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E-Resource Use by Science Faculty and Research Scholars: A Case Study of Panjab University, Chandigarh

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Abstract

Electronic resources have become an indispensable component of every library's collection. The present study was conducted amongst the faculty and research scholars of Panjab University, Chandigarh to assess their use of e-resources, purpose of use, preferred methods of learning, hindrances faced, and participation in training programmes and use of search strategies. The results indicate a significantly good level of e-resource use; e-journal is found to be the most used e-resource; self-learning is the preferred method of learning; search engine is the preferred interface to search e-resources; research is the main purpose of use; and article title the most preferred search option. The study suggests conducting more number of e-resource training programmes to ensure optimum use.

Keywords: *Electronic resources, E-resources, Panjab University, E-resource use, Search strategies*

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INTRODUCTION

ICT has made a profound impact on each and every aspect of our lives. Libraries have never been aloof to ICT and have always strived to cope up with the recent developments and in implementing the latest tools and techniques in providing better and efficient library services. The rapid advancement of information and communication technology (ICT) has brought a revolutionary change in the information scenario giving rise to a number of options to handle varied information sources conveniently and effortlessly. Over the last decade, electronic resources have become increasingly substantial components of academic library collection. The availability of information resources in electronic format have provided an impetus to the libraries shifting to electronic formats. The use of electronic resources is growing among the users mainly because the electronic resources provide better, faster and easy access to information than information accessed through print media.

E-resources

Electronic resources can be referred to those resources which are in electronic/digital form accessible online or offline using a computer-based system. These mainly includes e-journals, e-books, e-databases, ETDs, e-reference sources, e-newspapers, e-magazines, open access resources and similar other products which can be subscribed or made freely accessible mainly through the Internet.

According to AACR2, 2002 glossary [1], an electronic resource is: "Material (data and/or program(s)) encoded for manipulation by a computerized device. This material may require the use of a peripheral directly connected to a computerized device (e.g., CD-ROM drive) or a connection to a computer network (e.g., the Internet)." According to International Coalition of Library Consortia (ICOLC) (1998) [2], it is a broad term that encompasses abstracting and indexing services, electronic journals and other full text materials, the offerings of information aggregators, article delivery services, etc.

Panjab University, Chandigarh

Panjab University [3] is ranked number one amongst Universities in India and 38 in Asia Times Higher Education Asian University Rankings, 2015. The University was initiated at Lahore in 1882 and is presently located in Sector 14 and Sector 25 of Chandigarh

spreading across an area of almost 550 acres and has a long tradition of pursuing excellence in teaching and research in science and technology, humanities, social sciences, performing arts and sports. The library of Panjab University, named officially as A.C. Joshi Library [4], has a building which is centrally air-conditioned and equipped with computer and communication network, housing more than six lakh volumes and has a seating accommodation of 500 readers. The Library subscribes to about 600 current periodicals and provides access to approximately 5000 online full-text journals available through e-ShodhSindhu Consortium. The library is fully automated with SLIM-21 software and has also implemented RFID.

REVIEW OF RELATED LITERATURE

Many studies have been undertaken to study the use of e-resources in the libraries. Some selected studies during the time span from 2005 to 2017 have been highlighted here.

Arshad and Ameen [5] revealed that the top most frequently used information source by academicians is e-journal which they used mostly for research activities but to lesser extent for teaching and instruction and writing conference papers. Anasuya [6] found that most of the respondents prefer title to search their information followed by author, subject and publisher. The main problems encountered in accessing e-resources were lack of time, difficulty in finding relevant information, too much information retrieved, long time to view and limited access to computers. Nanda [7] found that that almost all the faculty and research scholars were aware about the e-journals and majority of faculty and research scholars (more than 80%) were aware about online databases subscribed by the library. Sohail and Ahmad [8] in their survey reveal that the majority of respondents are aware of the usage of e-resources and services. Bituka, Kumbar and Hadagali [9] found that majority of the faculty members (90%) were aware of electronic information resources (EIR), main purpose of use was teaching and research, main problem faced was overload of work and they came to know about EIR mainly through friends and colleagues. Chanchinmawia and Verma [10] found that 66% respondents are aware and use UGC-Infonet digital library consortium but there is a need to conduct more awareness/training program for enhancing the use of the UGC-Infonet Consortium. Kaur and Kathuria [11] found that the respondents are aware and well versed with web technology but still need to understand the significance of library's webpage for accessing information about resources and services. Ukachi [12] found a strong positive correlation between level of undergraduate students' information literacy skill and their use of electronic resources provided in the library. Bhat and Mudhol [13] in their study concludes that Medical Faculty members and students' attitudes seem to be very positive towards e-resources for their study and research and the role of libraries as gateway to provide assistance in accessing these resources Sivathaasan, Achchuthan and Kajananthan [14] revealed that usage of electronic information resources differs significantly among age groups, teaching language and experience of the university teachers. Bassi and Camble [15] studied the gender differences in use of electronic resources in University Libraries of Adamawa State, Nigeria. Bhatt and Rana [16] revealed that academic staff was using many types of e-resources and the majority of them were quite satisfied with using e-resources. Ansari and Zuberi [17] revealed that majority of the academics at the University of Karachi have computer skills that facilitate the use of electronic resources, although a majority have little knowledge of electronic resources. Moghaddam and Talawar [18] showed that there was a growing interest in electronic journals among the users at IISc, electronic journals were mostly used for research needs and PDF was the most preferred format. Malik [19] discussed the importance of web-based information resources and showed their advantages and terminological differences with other terms. Ali [20] found that 95 per cent of users are aware about the electronic information services (EIS) provided by the library; Boolean logic and truncation were found to be the most often used search facilities; Google was the most used search engine and; keyword search was the most common search strategy.

OBJECTIVES AND METHODOLOGY

The present study was conducted to assess the use of e-resources by science faculty and research scholars of Panjab University, Chandigarh. The main objectives of the study are:

- To study the frequency of e-resource use by the science faculty and research scholars.
- To find out the purpose of using e-resources.
- To find out the preferred methods of learning and searching e-resources.
- To identify the specific factors that hinders the use of electronic resources.
- To assess the provision of user education and training programmes regarding e-resources.
- To study the various search strategies adopted in using e-resources.

Survey method was adopted for the present study and a questionnaire was prepared and finalized after pre-testing. The total population for study was 1118 consisting of science faculty and research scholars of the University. A representative sample of 15% was chosen using stratified random sampling. The questionnaire was personally distributed to 150 research scholars and 100 faculty members of the various science departments of the University out of which 175 questionnaires were received back having a response rate of 70%. After discarding some incomplete questionnaires, the final data consisted of 168 questionnaires (103 from research scholars and 65 from faculty members) which was entered in an MS-Excel sheet and then analyzed.

DATA ANALYSIS AND INTERPRETATION

Use of E-resources

As indicated in Table 1, the most used e-resource is e-journal (mean = 4.542). This is followed by free internet resources (mean =4.161), open access resources (mean = 3.756), e-books (mean = 3.69), ETDs (mean =3.423), e-newspaper (mean = 3.381), e-research reports (mean =3.226), e-conference proceedings (mean = 2.905), e-bibliographic databases (mean = 2.815), e-magazines (mean = 2.815) and indexing abstracting databases (mean =2.637). The least used are institutional repositories (mean = 1.798).

Methods of E-resource Awareness

The various methods through which the users come to know about e-resources are listed in Table 2. The respondents came to know about e-resources mainly by "browsing or looking for materials" (73.81%). Other methods through which the respondents came to know about e-resources includes "by personal communication with friends, subject experts and resource persons" (61.31%), "cited in report/journals/conference papers" (58.93%) and "e-mail alerts from publishers/distributors, etc." (41.07%). The role of the library staff regarding creating awareness does not seem significant as only 8.33% respondents said that they came to know about e-resources through reference by the librarian (Table 2).

Table 1: *Use of E-Resources.*

Electronic Resource	H	F	O	R	N	Total	Mean	Std. Dev.
E-books	42	54	54	16	2	168	3.690	0.948
E-journals	100	60	7	1	0	168	4.542	0.608
E-theses/dissertations	31	56	50	22	9	168	3.423	0.992
E-bibliographic databases	29	36	49	17	37	168	2.815	1.038
E-conference proceedings	20	53	40	27	28	168	2.905	1
Indexing abstracting databases	21	46	33	27	41	168	2.637	1.026
E-research reports	32	54	39	24	19	168	3.226	1.015
E-magazines	14	49	40	42	23	168	2.815	1.021
E-newspapers	33	46	58	21	10	168	3.381	1.019
Free Internet resources	74	63	21	7	3	168	4.161	0.833
Open Access resources	56	64	31	1	16	168	3.756	0.761
Institutional repositories	8	22	43	22	73	168	1.798	0.906
H, Highly (5); F, Frequently (4); O, Occasionally (3); R, Rarely (2); N, Never (1)								

Table 2: *Methods of E-resource Awareness.*

Awareness Method	No. of response	%age
By searching bibliographic database	54	32.14%
Announcements in journals	45	26.79%
Cited in report/journals/conference papers	99	58.93%
Referred to me by the librarian	14	8.33%
By browsing or looking for materials	124	73.81%
E-mail alerts from publishers/distributors, etc.	69	41.07%
By personal communication with friends, subject experts and resource persons	103	61.31%
**multiple responses were allowed*		

Table 3: *Methods of Learning.*

Method of learning to use e-resources	No. of response	%age
Trial and error	61	36.31%
Self learning	147	87.5%
Guidance from other colleagues	74	44.05%
Guidance from library staff	9	5.36%
Courses, trainings, workshops and seminars	47	27.98%
Guidance from computing staff/technicians	10	5.95%
**multiple responses were allowed*		

Methods of Learning to Use

The methods through which the users learn to use e-resources are listed in Table 3. It is interesting to note that 87.5% of the respondents learnt through "self learning", 44.05% through "guidance from other colleagues", 36.31% by "trial and error" and 27.98% through "courses, trainings, workshops and seminars". Very few respondents obtained "guidance from computing staff/technicians" (5.95%) and "guidance from library staff" (5.36%) (Table 3).

Preferred Methods of Searching

Table 4 shows that the user preferred to find e-resources "through search engines like Google, etc." (mean = 4.679). Other methods used included "through University/Library website" (mean = 3.863), "links to full text in databases from bibliographic databases" (mean = 3.274), "directly through publisher/vendor website" (mean = 3.119) and "subject gateways/guides/portals on the Internet" (mean = 2.964).

Purpose of Use

The main purposes for which the respondents use the e-resources (in order of preference) included: "to update knowledge" (mean = 4.661), "for writing research paper" (mean = 4.607), "for reading articles" (mean = 4.601), "on-going research work" (mean = 4.583), "for writing research proposal/projects" (mean = 4.464), "preparation for seminar/conference/workshop" (mean = 4.292) and "for general information" (mean = 4.226).

Other purposes for which they used e-resources are: "preparation of teaching/lecture notes" (mean = 3.827), "exploring the research grants" (mean = 3.667), "for guiding researchers/peers" (mean = 3.423) and "curriculum design" (mean = 3.101) (Table 5).

Hindrances in Use of E-resources

The hindrances (shown in Table 6) which affected the users the most included: "Do not have access from home" (mean = 3.708), "Limited access to back issues" (mean = 3.512), "Only a limited number of titles available" (mean = 3.47), "Retrieval of irrelevant/junk information" (mean = 3.452), "Discomfort in online reading" (mean = 3.268), "Difficulty in finding relevant information" (mean = 3.238), "Slow download speed" (mean = 3.232), "Information overload" (mean = 3.214) and "Instability of electronic resources" (mean = 3.06) (Table 6).

Table 4: *Search Methods.*

Method	MF	F	O	R	N	Total	Mean	Std. Dev.
Through University/Library website	77	31	29	22	9	168	3.863	1.276
Directly through publisher/vendor website	26	40	47	38	17	168	3.119	1.218
Through search engines like Google, etc.	122	42	0	4	0	168	4.679	0.603
Links to full text in databases from bibliographic databases	34	46	37	34	17	168	3.274	1.275
Subject gateways/guides/portals on the Internet	22	41	46	27	32	168	2.964	1.304
MF, Most Frequently (5); F, Frequently (4); O, Occasionally (3); R, Rarely (2); N, Never (1)								

Table 5: *Purpose of Use.*

Purpose	SA	A	U	D	SD	Total	Mean	Std. Dev.
To update knowledge	113	53	2	0	0	168	4.661	0.499
For reading articles	109	53	4	2	0	168	4.601	0.601
For writing research paper	108	54	6	0	0	168	4.607	0.558
For writing research proposal/projects	92	64	10	2	0	168	4.464	0.665
Preparation for seminar/conference/workshop	71	82	10	3	2	168	4.292	0.761
For general information	64	83	16	5	0	168	4.226	0.74
On-going research work	108	52	6	2	0	168	4.583	0.623
Preparation of teaching/lecture notes	48	77	21	10	12	168	3.827	1.127
For guiding researchers/peers	51	46	22	21	28	168	3.423	1.454
Exploring the research grants	49	52	40	16	11	168	3.667	1.182
Curriculum design	22	52	43	23	28	168	3.101	1.279
SA, Strongly Agree (5); A, Agree (4); U, Undecided (3); D, Disagree (2); SD, Strongly Disagree (1)								

Table 6: *Hindrances Faced by the Users.*

Hindrances	SA	A	U	D	SD	Total	Mean	Std. Dev.
Only a limited number of titles available	29	66	31	39	3	168	3.470	1.083
Limited access to back issues	25	69	42	31	1	168	3.512	0.979
Difficulty in finding relevant information	16	68	27	54	3	168	3.238	1.062
Do not have access from home	48	66	17	31	6	168	3.708	1.17
Limited access to computers	9	44	30	72	13	168	2.786	1.084
Slow download speed	26	55	25	56	6	168	3.232	1.173
Difficult interface design	7	45	58	51	7	168	2.964	0.953
Lack of search techniques	9	45	38	65	11	168	2.857	1.057
Lack of guidance/assistance from library staff	14	35	58	50	11	168	2.946	1.051
Instability of electronic resources	9	55	49	47	8	168	3.060	1.007
Discomfort in online reading	19	68	27	47	7	168	3.268	1.113
Credibility and quality issue	11	45	38	70	4	168	2.935	1.022
Information overload	15	61	40	49	3	168	3.214	1.022
Retrieval of irrelevant/junk information	23	67	42	35	1	168	3.452	0.99
Frequent power failure	9	26	50	72	11	168	2.702	0.988
Lack of IT knowledge	9	24	42	73	20	168	2.577	1.047
SA, Strongly Agree (5); A, Agree (4); U, Undecided (3); D, Disagree (2); SD, Strongly Disagree (1)								

Training in Use of E-resources

Out of the total 168 respondents, only 24 (14.29%) said that they have attended any library training in the use of e-resources, which is a very low figure. The main reasons attributed for not attending any such training were "lack of information" (37.5%) and "heavy workload" (36.81%). Some users said that the "library doesn't organize any such training" (34.03%), again indicating that there is lack of information or communication between the user and the library. A few users (32.64%) said that they don't require any training (Table 7).

Table 7: *E-resource Training Programmes Attended.*

Training in use of e-resources	Yes	No	Total
Attended Training Programme	24	144	168
%age	14.29%	85.71%	100%

Table 8: *Reasons for not Attending Training.*

Reason	No. of response	%age
Library doesn't organize any such training	49	34.03%
Don't require any training	47	32.64%
University doesn't give permission	1	0.69%
Heavy workload	53	36.81%
Lack of information	54	37.5%
Any other	4	2.78%
**multiple responses were allowed*		

Further, the users said that if they were to attend training programme, they would prefer "training in department" (54.76%). Some users were in favour of "video/PowerPoint tutorials on university website" (42.26%) and some in favour of "customized training programme" (26.19%). Very few users preferred "training in library" (18.45%) (Table 8).

Table 9: *Preference of Mode of Training.*

Mode of Training	No. of response	%age
Training in library	31	18.45%
Training in Department	92	54.76%
Video/PowerPoint tutorials on university website	71	42.26%
Customized training programme	44	26.19%
Any other	6	3.57%
**multiple responses were allowed*		

Use of Search Strategies

The search strategies used for searching e-resources in the decreasing order of preference are: article title (mean = 4.56), journal title (mean = 4.238), keyword (mean = 4.208), subject (mean = 4.149), author (mean = 4.036), abstract (mean = 3.452), year/date (mean = 3.357), publisher (mean = 3.202) and DOI (mean = 3.048) (Table 9).

Table 10: *Search Strategies Used.*

Search Strategy/Option	MF	F	O	R	N	Total	Mean	Std. Dev.
Author	58	64	40	6	0	168	4.036	0.854
Title of the article/Article title	105	54	7	2	0	168	4.560	0.635
Title of journal/Journal title	74	66	23	4	1	168	4.238	0.821
Subject	73	55	33	6	1	168	4.149	0.9
Keyword	85	49	22	8	4	168	4.208	1.002
Year/Date	26	58	45	28	11	168	3.357	1.128
Abstract	30	55	55	17	11	168	3.452	1.099
Publisher	23	42	61	30	12	168	3.202	1.108
Author address/affiliation	13	31	49	49	26	168	2.738	1.159
DOI	29	34	45	36	24	168	3.048	1.299
Boolean operator "AND"	14	30	36	34	54	168	2.500	1.327
Boolean operator "OR"	13	25	31	41	58	168	2.369	1.302
Boolean operator "NOT"	10	16	30	47	65	168	2.161	1.21
Phrase search	19	38	32	33	46	168	2.708	1.377
Proximity operator "NEAR", "BETWEEN"	4	7	27	46	84	168	1.815	1.007
Truncation (# or $)	0	5	18	45	100	168	1.571	0.801
Wild cards	1	5	20	44	98	168	1.613	0.854
Limiters	0	8	28	41	91	168	1.720	0.909
MF, Most Frequently (5); F, Frequently (4); O, Occasionally (3); R, Rarely (2); N, Never (1)								

The strategies which were used to a lesser extent included: author address/affiliation (mean = 2.738), phrase search (mean = 2.708), Boolean operators AND, OR, NOT (mean = 2.5, 2.369 and 2.161 respectively), proximity operators (mean = 1.815), limiters (mean = 1.72), wild cards (mean = 1.613) and truncation (mean = 1.571) (Table 10).

Thus, the users prefer to search e-resources by article title, journal title, keyword, subject and author. Advanced search strategies like Boolean, phrase, truncation search, etc. were used to a lesser extent. This indicates that the users should be provided training in use of e-resources, so that they can get more relevant and pertinent search results.

RESULTS AND DISCUSSION

The results of the present study indicate that e-journals and free internet resources are the most used e-resources. The least used e-resources were institutional repositories. Many studies have confirmed the high awareness and use of e-journals among the academics. Sharma, Singh and Sharma [21] found that e-journals were the most preferred e-resource among the respondents. Similar results were obtained in the studies by Mahapatra, Swain and Jena [22], Sethi and Panda [23] and Satpathy and Rout [24].

The users mainly come to know about e-resources by browsing or looking for materials and by personal communication with friends and colleagues. Vasishta [25] also found that the primary source of acquaintance with e-resources was interaction with peers followed by browsing of the Internet.

The users mainly learned to use e-resources through self learning and they find e-resources mostly through search engines. Kiran Kumar and Kumbar [26] found that most of the faculty learned to use electronic resources through self learning or by guidance from other colleagues or by trial and error. Thanuskodi [27] revealed that the user searched the e-resources mainly through the library portal, followed by search engines and further followed by websites. Tilwani and Kumar [28] found Google as the highest point of interface used in search process.

The main purpose of using e-resources was to update knowledge, for reading articles and writing research papers. This result concurs with the studies by Ansari and Zuberi [29] and Haridasan and Khan [30].

The main hindrance faced in using e-resource was that they do not have access from home, access to back issues is limited, sometimes irrelevant or junk information is retrieved and they feel discomfort in online reading. Ahmed [31] identified various constraints in using e-resources including limited number of titles, limited access to back issues, difficulty in finding information, inability to access from home, limited access to computers and slow download speed.

Only one-seventh (14.29%) of the users have attended library training in use of e-resources and the main reason for not attending training was lack of information. The users preferred to attend training in their own department. This is in contradiction to the study by Anil Kumar and Reddy [32] in which a good majority of research scholars (67.90%) participated in training programmes in using e-journals conducted by the libraries.

As regards to search strategies, the most used search approaches were article title, journal title, keyword, subject and author. The use of search options like Boolean operators, phrase search and truncation search was low. Anasuya [6] also found that most of the respondents prefer title to search their information. Bhat and Ganaie [33], Rajender Kumar [34], Nikam and Kumar [35] also found similar results. Keyword searching was found to be adopted by users in many studies including Arshad and Ameen [5], Nanda [7] and Sethi and Panda [23] among many others.

SUMMARY AND CONCLUSION

The electronic resources have become a substantial component of every academic library's collection these days. The present study found that e-journals and free internet resources were the most used e-resources among the science faculty and research scholars. They came to know about e-resources mainly by browsing or looking for materials and learned to use them through self-

learning mode. Search engines like Google, etc. were the main interface through which the users approached the e-resources. The main purpose of using e-resources was for research and related activities. Many of the users faced problems in the use of e-resources. They mainly searched e-resources by article title, journal title and keywords while the use of advanced search strategies was found to be low. Only a small number of respondents seem to have attended library training pertaining to e-resources indicating that the libraries should focus more on this aspect. The libraries should play a proactive role and focus more on promoting the e-resources and increasing their efficient use through user training programmes in order to have optimum use of e-resources.

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