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Differences between Faculty Members and Research Scholars in Use of E-Resources

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DIFFERENCES BETWEEN FACULTY MEMBERS AND RESEARCH SCHOLARS IN USE OF E-RESOURCES

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ABSTRACT

Purpose: The present study investigates the differences between faculty and research scholars in terms of e-resource use, methods of use, purpose, hindrances faced and search strategies.

Methodology: The study was conducted in five universities of North India using survey method. Stratified random sampling was used for selection of the samples and the final data consisted of 668 respondents including 252 faculty members and 416 research scholars. Mann Whitney test was conducted for testing of hypotheses.

Findings: In the study it was found that the faculty members used e-resources more in comparison to the research scholars. Significant differences were observed in the e-resource use, methods of use and purpose. The research scholars faced more problems in using e-resources as compared to the faculty members. Significant differences were also found between faculty and researchers in the use of keywords, Boolean operators (AND OR NOT), phrase search and wildcards and these search strategies were used more by the faculty in comparison to research scholars.

Research Implications: The results of the study are relevant to the policy makers as well as library professionals for taking the decisions in providing better library services particularly in terms of e-resources.

Originality: In the previous studies, the faculty and researchers were treated together as single unit whereas the present study deals with them separately. This study focuses on the difference between the faculty and researcher in terms of e-resource use and associated aspects.

Keywords: E-resources, Electronic resources, Use of e-resources, Search strategies

1. INTRODUCTION

The academic system is mainly based on teaching, learning and research which are further dependent on the information resources. These days the information resources are available in both print and electronic form. The availability of ICT and the information resources in electronic format have provided an impetus to the libraries shifting to electronic formats.

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 International Coalition of Library Consortia (ICOLC) (1998), 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."

The advantages offered by the e-resources as compared to the print resources have attracted the users as well as the libraries. Due to developments in ICT and changing needs of the users to pin-pointed and exhaustive information within a short time, the collection development policies of libraries have undergone change. E-resources have become substantial component of almost every library these days. The electronic sources of information which complemented the print media initially, now form a major part of the library collection in the form of e-journals, e-books, e-databases, e-reference sources and similar other materials.

2. REVIEW OF RELATED LITERATURE

The following review of related literature covers facets like importance of e-resources, use of e-resources, purpose of use, problems faced and use of search strategies.

2.1 Importance of e-resources

Many studies indicated that the users' preference for electronic resources is increasing due to the benefits offered by them. Vasishta (2014) in her study revealed that the research scholars and faculty were of the opinion that e-resources have improved their professional competence and this service has expedited research process. Similarly, Bhatt and Rana (2011) revealed that using the e-resources improved the academic/professional competency of the users.

Ahmad and Panda (2013) stated that 100% faculty members agreed that e-resources are very useful and important to their work. According to Beard, Dale and Hutchins (2007), the uptake of e-resources has increased rapidly and considerably. Kaur and Kathuria (2016) stated that "electronic resources have become an integral part of the information for various features such as easy download and fast searching capability." Sohail and Ahmad (2017) reported a growing interest in e-resources among the users. Bhat and Mudhol (2014) stated that medical faculty members and students' attitudes seem to be very positive towards e-resources for their study and research. Ollé and Borrego (2010) revealed the increase in the amount of journal reading among academics.

2.2 Use of e-resources

The studies by Anil Kumar and Reddy (2016), Nanda (2017), Kaur and Kathuria (2016), Tilwani and Kumar (2007), Ansari and Zuberi (2010), Kaur and Verma (2009) stated that users prefer print as well as electronic resources, however, the inclination towards e-resources is increasing gradually. The users are using various categories of e-resources including e-books, e-journals, indexing abstracting databases, etc. Siwach and Malik (2018) found e-journals and free internet resources as the most used e-resources among the science academia of Panjab University. Qasim and Khan (2015) found that all the scientists of CSIR-IGIB, Delhi were actively involved in using e-journals including open source journals. Bhatt and Rana (2011) revealed that academic staff were using many types of e-resources along with the latest sources of information like e-groups, virtual conferences. Haridasan and Khan (2009) reported that the faculty members and research scholars were using library databases, OPACs, and bibliographies, for locating e-information. Swain and Panda (2009) stated that the internet-based e-resources were being well used compared with CD-ROM databases. In the study by Amjad, Ahmed and Naeem (2013), Internet, web resources, e-journals, HEC databases, e magazines, e-thesis, e-books, e-mail, and e-newspaper were found to be the frequent and most useable electronic resources among the academic scholars.

2.3 Purpose of using e-resources

Electronic resources are used for various purposes by different categories of users. According to Sharma, Singh and Sharma (2011) the users primarily seek the help of e-resources

for performing their routine exercises, i.e. teaching, research, entertainment and communication. Many more studies found that the users mainly used e-resources for research purpose. (Sohail and Ahmad, 2017; Anil Kumar and Reddy, 2016; Nanda, 2017; Siwach and Malik, 2019). In their study Arshad and Ameen (2017) stated that academic staff frequently used e-journals for research activities but they least frequently used e-journals for teaching and instruction and writing conference papers. In their study Kaur and Kathuria (2016) indicated that the respondents visits library mostly for research purpose. Tamrakar and Garg (2016) found that most of the users of IIT-Guwahati were using e-journals for information, updating their knowledge, and for collecting significant material for their study and research purposes. Wu and Chen (2012) revealed that the graduate students of science and technology perceived electronic resources to be considerably more important to their research and studies. According to Ansari and Zuberi (2010) electronic resources were used for research and for preparation of lectures.

2.4 Problems in the use of e-resources

Many studies reported the problems encountered in the use of e-resources. Vasishta (2014) stated that the major hindrances faced by research scholars and faculty were 'limited user access' and 'slow speed of access'. According to the study by Anasuya (2017), the main problems encountered in e-resource access were lack of time, difficulty in finding relevant information, too much information retrieved, long time to view and limited access to computers. Thanuskodi (2011) found that the main problems in using e-resources were - lack of IT knowledge, lack of time, poor personal assistance, power failure and limited access to computers. Ansari and Zuberi (2010) stated that lack of knowledge and lack of facilities were the main reasons for not using electronic resources. The study by Satpathy and Rout (2010) found that the main reason of dissatisfaction on available e-resource in the opinion of the respondents was non-availability of e-resources as per the need. Walmiki, Ramakrishnegowda and Prithviraj (2010) found that lack of knowledge to use, insufficient internet nodes, slow bandwidth and lack of relevant information sources were found to be the major problems faced by the faculty members. Tilwani and Kumar (2007) stated some barriers as lack of computer labs for access, lack of guidelines on using and searching, lack of trained staff, lack of awareness and slow speed of access.

Ahmed and Amjad (2014) identified major problems as lack of internet connection, difficult interface design and power outages along with some lesser problems like technical problem, lack of searching techniques, discomfort with online reading and lack of guidance from teachers. Sethi and Panda (2011) attributed the lack of appropriate training to the users to access e-resources as one of the major constraints in effective use of e-resources. Ali (2005) found that lack of printing facilities, terminals and trained staff were the major reasons that discouraged users of IIT Delhi from accessing the EIS. Dadzie (2005) attributed the low patronage to inadequate information about the existence of these library resources. In the study by Rehman and Ramzy (2004) the respondents reported that time constraints, lack of awareness, and low skill levels were among the primary constraints they experienced.

Tamrakar and Garg (2016) found that 23.60 % respondents were not enquired on their information requirements before subscription of e-journals/databases by the library. In the study by Ollé and Borrego (2010), the librarians stated that most of the complaints they receive from users were to do with platform breakdowns, difficulties in accessing resources off-campus, and discontinued resources.

2.5 Search strategies for e-resources

Bhat and Ganaie (2016) found that among all popular platforms, users of Dr Y.S. Parmar University of Horticulture and Forestry prefer to use "search engines", among which "Google" proves to be the number one search engine. Majority of users search the information through "title" followed by "keywords/subject terms". The users are not yet well-versed with most of the advanced search techniques, as less than half of them are able to use only Boolean operators, and less than 10 per cent of them claim to know other search techniques. Majority of users have learnt to use information search and retrieval skills through self-study. Rajender Kumar (2016) found that title was used highly by students (PG and UG), followed by subject and then by author while DOI was not used by UG students. Kiran Kumar and Kumbar (2015) revealed that the faculty used search engines to find information and the preferred search engines in order of preference included Google, Yahoo, Bing, MSN and Alta Vista among others. Nikam and Kumar (2013) in their study states that to access e-journals several strategies are used by the library users which in the order of preference are title of articles, subject, journal titles, keywords, author, abstracts, publishers name, date of publication, table of content, ISSN and

ISBN. Sethi and Panda (2011) revealed that the majority of the Life Scientists (70.31 percent) use keywords as their search strategy. Chirra and Madhusudhan (2009) found that the most popular search strategy with the respondents was via a Boolean search (52 percent) while the second most used option was a phrase search (34 percent), followed by field searching (28 percent), and truncation (6 percent). Vakkari and Talja (2006) found that "keyword searching in journal databases (63%) and reference databases (53%) were the two most important methods of accessing electronic journal articles, followed by browsing core journals (39%), chaining (29%) and colleagues (14%)." Disciplinary differences were also observed by the authors as "keyword oriented searching was more typical in natural sciences, engineering and medicine than in other disciplines, whereas semi-directed searching was significantly more typical in humanities."

3. METHODOLOGY

The faculty members and research scholars of the science departments of the five Universities of North India namely Maharishi Dayanand University, Kurukshetra University, Punjabi University, Guru Nanak Dev University and Panjab University constituted the population of the present study. At the time of conducting the study, the total population was 3005 consisting of 734 faculty members and 2271 research scholars of the science departments of these five universities.

For the present study probability sampling was chosen and stratified random sampling was used for selection of the samples. For estimation of the sample size, the formula by Taro Yamane (1970), table by Krejcie and Morgan (1970) and online calculator of surveysystem.com were used and the average sample size using these three methods came to 345. However, it is better to have a larger sample size than the calculated one to have a better insight into the realm of the study. As a result, it was finalized to collect data of atleast 100 respondents from each university consisting of atleast 40 faculty members and 60 research scholars.

Keeping in view the nature of the problem, survey method was found more appropriated and thus adopted for the study. A comprehensive questionnaire was designed and used to collect the required information. Data collection was mainly undertaken by personally administering the questionnaires to the faculty and research scholars of the five universities. Additionally, the link of online questionnaire was e-mailed to faculty members whose e-mail ids could be obtained. However, the major data was collected through personal administration of questionnaires during

the visits to the universities. The final data of 668 respondents including 252 faculty members and 416 research scholars was collected.

The data normality was checked using Kolmogorov-Smirnov and Shapiro-Wilk Test. It was found that the data do not have a normal distribution and since the data was ordinal in nature, it was decided to undertake non-parametric tests for the study. Mann-Whitney U test, which is a non-parametric equivalent of the independent samples t-test, was found to be suitable for the study.

3.1 Objective of Study

The objective of the study is to investigate the differences in e-resource use, methods, purpose, hindrances and search strategies used in accessing the e-resources by faculty and research scholars.

3.2 Hypotheses

- There is no significant difference in the usage of e-resources between the faculty and research scholars.
- There is no significant difference in the e-resource use methods among the faculty and research scholars.
- There is no significant difference in the purpose of use of e-resources by the faculty and research scholars.
- There is no significant difference in the hindrance faced in use of e-resources among the faculty and research scholars.
- There is no significant difference in the e-resource search strategies adopted by faculty and research scholars.

4. DATA ANALYSIS AND DISCUSSION

4.1 Differences in use of e-resources

Table 1 shows the Mann-Whitney U test results for significant differences in the use of e-resources between faculty members and research scholars.

Table 1: Mann-Whitney Test for Differences in the Use of E-resources

E-resources	Mean Rank (R)		U	W	Z	p
	FM (n=252)	RS (n= 416)				
E-books	372.7	311.36	42790.5	129526.5	-4.18	0.00**
E-journals	359.54	319.33	46105	132841	-2.949	0.003**
E-theses/ dissertations	342.1	329.9	50501	137237	-0.824	0.41
E- bibliographic databases	389.82	300.99	38474.5	125210.5	-5.934	0.00**
E-conference proceedings	384.06	304.48	39928	126664	-5.299	0.00**
Indexing abstracting databases	389.7	301.06	38504.5	125240.5	-5.922	0.00**
E-research reports	343.45	329.08	50161	136897	-0.955	0.34
E-magazines	358.39	320.03	46394.5	133130.5	-2.552	0.011*
E-newspapers	330.37	337	51376	83254	-0.444	0.657
Free Internet resources	322.35	341.86	49353	81231	-1.376	0.169
Open Access resources	362.24	317.69	45425	132161	-3.021	0.003**
Institutional repositories	403.28	292.84	35084	121820	-7.711	0.00**

U= Mann-Whitney U, W= Wilcoxon W, p= Asymp. Sig. (2-tailed)
** = Significant at 0.05*
*** = Significant at 0.01*

It was found that the mean ranks of e-books, e-journals, e-theses/ dissertations, e-bibliographic databases, e-conference proceedings, indexing abstracting databases, e-research reports, e-magazines, open access resources and institutional repositories are higher for faculty members in comparison to the research scholars indicating a higher use among them. The mean rank for e-newspapers and free internet resources were lower in faculty members than the research scholars showing that these two resources were used more by the research scholars. Statistically significant differences were found between the faculty members and research scholars in the use of some e-resources viz. e-books (U=42790.5, Z= -4.18, p=0.000), e-journals (U= 46105, Z= -2.949, p= 0.003), e-bibliographic databases (U= 38474.5, Z= -5.934, p= 0.00), e-conference proceedings (U= 39928, Z= -5.299, p= 0.00), indexing abstracting databases (U= 38504.5, Z= -5.922, p= 0.00), e-magazines (U= 46394.5, Z= -2.552, p= 0.011), open access resources (U= 45425, Z= -3.021, p= 0.003) and institutional repositories (U= 35084, Z= 7.711, p= 0.00).

Thus, the hypothesis “There is no significant difference in the usage of e-resources between the faculty and research scholars” is accepted for the use of e-theses/ dissertations, e-

research reports, e-newspapers and free internet resources. This hypothesis is rejected for the use of e-books, e-journals, e-bibliographic databases, e-conference proceedings, indexing abstracting databases, e-magazines, open access resources and institutional repositories.

The study by Arshad and Ameen (2017) revealed that academics' top most frequently used information source is e-journals; online reference sources and discussion with colleagues are also frequently used sources while online indexing and abstracting services are not a frequently used source. Kiran Kumar and Kumbar (2015) revealed that the most used electronic information resources included e-teaching materials, e-journals, e-books, open source literature, e-databases, students and faculty generated contents, e-reference resources and e-tutorials.

4.2 Differences in search methods

The Mann-Whitney test results of differences in methods of searching e-resources are shown in Table 2. Statistically significant differences were found between faculty members and research scholars in all the methods listed in the table.

Table 2: Mann-Whitney Test for Differences in the Search Methods

Methods of searching	Mean Rank (R)		U	W	Z	p
	FM (n=252)	RS (n= 416)				
Through University/ Library website	372.82	311.29	42759	129495	-4.155	0.000**
Directly through publisher/ vendor website	363.65	316.84	45069	131805	-3.14	0.002**
Through search engines like Google, etc.	316.58	345.35	47901	79779	-2.503	0.012*
Links to full text in databases from bibliographic databases	363.33	317.04	45151	131887	-3.081	0.002**
Subject gateways/ guides/ portals on the Internet	355.58	321.73	47103	133839	-2.247	0.025*

U= Mann-Whitney U, W= Wilcoxon W, p= Asymp. Sig. (2-tailed)
** = Significant at 0.05*
*** = Significant at 0.01*

In searching of e-resources "through University/ Library website" the faculty members have a greater mean rank (R=372.82) than research scholars (R=311.29) and a statistically

significant difference (U= 42759, Z= -4.155, p= 0.00) was observed between them. For the method of searching "directly through publisher/ vendor website" the faculty members mean rank (R= 363.65) is greater than research scholars mean rank (R=316.84) indicating that this method was used more by the faculty members. The p value (0.002) indicates a significant difference 0.01 level of significance. In searching the e-resources "through search engines like Google, etc." the mean rank of faculty members (R=316.58) was less than that of research scholars (R=345.35) and a statistically significant difference was observed between them (U= 47901, Z= -2.503, p= 0.012). Thus, the research scholars used search engines for finding electronic resources more than the faculty members. In finding the e-resources through "links to full text in databases from bibliographic databases" and through "subject gateways/ guides/ portals on the Internet" the faculty members have higher mean ranks (R=363.33 and 355.58 respectively) than the research scholars mean ranks (R= 317.04 and 321.73 respectively). Statistically significant differences were found in the use of both these methods also (p= 0.002 and p= 0.025 respectively).

Thus, it was found that except for searching "through search engines like Google, etc.", all the other search methods were used more by the faculty members than the research scholars. Also, statistically significant differences exists among the faculty members and research scholars in all the search methods discussed above. The hypothesis "There is no significant difference in the in the e-resource use methods among the faculty and research scholars" is rejected.

According to Thanuskodi (2011) the respondents searched the e-resources mainly through the library portal, followed by search engines and further followed by websites. According to the study by Satpathy and Rout (2010), most of the respondents search their required e-resources through Google/other search engine (37.2%), followed by 'as per the instruction of the library staff' (32.7%) and from the 'website of concerned e-resource' (30.1%)."

4.3 Differences in purpose of use

The results of the Mann-Whitney U test for differences in purpose of using e-resources among faculty members and research scholars are indicated in Table 3. As seen in the table, except for two purposes i.e. for "Preparation for seminar/ conference/ workshop" (U= 48321, Z= -1.879, p= 0.06) and "For general information" (U= 48882, Z= -1.609, p= 0.108), statistically significant differences were observed in other purposes of use of e-resources viz. "To update

knowledge" (U= 43253.5, Z= -4.671, p= 0.00), "For reading articles" (U= 47653, Z= -2.306, p= 0.021), "For writing research paper" (U= 46395, Z= -3.009, p= 0.003), "For writing research proposal/ projects" (U= 45189, Z= -3.315, p= 0.001), "On-going research work" (U= 46344.5, Z= -3.01, p= 0.003), "Preparation of teaching/ lecture notes" (U= 28672, Z= -10.531, p= 0.00), "For guiding researchers/ peers" (U= 14159.5, Z= -16.316, p= 0.00), "Exploring the research grants" (U= 29957, Z= -9.632, p= 0.00) and "Curriculum design" (U= 14578.5, Z= -16.072, p= 0.000).

Table 3: Mann-Whitney Test for Differences in Purpose of Use

Purpose of using e-resources	Mean Rank (R)		U	W	Z	p
	FM (n=252)	RS (n= 416)				
To update knowledge	370.86	312.47	43253.5	129989.5	-4.671	0.000**
For reading articles	353.4	323.05	47653	134389	-2.306	0.021*
For writing research paper	358.39	320.03	46395	133131	-3.009	0.003**
For writing research proposal/ projects	363.18	317.13	45189	131925	-3.315	0.001**
Preparation for seminar/ conference/ workshop	350.75	324.66	48321	135057	-1.879	0.06
For general information	348.52	326	48882	135618	-1.609	0.108
On-going research work	358.59	319.91	46344.5	133080.5	-3.01	0.003**
Preparation of teaching/ lecture notes	428.72	277.42	28672	115408	-10.531	0.000**
For guiding researchers/ peers	486.31	242.54	14159.5	100895.5	-16.316	0.000**
Exploring the research grants	423.62	280.51	29957	116693	-9.632	0.000**
Curriculum design	484.65	243.54	14578.5	101314.5	-16.072	0.000**

U= Mann-Whitney U, W= Wilcoxon W, p= Asymp. Sig. (2-tailed)
** = Significant at 0.05*
*** = Significant at 0.01*

In all these purposes, the mean ranks of faculty members were higher than the mean ranks of research scholars. However, major difference in the mean rank was observed in four purposes namely - preparation of teaching/ lecture notes, for guiding researchers/ peers, exploring the research grants and curriculum design in which the faculty members have higher mean ranks than research scholars indicating that these four purposes were considered more

important by the faculty members in comparison to the research scholars. The hypothesis "There is no significant difference in the purpose of use of e-resources by the faculty and research scholars" is rejected.

Zhang and Liu (2011) found that the purpose of the utilisation of electronic resources was scientific research, teaching and the need for self-development. Bituka, Kumbar and Hadagali (2016) also stated that the main purpose of use of electronic resources was teaching and research. Amjad, Ahmed and Naeem (2013) in their study of Islamia University of Bahawalpur (IUB), Punjab, Pakistan found that most of the M.Phil and Ph.D. scholars used electronic resources daily for pursuing their research activities. They found that the researchers mainly used electronic information resources for learning and research purposes.

4.4 Differences in hindrances faced

Out of the hindrances listed in table 4, significant differences were found in five hindrances namely: difficulty in finding relevant information (U=42923, Z= -4.161, $p<0.05$), limited access to computers (U= 44639.5, Z= -3.363, $p< 0.05$), lack of search techniques (U= 43813, Z= -3.71, $p< 0.05$), lack of guidance/ assistance from library staff (U= 46976.5, Z= -2.338, $p< 0.05$) and lack of IT knowledge (U= 40680.5, Z= -5.112, $p< 0.05$). In all these hindrances, the mean rank of faculty members were less than the mean rank of research scholars indicating that these problems were faced more by the researchers.

Table 4: Mann-Whitney Test for Differences in Hindrances Faced

Hindrances/ Problems	Mean Rank (R)		U	W	Z	p
	FM (n=252)	RS (n= 416)				
Only a limited number of titles available	327.09	338.99	50548.5	82426.5	-0.816	0.415
Limited access to back issues	341.76	330.1	50587.5	137323.5	-0.8	0.424
Difficulty in finding relevant information	296.83	357.32	42923	74801	-4.161	0.000**
Do not have access from home	330.52	336.91	51414	83292	-0.436	0.663
Limited access to computers	303.64	353.19	44639.5	76517.5	-3.363	0.001**
Slow download speed	324.42	340.61	49875	81753	-1.096	0.273
Difficult interface design	326.47	339.37	50392	82270	-0.884	0.377

Lack of search techniques	300.36	355.18	43813	75691	-3.71	0.000**
Lack of guidance/ assistance from library staff	312.91	347.58	46976.5	78854.5	-2.338	0.019*
Instability of electronic resources	334.64	334.42	52381.5	139117.5	-0.015	0.988
Discomfort in online reading	328.42	338.18	50884.5	82762.5	-0.665	0.506
Credibility and quality issue	319.75	343.44	48698.5	80576.5	-1.61	0.107
Information overload	332.21	335.88	51840	83718	-0.249	0.803
Retrieval of irrelevant / junk information	332.06	335.98	51800	83678	-0.267	0.789
Frequent power failure	321.58	342.33	49160	81038	-1.416	0.157
Lack of IT knowledge	287.93	362.71	40680.5	72558.5	-5.112	0.000**

U= Mann-Whitney U, W= Wilcoxon W, p= Asymp. Sig. (2-tailed)
** = Significant at 0.05*
*** = Significant at 0.01*

In rest of the problems listed in Table 4, no significant differences were found between the two groups viz. faculty members and research scholars.

The hypothesis "There is no significant difference in the hindrance faced in use of e-resources among the faculty and research scholars" is partially rejected.

Anil Kumar and Reddy (2016) found that the main problems faced by research scholars included 'slow Internet connectivity', 'not familiar with searching e-journals' and 'inaccessibility of back volumes of periodicals'. Nisha and Ali (2013) in their study also revealed several inherent problems like slow downloading, non-availability of particular issue, lack of training and limited access to terminals. Isubika and Kavishe (2018) found several barriers to the effective use of e-resources which included: lack of searching skills (35%), unstable network connectivity (71.7%), lack of computer facilities (40%) and lack of computer skills (36.7%). The major constraints identified by Ahmed (2013) were 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.

4.5 Differences in use of search strategies

The results of the Mann-Whitney test to examine the significant differences in the use of e-resource search strategies between faculty members and research scholars are shown in Table 5.

Table 5: Mann-Whitney Test for Differences in the Use of Search Strategies

Search Strategy/ Option	Mean Rank (R)		U	W	Z	p
	FM (n=252)	RS (n= 416)				
Author	322.22	341.94	49321	81199	-1.354	0.176
Article title	332.29	335.84	51858.5	83736.5	-0.279	0.78
Journal title	347.47	326.64	49148	135884	-1.46	0.144
Subject	343.84	328.84	50063	136799	-1.046	0.296
Keyword	355.65	321.69	47085	133821	-2.372	0.018*
Year/ Date	327.48	338.75	50647.5	82525.5	-0.755	0.45
Abstract	331.27	336.46	51601.5	83479.5	-0.349	0.727
Publisher	320.27	343.12	48831	80709	-1.528	0.127
Author address/ affiliation	349.69	325.3	48587	135323	-1.627	0.104
DOI	331.03	336.6	51541.5	83419.5	-0.37	0.712
Boolean operator "AND"	384.26	304.36	39876	126612	-5.372	0.000**
Boolean operator "OR"	384.03	304.5	39935.5	126671.5	-5.397	0.000**
Boolean operator "NOT"	374.43	310.31	42354.5	129090.5	-4.399	0.000**
Phrase search	364.76	316.17	44791.5	131527.5	-3.25	0.001**
Proximity operator "NEAR", "BETWEEN"	350.06	325.08	48496	135232	-1.779	0.075
Truncation (# or $)	349.64	325.33	48600	135336	-1.823	0.068
Wild cards	354.08	322.64	47482.5	134218.5	-2.37	0.018*
Limiters	349.85	325.2	48547.5	135283.5	-1.842	0.065

U= Mann-Whitney U, W= Wilcoxon W, p= Asymp. Sig. (2-tailed)
** = Significant at 0.05*
*** = Significant at 0.01*

Among the various e-resource search strategies listed in table, significant differences were found in the use of keywords (U=47085, Z= -2.372, p= 0.018), all three Boolean operators i.e. AND (U= 39876, Z= -5.372, p= 0.000), OR (U= 39935.5, Z= -5.397, p= 0.000) and NOT (U= 42354.5, Z= -4.399, p= 0.000), phrase search (U= 44791.5, Z= -3.25, p= 0.001) and wildcards (U= 47482.5, Z= -2.37, p= 0.018). In all these strategies, the mean ranks of faculty were higher than that of research scholars. In the use of other e-resource search strategies listed in table, no significant differences were found between faculty members and research scholars.

Thus, it was found that many search strategies like keyword, Boolean operators AND OR NOT, phrase search and wildcards were used more among the faculty members than the research scholars and statistically significant differences were found in the use of these search strategies among the faculty members and research scholars. This indicates that the use of advanced search strategies was found to be more in faculty members in comparison to the research scholars. Many other search strategies like journal title, subject, author address/ affiliation, proximity operators, truncation and limiters were also used more by the faculty members in comparison to the research scholars but the difference in use was not statistically significant. Some strategies were used almost equally among both faculty members and research scholars like article title, abstract and DOI. Some strategies including author, year/ date and publisher were used to a lesser extent by the faculty members in comparison to the research scholars but the difference is not statistically significant.

The hypotheses "there is no significant difference in the e-resource search strategies adopted by faculty and research scholars" is rejected for the search options keyword, Boolean operators AND, OR, NOT, phrases search and wildcards while the hypothesis is accepted for the search options author, article title, journal title, subject, year/ date, abstract, publisher, author address/ affiliation, DOI, proximity operators, truncation and limiters.

Kiran Kumar and Kumbar (2015) found that the faculty prefer to use both basic and advanced search option for searching relevant e-information resources and keyword based field search is the most popular search method. Arshad and Ameen (2017) found that "keyword searching in journal and reference databases were the most important access methods in all disciplines as compared to browsing, chaining, or obtaining materials from colleagues." Similarly Nanda (2017) also indicated that keyword searching was adopted by majority of faculty members and research scholars. According to Anil Kumar and Reddy (2016), the search methods used by the researchers are author, date of publication, title of article, keywords, title of the journal, subject and table of contents. Anasuya (2017) found that most of the respondents prefer title to search their information followed by author, subject and publisher. Ali (2005) in his study stated that Boolean logic and truncation were found to be the most often used search facilities by IIT users. Google was the most used search engine and keyword search was the most common search strategy.

5. SUMMARY AND CONCLUSION

The results of the study indicate significant differences between the faculty members and research scholars in the use of e-books, e-journals, e-bibliographic databases, e-conference proceedings, indexing abstracting databases, e-magazines, open access resources and institutional respositories. These resources were used more by the faculty in comparison to researchers. Significant differences were also found in the in the e-resource use methods among the faculty and research scholars. Among the various methods, the most popular was through the use of search engines. In terms of purpose of use of e-resources the major differences between faculty and researchers were observed in four purposes namely - preparation of teaching/ lecture notes, for guiding researchers/ peers, exploring the research grants and curriculum design. The faculty members gave more importance to these purposes in comparison to the research scholars. The research scholars faced more problems in using e-resources as compared to the faculty members. However, the differences were significant only for five problems - difficulty in finding relevant information, limited access to computers, lack of search techniques, lack of guidance from library staff and lack of IT knowledge. In the use of e-resource search strategies, significant differences were found for keywords, Boolean operators - AND OR NOT, phrase search and wildcards.

Thus, it is evident from the results of the study that significant differences exist between faculty and research scholars in terms of e-resource use, methods of use, purpose, hindrances faced and use of search strategies. It is suggested through this study that the faculty members and research scholars should be focused separately and not as a single unit while organizing user awareness and other training programmes. The contents of the training programmes should be different for faculty and researchers as their background knowledge, understanding and experience is different.

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