

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

ABSTRACT

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ABSTRACT

INTRODUCTION

The libraries have a long history in human existence. Yet the history of cooperation across library and their resources has rather been dismal. Earlier the print resources used to exist across libraries, now the print resources co-exist with e-resources across electronic libraries and repositories. The attempts at seeking cooperation across library networks are facing tremendous challenges in terms of user acceptance, user awareness and sense of satisfaction with regard to resource adequacy and resource preferences with regard to research works. 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-Infonet DLC is another challenging aspect of the consortia management.

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

The university libraries in Punjab state in India are under similar situation. The national research studies have earlier projected a lower acceptance and gross effective utilization of the aforesaid facility. The UGC 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 thus focuses on the awareness, user and the user's sense of satisfaction; in a bid to discover the challenges across the diverse stakeholders that contribute to the problem.

RESEARCH OBJECTIVES

The research objectives are intended to guide the research process and energies. This research on the awareness and user satisfaction of UGC-Infonet DLC across the research scholars focuses 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.

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 with regard to library, with regard to e-resources, with regard to impact of e-resources on research work as well as the related issue of the problems being faced by users.

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

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 future.

- The study assumes importance as the existing budgetary support for the UGC-Infonet DLC is high, yet the ground level outcomes regarding adoption and by the research 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 being faced at the regional level about the satisfactory usage of the facility. The study covers the access to e-resources, post access usage factors, e-resource adequacy, device compatibility and other infrastructural aspects of the problem in 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 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 regional context and seeks the exploration of possible reasons of the lower than expected satisfaction with aforesaid library consortia and concerning e-resource usage.

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, the research methods have concentrated around the bibliometrics analysis, discourse analysis, focus group studies, interview, observation, field studies, 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 research scholars. This leads to the decision concerning to choosing the mode for the research. This research study would be inductive in nature as it relies on the generalization of trends from the data hence collected. The research strategy and its appropriate choice is vital for the research to reach its meaningful conclusion. This study opts for the opinion based individual driven approach in order to formalize their responses for generalization of awareness and their respective satisfaction levels with concerning 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 each and 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).

TOOLS USED FOR DATA COLLECTION AND ANALYSIS

The questionnaire, interviews techniques have been used in data collection is discussed below:

Questionnaire

The questionnaire tool was used to collect data related to present research work. Single questionnaire was designed for research 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.

Interviews

The personal interaction with the scholars was initiated and, Interview technique was 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.

Data Analysis Techniques

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

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 being investigated was less significant than obtaining a sample that was large in size.

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 being 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 population and sample

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

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 research scholars at five universities. Further, the 30% produced large absolute numbers for survey which are as follows: at Panjab University, Chandigarh, 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.

Standards followed for Bibliographic References

Reference sources are 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. In this study, both a signpost and acknowledgement references are given. For citing references in the present study, American Psychological Association (APA) 6th edition has been followed.

Statistical Tools and Techniques

The statistical analysis of the data for the existing study was 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:

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

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

SCOPE AND LIMITATIONS OF THE STUDY

The research task is an intellectual phenomenon and certainly involves some limitations that need to be considered in order to get the desired outcomes. The research has its limitations in terms of applicability, conceptualization 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 was research scholars performing their research in the following universities. The present study is 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

STRUCTURE OF THE THESIS

The study is arranged into the following six chapters.

Chapter 1: Introduction

This chapter includes the background of the present study, electronic information sources and services, statement of the problem, the significance of the study, objectives, hypothesis, limitations of the study, methodology, definition of the concepts used and chapters. This chapter includes the site of the study, the population of the study, instruments used in the study, data collection and analysis methods.

Chapter 2: Literature Review

In this chapter, an attempt has been made to review the related literature. This chapter covers the development of consortia and explores the issues of awareness and usage of the e-resources across the INFONET DLC platforms.

Chapter 3: UGC- Infonet DLC : A Theoretical Framework

This chapter includes the meaning of library consortia, the consortium - History and development, objectives of library consortia; scenario of consortium in India This chapter also contains the UGC-Infonet DLC aims and objectives, e-resources, member universities, E-Sodh Sindhu aims and its objectives.

Chapter 4: Profile of University Libraries

This chapter deals with historical overview of the selected university libraries in Punjab State, and provides information about the Campus profile, teaching departments and 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 the university libraries.

Chapter 5: Data analysis and interpretation.

In this chapter, the data received from the Research Scholars have been tabulated and analyzed. The data received from the scholars have been divided into (i) Awareness and use of digital library consortium, (ii) Collection services and infrastructure in the

universities, (iii) Usage pattern and satisfaction of e-resources, (iv) Significance of e-resources v/s print resources and its impact on research, (v) Problems, prospects, measures and suggestions for improving UGC-Infonet DLC.

Chapter 6: Findings, Conclusion and Suggestions.

Summary of the findings from the questionnaire

Profile of the scholars

- This study finds several findings and these are summarized as under various headings:
- The study found that majority of 61.87% female scholar have responded the question by comparing 38.13% male scholar.
- The study shows that 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.
- The study reveals that most of the scholars participated are from the streams of Applied Sciences 227(26.80%) followed by Arts 218(25.74%), Basic Sciences 205(24.20%) and Social Sciences 197(23.26%).

FINDING ON OBJECTIVES OF THE STUDY

Objective 1: To discover the collection, services and infrastructure available for access e-resources.

- The study revealed that the majority of the 34.71% scholars visit library weekly and least 19.72% visit rarely. Scholars of PU-C, GNDU-A, PU-P, TU-P visit weekly and scholars of CU-B visit daily.
- It was noted that the majority of the scholars (43.76%) visiting the library for issue and return of books and least percentage of scholars (8.01%) use for any other purposes. The reason may be scholars prefer accessing e-resources from their respective departments, hostel.

- It is concluded from the study that the infrastructural support for accessing e-resources in the University Libraries of Punjab is excellent because the majority of the scholars (71.19%) said “YES” are found to be satisfied. It also shows that still, some scholars (28.81%) said “NO” and found inadequate.
- The study found that majority of 64.23% scholars found the collection adequate and 2.01% scholars found the collection very inadequate and that they don’t know about it equally.
- The study shows that 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.
- From the comprehensive study, it is inferred that highest 43.33% of scholars agree that the library has adequate access to e-books, 1.53% 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.
- It is inferred from the study that the highest number of the 52.07% of scholars agree that the library has adequate access to e-scholarly internet resources, and very few 1.77%scholars agree Inadequate. The scholars of PU-C, GNDU-A and PU-P finds e-scholarly inadequate.
- The study shows that the highest number of the scholars(49.35%) agree that the library has adequate access to e-references but still, 8.15% and 3.53% and found very inadequate and Don’t know respectively. So even the scholars of PU-C (26.72%), GNDU-A (23.94%), PU-P (29.37%) and CUP-B (22.22%) finds e-scholarly inadequate.
- The study shows that 47.46%scholars agree that the library has adequate access to 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 library has inadequate e-theses.
- The study found that majority of 41.93% scholars said 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. University

Libraries of Punjab requires substantial steps for delivering and access of EDS, CAS and SDI services. It is clear that still most of the scholars are not using the services offered by the library or the libraries don't have these facilities.

- It was noted that majority of 90.67% scholars admitted that they have computers for accessing e-resources under in the library, computer centre, computer lab, hostel etc. and 9.33% scholars admitted that they do not have computers.
- The study found that all the university libraries of Punjab provide internet connections for accessing e-resources through Wi-Fi and leased line. The However, it is interesting to note that none of the scholars informed about Li-Fi connection.
- The study found that majority of 74.58% scholars is satisfied with the collection of e-resources available under UGC Infonet DLC whereas 25.42% scholars are not satisfied at all.
- The study reported that 35.72% of the scholars from the University Libraries of Punjab said it helped in access to wider range of information, followed by 23.97% scholars said it expedite research process, 20.06% said it improve professional competence and 20.25% fast access of Information. (Table: 5.17)

Objective 2: To find out the awareness and use of UGC-Infonet digital library consortium among research scholars.

- It was established from the study that 69.66% of the scholars are aware and 30.34% are not aware of it 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.
- The study found that the scholars of PU-C source of awareness regarding UGC-Infonet DLC is through Library website, scholars of GNDU-A and PU-P through friends, scholars of TU-P and CUP-B through the library professionals. The overall majority of the source through friends/colleagues (39.55%) followed by library professionals (26.46%) and library websites (6.13%).
- The study found that 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. The highest number of scholars, that is, 45.57% access from the department, and very less access 1.38% from any other place. Thus it can be assumed that most of the scholars' access UGC-Infonet DLC from their respective departments.

- The study reported that 53.65% of the scholars from University Libraries of Punjab 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 huge impact on scholars study and research work.
- It is found that majority of scholars in University Libraries of Punjab reveals that they do not use UGC-Infonet DLC, the major reason 47.28% due to lack of knowledge to use and very least 2.24% scholars due to no journal related to my field of research. The primary concern is lack of knowledge to use, and it is the responsibility of the university libraries of Punjab to impart training to the scholars.
- The study reported that majority of 34.99% scholars are aware of e-journals and very few 8.91% scholars are aware of Bibliographic databases e-resources available under UGC-Infonet DLC. It shows that e-journals are more popular among scholars due to the primary source of information.
- The study found that majority of 8.87% scholars prefers Science Direct followed by 8.57% preferred Emerald and very few 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 prefer Emerald, Scholars of PU-P, TU-P and CUP-B prefer Science Direct. (Table: 5.20 (a))
- The study found that largest number of the scholars, that is, 34.23% 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 accessing daily by comparing to the other scholars of PU-C, GNDU-A on weekly basis and Scholars of PU-P on a monthly basis.

- The study found that the highest percentage of the scholars, that is, 71.09% access less than 5 journals and least number of 8.33% access less than more than 10 journals. However, it is interesting to note that very few scholars are using more than 10 journals.
- **Objective 3: To investigate the usage pattern and satisfaction level of e-resource available under the UGC-Infonet Digital Library Consortium.**
- The study found that majority of 70.51% scholars from PU-C,GNDU-A,PU-P,TU-P and CUP-B preferred both (searching and browsing) options and least number of 10.34%scholars preferred browsing options.
- 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. The scholars of PU-C, TU-P and CUP-B prefer Keywords and scholars of GNDU-A and PU-P prefer article title
- As regards to browsing approach in accessing e-resources, it was found that Journal title which is used by 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.
- In response to search techniques to find e-resources, it was noted that majority of the 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.
- 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 overall laptop emerged as the most popular and widely used device by scholars in the university library of Punjab for accessing e-resources.
- The study reveals that majority of the 64.07% scholars read e-resources by using both computer screen and printouts; followed by 19.66% scholars who read through the computer screen and 16.27% scholars read through printouts.

- The study revealed that majority of scholars (78.19%) prefer PDF format and very few scholars (5.78%) prefer HTML format to read e-journals in the selected five universities of Punjab.
- The study found that among scholars pattern of using e-resources of selected libraries of Punjab, a majority that is, 33.08% 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.
- 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 majority of the 52.78% scholars of CUP-B, 46.81% scholars of PU-P and 45.16% Scholars of TU-P are partially satisfied.
- 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. The scholar's sense of satisfaction with regard to available online e-journals has multiple dimensions of analysis.
- 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 finds highly dissatisfied. It also reveals that scholars of GNDU-A found partially satisfied as compared with scholars of PU-C, PU-P and TU-P who's found satisfied. The scholars of CUP-B equally found satisfied and partially satisfied.
- It was found that 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.

Objective 4: To know the significance of e-resources v/s print resources and its impact on research.

- It is found that 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. Scholars inclined to use and prefer print resources and e-resources, depending on the advantages and disadvantages that are attached to these formats.

- The study revealed from the table: 5.34 (a) indicates that highest number of scholars, that is, 55.61% consider that e-resources have a high impact on 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 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 23740 Publications.
- The study found that e-resources are more useful as compared to print resources. It reveals that majority of 62.22% scholars said 'Yes' followed by 9.83% scholars who said 'No' and 7.55% scholars said that they 'Don't know'.
- The study reveals that most of the scholars would prefer e-resources due to availability (32.38%) followed by searching and browsing (26.70%), Convenience (24.18%), Archiving (9.95%), Perpetual (6.52%) and very few (0.28%) influenced to access the e-resources.
- The result from the table: 5.36 (a) found that in case of frequency of using E-journal majority of the 56.32% scholars of University libraries of Punjab uses all the time followed by 36.36% scholars uses most of the time and very few 0.47% scholars said they never use whereas from the table: 5.36 (b) found that in case of frequency of using print journal from the table that majority of the 51.23% Scholars uses most of the time followed by 35.65% rarely and very few 0.47% Scholars uses never. The data shows that majority of the Scholars using e-journal compare to print journal.
- The study reveals that scholars of University Libraries of Punjab opinion about quality of content in e-resources compared to print resources the study found that 43.21% 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.

Objective 5: To find out the problems, prospects, measures and suggestions for improving the usage of UGC-Infonet Digital Library consortium in University Libraries of Punjab

- The study reveals that majority of 60.37% 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 scholars of University Libraries of Punjab face problems while accessing e-resources.
- 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 is found that internet speed is very low in all the University Libraries of Punjab.
- It was noted from the study that the highest 41.41% scholars faced problems while reading on the computer and 36.87% in downloading are the two main problems faced by the scholars.
- The scholars opinions about future prospects for e-resources available under UGC Infonet DLC, the study found that 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.
- 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.
- The study found that maximum of 41.84% scholars need training occasionally, followed by 38.37% 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 monthly basis.
- The study found that 22.24% scholars prefer practical based seminar and workshops, 18.22% scholars prefer article alert service and are the most preferred opinions regarding improvement in the usage of e-resources under UGC- Infonet DLC for better and effective utilization of e-resources and very few 8.94% prefer digital archival facilities.

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 H₀: There is no significant difference between research scholars about awareness of UGC- Infonet digital library consortium and use of e-resources.

Alternative Hypothesis H₁: There is a significant difference between research scholars about awareness of UGC- Infonet digital library consortium and use of e-resources.

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 $p \text{ value} = 0.073 (\leq 0.05 \text{ significant})$.

H2: Majority of the research scholars are partially satisfied with e-resources available in UGC-Infonet consortium.

Null Hypothesis H₀: There is no significant difference between majorities of research scholar regarding partially satisfied with e-resources available in UGC-Infonet consortium.

Alternative Hypothesis H₁: There is a significant difference between majorities of research scholar regarding partially satisfied e-resources available in UGC-Infonet consortium.

In Table 15 (Page No.). 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 (≤ 0.05 significant).

H3: Electronic resources have more significant impact on research as compared to print resources.

Null Hypothesis H_0 : There is no significant impact of e-resources as compared print resource.

Alternative Hypothesis H_1 : There is a significant impact of e-resources as compared print resource.

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 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 41 shows $X^2 = 12.76$, and p value = 0.689 (≤ 0.05 significant) and Table 42 shows $X^2 = 15.06$, and p value = 0.520 (≤ 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_0 : There is no significant difference between research scholars' regarding problems in accessing e-resources, available in UGC-Infonet Digital Library Consortium.

Alternative Hypothesis H_1 : There is significant difference between research scholars' regarding problems in accessing e-resources, available in UGC-Infonet Digital Library Consortium.

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 (≤ 0.05 significant).**

CONCLUSION

The "Science" based international Journals are being preferred across the five universities as the most accessed content. In other words, intends to infer that the non-available premium research inclined journals are being accessed at a rate faster than Indian ones. In other words, it can be deduced that the infrastructure to support accessing UGC-Infonet DLC in the University Libraries of Punjab is good because the research scholars are found to be satisfied. This indirectly points to more usage of the system based content across the science and engineering students in comparison with scholars from social sciences, humanities, literature and library sciences. This might be an outcome of better equipped departmental libraries or the lesser enrolment of scholars for doctoral programs or existence of some other source of information in the department as well.

The collection adequacy is a related aspect and the trends point towards satisfactory rankings of the observant about the overall resource adequacy. The readiness of the respective institutions and library setups was not observed in competition with each other. The scholars pointed towards the gaps in infrastructure readiness of the institutional libraries.

The library readiness is a major question in itself. The infrastructure availability, librarian training and resource adequacy are collectively believed to shape user's experiences. In the context of this, our findings point to satisfactory levels of resource adequacy across the five institutional 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 best possible usage of e-resources across Indian research scholars. The finding and conclusions are in line with the existing research on the operation inefficiencies about collection management practices in the Indian context. The bureaucratic work cultures and centralization could be obvious reasons for this neglected state of affairs in 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 research 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 institutions of higher learning are the lack of skills and efficiency across scholars optimum usage. The user's opinions as expressed stressed the need for awareness sessions and proper training for skill development. The library's role in creating awareness is being 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 the free access to e-resources is on the rise as per the study. The friends and library websites are being observed to play a key role in this exercise as such in University Libraries of Punjab. It is 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, connote that the usage is increasing though it may take some time on account of raising awareness, friend circle, peer network as well as increased user-friendliness of interfaces; as observed in the research. Regarding 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 60 percent which has a potential to rise on the increase.

The scholar' perceptions about non-assistance by the operation staff and non-cooperation about search algorithms customization could be obvious reasons for such a pattern of library facility usage in 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 visit, the pattern of time spent as well as user's experiences regarding the new technology-based set up(Hines, 2013).

The concern of the information literacy by Tuominen, Savolainen & Taliija (2005) across library users has been defined as vital in advancing the user indulgence and satisfactory experience creation across the information environments. Information literacy in literal terms has been interpreted as scholars capability to consider the need for, seamlessly access and evaluate the relevant information across the digital platform. The sustainable participation of scholars has always remained a core concern. In fact, the interpretation of the emerging "Computing skills of research scholars" has remained an underexplored construct in the library and information sciences research (Tuominen, Savolainen, & Taliija 2005; Bates, 2010). The user studies point to the fact that the digital libraries are not only physical yet they also carry virtual usage and remote usage as well. This aspect and its awareness across the users have never been given the due concern in research overview across existing studies in Indian universities and associated library infrastructures.

As predicted that rise in the use of digital media will impact the currency of print resources, this observation has been observed as true in the context of our findings from across the University Libraries of Punjab. About the evaluation of the impact of e-resources on quality of research, it is inferred that 55.61% consider e-resources have a high impact on quality of research followed by 39.08% who regard the impact as a moderate one.

Regarding assessment of the impact of print resources on quality of research, it is inferred across this user study, that the majority, 51.59% scholars consider that e-resources have a high impact on 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 regard 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. The negative preferences for e-resources across some sections of scholars could be on account of on the young student's differential sense-making across the digital technology-based platforms.

The global studies point towards the role of the individual's behavioral intentions in shaping overall pattern of the technology's appropriation by the users in a long-term perspective. The study highlighted the framework of user's sense making in general information search practices across the technology enabled platforms and mechanisms. The antecedents of the phenomenon of the sense-making and technology appropriation(Lin, 2005) at student's end is not that easy as it appears to be in general perspective. The study underlined the determinant role of the subjective norms, perceived behavioral controls, individual's levels of the motivation, technology-based appropriations and the resultant satisfaction as interrelated. The scholars self-efficacy based beliefs regarding the computer-based libraries; e-resource authenticity and the information retrieval across such systems have long been a matter of intense debate and analysis (Ingwersen, 1996). The review of literature points towards substantial non-convergent views about determinants of user's self-efficacy based beliefs in developing nations.

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 made to improve and maximize the utility of e-resources available through UGC-Infonet DLC across the University Libraries in Punjab:

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 research 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 of 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 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.

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 need 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 MPhil and 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 in PU-C, GNDU-A, PU-P, TU-P and CUP-B, through emails indicating new subscriptions, launch events, training programs, will promote awareness.
- The libraries should notify their scholars about current issues of e-journals via e-mail for faster access to both current as well as back volumes; this will surely

enhance the research activities. For enhancing the research activities, it is very necessary to introduce and demonstrate the new e-journals available in the varied field of interest to the research scholars by the library staff.

- Agencies such as INFLIBNET, UGC-Infonet DLC are supervising and execution organization 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 newer methods which can be effectively used for the promotion of usage of e-resources.
- User education can be conducted for 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.

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 use 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 suggested 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 of all libraries should be taught about advanced search strategies to make e-resources easily accessible and must learn to use wild card characters to perform a comprehensive.
- The problem of retrieval in University Libraries of Punjab can be overcome by acquiring federated search engine software for faster download of e-journals and expansion in the use of e-journals access.

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.

Problems, prospects, measures and suggestions for improving UGC-Infonet DLC

- Scholars are not satisfied with the IT infrastructure and internet connectivity available at the library. To enhance the use of e-resources under UGC-Infonet DLC bandwidth should be sought by the university libraries Punjab to provide faster access, along with high-speed computer terminals should 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 e-journal use.
- To solve the problem of slow downloading of HTML and PDF files, it is suggested that there should be a provision of other options such as converting the soft copy of article/document into JPEG or JPG files. Hard copies of documents can be scanned 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 organized for the scholars related to UGC-Infonet DLC in a systematic manner so that scholar participation could be encouraged and ensured. The scholars, information literacy needs consistent revision and restructuring by the needs of the emerging digital infrastructure.
- The Library should provide awareness programs for scholars to educate them about what e-resources are available in the Library and how to make maximum use of these resources in academic work.
- The need for more qualified staff with better exposure to modern technological devices to assist scholars when they face problems in accessing e-journals should be stressed in all libraries. In-service training should be given to those library professionals who are already working, so that they may have a better understanding. Staff training programs can be carried out by different methods such as holding formal courses, workshops, seminars, lectures, discussion groups, etc. The training should be practically oriented instead of theory-based.

- 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 users' feedback survey through online and offline to know the usage of e-resources and the future needs of the research scholars from time to time and include more number of online resources in various disciplines.
- A separate e-resources floor provision may be made in the Library building for research scholars for effective use of e-resources. An e-archive should be provided wherever possible. When this cannot be achieved, the physical archive needs to be retained.
- 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 and faculties.