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Accessibility and Use of Electronic Journals at Iranian University Libraries

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ABSTRACT

Today, e-journals play a significant role in meeting information needs of scholars. On the other hand, each year publishers demand higher costs for e-journals subscription. Librarians seek ways to assess the use of e-journals in order to determine how well they meet users' needs and to justify increases in budget for e-journals acquisition. This study aimed to assess accessibility and use of e-journals by the research scholars at top ten university libraries affiliated to the Ministry of Science, Research and Technology (MSRT) in Iran. Questionnaire was adopted for data collection and a total of 1380 research scholars participated in this study. It was found that the level of e-journals accessibility at university libraries affiliated to the MSRT in Iran was high. A great majority of research scholars were aware of e-journals at their libraries. Further, e-journals had been used more than medium level. Although research scholars belonging to Basic Sciences were known as the heaviest e-journals users, available e-journals met their information needs less than the other disciplines. The study suggested that the provision of e-

journals have to be maintained and continued by Iranian university libraries concerning users' preferences and characteristics especially users' discipline.

Keywords: Electronic journals; E-journals; University Library; User Studies; Research Scholars; Iran.

INTRODUCTION

University libraries are the key centers of their parent institutions and must sustain teaching, learning and research for all of their students, teachers and staff. Regarding information explosion, users' new expectations in acquiring the needed information has made libraries and librarians to change rapidly. Today, development in information and communication technology has made it possible for the library staff to provide their users with a wide range of different information resources. With the help of electronic resources such as e-books, e-journals, etc. university libraries fulfill their users' information needs. Today, e-journals have been regarded as important library resources and many libraries all over the world have already replaced print journals with e-journals (Islam and Chowdhury, 2006). On the other hand, each year publishers demand higher costs for e-journals subscription. In Iran, millions of Dollars are paid for e-journals subscription each year by educational and research centers (Emrani, 2007). However, library budget is decreasing every year. So, librarians try to determine collection development policies which will make optimum use of money and space available while meeting the needs of library clientele. Librarians seek ways to assess the use of e-journals in order to determine how well they meet users' needs and to justify increases in budget for e-journals acquisition. Several techniques can be used for the purpose of assessment. As noticed by Voorbij and Ongering (2006), "only user studies can reveal the motives, opinions, wishes, and problems experienced by the users and allow library researchers to gather data on the gender, age, discipline, level of experience with electronic

resources and other demographic data, and to investigate the differences in behavior and satisfaction between various user groups".

Although there are some studies on the use of e-journals and users' behavior in Iran, hardly any effort has been made to study in-depth covering top universities. Having this in mind, carrying out the user studies in a broad range in Iranian universities such as the present study seems necessary. Whereas, e-journals play a pivotal role in meeting the research scholars (Ph.D students)' information needs, the present study will attempt to assess the accessibility and use of e-journals by research scholars -the most frequent e-journals users- in top ten Iranian university libraries. The results of this study can be used to justify increases in budgets for acquisition of e-journals. It can be useful for the efficient management of the collection and provides empirical evidence for library staff and the research community. Further, it will broaden our knowledge of the use of e-journal collections and provide more effective e-journal services.

LITERATURE REVIEW

The introduction of information and communication technology into libraries has changed users' information behaviors. Wolf (2001) found that the academic staff and researchers at Cardiff University, UK preferred to use e-journals to print because of ease of access. Asemi and Riyahiniya (2007) found that about 70% of students at Isfahan University of Medical Sciences were aware of online databases and e-journals available, and about 53% of respondents had used them. However, in a recent questionnaire-based survey, a good level of e-journal usage by postgraduates at Shiraz University, Iran was reported (Hayati and Jowkar, 2013). Majority of teachers and research scholars at Guru Gobind Singh Indraprastha University, India preferred to use e-journals in comparison with other e-resources (Sharma, 2009). The main finding of Gupta's study (2011) on the use of electronic journals from the INFONET consortium by faculty and research scholars of physics and chemistry at Kurukshetra University, India was that the respondents were more attracted towards e-journals than print journals.

The use of e-journals may vary among users with different demographic characteristics such as discipline, age and gender. For example, the results of a study by Tenopir, Wilson, Vakkari, Talja and King (2008) in the United States, Finland and Australia showed that scholars in Medicine and Engineering read more articles than scholars in other disciplines, Humanities and Social Sciences scholars read both books and journal articles, which explain in part their lower use of e-journal articles. An online survey on e-journal usage by academics of University of Patras, Greece found that e-journals were used more frequently by end-users 35 years old or under and most end-users were men (Monopoli, Nicholas, Georgiou and Korfitai, 2002). A study by Borrego, Anglada, Barrios and Comellas (2007) at the universities belonging to the consortium of Catalanian university libraries in Spain (CBUC) confirmed the importance of discipline and age as explanatory factors of the use of e-journals. The findings of Rogers' study (2001) at Ohio State University revealed that there was little or no correlation between age and frequency of use. In 2009, another study by Kurata *et al.* (2009) revealed the current state of e-journal usage among Japanese medical researchers. No significant differences relating to article usage patterns were observed among age groups; however, large differences were found among the fields of research. Nikkar and Mooghali (2010) concluded that aged faculty members of Payam-e-Noor University, Iran with more experience had a lighter tendency to e-journal usage. Furthermore, there was no significant correlation among gender, subject, educational level and e-journals' acceptance.

A number of researchers identified the most used e-journals publisher/providers. A study by Salmani Nodushan, Hoseini Nasab and Shokraneh Nanekaran (2008) reported that Science Direct had the highest usage while Willey had the lowest rate of usage among faculty members of Tabriz University of Medical Sciences, Iran. In a study using log file analysis, Jstore was the most used e-journal database among Ebsco, Emerald and Proquest at Emam Sadeq University, Iran (Rajabi, 2009). In another survey by Galyani Moghaddam and Talawar (2008) at the Indian Institute of Science (IISc), Bangalore, India, showed that e-journals from Elsevier were most popular among users while, Sage Publications journals

ranked lowest. Sharma (2009) found that Science Direct and Springer Link often used, respectively by teachers and research scholars at Guru Gobind Singh Indraprastha University, India. Also, Nemati Anaraki and Babalhavaeji (2013) concluded that students of Tehran University of Medical Science used Elsevier, Thomson, Scopus and Proquest databases most.

Some studies indicated the e-journals users' problems while accessing and using e-journals, for example, use and access to e-journals were very limited due to the infrastructural problem in the field of library and information sector in Bangladesh (Islam and Chowdhury, 2006). Results of Asemi and Riyahiniya's study (2007) revealed that the users were faced with problems like low speed connectivity and shortage of hardware facilities. In a recent survey by Nisha and Naushad Ali (2013) several inherent problems especially with the use of e-journals such as slow downloading and other mechanical deficits were present while using e-journals.

OBJECTIVES

The objectives of the study are as follows:

- a) To explore the extent of e-journals accessibility at university libraries affiliated to the Ministry of Science, Research and Technology (MSRT) in Iran;
- b) To determine the level and source of awareness with e-journals among the research scholars;
- c) To find out the ability of research scholars in using e-journals and the reasons for not using e-journals;
- d) To determine e-journals usage from different publishers/providers;
- e) To understand the frequency of e-journals use by the research scholars in total and by discipline;
- f) To assess the level of meeting information needs of research scholars belonging to various disciplines via available e-journals;
- g) To find out the problems faced, the need of training/orientation while accessing and using e-journals and preferred modes of training.

HYPOTHESES

There are two research hypotheses:

H1: There is a relationship between the frequency of e-journal use and the time spent on access to e-journals.

H2: The level of meeting information needs of research scholars belonging to various disciplines via available e-journals is not different.

METHODOLOGY

Higher education in Iran is offered by public and non-public sectors. Public higher education is financed by state funds and includes the programs offered by Ministry of Science, Research and Technology (MSRT), as well as Ministry of Health and Medical Education (MHME), whereas non-public higher education is not funded by the government (Hadian Dehkordi, 2011). Of forty-nine (49) public, non-medical universities affiliated to MSRT, top ten universities were selected for this study as follows:

- 1) Amirkabir University of Technology (located in Tehran, the capital city of Iran), the first technical university of Iran;
- 2) Ferdowsi University of Mashhad (located in Mashhad, in the northeast of Iran), as one of the most comprehensive universities in Iran;
- 3) Iran University of Science and Technology (located in Tehran), as one of the major technical universities in Iran;
- 4) Khaje-Nasir-Toosi University of Technology (located in Tehran), is known for its excellent track record of research output and industrial connections;
- 5) Shahid Beheshti University (located in Tehran), as one of the most prestigious universities in Iran;
- 6) Shahid Chamran University of Ahvaz (located in Ahvaz, the capital city of the province of Khuzestan in the southwest of Iran), as one of the four largest universities in Iran;
- 7) Sharif University of Technology (located in Tehran), as the most famous technical university in Iran;

- 8) University of Guilan (located in Rasht, the capital city of Guilan Province, in northwestern Iran), the largest academic institution in the north of Iran;
- 9) University of Isfahan (located in Isfahan, the capital city of Isfahan Province in the center of Iran), as one of the oldest scientific and cultural centers of Iran;
- 10) University of Tehran, as a mother university.

The selected universities are the large universities in Iran based on the number of students; they have a significant number of students pursuing research leading to Ph.D. degree; Internet facilities are available in all departments for all students, research scholars and teachers; they have access to significant number of e-journals from distinguished publishers; they are multi-disciplinary universities that provide coverage of different subject areas; they are located at different provinces and different geographical positions in Iran.

For the purpose of data collection, a structured questionnaire was designed. Before finalizing the questionnaire, content validity of the instrument was established by review of four LIS experts. Reliability of the questionnaire by means of Cronbach's Alpha was confirmed (0.85) on the collected data by the preliminary questionnaires in the pilot test. The final questionnaire was divided into two sections. The first section collected demographic information about the participants. The second section solicited responses related to awareness, access and use of e-journals, reasons for not using e-journals, use of listed e-journal publishers/providers, time spent for accessing e-journals and so on.

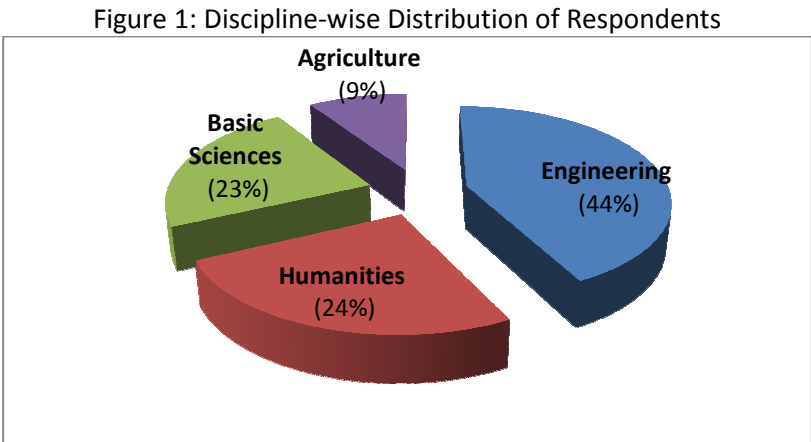
The stratified random sampling technique was used in administering questionnaire. Research population consisted of 5300 research scholars belonging to four disciplines i.e., Agriculture (9%), Engineering (41%), Basic Sciences (22%), and Humanities (28%). Data collection was done in person and via e-mail. Overall, 1380 full time research scholars participated in this study. Descriptive and inferential statistics such as frequency, percentage, mean, standard deviation, χ^2 (Chi-square) test and analysis of variance (ANOVA) have been used to analyze the data using the Statistical Package for the Social

Sciences (SPSS) Version 16. The accepted mean score for a question on 4-point scale was considered as 2.5, on 5-point scale as 3 and 6-point scale as 3.5. Further, the significance values that fell below the 0.05 level were accepted.

RESULTS

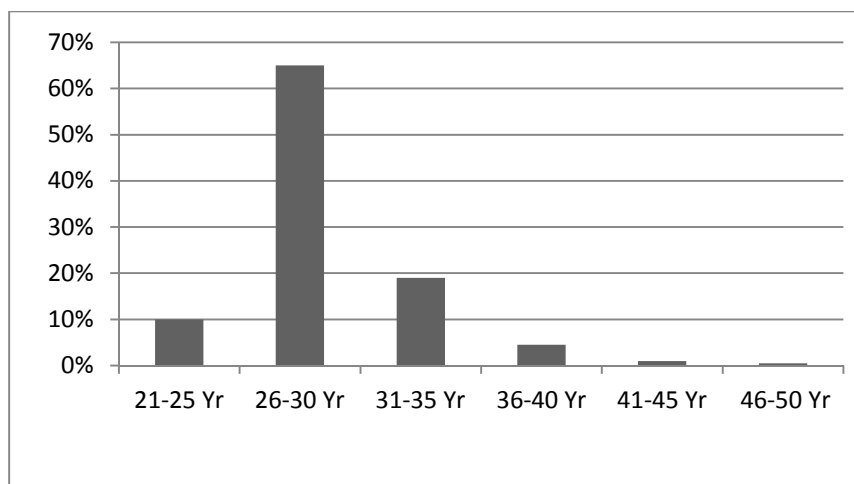
Demographic Information

Figure 1 depicts the distribution of the respondents by discipline. The highest segment of the respondents belonged to Engineering (44%). It was followed by the respondents belong to Humanities (24%), Basic Sciences (23%) and Agriculture (9%).



Moreover, the majority of respondents were male (77%) and the remaining (23%) were female. Further, age of the respondents varied between twenty one years to fifty. The largest age group was between twenty six to thirty years of age (65%). This group was followed respectively by the other age groups: thirty one to thirty five (19%), twenty one to twenty five (10%), thirty six to forty (4.5%), forty one to forty five (1%) and forty six to fifty (0.5%). In other words, the majority of the respondents (94%) were at the age group of twenty one to thirty five (Figure 2)

Figure 2: Age-wise Distribution of Respondents (%)



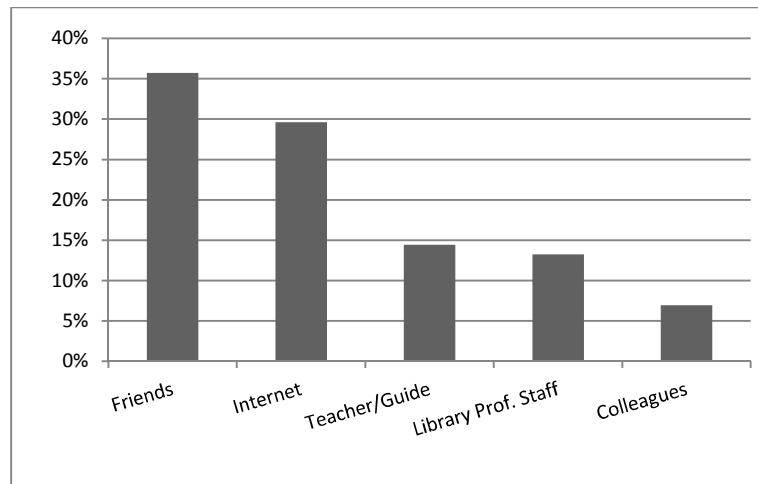
Extent of Access to E-journals

The university libraries affiliated to MSRT provide access to e-journals through 'Consiran' Consortium. Browsing the websites of universities showed, of forty-nine (49) public, non-medical universities affiliated to MSRT in Iran, 45 (92%) libraries had access to e-journals while, 4 (8%) did not.

Sources of Awareness of E-journals

Data analysis shows that a great majority of the research scholars (98.47%) were aware of e-journals at their libraries, while, a small portion of them (1.52%) were not. Further, as it is shown in Figure 3, 'friends' (35.73%) were the most important source through which the research scholars became aware of e-journals in their field. 'Internet' (29.62%) was the second most sought after factor by the research scholars to become aware of e-journals, followed respectively by the 'teachers/guide' (14.44%) and 'library professional staff' (13.24%). Moreover, 'colleagues' (6.93%) were the least preferred factor by the research scholars in becoming aware of e-journals.

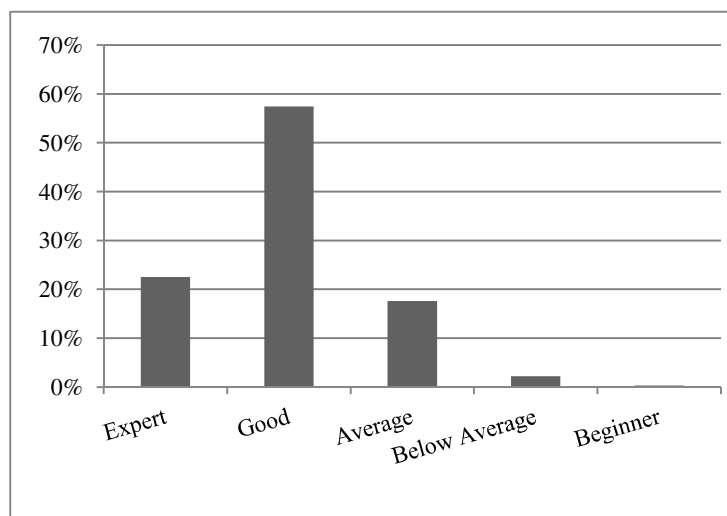
Figure 3: Source of Research Scholars' Awareness of E-journals



Ability of Using E-journals

For effective use of e-journals, the users have to possess ability of using e-journals. The respondents were asked to rate their ability to use e-journals on a five-point scale: 'expert', 'good', 'average', 'below average', and 'beginner'. From Figure 4 it is seen that more than half of the research scholars (57.4%) evaluated their abilities to use e-journals as 'good', 22.5% 'expert', 17.6% 'average', and 2.2% 'below average'. Only a negligible percentage of the research scholars (0.3%) were 'beginner' in this regard. Thus a great majority of the research scholars (80%) evaluated their abilities to use e-journals as 'good' to 'expert'.

Figure 4: Ability of Using E-journals as Perceived by Research Scholars



E-journals Users and Non-users

For the study of e-journal use, the real number of e-journals users should be determined at first, so the research scholars were asked whether they used the e-journals collection offered by their university libraries. The results showed that 96.95% of respondents claimed to be e-journals users, whereas, 3.05% of respondents did not.

Reasons for Not Using E-journals

The respondents were asked about the reasons for not using e-journals with a wide range of 12 options on a four-point scale. The ranked reasons by mean score were shown in Table 1. The accepted mean score for these options was 2.5. Therefore, the options having a mean score of more than 2.5 were considered as reasons for not using e-journals by the research scholars. It is observed that 'prefer print journals' had the highest mean (mean=3.55) and 'frequent electricity failures' (mean=1.29) the lowest ones. Thus, the first six options, 'prefer print journals' (mean=3.55), 'use other resources for information needs' (mean=3.23), 'access difficulties' (mean=2.97), 'lack of time to explore and locate e-journals' (mean=2.72), 'lack of sufficient subscriptions in my field'(mean=2.67), and 'lack of knowledge about e-journals' (mean=2.63) were considered the as reasons for not using e-journals (Table 1).

The other options (mean < 2.5) were not considered as reasons for not using e-journals by the research scholars: 'lack of skill in accessing and using e-journals', 'inadequate number of computer terminals', 'no help available in the library', 'inconvenient working hours of the library' and 'frequent electricity failures'.

Since 3% (42) of respondents were not e-journals users, they were excluded and remaining data analysis was based on the remaining respondents who were e-journals users.

Table 1: Reasons for not using e-journals

Rank	Reasons	Mean 1~4	Std. Deviation
1	Prefer print journals	3.55	0.82
2	Use other resources for information needs	3.23	0.77
3	Access difficulties	2.97	1.14
4	Lack of time to explore and locate e-journals	2.72	0.81
5	Lack of sufficient subscriptions in my field	2.67	1.11
6	Lack of knowledge about e-journals	2.63	0.94
7	Lack of skill in accessing and using e-journals	2.45	1.09
8	Inadequate number of computer terminals	2.34	1.07
9	No help available in the library	2.20	0.99
10	Inconvenient working hours of the library	2.10	2.50
11	Frequent electricity failures	1.29	0.46

E-journals Usage from Different Publishers/Providers

E-journals are accessed through different channels like original publisher (e.g., Elsevier) or an e-journal provider (e.g., EBSCO). A list of reputed and available e-journal publishers/providers was presented to the e-journals users to identify the extent of using each e-journal publisher or provider on a five-point scale (never, low, moderate, high and very high). In respect to the accepted mean for this question (3), it is observed that Elsevier was considered as the most popular publisher among the research scholars (mean > 3). In other words, except Elsevier, other publishers/providers were not used sufficiently by the research scholars (Table 2).

Table 2: E-journals Usage from Different Publishers/Providers

Rank	E-journal publisher/provider	Mean 1~5	Std. Deviation
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1	Elsevier Science	3.85	1.47
2	Springer-Verlag	2.80	1.58
3	Wiley-Blackwell	2.21	0.90
4	IEEE	1.86	1.50
5	Taylor & Francis	1.72	1.25
6	Oxford University Press	1.66	1.09
7	Emerald	1.62	1.21
8	EBSCOhost	1.54	1.17
9	ACS	1.42	1.10
10	Sage Publications	1.38	0.98
11	ASME	1.36	0.99
12	IOP	1.32	0.94
13	ASCE	1.29	0.80
14	Proquest	1.28	0.89
15	SIAM	1.27	0.85
16	ACM	1.24	0.79
17	Econlit	1.24	0.85
18	APS	1.22	0.78
19	AIP	1.22	0.78
20	Royal Society of Chemistry	1.20	0.74

Frequency of E-journal Use

Since, frequency of using e-journals is an important indicator of how they are utilized, the respondents were asked how frequently they used e-journals. Table 3 shows that more than one third of the research scholars (35.2%) used e-journals 'three times in a week', followed by those who used e-journals 'daily' (29.3%), 'weekly' (23.7%), 'fortnightly' (6.1%), 'monthly' (4.1%), and 'rarely' (1.6%). Thus a majority of the research scholars (88.2%) used e-journals from 'daily' to 'weekly'. Remaining users (11.8%) used e-journals 'fortnightly' to 'rarely'. Concerning the accepted mean for this question on a six-point scale (3.5), it can be said that frequency of e-journal use by the respondents was more than average level (mean=4.75 > 3.5) (Table 3).

Table 3: Frequency of E-journal Use

Frequency of use	%	Cumulative %
Daily	29.3	29.3
Three times in a week	35.2	64.5
Weekly	23.7	88.2

Fortnightly	6.1	94.3
Monthly	4.1	98.4
Rarely	1.6	100
Total	100	
Mean=4.75, Std. Deviation =1.15		

Frequency of E-journal Use by Discipline

As it is seen from the Table 4, the respondents belonging to Basic Sciences (mean=5.02) had the highest frequency of e-journal use, followed by the respondents belonging to the other disciplines as follows: Engineering (mean=4.85), Agriculture (mean=4.77) and Humanities (mean=4.26).

Table 4: E-journal Use by Discipline

Disciplines	Mean 1~6	Std. Deviation
Basic Sciences	5.02	1.19
Engineering	4.85	1.00
Agriculture	4.77	1.09
Humanities	4.26	1.25

Level of Meeting Information Needs of Research Scholars Belonging to Various Disciplines via Available E-journals

The level of meeting the information needs of the respondents by available e-journals were asked on a four-point scale of 'to a great extent', 'to some extent', 'to a little extent', and 'not at all'. Table 5 illustrates that obtained means for all disciplines were more than the accepted mean (2.5). Thus, available e-journals met information needs of all disciplines more than average.

Table 5: Meeting Information Needs via Available E-journals by Discipline

Disciplines	Mean 1~4	Std. Deviation
Agriculture	3.20	.65
Engineering	3.15	.61
Humanities	3.07	.67
Basic Sciences	2.97	.65

Problems of Accessing and Using E-journals

Data analysis shows that 82% of the respondents encountered problems while accessing and using e-journals and 18% did not. So, the respondents who had problem in this respect were requested to state the problems by a wide range of 10 options on a four-point scale. From the Table 6 it is seen that 'poor connectivity (low Internet speed)' (mean=3.48) was the main problem which was followed by 'lack of Internet facilities' (mean=2.98), and 'lack of well organized home page of library with link to the e-journals' (mean=2.79). The remaining options (mean<2.5) could not be considered as the problems by the research scholars during accessing and using e-journals: 'inadequate number of computer terminals', 'inconvenient location', 'lack of training/orientation', 'lack of assistant from librarians', 'inconvenient timings of library', 'electricity failure', and 'poor computer use skill'.

Table 6: Problems Faced while Accessing and Using E-journals

Rank	Problems	Mean 1~4	Std. Deviation
1	Poor connectivity (low Internet speed)	3.48	0.69
2	Lack of Internet facilities	2.98	0.85
3	Lack of well organized home page of library with link to the e-journals	2.79	0.99
4	Inadequate no. of computer terminals	2.46	1.02
5	Inconvenient location	2.10	0.91
6	Lack of training/orientation	1.98	0.93
7	Lack of assistant from librarians	1.88	0.94
8	Inconvenient timings of library	1.84	0.93
9	Electricity failure	1.59	0.64
10	Poor computer use skills	1.55	0.74

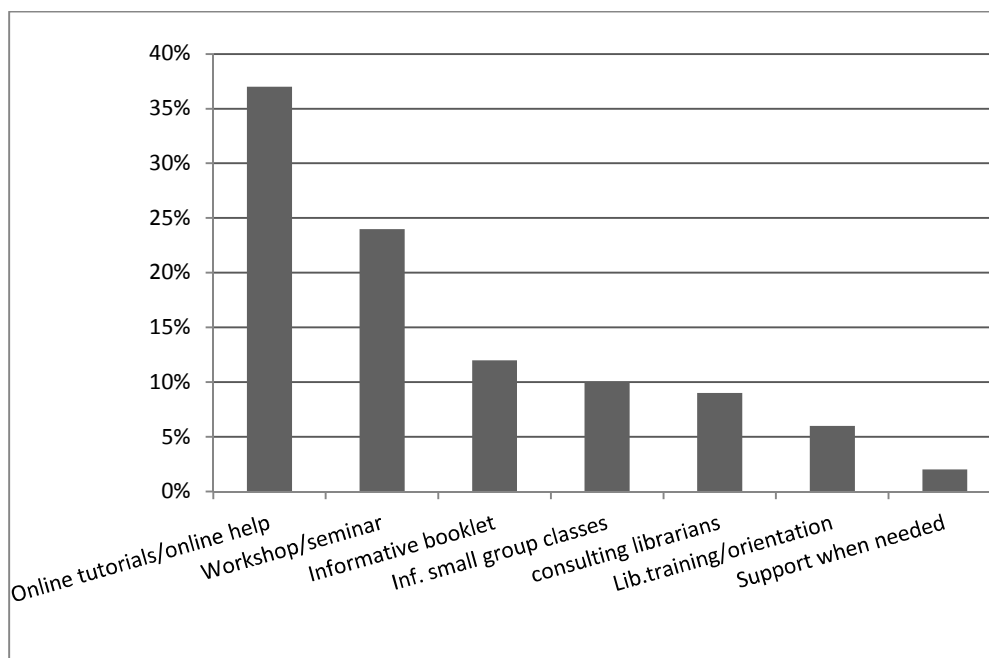
Need for Regular Training/Orientation for Effective Accessing and Using E-journals

The respondents were asked whether they needed regular training/orientation for effective accessing and using e-journals. The majority of the research scholars (64.1%) opined that they needed regular training/orientation for effectively accessing and using e-journals whereas, more than one third of the research scholars (35.9%) did not.

Preferences for Modes of Training

There are different modes of training. The libraries should choose the users' preferred modes of training. Therefore, the research scholars who needed a regular training were requested about their preference modes of training. The findings demonstrate that 'online help/ online tutorial' was the first preferred mode of training/orientation by more than one third of the research scholars (37.12%), 'workshop/seminar' was the second preferred mode of training/orientation (24.07%), followed by 'informative booklet' (12.2%), 'informal small group classes' (10.1%), 'consulting librarians' (8.67%), 'library training/orientation' (5.55%), and 'support when needed' (2.27%) (Figure 5).

Figure 5: Preferences for Modes of Training



Analysis of Hypotheses:

H1: There is a relationship between the frequency of e-journal use and the time spent on access to e-journals.

Chi-square (χ^2) test shows that there was a significant relationship between the frequency of e-journal use and the time spent on access to e-journals (χ^2 value=1.07, $p=0.000<0.05$). Hence, the research

hypothesis was supported i.e., the research scholars who spent less time on access to e-journals used e-journals more frequently than the others.

H2: The level of meeting information needs of research scholars belonging to various disciplines via available e-journals is not different.

Although available e-journals met information needs of all disciplines more than average (Table 5), ANOVA test showed that available e-journals met information needs of various disciplines significantly different ($F=6.40$, $df=3,1295$, $p=0.00<0.05$). Agriculture respondents had the highest level of information needs satisfaction (mean=3.20) and Basic Sciences (mean=2.97) had the lowest ones, while Engineering respondents (mean=3.15) and Humanities respondents (mean=3.07) were ranked as the second and third in this regard. So the research hypothesis was not supported.

DISCUSSION

The results of this study confirmed the high level of e-journals accessibility at the university libraries affiliated to the MSRT, Iran. To use e-journals, the users have to be aware of their availability. E-journals' awareness among research scholars was very high and they became aware most through their friends and then the Internet, teacher/guide, library staff and colleagues, respectively. The importance of 'friends' as a major source of awareness of e-journals was validated in Wolf's study (2001), which reveals the importance of personal interaction with others. Further, unimportance of 'colleagues' as a source of awareness of e-journals was confirmed by Vakkari and Talja (2006) and contradicted with the result of study by Talja and Maula (2003). It seems that library staff at top ten Iranian universities, have not had any important role in this regard. In other words, e-journals marketing by library staff have not been satisfactory.

It is observed that 'prefer print journals' and 'use other resources' were the main reasons for not using e-journals. It can be said that the reasons for not using e-journals were more related to the users rather

than the library conditions. It may be concluded that library working hours or number of computer terminals for accessing and using e-journals have been adequate.

The analysis of publishers/providers revealed that among various publishers/providers, just Elsevier's e-journals have been used sufficiently. This result is acceptable because about 50% of the expenditure spent on e-journals by Iranian universities is paid for Elsevier's journals (Emrani, Moradi-Salari and Jamali, 2010). Further, one could assume that the high usage of Elsevier's journals could be because of vast subject coverage and high number of its journals since Elsevier's full-text platform, Science Direct, is a leading full-text scientific database offering journal articles from more than 2,500 peer-reviewed journals in STM (Science, Technical and Medical). The high use of Elsevier's journals has already been reported in numerous studies (Obst, 2003; Galyani Mogaddam and Talawar, 2008; Salmani Nodushan et al. 2008; Sharma, 2009; Nemati Anaraki and Babalhavaeji, 2013).

It is worth nothing that, e-journals have been used more than medium level by the research scholars. Further, the study supported the influence of discipline as a determining users' behavior in e-journals usage as the research scholars belonged to Basic Sciences were known as the most frequent e-journals users and Humanities users were the least ones. This can be attributed to the fact that in Basic Sciences, Engineering and Agriculture, researchers rely on the newest information resources, e.g. journals, for doing research. In Humanities, on the other hand, the older a resource, the more reliable it is for doing research. So they prefer information resources like books over journals. This result echoes those of Tomney and Burton, 1998; Tenopir et al., 2008; and Dilek-Kayaoglu, 2008.

Time spent on access to e-journals can be an indicator of quality infrastructure facilities, Internet speed, availability of e-journals on the university library website and the like. The findings illustrated that the research scholars who spent less time on access to e-journals used e-journals more frequently than the others. In other words, time-consuming access to e-journals leads to less frequent e-journal use.

Because time is an important issue for the research scholars. They usually prefer easy and prompt information access.

It is also found that available e-journals met the information needs of all disciplines more than average level but significantly different (Agriculture the highest level and Basic Sciences the lowest ones). However, a notable result was that Basic Sciences users were known as the heaviest e-journals users, available e-journals met their information needs less than the other disciplines. This point has to be regarded for e-journals collection development by the librarians.

Since e-journals like other e-resources are meant for easy and quick access to information, incidence of problems during access and use of e-journals could be considered as a drawback. If users encounter problems while accessing and using e-journals it would discourage them from using e-journals. In this regard, the result demonstrated that a huge number of research scholars had problem while accessing and using e-journals. Poor connectivity (low Internet speed), lack of Internet facilities and lack of well organized home page of library with link to the e-journals were known as the major problems. Low Internet speed as the main problem during accessing and using e-journals has been reported by Asemi and Riyahiniya, 2007; and Nisha and Naushad Ali, 2013. This point could be considered as a serious issue which should be resolved by the authorities.

Although a majority of the research scholars had perceived themselves capable of using e-journals, they felt that they needed training on using e-journals. In this study, 'online help/online tutorial' and 'workshop/seminar' were explored as the most preferred modes of training/orientation among the research scholars. Monopoli *et al.* (2002) express that the structure of 'online help' service may differ for journal titles coming from different publishers. However, the basic purpose of the service remain the same-to provide instructions on how to use a service such as search, browse, and print.

CONCLUSION

Today, e-journals play a significant role in meeting information needs of the researchers. On the other hand, shrinking budget and changing electronic resources pricing models and licensing agreements have been made library collection development as a complicated task. To justify increases in budgets for acquisition of electronic resources especially e-journals and for the efficient management of the collection, libraries should assess the e-journal usage. Thus, this study provided insight into the use of e-journals by the main e-journals users-research scholars- belonging to four disciplines at top ten universities in Iran that has not been explored much by the researchers. The research also confirmed that as time passes e-journals were being increasingly adopted. The overall attitude towards the use of e-journals among Iranian research scholars has shown to be very positive. Based on the findings of the study, the provision of e-journals have to be maintained and continued by Iranian university libraries concerning users' preferences and characteristics especially users' discipline. Libraries should redesign policy making for e-journals building collection to gain an optimum level of e-journal use and users' information needs satisfaction. The librarians should take into account e-journals marketing via library newsletter, Intranet, discussion group, library weblog, etc. to inform all the users about existence of available e-journals to maximize e-journals usage.

Other issues for attention include:

Establishing more informative, user friendly and well organized university library website to make easy and prompt access to e-journals;

Providing more Internet facilities such as Internet connectivity in dormitories and out of campus, and etc. as well as faster and more reliable Internet connection to increase the speed of download and decrease access time;

Promoting on-screen help, holding workshops/seminars at regular interval and preparing informative booklets, etc. to support users training on e-journals;

Increasing e-journals available to meet research scholars' information needs to the higher level;

Identifying the non-users of e-journals to take proper steps to convert them into potential users.

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