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# Use of E-Journals by Research Scholars in University Libraries in Andhra Pradesh

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## Abstract

The e-journals available in University libraries of Andhra Pradesh are UGC-INFONET journals, open access journals and the journals subscribed by the libraries on their own. The present study is aimed to study the use of e-journals by the research scholars in the libraries of Sri Venkateswara University (SVU), Andhra University (AU) and University of Hyderabad (UH). It is intended to assess the type of e-journals used, purpose for which they are used, amount of time spent in using them, problems in accessing e-journals, search methods used in accessing them, satisfaction with print and e-journals, adequacy of e-journals and training obtained in accessing them.

**Keywords:** E-Journals, E-Journals use, UGC-INFONET Journals, Open Access Journals, University Libraries.

## 1. Introduction

Library contains the different types of reading materials namely books, periodicals, maps, microforms, sound recordings, video recordings, electronic resources etc. These are procured to meet the information requirements of the user community.

It is necessary to conduct user studies to examine the use of these reading materials to design a need-based acquisition policy, develop a balanced collection in the prevailing environment of diminishing budgetary provisions and maximize the use of collection.

One of the main functions of the university is the creation of new knowledge by research. The university library through its reading materials and services helps in the successful conduct of research programmes of the university. In this context, among all the reading materials, periodicals are playing an important role in informing the latest research findings and avoiding the duplication of research work.

An increasingly important function of academic libraries today is the provision of right information to their users at the right time. Latest advances in computer applications during the past few decades have brought radical changes in the way information is generated, stored, organized, accessed, retrieved and consumed. The vast speed at which different operations are carried out in an automated environment has attracted information professionals towards a computer-based system. It has opened floodgates to people to access information through many different ways. The information could be located even at far-off locations and could be in different languages. These capabilities were unheard in the library world before of computers entered into information field. The demand for information and the majority of journals are available electronically. Today, libraries are providing access to e-journals by spending a substantial amount on them. Availability ranges from sites, which provide table of contents only, to those supplying the full text of every issue. Some journals only exist in their online format and others have two different versions. In case of subscription, they may be free or chargeable. The paid subscribers are permitted to browse full text of the article with downloadable facility.

The e-journals available in university libraries in India are journals of UGC-Infonet Digital Library Consortium which is launched in 2003, open access journals and the journals subscribed by the libraries on their own. UGC-Infonet Digital Library Consortium is providing access to current as well as archival access to more than 7000 core and peer reviewed journals and 10 bibliographical data bases. The present study has been undertaken to examine the use of e-journals in university libraries in Andhra Pradesh as previously no study has been undertaken on that aspect.

## **Earlier Studies**

The following are the major studies conducted on use of e-journals.

Bonthron made a study on the use of electronic journals in higher education in U.K. The disciplinary differences in the use of electronic journals by academic staff and students were examined. Chandra Kumar conducted a survey on the research scholars of University of Madras to examine the use and utilization of e-journals using a questionnaire. Murthy examined UGC-INFONET e-journals consortium for universities and colleges. The consortia offer the opportunity of providing access to a broader and deeper range of titles than most libraries currently can provide to their communities. Vishala and Bhandi expressed that UGC-INFONET electronic journal consortium is an innovative project launched by University Grant Commission to promote the use of electronic databases and full text access to journals by the research and academic community in the country. Surendra Babu and Pulla Reddy carried out a study on the use of e-journals. The study revealed that most of the users are using both print and electronic journals. Chauhan and Prem Chand described the UGC-Infonet e-journals consortium initiative undertaken by the Indian University Grants Commission (UGC) to facilitate free access to scholarly journals and databases in all fields and disciplines by the research and academic community across the country.

Shukla and Mishra made a study to highlight the problems faced by the users in accessing e-resources and to examine their views on usefulness of e-resources compared to that of print resources, and the place from where they prefer to access information. Research scholars prefer e-resources against print resources because of their various good features for their research work and are looking in future to have more e-resources access within university campus with better Internet connectivity.

Naushad Ali and Nisha carried out a study to determine the extent to which research scholars at Central Science Library, University of Delhi, are aware and make use of e-journals for their research work. Guruprasad and Nikam conducted a study on the usage patterns of e-journals among the Aerospace scientists and engineers in Bengaluru. Data have been gathered

form 583 Aerospace scientists and engineers belonging to 16 prestigious organizations in Bengaluru using a questionnaire.

Madhusudhan conducted a study on the use of UGC-Infonet e-journals by collecting data from 40 research scholars (Ph.D and M.Phil) and 28 students (M.L.I.Sc.) studying in the Department of Library and Information Science during the academic year 2006-2007 using a questionnaire. The study shows that e-journals perform an increasingly important role in research at Department of Library and Information Science.

Trivedi and Joshi in their study examined the use of e-journals by the health care professionals of HMPCME (H M Patel Centre for Medical Care and Education) and that of print journals which can be availed at the behest of library at Pramukhswami Medical College (PSMC), Karamsad, Gujarat, India. From this survey it was found that most of the research scholars i.e. (Doctors, Physicians, Medical officers, Interns, Post Graduate students, Residents) are referring to e-journals, as well as print journals from their departmental library as well as computer centre in the central library.

Vishala and Bhandi in their study reported the preference of the physical form of the journals amongst the academicians in Karnataka. In the situation where both electronic and print versions are available, the study revealed that the respondents preferred to have both the versions equally.

Prem Chand and others in their paper highlight the usage trends of access to e-journals in ten universities of North East India. The preliminary findings from the data of last five years revealed that there is an upward trend. The paper briefly describes open access journals and the measurement tools of e-journals.

Kaur and Verma examined the issues like use of electronic information resources, its impact on the collection of print and electronic journals, its awareness among the users, and the places where the users are accessing these resources. A survey was conducted in the academic year 2006-07 at the Thapar University, Patiala. A total number of 504 users from the undergraduate, postgraduate, research scholar and faculty members were selected and their responses were obtained with the help of a questionnaire.

The response of respondents with regard to awareness about e-resources and services of library shows that only 36.29 per cent were not aware of it. Faculty, research scholars and postgraduates were more aware of their library e-resources and services as compared to undergraduates. The library should provide orientation workshop and ongoing seminars for students to guide them how to use electronic resources in order to extract maximum value from these resources. In response to the question whether they have heard the name UGC-Infonet consortium, it was found that only 23.71 per cent respondents knew about UGC-Infonet. Users-wise results show that faculty and postgraduates were more aware of it as compared to the others. Among the users who were aware of UGC-Infonet consortium, only 55.65 per cent were using these e-resources. The maximum users (53.98%) were using e-journals occasionally. The library should involve university academic departments in the selection of resources so that the required journals can be identified. Most of the users use hostel and computer centre as places for accessing electronic information than library and departments. The e-journals were used by faculty and research scholars more in the departments. Further, it has been found that the awareness about e-resources has encouraged the users to use these to maximum. The impact of e-journals shows that there is an increase in the collection and usage of e-journals.

Nikam and Pramodini conducted a study on the use of e-journals and databases by selecting a sample of 200 users of University of Mysore consisting of faculty members and research scholars out of 316 pertaining to 17 science departments using a structured questionnaire and interview schedule. Besides studying the use of e-journals and databases, the paper also examines the utilization and satisfaction levels of users with respect to the e-resources. The role of Information Communication Division (ICD) of the University of Mysore informing the users about the availability of these resources is also discussed. Use of Internet as an alternative to UGC Infonet Consortium resources is presented.

Out of the 200 users, 4% of them were 'fully aware' of the UGC-Infonet facility. The majority of the respondents (61.5%) were 'some what aware' of UGC-Infonet, 18% are 'moderately aware' and 16.5% are 'not aware' of the facility. It was seen that most popular resources among the user community are 'Emerald', 'Fly base', 'Science Direct'. 'Document Image Database' and the journal 'Nature'.

Rani and Zainab in their study examine the users of electronic journals published in a hosting system called EJUM (Electronic Journal of the University of Malaya) and their perceived satisfaction with the electronic journals as well as their preferred features in electronic journals and problems they face when using the electronic journals. The Malaysian Journal of Computer Science (MJCS), Malaysian Journal of Library & Information Science (MJLIS) and Journal of Problem Based Learning (JPBL) are being hosted by EJUM. These three electronic journals constitute 3 out of an estimated 17 electronic journals published in Malaysia. Users seem to use the electronic journals to mainly support research and teaching needs. About 50% of respondents rated the journals as 'good', 20.6% rated 'fair'. Respondents seem to find out about the journals mainly serendipitously as they were browsing the Internet or 'found out from a conference paper' or 'saw information about it in an article'. Keywords (28.9%) and title (24.3%) searches were chosen by a third of respondents respectively. The majority of respondents (70%) indicated preferring retrieving articles in PDF or HTML. About 41.8% of respondents access the electronic journals while making searches on Google or Yahoo. The next most selected option was 'from specific journal hosting system' (21.8%), followed by 'from my library web portal' and 'from citation links found in another resource'. Most respondents scan the abstracts first to check relevance and then download the articles. Most respondents believed that electronic journals will co-exist with print journals (46.2%). The rest believed that electronic journals will replace the print journals (25.5%) or will supplement (25.5%). The list of functions and features preferred by electronic journal is provided.

Ali conducted a study to examine the use of electronic information services (EIS) among the users of the Indian Institute of Technology (IIT) Library in Delhi, India. Both questionnaire and observational methods were used for data collection where 300 valid samples were collected. The analysis of data collected covers awareness of EIS services, use of e-journals, advanced search facilities, acquaintance with electronic information sources, the purpose of using e-information, problems faced by the users while using EIS, infrastructure facility available and satisfaction level of users. The study found that Boolean logic and truncation are the most often used search facilities by IIT users. Lack of printing facilities, terminals and trained staff are the major reasons that would discourage users from accessing the EIS. The survey also reveals that some 60 per cent of users face difficulties while browsing e-information.

Th Khomdon Singh and others conducted a survey on 100 users of Manipur University Library to assess the access to Infonet e-journals consortium in the University Library using a questionnaire. Analysis of data reveals that most of the users have knowledge on Internet (69%) and awareness about Internet consortium (54%). Most of the users (59%) access e-journals consortium. Most of the users (85%) are satisfied with the services and other facilities rendered by the library. Most of the users preferred printed journals more than the e-journals. Most of the users (49%) encountered problems in the use of the e-resources made available to them by the library. The major problems they encountered included the lack of Knowledge about e-resources, lack of knowledge on surfing, illiteracy of ICT and its knowledge, disturbance due to frequent power failure, the low speed of Internet, lack of sufficient number of computers, selection of desired title of journals and often disconnection of Internet. The users who know about Infonet e-journal consortium of the library have a number of expectations. Their expectations include the access to the full-text of the journals, easy access to the journals, assistance from the professionals to use the consortium, provision of up-to-date information, saving time in searching desired information, fulfilling the needs of the users, more installation of computers, prolonged access without interruption, organisation of awareness programme to benefit the users and more information on career opportunities and jobs. The users also suggested about regularly conducting users' education programmes for the e-journals consortium.

A survey carried out by Natarajan and others on use and user perception of electronic resources in Annamalai University from the data collected from 117 faculty members and research scholars using questionnaire method. It reveals that despite the availability of wide range of e-resources, the frequency of their use was low. The reasons identified for this are lack of time, lack of awareness, lack of subject coverage, and slow downloading.

Walmiki and others carried out a questionnaire based survey on 578 faculty members of Karnataka State Universities to examine the awareness and use of journals of UGC-Infonet Digital Library Consortium. The survey reveals that 39.79 percent of the faculty members are aware of and use the UGC-Infonet Digital Library Consortium resources whereas 35.99 percent are aware but do not use and 24.22 percent are not at all aware of the availability of the consortium resources. Majority of the non-users belong to social sciences and humanities and



those who have not undergone formal computer training. Comparatively the science faculty uses the consortium resources more frequently than those belonging to social science and humanities. Lack of knowledge to use, insufficient Internet nodes, slow bandwidth and lack of relevant information sources and found to be the major problems faced. Only 5.22 percent of the faculty members have indicated that they have necessary expertise to use the digital resources. About 37 percent of the faculty members were aware of and participated in user education programmes conducted by their university libraries.

Khan and Ahmad studied the level of awareness and use of e-journals by the research scholars of the Aligarh Muslim University (AMU) and the Banaras Hindu University (BHU). Their survey reveals that most of the research scholars are aware of the availability of e-journals. The majority of research scholars have access to e-journals from their respective central libraries and computer centres. Most of the research scholars use of e-journals for their study and research work, to update their knowledge and to write manuscripts and papers. The study reveals that 55.69% of research at AMU and 47.84% at BHU use e-journals daily. They fully agree that the usage of e-journals improves the quality of research work. It is however found that lack of training is the obstacle in proper and full utilization of e-journals.

Cooper examines both qualitative and quantitative studies by academic librarians to compare the usage of electronic versus print journals and the strengths and weaknesses inherent in the methods used. New initiatives, such as Project COUNTER (Counting Online Usage of Networked Electronic Resources) to provide librarians with comparable usage data from various vendors, will enable librarians to make more informed journal collection development decisions.

An evaluation of journal use statistics at Washington State University in 2003 was undertaken by Brady and others to determine if the selection of electronic journals in the Owen Science and Engineering Library was changing student and researcher's choice of journals. Use statistics showed that most print journals were being used more than they were prior to the advent of electronic journals. Generally, electronic journals were used heavily and the availability of electronic format greatly enhanced the total use of most titles. However, some electronic journals were used little or not at all, and there was a substantial increase in the use of some print titles.

A study conducted by Tyagi on 160 users of IITK P.K. Library reveals that the users showed interest in the use of various databases like Science Direct, Web of Science and the others for various purpose. Awareness among the users about the availability of online journals was found satisfactory. Online journals were mostly used for research needs and PDF was the most preferred format. Khan conducted a study on the use of e-journals by students and research scholars in the Department of Botany of Aligarh Muslim University. Brown and others conducted a study on the use of e-journals by academic staff and research at Loughborough University. Vasishta and Navajyoti conducted a study on the use of e-journals.

## **2. Objectives**

### **The following are the specific objectives of the present study:**

1. To assess the types of journals (print and electronic) used and to examine the purpose for which e- journals are used;
2. To examine the type of journals (print and electronic) the users prefer to read and the reasons for the same;
3. To assess the type of e-journals used and the problems faced in using them;
4. To examine users' approach to e-journals;
5. To know the number of hours spent by the users on an average per week in using e-journals;
6. To find out mostly consulted e-journals in the library and frequently used databases of the publishers/aggregators of e-journals;
7. To examine the frequently used databases of open access journals;
8. To examine the necessity of user education programmes in using e-journals; and
9. To make suggestions for improving the access to e-journals in the university libraries.

### **3. METHODOLOGY**

#### **3.1. Selection of sample of universities and research scholars**

##### **3.1.1 Universities**

There are 46 universities in Andhra Pradesh, India. Among them, three universities are selected. They are Sri Venkateswara University (SVU), Andhra University (AU) and University of Hyderabad (UH). The use of e-journals by the research scholars in the libraries of these universities was studied. Brief profiles of these university libraries were presented in the following paragraphs.

##### **a) Sri Venkateswara University Library**

Sri Venkateswara University was established in 1954 in Tirupati on the campus of 1000 acres. Right from its inception, the University has been laying more emphasis on teaching, research and extension activities in different subjects. The University was started with six departments of Chemistry, Physics, Mathematics, Botany, Zoology, Economics and Philosophy. The university has four constituent colleges concerning various conventional and advanced subjects, in order to provide good academic and smooth administrative service to one and all. The University has 58 departments, wherein 71 different PG courses and several Diploma and Certificate courses are being run with a total academic faculty strength of 400 and 1500 non-teaching and a student strength of 5000, including research scholars.

The university library was started in the year 1955 with a small collection of 6,700 books. The university library, centrally situated and easily accessible to all the departments on the campus has steadily grown over the years and it has 3, 53,136 documents as on today. It includes textbooks, reference books, reports, general books, back volumes of journals, e-documents and M.Phil. and Ph.D. dissertations. All these documents are classified and catalogued according to DDC and AACR respectively. The library subscribes to about 430 current journals of national and international importance by spending Rs.4.00 lakhs per year. It provides access to UGC-Infonet e-journals. It has Internet facility.

## **b) Andhra University Library**

Andhra University is not just one of the oldest educational institutions in the country, but is also the first to be conceived as a residential and teaching-cum-affiliating university, mainly devoted to post-graduate teaching and research.

The university presently is offering 313 courses in Arts, Commerce, Management, Science and technology, Engineering, Law, Pharmacy and Education. The University has five constituent colleges. The College of Arts and Commerce is the biggest constituent college in the university with 26 Departments offering 42 courses including four Diploma Courses. The College of Science and Technology has 21 Departments, which offers 63 Courses including one PG Diploma. The College of Engineering has 15 Departments offering Undergraduate, Postgraduate and Research Programmes. The College of Law has been identified as an advanced Centre in Law by UGC. The College of Pharmaceutical Sciences is first of its kind in South India, which is offering one UG Programme and six PG Programmes, besides Research Programmes leading to Ph.D. Degree.

The Andhra University Library was started in the year 1927, renamed as V.S.Krishna Memorial Library in 1968 as a mark of respect to the former Vice-Chancellor Dr. V.S.Krishna. The university library has two branch Libraries, one in Engineering College and other in Law College. Dr. V.S. Krishna Library has a collection of 4, 41,400 books and 497 print journals including foreign and Indian. It also provides access to UGC-Infonet journals. The books and the bound volumes of periodicals are arranged on the shelves subject-wise according to Dewey Decimal Classification system. The catalogue is maintained in card form in three separate sequences under author catalogue, title catalogue and subject catalogue. The entries in each of these catalogues are arranged alphabetically. The library follows open access system in most of the sections, to assist the user in locating the needed books. The library has Internet facility.

### **c) Library of University of Hyderabad**

The University of Hyderabad (UH), a premier institution of post-graduate teaching and research in the country, was established by an Act of Parliament (Act No. 39 of 1974) on 2nd October, 1974 as a Central University, wholly financed by the University Grants Commission. The University of Hyderabad is divided into ten Schools, each of which offers multiple post-graduate/research courses in their respective domains. In addition to them, the university has eight specialized centres.

The library of University of Hyderabad is known as Indira Gandhi Memorial Library (IGM Library). This Library is the home for one of the largest and richest collection of learning resources in the country on Arts, Humanities, Social Sciences, Management, Sciences and Engineering. The library supports study, teaching and research activities of the university by acquiring the learning resources and providing information services that enhance their usefulness, accessibility, and availability. IGM Library is fully computerized for housekeeping operations and has Internet facility.

The total collection of IGM Library is 4, 44389 including books, back volumes of journals and theses/dissertations. The library subscribes to 510 print journals and access around 17000 e-journals under subscription and UGC Infonet programme.

#### **3.1.2. Research Scholars**

The total number of research scholars population in Andhra University is 1834, in S.V.University 1680 and in University of Hyderabad 1426. Hence the total number of research scholars in all the 3 universities is 4940. As the population is large in terms of cost, time and labour involved, the investigator selected a sample of 888 users (18% of the population) using stratified random sampling.

Out of the total sample of research scholars, 330 respondents (37.17%) belong to Andhra University, 302 respondents (34.01%) belong to S.V.University and 256 respondents (28.82%) belong to University of Hyderabad.

### **3.2. Collection of data**

Survey method of research has been used in the present study. A questionnaire was designed for collection of data from research scholars. As the respondents were highly conversant with English languages, questions were prepared in English language. The questions were prepared in a very simple language so that the users could understand them easily and could answer them within 30 minutes. The questions were of the type of specific informative, which call for a specific item of information or questions with yes or no answers or multiple answers.

The questionnaire consists of questions pertaining to the frequency of visiting the library, purpose of visit, type of journals used, average number of hours spent in using e-journals per week, purpose of using e-journals, preferred format of journals, search methods they use for locating articles, search engines they use for getting the required information, problems faced in using e-journals, assistance obtained from the library staff, participation in user training programmes conducted by their libraries concerned, in using e-journals, and their suggestions to improve the use of e-journals in their libraries. The data needed for the study were collected during the period from 1<sup>st</sup> February 2011 to 31<sup>st</sup> May 2011.

### **3.3. Analysis of data and presentation of data**

After collecting the data from the respondents, the data were analyzed according to the objectives stated. First, the data were recorded on data sheets and then fed in to the computer. The data were analyzed by using 'SPSS' (Statistical Package for Social Sciences). However, a few calculations were done with the help of a calculator.

Both descriptive and inferential statistical techniques were employed. Chi-square values were calculated using the SPSS software package.

## **4. CONCLUSIONS**

The following are the conclusions drawn after the analysis of data collected from the research scholars of SVU, AU and UH.

### **4.1. Experience in using computers**

- a. Most of the research scholars (65.87%) have from 2 to 4 years of experience in using computers.
- b. The research scholars of UH have more experience in using computers compared to the research scholars of SVU and AU. Science scholars have more computer experience in using computers compared to arts research scholars. Men research scholars have more experience in using computers compared to women. There is no significant difference between the research scholars of SVU and AU in their experience in using computers.

### **4.2. Experience in using Internet**

- a. The majority of research scholars (67.58%) have from 2 to 4 years of experience in using Internet.
- b. The research scholars of AU have more experience in using Internet compared to the research scholars of SVU.
- c. The research scholars of UH have more experience in using Internet compared to the research scholars of SVU and AU.
- e. Research scholars of men, and science have more experience in using Internet compared to women, and arts research scholars respectively.

### **4.3. Library Visit**

- a. A high percentage of the research scholars (39.19%) visit library daily. A high number of research scholars of UH visit the library daily compared to the research scholars of other universities.
- b. There is no significant difference between the research scholars of SVU and AU, SVU and UH with regard to their visit to the library.

- c. There is significant difference in this regard between the research scholars of AU and UH, men and women, and arts and science research scholars. That means more number of research scholar of UH visit the library compared to the research scholars of AU. The men, and science research scholars visit the library regularly compared to the research scholars of women, and arts disciplines respectively.

#### **4.4. Purpose of visit to the library**

- a. The majority of the research scholars (58.46%) visit library for literature collection and also for their research purpose.
- b. There are significant differences among the various groups of research scholars namely research scholars of SVU and AU, SVU and UH, arts and science, and men and women research scholars with regard to their purpose of visit to the library.
- c. There is no significant difference between the research scholars of AU and UH with regard to their purpose of visit to the library

#### **4.5. Internet access at the Department**

- a. Most of the research scholars (88.07%) replied that they have Internet facility at their departments.
- b. More number of research scholars of AU and UH replied that they have Internet facility at their departments compared to SVU.
- c. There are no significant differences between the research scholars of AU and UH, men and women research scholars with regard to Internet facility at their departments.
- d. More number of the science research scholars replied that they have Internet facility at their departments compared to arts research scholars.

#### **4.6. Form of Journals used frequently**

- a. A high percentage of research scholars (43.92%) use both print and e-journals in all the three universities.
- b. More number of research scholars of SVU use e-journals where as more number of research scholars of AU use print journals.



- c. More number of research scholars of UH use print journals for their research, where as more number of research scholars of SVU use e-journals.
- d. There is no significant difference between the research scholars of AU and UH with regard to the form of journals they use frequently for their research work.
- e. There is no significant difference between the men and women research scholars with regard to the form of journals they use frequently for their research work.
- f. More number of the science research scholars use e-journals for their research work where as more number of arts research scholars use print journals.

#### **4.7. Time spent in using e-journals**

- a. A high percentage of research scholars (40.88%) spend 3 hours per week in using e-journals.
- b. The research scholars of AU and UH spend more time in using e-journals compared to the research scholars of SVU. The research scholars of UH spend a little more time in using e-journals compared to the research scholars of AU.
- c. Women research scholars spend a little more time in using e-journals compared to men research scholars.
- d. The science research scholars spend more time in using e-journals compared to arts research scholars.

#### **4.8. Experience in using e-journals**

- a. Nearly one-fourth of research scholars (28.27%) have two years of experience in using e-journals.
- b. There is a significant difference between the research scholars of SVU and AU in their experience in using e-journals.
- c. The research scholars of UH have more experience in using e-journals compared to the research scholars of SVU and AU. Research scholars of men, and science have more experience in using e-journals compared to the research scholars of women, and arts respectively.

#### **4.9. Purpose of using e-journals**

The majority of research scholars (73.03%) use e-journals for the purpose of M.Phil/Ph.D. research work.

#### **4.10. Form of journals**

- a. Most of the research scholars (64.52%) prefer to use electronic format of journals for their research work.
- b. More number of research scholars of AU prefer to use electronic format of journals as compared to the research scholars of SVU.
- c. There is no significant difference between the research scholars of SVU and UH in their preferred format of journals.
- d. More number of research scholars of AU prefer to electronic format of journals compared to the research scholars of UH.
- e. There is no significant difference between the research scholars of men and women, and arts and science in their preferred format of journals.

#### **4.11. Importance of print journals despite the presence of e-journals**

- a. The majority of the research scholars (54.61%) considered that the print journals are very important despite the presence of e-journals.
- b. More number of research scholars of SVU expressed that print journals are very important despite the presence of e-journals compared to the research scholars of AU.
- c. There is no significant difference between the research scholars of SVU and UH with regard to the importance of print journals despite the presence of e-journals.
- d. More number of research scholars of UH expressed that print journals are very important despite the presence of e-journals compared to the research scholars of AU.
- e. There is no significant difference between men and women research scholars with regard to the importance of print journals despite the presence of e-journals.

- f. More number of research scholars of arts expressed that print journals are very important despite the presence of e-journals compared to the research scholars of science.

#### **4.12. Types of e-journals used**

Most of the research scholars (83.90%) use UGC-INFONET e-journals for their research work.

#### **4.13. Search methods used for accessing e-journals**

Nearly half of the research scholars (48.53%) use keywords for searching the required information.

#### **4.14. Frequently used databases of e-journals of publishers/aggregators**

A high percentage of research scholars (40.20%) are frequently using the database of 'JCCC'. The databases of publishers 'Science Direct' (33.55%), 'Springer Links' (33.32%) and 'Taylor and Francis' (30.97%) are also frequently used by the research scholars.

#### **4.15. Use of Open Access e-journal databases**

The most frequently used databases of Open Access e-journal databases by the research scholars are Directory of Open Access Journals (29.39%), PubMed Central (22.07%) and Indian Journals (20.27%).

#### **4.16. Use of Search engines**

The mostly used search engine by the research scholars is Google (35.17%). The majority of research scholars (57.89%) are not using meta search engines for retrieving required information.

#### **4.17. Satisfaction of search engines of e-journals**

- a. Most of the research scholars (73.64%) expressed their happiness with the search engines of e-journals. However, 26.36% of them expressed their unhappiness in this regard.
- b. More number of research scholars of AU are happy with search engines of e-journals compared to the research scholars of SVU.

- c. There is no significant difference between the research scholars of SVU and UH, AU and UH in this regard.
- d. There is no significant difference between the men and women research scholars in this regard.
- e. More number of research scholars of science are happy with search engines of e-journals compared to the research scholars of arts.

#### **4.18. Problems faced in using e-journals**

- a. Most of the research scholars (71.40%) have faced problems in using e-journals. The major problems faced by them are: slow Internet connectivity, (26.49%); lack of familiarity in searching e-journals (25.07%); inadequate information in the interested subjects (18.29%); and no facility to get a print copy for a downloaded article (17.98%).
- b. More number of research scholars of AU faced problems in using e-journals in their library compared to the research scholars of SVU.
- c. More number of research scholars of SVU and AU faced problems in using e-journals in their library compared to the research scholars of UH.
- d. There is no significant difference between men and women research scholars with regard to the problems faced in using e-journals.
- e. More number of research scholars of arts faced problems in using e-journals in their library compared to the research scholars of science.

#### **4.19. File Format**

- a. That majority of the research scholars (60.70%) like to read articles in PDF format.
- b. More number of research scholars of AU preferred to read articles in PDF format compared to the research scholars of SVU.
- c. More number of research scholars of SVU and AU preferred to read articles in PDF format compared to the research scholars of UH.
- d. There is no significant difference between the research scholars of men and women, and arts and science in their preference to read articles in PDF format.

#### **4.20. Percentage of information available in e-journals**

- a. A high percentage of the research scholars (36.26%) opined that they get 40-60 per cent of required information from e-journals.
- b. The research scholars of AU are getting more required information from e-journals in their library compared to the research scholars of SVU.
- c. There is no significant difference between the research scholars of SVU and UH with regard to percentage of getting of required information from e- journals.
- d. The research scholars of UH are getting more required information from e-journals in their library compared to the research scholars of AU.
- e. There are no significant differences between the men and women, and arts and science research scholars with regard to percentage of getting required information from e- journals

#### **4.21. Percentage of information available in print journals**

- a. A high percentage of the research scholars (41.55%) opined that they get 60-80 per cent of information from print journals.
- b. The research scholars of SVU are getting more required information from print journals in their library compared to the research scholars of AU.
- c. There is no significant difference between the research scholars of SVU and UH with regard to getting of required information from print journals.
- d. The research scholars of UH are getting more required information from print journals in their library compared to the research scholars of AU.
- e. There are no significant differences between men and women research scholars, and arts and science research scholars with regard to getting percentage of required information from print journals.

#### **4.22. Frequently used e-journals**

The frequently used journals by more than 10% of research scholars of all universities put together are 'Journal of Analytical Chemistry' (12.75%), 'Chemistry World' (10.92%), 'Plant Cell Reports' (10.82%), and 'Advances in Applied Mathematics' (10.36%).

#### **4.23. Adequacy of e-journals**

- a. Most of the research scholars (84.45%) opined that the e-journals available in their libraries are adequate for their requirements.
- b. More number of research scholars of AU and UH expressed that the e-journals available in their libraries are adequate for their requirements compared to the research scholars of SVU.
- c. There are no significant differences between the research scholars of AU and UH, men and women, and arts and science with regard to adequacy of e-journals available in their respective libraries for their requirements.

#### **4.24. Abstracting Periodicals**

- a. The majority of the research scholars (64.41%) replied that they are not using abstracting periodicals in electronic form in their libraries.
- b. More number of research scholars of AU and UH are using abstracting periodicals in electronic form in their libraries compared to the research scholars of SVU.
- c. More number of research scholars of UH are using abstracting periodicals in electronic form in their library compared to the research scholars of AU.
- d. There is no significant difference between men and women research scholars in using abstracting periodicals in electronic form in their respective libraries.
- e. There is a significant difference between the research scholars of arts and science disciplines in using abstracting periodicals in electronic form in their respective libraries.

#### **4.25. Performance of library**

A high percentage of research scholars (41.67%) opined that the performance of library in providing access to e-journals in their libraries is good.

#### **4.26. Assistance by Library Staff**

- a. Most of the research scholars (75.11%) opined that they are getting adequate assistance from the library staff in using e-journals in their libraries.
- b. There is no significant difference between the research scholars of SVU and AU in their replies with regard to getting of adequate assistance from the library staff in using e-journals.
- c. More number of research scholars of SVU and AU replied that they are getting adequate assistance from the library staff in using e-journals compared to the research scholars of UH.
- d. More number of men research scholars and science research scholars are getting adequate assistance from library staff in using e-journals compared to women research scholars and arts research scholars respectively.

#### **4.27. User training programme**

- a. Most of the research scholars (67.90%) participated in training programmes conducted by their libraries with regard to the use of e-journals.
- b. More number of research scholars of AU and UH participated in training programmes conducted by their respective libraries with regard to the use e-journals compared to the research scholars of SVU.
- c. There is no significant difference between the research scholars of AU and UH in their participation in training programmes conducted by their respective libraries in using e-journals.
- d. More number of women research scholars participated in training programmes conducted by their respective libraries in using e-journals compared to the men research scholars.
- e. More number of research scholars of science participated in training programmes conducted by their respective libraries in using e-journals compared to the research scholars of arts.

## **5. RECOMMENDATIONS**

The following are the recommendations made by the investigator on the basis of analysis of the data and suggestions from the users.

### **5.1. Library Visit**

It is revealed from the study that only 39.19% of the research scholars visit the library daily. Hence, to enhance the frequency of visits to the library, they should be informed about the importance of information, availability of various information sources including e-journals and the techniques of getting the required information from these sources. The research supervisors should motivate their research scholars to go to the library for getting the required information for their research work.

### **5.2. Place of accessing e-journals**

The study shows that only 25.33% of research scholars access e-journals at their respective Departments. This may be due to inadequate computer facilities at their Departments concerned. Hence there is need to provide better computer infrastructure at the Departments in all the universities for the better utilization of e-journals.

### **5.3. Time spent in using e-journals**

It is evident from the study that 40.88% of the research scholars spent only three hours, 20.95% of them two hours and 6.30% of them one hour per week in their libraries in using e-journals. Hence, appropriate steps may be undertaken by the authorities in making the research scholars to spend more time in library in getting the required information. The library authorities should enhance the timings of digital libraries and provide adequate number of computer systems. Adequate infrastructure facilities should be provided for research scholars in the Departments also for accessing e-journals.

### **5.4. Training to the research scholars of arts**

The study shows that the research scholars of science disciplines have more computer and Internet experience compared to research scholars of arts disciplines. They also have more



experience in using e-journals and are spending more time in using e-journals compared to the research scholars of arts disciplines. The difference between the research scholars of science and arts should be minimized for better utilization of e-journals. Librarians of SVU, AU and UH should conduct special training programmes to the research scholars of arts in making them aware of e-journals, how to use Internet and how to access e-journals efficiently and effectively. There is also need to publish more number of journals in arts disciplines in electronic form.

### **5.5. Training to women research scholars**

The study shows that men research scholars have more computer and Internet experience compared to women research scholars. They have more experience in using e-journals compared to women research scholars. The difference between men and women research scholars should be minimized for better utilization of e-journals. Librarians of SVU, AU and UH should conduct separate training programmes to women research scholars to provide instructions in using Internet and in accessing e-journals available in their respective libraries.

### **5.6. Training to research scholars of SVU and AU**

The study shows that the research scholars of UH have more computer and Internet experience compared to the research scholars of SVU and AU. They also have more experience in using e-journals compared to the research scholars of SVU and AU. The librarians of SVU and AU should provide more intensive training to their research scholars in using Internet and in accessing e-journals.

### **5.7. Importance of print journals despite the presence of e-journals**

It is clear from the study that 29.72% of research scholars use print journals frequently for their research work. The majority of the research scholars (54.61%) replied that the print journals are very important, and 39.30% of them replied that the print journals are moderately important despite the presence of e-journals. Nearly one-fourth of research scholars (23.87%) are dissatisfied with the print journals subscribed by their respective libraries. The study also reveals that 35.48% of research scholars prefer print format of journals. Print journals are important for the research scholars to collect the required information for their research work. Hence the libraries should continue to provide required budget for subscription of print journals. The

libraries can subscribe the required print journals after assessing the requirements of users in this regard.

### **5.8. Use of UGC-INFONET and Open Access e-journals**

The study reveals that 16.10% of the researchers are not using UGC-INFONET e-journals. The study also reveals that 69.03% of them are not using open access e-journals. This may be due to their unawareness of UGC-INFONET e-journals and open access e-journals and lack of skills to access these journals. Hence the library authorities should create awareness among them about UGC-INFONET e-journals and open access journals and provide sufficient skills among them for accessing these journals. Provision should be made by the library authorities to access open access journals through their respective websites.

### **5.9. Search methods**

The research scholars use a wide range of search methods for getting the required information. The study shows that nearly half of the research scholars (48.53%) use keywords for searching the required information. The other search methods are less used by the researchers. Hence there is need to provide practical training to the research scholars on the search methods for accessing UGC-INFONET e-journals and open access e-journals.

### **5.10. Problems faced in using e-journals**

Most of the research scholars (71.40%) are facing problems in using e-journals. The main problem for the research scholars is slow Internet connectivity. The computer centres and the libraries should acquire high-speed Internet connectivity to overcome the problem of slow downloading. Another problem is the inaccessibility of back volumes of periodicals. Hence the provision is to be made by the library authorities for accessing back volumes of periodicals in electronic form. The number of e-journals available electronically should be increased for researchers in their area of specialization. AU and UH are not providing printing facility for downloaded articles. Hence the research scholars of AU and UH are facing this problem in their respective libraries. Hence the library authorities of AU and UH should provide printing facility for articles downloaded for the convenience of research scholars.

### **5.11. Satisfaction with e-journals**

A significant percentage of research scholars (12.16%) are dissatisfied with the e-journals subscribed by their libraries. The library authorities can take necessary steps to improve the subscription of the e-journals after assessing the needs of the researchers. The research scholars of science disciplines are more satisfied with e-journals compared the research scholars of arts. Hence the publishers of e-journals should come forward to publish more number of e-journals in the disciplines of arts. The research scholars of AU and UH are more satisfied with e-journals compared to the research scholars of SVU. Hence there is need to subscribe more number of e-journals in S.V.U. Library after assessing the needs of research scholars.

### **5.12. Abstracting Periodicals**

The majority of the research scholars (64.41%) replied that they are not using abstracting periodicals in electronic form in their respective libraries. This may be due to the unavailability of abstracting periodicals in electronic form and their unawareness of these journals in the libraries. The library authorities should motivate their research scholars to use abstracting periodicals in electronic form if available in their libraries. User training programmes are to be conducted to the researchers for the proper utilization of abstracting periodicals in electronic form if available in their libraries. The abstracting periodicals in electronic form should be subscribed for making literature search easily after assessing the requirements of research scholars.

### **5.13. Printing charges**

There is no provision for printing of downloaded articles in the libraries of AU and UH. But there is provision for printing of articles in SVU Library. Half of the research scholars of SVU are dissatisfied with the printing charges collected per page. Hence the library authorities of SVU can consider to reduce the printing charges per page for downloaded articles if feasible.

### **5.14. Digital Library**

The study shows that 28.50% of the research scholars are not satisfied with the physical facilities provided by their digital libraries. Hence the authorities can take necessary steps to improve the physical facilities such as comfortable furniture, lighting and air-conditioning in digital libraries for long hours of consulting e-journals.

### **5.15. Performance of library**

Nearly one-tenth (10.47%) of research scholars opined that performance of their respective libraries is either poor or very poor in providing access to e-journals. Hence the library authorities can take necessary steps to improve the performance of their respective libraries in accessing e-journals.

### **5.16. Assistance by library staff**

Most of the research scholars (75.11%) opined that they are getting adequate assistance from the library staff in using e-journals in their libraries. The remaining (24.89%) opined that they are not getting adequate assistance from their library staff in using e-journals. Hence the staff of the university libraries and university computer centres must have skills to assist the research scholars when they face any problem in accessing e-journals. The staff should be given enough training in using Internet and accessing e-journals so that they can assist whenever the research scholars get problems in accessing e-journals.

### **5.17. User training programmes**

The study shows that 32.10% of the research scholars did not participate in training programmes conducted by their libraries with regard to the use of e-journals. But all these research scholars are willing to attend if the training programmes are conducted by their libraries on using of e-journals. Hence, the libraries should conduct user training programmes to freshers and others regularly. In these programmes, the users should be told about the importance of e-journals, types of e-journals, search methods, and the techniques in using the computer and Internet. Training should be given for research scholars for the proper utilization of e-journals. As the majority of the research scholars (75.91%) like the conduct of training programmes in small group in central library on the use of e-journals, the library authorities can plan their user training programmes accordingly. The training programmes should be made compulsory for the research scholars of M.Phil and Ph.D. programmes.

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