RFID technology etc. should be made available in the libraries to attract more users in the libraries.
- Websites of the university and library are the chief source of updated information on everyday activities, so the web pages should deliver latest development, services and activities regarding academic information.
- The University Libraries of Punjab should design and develop a Multimedia Presentation for the scholars to get encouraged towards the efficient and effective use of e-resources available under UGC-Infonet DLC in different subjects.
- The content page of the website should be updated regularly along with the date of last update; it would help the scholars to know the new updated content page.

### 6.6.2 Methods and Sources of Awareness of UGC Infonet DLC

- The study found that 20.00% of the scholars are not aware of UGC Infonet DLC so the University Libraries of Punjab needs to sensitize the scholars with regard to authenticity and usage and credibility of the e-resources. The preferences about e-resources and print resources need a calibration as the scholars are unaware of the effective use of such resources. The awareness-generation across the young scholars is essential to project it as a viable and most effective alternative to print resources available in the traditional libraries, either at the department or at the central library.
- There is an urgent need to leverage the power of the ICT interfaces and the related platforms like the library website and the friend circle of the scholars to create awareness regarding the existence of the UGC-Infonet DLC in the nearby institutional and departmental library. The focus should be on creating a climate that empowers the scholars to break the initial inertia and hesitations with regard to e-resource awareness and their correct usage for research purposes.
- The current UGC-Infonet DLC system is accessible only across the libraries yet the remote access and multiple device access could increase the frequency and intensity of usage on a regular basis.
- To increase e-resources usage among students, faculty should give more assignments on current topics so that scholars are forced to exploit e-resources more efficiently. Course work on the proper utilization of e-resources for scholars should be introduced at all the Universities Library of Punjab as a part of PhD programs.

- It should be the duty of University Libraries of Punjab authorities to teach research scholars about the impact of e-journals and their value in research. This could create a solid ground for a digital learning environment and fulfil the purpose of libraries to provide timely and speedy access to e-journals without wasting scholars precious time.
- The number of e-resources available through consortia should be increased in to access more journals in their respective fields. Access to e-journals should be provided to the scholars in their respective hostels, departments, campus etc. so that the acceptance and use of scholarly e-journals can be maximized.
- To enhance research activities, it is essential to introduce and demonstrate the new e-journals available to scholars of their subject interests by the library staff, through emails indicating new subscriptions, launch events, training programs, will promote awareness.
- INFLIBNET, UGC-Infonet DLC should take care of problems and information requirements of the scholar through the usage report of the particular university. It should inform about their policies and actions of the consortia programme by providing reference guides, Flyers, brochures, Banners, posters, emails, bulletin board made freely available at various service points in the library along with hostels, Departments and faculty meeting places. Publishers of e-resources, templates, banners, posters, brochures, and press release can be used for publicizing e-resources to all universities and departments from time to time.
- RSS Feeds, blogs, Wikis, Facebook, Twitter, are the new methods, which can be effectively used for the promotion of usage of e-resources.

- User education can be conducted in a small group of scholars for a single subject (Information Technology, Physics, Chemistry, Biology, etc.) so that they can familiar and access the e-resources available UGC Infonet DLC.
- The University Libraries of Punjab should insist on the user-friendliness of their website interfaces. The website, on-site assistance and the easy to operate procedures are essential to drive the traffic and enable the scholars to benefit from such a library based consortia

### **6.6.3 The Usage pattern of e-resources available under UGC- Infonet DLC**

- The University Libraries of Punjab should insist on the sufficient online subscriptions in order to enhance the collection across multiple disciplines. The availability of multi-linguistic search and browsing capabilities could be a step towards usage enhancement of UGC-Infonet DLC.
- There is a need to organize orientation classes and training programs in accessing, searching and downloading of e-resources effectively at regular intervals and awareness among the research scholars should be created to using e-resources under UGC-Infonet DLC to obtain current information.
- The University Libraries of Punjab web page should provide an online guide to various search-options to access and use e-resources. This will to find and get the desired content and will also maximize the use of e-resources and the satisfaction level of scholars.
- The University Libraries of Punjab should create a digital database of resources that they subscribe through digital library software to enable scholars to search full-text journal articles from various publishers by subject, keywords and topic.

- It is suggest that scholars of University Libraries of Punjab must learn that searching by keywords rather than by subjects will not increase the amount of relevant information obtained and using keywords alone will not produce the correct level of specificity. They should be equally familiar with other search options. Scholars should teach about advanced search strategies and wild card characters to make e-resources easily accessible.
- The problem of retrieval can overcome by acquiring federated search engine software for faster download of e-journals and expansion in the use of e-journals access.

#### **6.6.4 The Significance of E-Resources V/S Print Resources and its Impact on Research**

- The study indicates that the print journals are still important for the scholars. The University of Punjab Libraries should continue to provide printed editions in addition to e-resources.
- Most of the Scholars give importance to printed resources in the comparison of e-resources, so that in shifting era of e-learning through ICT requires to encourage the scholars about e-learning which is used anywhere, anytime time at minimum cost.

#### **6.6.5 Problems, prospects, measures and suggestions for improving UGC-Infonet DLC**

- To enhance the use of e-resources under UGC-Infonet DLC bandwidth should be sought by the libraries to provide faster access, along with high-speed computer terminals to be installed in the various departments, departmental libraries, computer laboratories, and central Library, etc., which will save scholars time and be a source of motivation to use e-resources. This will also solve the problem of slow downloading. Librarians should take

care of computer laboratories providing an uninterrupted power supply for accessing e-resources.

- To solve the problem of slow downloading of HTML and PDF files, it is suggest that there should be a provision of other options such as converting the soft copy of the article/document into JPEG or JPG files. Hard copies of documents can be scan and converted into JPEG or JPG files as these files are easily downloadable due to their small size, special software and systems are not required to open them. These files have a good quality of text and images.
- Regular training needs to be organize for the scholars related to UGC-Infonet DLC in a systematic manner so that their participation could be encouraged and ensured. The scholars, information literacy needs consistent revision and restructuring by the needs of the emerging digital infrastructure.
- The need for more qualified staff with better exposure to modern technological devices to assist the scholars when they face problems in accessing e-journals should be stress in all libraries. In-service training should given to those library professionals who are already working, so that they may have a better understanding.
- The research scholars requirements and opinions should be taken into consideration on a priority basis while subscribing to the e-resources. The Library should conduct a scholars feedback survey through online and offline to know the usage of e-resources and the future needs of the scholars from time to time and include a number of online resources in various disciplines.

- Separate e-resources floor provision make in the Library building for effective use of e-resources. An e-archive should be provided wherever possible, when this cannot achieve, the physical archive needs to be retain.
- The library should celebrate special week-month through various programmes with the help of handbooks/tutorials, list of e-resources, gateways to online resources for the scholars.

#### **6.6.6 General comments and suggestions for the improvement of e-resources**

The availability of the requisite Internet bandwidth featured across the interactions with scholars from across all the university libraries surveyed. The scholars from nearly all the universities pressed for the need for making available a high bandwidth system for enabling faster and more efficient e-resource access. The device compatibility was the related concern that was equally voiced by the scholars from across the Punjab. The concern of user-friendliness of the interfaces also echoed across diverse categories of the scholars from across the five chosen universities.

The scholars across **CUP-B** expressed the desire with regard to the urgent need for improving the current access speed of the internet. Moreover, the scholars stressed the need for full access to the subscribed journals. The scholars suggested that the new options should be added to make the current interface more usable and accessible across the masses. The scholar's opinions regarding the facilitation of access to the journals which are not under its cover till now and suggested the incorporation and coverage of internationally acclaimed libraries from across the world. The scholars also pointed towards the recurrent need for digital archiving facilities. The scholars insisted on the utility of article alert service, increase the current access speed as

well as the arrangement of regular sessions of awareness and training. The scholars pointed towards the need for proper gauging of the articles in the post download stage and suggested that the current collection of the various e-resources should also be available outside the library and should be keep free of cost.

Whereas in the **GNDU-A**, the scholars favoured the complete reliance on the e-resources. They advocated the device compatibility and provision of access across their laptops and palmtops in departments, hostel room as well as across their place of convenience. The scholars suggested the incorporation of embedded software for in-house print. They also suggested the provision of the print version of the concerned document and facility of proactive email-based content. The regional linguistics demands were observed. The scholars advised search and archive services in Punjabi, Sanskrit and Urdu as well. The scholars preferred the provision of high-speed data access to more data and wished that awareness seminars and workshops should be conducted. The scholars advocated the frequent hosting of awareness campaigns for the use of e-resources. The scholars also stressed the need for fair and equitable consideration for all the branches as well as all the diverse disciplines, while planning future digital libraries. Some of the scholars pointed towards the essence of a collaborative platform for interaction among scholars.

The scholars also objected to the current terms of practice and conditions about the data download limits, data usage restriction on the scholars as these restrictions are widely believed to render the setup useless for the scholars. The scholars proposed the notion of the remote access and fair access for all scholars. Some opinions that the current portfolio of open access resources should be further increased and consolidated. Some advocated the practice of the respective departmental password username to its scholars so that they can access e-resources from

anywhere and limited to access from the department library only. Maximum students voiced the concern of user-friendliness and multi-linguistic search base (Gurmukhi, Sanskrit and urdu). Some of the scholars stressed the need for incorporation of journals from international relations, vocational psychology, economic geography, career counselling as well as physical education.

In case of **PU-C**, the regional high literacy levels filtered into the opinions and ideologies with regard to the optimum use of the research resources. The scholars advocated the addition of more journals as well as the expansion of the current portfolio of free e-resources. The students stressed the case for Wi-Fi enabled connectivity as well as the trunk line for bandwidth availability. The scholars also suggested the rationale of organizing the user awareness programs on regular a basis for familiarizing the new scholars with the effective use of e-resources promptly. The scholars voiced concerns regarding the availability of remote access, and the inclusion of more resources. The scholars suggested that the current setup should be easily accessible to all, and advocated the insistence on the article alert service.

Scholars pointed towards the pungent need for the increase in the options of download. They also stressed the need for the provision of online versions of daily newspapers and economic weeklies. The other scholars underlined the role of timely redress of user's complaints on a periodic basis. The controlled access towards some journals was highlighted as a matter of concern across the sections of scholars.

The question of timely and real-time updation of content on the UGC-Infonet DLC was stress. Other scholars pointed towards the lack of internet speed and needed to update the system. The scholars also objected to the non-availability of the full text; moreover, the lack of knowledge or internet speed is a hindrance which if improved can be highly beneficial. Some

scholars devised the rationale for a tie-up with another university to access more resources. There are very few e-resources available for scholars with disabilities, kindly considered and it should be accessible. A section of scholars advised that the journals should be arranged yearly in alphabetical order and topic wise.

In case of **PU-P**, the scholars favoured the instant and consistent access to Wi-Fi connections. Another regular user of the facility pointed towards the need for proper gauging of the articles in post download stage and suggested that the current collection of the diverse e-resources should also be available outside the library for the scholars and should be kept free of cost. The scholars opinions regarding the facilitation of access to the journals which are not under its cover till now and suggested the incorporation and coverage of internationally acclaimed libraries from across the world. The scholars also pointed towards the recurrent need for digital archiving facilities. The scholars insisted on the utility of article alert service, increase the current access speed as well as the arrangement of regular sessions of awareness and training. Some scholars advocated the provision of full-text paper, free access to all the articles and more journals in online mode. There is a lack of information regarding UGC-Infonet DLC across the frequent scholars of the library in aforesaid institution. Another problem was about the inefficiency of the library staff.

Some scholars pointed out that most of the time, some online content, especially the papers are not accessible and the access is made available to the abstract only. The question of free download found echo across multiple scholars. Some suggested that the e-journals available under UGC-Infonet DLC should make to coexist with printing options. The section of scholars

favoured the existence of user alert service. A section of scholars advocated the use of workshops for awareness creation and increasing individual's digital literacy levels.

The issue of free and high-speed internet connectivity and related ICT infrastructure readiness was questioned because the UGC-Infonet DLC was inaugurated yet the university's preparedness was missing. The scholars objected to non-organization of familiarization sessions about the optimum usage of the collaborative resources from across the world. A major chunk of scholars suggested the provision of the print version of the concerned document and facility of proactive email-based content. The regional linguistics demands were observed. The scholars suggested search and archive services in Punjabi and Urdu and local dialects as well. The scholars preferred the provision of high-speed data access to more data and wished that awareness seminars and workshops should be conducted. The scholars advocated the frequent hosting of awareness campaigns for the use of e-resources. The software linkages were observed as weak and, the relative device compatibility of the infrastructure was viewed as non-comprehensive by the scholars of the facility.

In case of another institution, the **TU-P**; the scholars varied about their opinions of the content and context of the orientation program to make the students and faculty aware about UGC-Infonet DLC. The issue of awareness about the existence and usage of the facility was seen as a major issue across Thapar University scholars. The scholars also objected to the non-availability of the full text; moreover, lack of knowledge or internet speed is a hindrance which if improved can be highly beneficial. Some scholars devised the rationale for a tie-up with another university to access more resources.

The student also desired the availability of remote access to the e-resources across their tablets, palmtops and laptops in their hostel rooms and across the lounges in libraries. More categories of the journals should be made on the basis of properties in a specific field. The scholars also suggested the rationale of organizing the awareness programs on a regular basis for familiarizing the new scholars with the effective use of e-resources on time.

The scholars voiced concerns regarding the availability of remote access, and the inclusion of more resources. Some advocated the initiation of the standard library practice of the respective departmental password username, so that they can easily access e-papers from anywhere and are not limited to access from the department library only. Other scholars pointed towards the lack of internet speed and needed to update the system. Scholars also objected to the non-availability of the full text; moreover, the lack of knowledge or internet speed is a hindrance which if improved can be highly beneficial.

### **6.7 Suggestions for further Research**

Most obviously, this user study based research needs to be pursued in other Universities also; in order to understand the generalization of outcomes. It is vital to use a different methodological approach to examine the barriers encountered when using UGC-Infonet DLC. Further research is needed to investigate how the scholars interact with information, what specific e-resources they access, what search strategies they use, as well as the extent to which their information needs are satisfied. In the study, it was noticed that the e-journals on the science subject were downloaded to the maximum extent. There is no study in relation to different faculties like the use of consortium sources by Social Science faculty, Humanities and possible interdisciplinary research.

The future research is needed to improve our understanding of the user's awareness and usage patterns of the diverse library consortia especially the UGC-Infonet DLC as its successive versions. The library sciences and informatics as a discipline need strong research and analysis regarding user awareness and usage skills development. Further research can be carried out in areas of:

- Usage patterns and inertias to use the e-resources
- Information literacy of the users and user's ICT skillsets
- Forms and contexts of user training programs for researching out to the masses
- User awareness program for rural students
- Methods and contexts of enhancing the user-friendliness of interfaces
- Instances of the multi-linguistics search base
- Enhancing the use of local languages in training and user awareness creation
- Advocating the librarian training and skill development

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**Questionnaire- Research Scholar**

Dear Research Scholar,

I am requesting you to kindly fill up the Questionnaire. The Topic of my Research Entitled “**Awareness and use of UGC INFONET Digital Library Consortium among Research Scholars of University Libraries of Punjab: A Study**” and registered as PhD Scholar at Babasaheb Bhimrao Ambedkar University, Lucknow. The data provided by you will be kept confidential and will be used for research purpose only. I solicited your kind co-operation in this regards.

Thanking you.

With Regards

**Vishwas Jeet Rajbanshi**

(Research Scholar)

DLIS, BBAU (A Central University), Lucknow, U.P.

**1. USER PROFILE**

**1.1 Name:** \_\_\_\_\_

**1.2 Gender:** Male [  ] Female [  ]

**1.3 Age group:** 21-25 [  ] 26-30 [  ] 31-35 [  ] 36-40 [  ] 41-45 [  ]

**1.4 Name of the University** \_\_\_\_\_

**1.5 Subject Discipline** \_\_\_\_\_

**1.6 Department/Branch** \_\_\_\_\_ **Session** \_\_\_\_\_

**2. COLLECTION SERVICES AND INFRASTRUCTURE**

**2.1 How frequently do you visit the library?**

(a) Daily [  ] (b) Weekly [  ] (c) Fortnightly [  ] (d) Monthly [  ] (e) Rarely [  ]

**2.2 Please mention the purpose of visit to the Library. (Multiple Choice)**

(a) Issuing and return of books [  ] (b) Searching online information [  ]  
(c) Consulting print resources [  ] (d) Any other pls. specify \_\_\_\_\_

**2.3 Whether your library has adequate number of e-resources to meet your needs?**

(a) Yes [  ] (b) No [  ]

**2.4 Adequacy of e-collection available in the library.**

Collection	Very adequate	Adequate	Inadequate	Very inadequate
E-journals				
E-databases				
E-book				
E-Scholarly internet resources				
E-Reference				
E-thesis				

Any other please specify\_\_\_\_\_

**2.5 What are the services related to e-resources is provided by the library?(Multiple Choice)**

- (a) Electronic Document supply [ ] (b) Current Article Alert Service [ ]  
(c) SDI Service [ ] (d) Any others please specify\_\_\_\_\_

**2.6 Does your library offer computers for accessing e-resources?**

- (a) Yes [ ] (b) No [ ]

**2.7 Does your library offers high bandwidth connection of the internet?**

- (a) Yes [ ] (b) No [ ]

**2.8 Which kind of internet connections is available for accessing of e-resources?**

- (a) Wi-Fi [ ] (b) Leased line [ ] (c) Li-Fi [ ]

**2.9 Does UGC Infonet have enough collection to all the electronic resources you would require?**

- (a) Yes [ ] (b) No [ ]

If No, then please specify\_\_\_\_\_

**2.10 To what extent the collection of e-resources under UGC-Infonet supports yourresearch? (Multiple Choice)**

- (a) Expedite research process [ ] (b) Improve professional competence [ ]  
(c) Access to wider range of information [ ] (d) Fast access of Information [ ]

**3. AWARENESS AND USE OF UGC-INFONET DLC**

**3.1 Are you aware of UGC- Infonet Digital Library consortium?**

- (a) Yes [ ] (b) No [ ]

**3.1(a) If yes, how do you know about UGC-Infonet Consortium? (Multiple Choice)**

- (a) Library professionals [ ] (b) Library website [ ] (c) Friends [ ] (d) Any other\_\_\_\_\_

**3.2 From where do you access and use UGC-Infonet Consortium? (Multiple Choice)**

- (a) Department [ ] (b) University Library [ ] (c) Hostel [ ] (d) Any other \_\_\_\_

**3.2 (a) If you access and use please specify the purpose. (Multiple Choice)**

- (a) Publishing Articles [ ] (b) To update subject knowledge [ ]  
(c) Study and Research work [ ] (d) Any other please specify\_\_\_\_\_

**3.2 (b) If you don't access and use please specify the reason. (Multiple Choice)**

- (a) UGC-Infonet not accessible in department [ ] (b) I prefer reading print journals [ ]  
(c) Technical difficulties in using online journals [ ] (d) Lack of relevant information sources [ ]  
(e) No any journal related to my field of research [ ] (f) Lack of knowledge to use [ ]  
(g) Any other please specify\_\_\_\_\_

**3.3 Are you aware of with the following e-resources available in UGC-Infonet consortium (Multiple Choice)**

- (a) e-journals [ ] (b) e-books [ ] (c) Full text e-resources [ ]  
(d) Open Access resources [ ] (e) Bibliographic databases [ ]

**3.3 (a) If yes, please provide few names of resources of your subject frequently used by you.**

1. \_\_\_\_\_ 2. \_\_\_\_\_ 3. \_\_\_\_\_  
4. \_\_\_\_\_

**3.4 How frequently do you use UGC-INFONET Digital library Consortium?**

- (a) Daily [ ] (b) Weekly [ ] (c) Monthly [ ] (d) Any Other \_\_\_\_\_

**3.5 How many e-journals do you access daily available under UGC Infonet Digital Library Consortium?**

- (a) < 5 [ ] (b) 6-10 [ ] (c) > 10 [ ]

**4. USAGE PATTERN AND SATISFACTION OF E-RESOURCES AVAILABLE UNDER UGC- INFONET**

**4.1 How do you access e-resources?**

- (a) Searching [ ] (b) Browsing [ ] (c) Both [ ]

**4.2 What is your searching approach?(Multiple Choice)**

- (a) Author [ ] (b) Article Title [ ] (c) Key Words [ ] (d) Any other please specify \_\_\_\_\_

**4.3 What is your browsing approach?(Multiple Choice)**

- (a) Journal Title [ ] (b) Date of Publication [ ] (c) Table of content [ ]  
(d) Author [ ] (e) Any other \_\_\_\_\_

**4.4 Which search techniques do you used to find e-resources?(Multiple Choice)**

- (a) Simple Search [ ] (b) Boolean operators (AND, OR, NOT) [ ] (c) Truncation [ ]  
(d) Phrases (“ ”) [ ] (e) Field Searching [ ]  
(f) Any other \_\_\_\_\_

**4.5 Which Devices do you use for access of e-resources?(Multiple Choice)**

- (a) I-pad [ ] (b) Laptop [ ] (c) Mobile [ ]  
(d) Desktop [ ] (e) Any other please specify \_\_\_\_\_

**4.6 How do you read full text journals?**

- (a) Computer screen [ ] (b) Print out [ ] (c) Both [ ] (d) Any other \_\_\_\_\_

**4.7 Which file format do you prefer to read e-journals?(Multiple Choice)**

- (a) PDF [ ] (b) HTML [ ] (c) Post Script [ ]  
(d) PPT [ ] (e) Any other \_\_\_\_\_

**4.8 Indicate kind of pattern of using E-Journals?(Multiple Choice)**

- (a) Read Abstract only [ ] (b) Read Full-text online [ ] (c) Download and print without reading [ ]  
(d) Read online and Print [ ] (e) Download without reading [ ] (f) Read online, download and print [ ]

**4.9 Do you satisfied with the user friendly interface of UGC- Infonet digital Consortium?**

- (a) Satisfied [ ] (b) Partially satisfied [ ] (c) Unsatisfied [ ] (d) Don't know [ ]

**4.10 How much you are satisfied with e-journals available through UGC-Infonet Consortium?**

S.	Item Used	Highly Satisfied	Satisfied	Partially	Dissatisfied	Highly Dissatisfied
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No						
	Full-text E-resources					
	Bibliographic Database					
	Open Access Resources					

**5. SIGNIFICANCE OF E-RESOURCES V/S PRINT RESOURCES AND ITS IMPACT ON RESEARCH**

**5.1 Your preferences for Printed vs Electronic resources.**

(a) Printed resources [ ] (b) Electronic resources [ ] (c) Both [ ]

**5.2 Please specify the impact of print and electronic resources on quality of research.**

Resources	Highly Impact	Moderately Impact	Very little Impact	Not at all	Do not know
Electronic					
Print					

**5.3 Do you feel electronic resources are more useful as compared to print resources for various purpose (such as article/paper writing, research etc)?**

(a) Yes [ ] (b) No [ ] (c) Do not know [ ]

**5.3 (a) If yes, please give reasons for using electronic resources. (Multiple Choices)**

(a) Availability [ ] (b) Archiving [ ] (c) Convenience [ ]  
 (d) Perpetual Access [ ] (e) Searching and browsing [ ] (f) Any other \_\_\_\_\_

**5.4 Please specify the frequency of using electronic and print journal.**

	Electronic	Print
(a) All the time	[ ]	[ ]
(b) Most of the time	[ ]	[ ]
(c) Rarely	[ ]	[ ]
(e) Never	[ ]	[ ]

**5.5 Please give your opinion about quality of content in e-resources compared to print resources?**

(a) Better than print [ ] (b) Same as print versions [ ] (c) Not better than print [ ] (d) Not sure [ ]

**6. PROBLEMS, PROSPECTS, MEASURES AND SUGGESTIONS FOR IMPROVING UGC-INFONET**

**6.1 Do you face any problem while accessing e-resources?**

(a) Yes [ ] (b) No [ ]

**6.1 (a) If yes, please specify. (Multiple Choice)**

(a) Internet speed [ ] (b) No remote Access [ ] (c) Inadequate e-resources [ ]  
 (d) Inadequate infrastructure [ ] (e) Any other please specify \_\_\_\_\_

If you faced any problems please state that how to remove these problems.

**6.2 What problems you faced while using e-resources please specify?(Multiple Choice)**

(a) Difficulty in reading on computer [ ] (b) Displaced Images [ ] (c) Difficult in Copying [ ]

(d) Difficult in downloading [ ] (e) Difficulty in printing [ ] (f) Any other pls. specify \_\_\_\_\_

If you faced any problem please state that how to remove these?

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**6.3 In your view what are the future prospects of e-journals available under UGC Infonet?**

(a) Co-exist with print [ ] (b) Replace the print [ ] (c) Supplement [ ] (d) Don't know [ ]

**6.4 Do you need user awareness or training programmes on using electronic resources?**

(a) Yes [ ] (b) No [ ]

**6.4 (a) If yes, then what will be the frequency of these programmes?**

(a) Weekly [ ] (b) Monthly [ ] (c) Occasionally [ ] (d) Any other \_\_\_\_\_

**6.4 Please suggest improving the usage of e-resources. (Multiple Choice)**

- (a) Organize seminar and workshops regarding e-resources (Practical based) [ ]
- (b) Inform the users frequently of what is available [ ]
- (c) Provide web based guided tour or online instructions [ ]
- (d) Computer with high internet speed [ ]
- (e) Digital Archival facilities [ ]
- (f) Article alert service [ ]
- (g) Proactive e-mail based content page [ ]
- (h) Any others pls. specify \_\_\_\_\_

**6.6 Please give your comments and suggestions for the improvement of e-resources under UGC-Infonet Digital Library Consortium.**

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Thank you for your time and completing this questionnaire.

**Signature**

**INFLIBNET Centre, Ahmedabad**  
**UGC-INFONET Digital Library Consortium**  
**E-Resources Subscribed by the UGC-INFONET Digital Library Consortium**

**(a) Full –text e-resources**

S. No.	Publishers	S. No.	Publishers
01	American Chemical Society	15	OUP Archive
02	American Institute of Physics	16	Oxford University Press
03	American Institute of Physics Archive	17	Portland Press
04	American Physical Society	18	Project Euclid
05	Annual Reviews	19	Project Muse
06	Cambridge University Press	20	Royal Society of Chemistry
07	Economic & Political Weekly	21	RSC Archive
08	Emerald	22	Science Direct 10 Subject Collection
09	HeinOnline	23	SIAM
10	Institute of Physics	24	SIAM Locus (Archive)
11	JSTOR	25	Springer Link
12	Manupatra	26	Taylor and Francis
13	Nature	27	Westlaw India
14	Nature Archive (1987-1996)	28	Wiley Blackwell Publishing

(Source <http://www.inflibnet.ac.in/econ/downloads.php> accessed on 26/03/16)

**(b) Bibliographic Databases**

S. No.	Databases	S. No.	Databases
01	ISID-00/197	04	Royal Society of Chemistry (6 Databases)
02	JCCC-00/200	05	SciFinder Scholar-00/45
03	MathSciNet00/77	06	Web of Science-00/100

(Source <http://www.inflibnet.ac.in/econ/downloads.php> accessed on 26/03/16)

### (c) Open Access Resources

About Open Access		
• About Open access	<a href="http://www.eartham.edu/~peters/fos/overview.htm">http://www.eartham.edu/~peters/fos/overview.htm</a>	More Info >>
• ARL	<a href="http://www.arl.org/scomm/open_access/">http://www.arl.org/scomm/open_access/</a>	More Info >>
• Budapest Open Access Initiative	<a href="http://www.soros.org/openaccess/">http://www.soros.org/openaccess/</a>	More Info >>
• Open Access News	<a href="http://www.eartham.edu/~peters/fos/fosblog.html">http://www.eartham.edu/~peters/fos/fosblog.html</a>	More Info >>
• Open Archives Initiative	<a href="http://www.openarchives.org/">http://www.openarchives.org/</a>	More Info >>
• SPARC	<a href="http://www.arl.org/sparc/index.html">http://www.arl.org/sparc/index.html</a>	More Info >>
Open Access E-Journals		
• Bioinfo Publications	<a href="http://www.bioinfo.in/">http://www.bioinfo.in/</a>	More Info >>
• Bioline International	<a href="http://www.bioline.org.br/">http://www.bioline.org.br/</a>	More Info >>
• BioMed Central	<a href="http://www.biomedcentral.com/">http://www.biomedcentral.com/</a>	More Info >>
• HighWire Press	<a href="http://highwire.stanford.edu/">http://highwire.stanford.edu/</a>	More Info >>
• Indian Academy of Sciences (IAS)	<a href="http://www.ias.ac.in/">http://www.ias.ac.in/</a>	More Info >>
• Indian Journals	<a href="http://indianjournals.com/">http://indianjournals.com/</a>	More Info >>
• Journal of Digital Information (JoDI)	<a href="http://jodi.tamu.edu/">http://jodi.tamu.edu/</a>	More Info >>
• Journal of Postgraduate Medicine	<a href="http://www.jpqmonline.com/">http://www.jpqmonline.com/</a>	More Info >>
• MedIND	<a href="http://medind.nic.in/">http://medind.nic.in/</a>	More Info >>
• Medknow	<a href="http://www.medknow.com/">http://www.medknow.com/</a>	More Info >>
• Molecular Diversity Preservation International (MDPI)	<a href="http://www.mdpi.org/">http://www.mdpi.org/</a>	More Info >>
• Public Library of Science (PLoS)	<a href="http://www.plos.org/">http://www.plos.org/</a>	More Info >>
• PubMed Central	<a href="http://www.pubmedcentral.nih.gov/">http://www.pubmedcentral.nih.gov/</a>	More Info >>
• Trials	<a href="http://www.trialsjournal.com/">http://www.trialsjournal.com/</a>	More Info >>
• Versita Open Journals	<a href="http://versitaopen.com/">http://versitaopen.com/</a>	More Info >>
Open Access Directories		
• Directory of Open Access Books (DOAB)	<a href="http://www.doabooks.org/doab">http://www.doabooks.org/doab</a>	More Info >>
• Directory of Open Access Journals (DOAJ)	<a href="http://www.doaj.org/">http://www.doaj.org/</a>	More Info >>
• Free Medical Journals	<a href="http://www.freemedicaljournals.com/">http://www.freemedicaljournals.com/</a>	More Info >>
• Open J-Gate	<a href="http://www.openj-gate.com/">http://www.openj-gate.com/</a>	More Info >>
• Scientific Open Access Repository - OMA	<a href="http://scoar.net/">http://scoar.net/</a>	More Info >>
IRs @ Member Institutions		

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