

Online Search Skills of Shiraz University Post Graduate Students: A Survey

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Abstract

This survey attempted to measure online search skills amongst post graduate students of Shiraz University. Having examined the literature on online search skills, seven most frequently used and applicable online search skills were selected for this study. The two broad objectives were to measure the mean score of each skill and also the difference between students of different post graduate levels with regard to the application of online search skills. The data were collected by a questionnaire. Descriptive and referential statistics were used to analyze the data. The results revealed that there were not any significant differences between the M.A. and the Ph.D. students in the seven search skills examined. The within-group analysis revealed, however, a significant difference amongst these seven skills such that the 'time limitation' skill had the highest score but the 'proximity' skill was in the lowest level. Other findings showed that there was a significant correlation between the real skills' scores as well as the self report scores of the participants. Also, more than 84% of the students declared that their familiarity with these skills had helped them retrieve information in the least amount of time.

Keywords: Online Search, Search Skills, Graduate Students, Shiraz University.

Introduction

Online search is used to describe the process of posing a query to an information system in order to fulfill a specific request (Hartly, 2002). Although some people think that the word 'online' means the Internet (Bjorner and Stephanie, 2003), this is only a misconception. In fact, the term has been in use well before the creation of the Internet and since 1960s. Online search is an interactive and dynamic process with the ability to provide immediate feedback and has the following characteristics:

1. System's ability to interact with the user (feedback and therefore refinement of search strategy)
2. Remote access
3. Updatedness
4. Faster access to information
5. Multi-user applications.

The Internet which is currently functioning as a gateway to huge information sources can be accessed by potential users with such an ease that was inconceivable a decade before. Many people consider ease of access, even by naïve users, to text and other information sources to be the most noticeable advantage of the Internet. The disadvantage of this sort of unharnessed access is the possibility for any individual to upload their own documents in the Internet. In fact, this has already resulted in a mammoth of unmanaged information sources which, rather than bearing any advantage, form a sort of chaos in information seeking behavior (Lancaster, 2003). The Internet embodies a variety of information sources including, Web Pages, Gopher Sites, File Transfer Protocol, Usenet, etc.

To get access to information, users have different tools at their disposal. In the traditional environment and regarding printed materials, placing the right piece of information was important but in the modern information environment, concentration is on using the best search strategies. For this reason, different search and IR tools have already been designed and used. Such tools, retrieve, index and classify the information available in the web to the benefit of the users.

These tools are updated regularly to keep pace with the speeding growth of the information volume. Search tools are equipped with facilities with which users should be familiar if they are to make the best use of them. Searching strategies differ from one tool to another. But in general, all of them have common characteristics an understanding of which is important for user's effective application of such systems. These are as below:

Boolean searching: The ability to use Boolean operators in simple and advanced search.

Phrase searching: Includes keywords that should come exactly next to each other.

Proximity searching: Includes keywords which the user wants to come adjacent to each other.

Field searching: The ability to limit search to a specific field.

Truncation: The act of adding a sign to the beginning or to the end of the root of a word in order to retrieve morphologically variant forms bearing the same root/stem.

Time limitation: Another characteristic of information retrieval tools is their ability to limit the search to a specific time (Alijani and Dehghani, 2006).

Synonyms and suitable keywords: It is another characteristic of information retrieval tools which will be considered in this article.

Statement of the Problem

One way to access information is through the use of information retrieval systems. These systems, as their names show, have a specific structure and system a good

command of which is essential for information extraction. As post graduate students need different databases for their research, measurement of their skills and abilities is the main problem which has been taken into consideration in this research.

Today, online search skills, as a branch of information literacy, are matters of great importance and since these skills highly affect the retrieving quality, they need to be studied more.

Purpose of the Study

This research has the following as its objectives:

1. Evaluation of online search skills amongst post graduate students of University of Shiraz.
2. Determining if there is a significant difference between students of different post graduate levels, M.A. and Ph.D. candidates.
3. Determining correlation coefficients between the real skills' scores and the self report scores of the participants.

Significance of the Study

Substantial amount of budget is allocated per annum to purchase of information systems by universities and higher education as well as research institutes. These systems can mostly be accessed online and thus the necessity for the users to attain a mastery of online search skills. This study will help determine whether or not information databases are used correctly and whether students have already been equipped with the ability to retrieve updated relevant information.

Literature Review

Alavi (1992) in her thesis studied the abilities of information searchers and found that the best scores were obtained by those who were specialist in librarianship, knew the basics of search and retrieval and had higher academic degree.

Studying the students' information skills in Singapore, Hepworth (1999) suggested that these skills be inserted into the students' syllabi. He stated Singapore's government had found that information skills were necessary for the vividity of the country's economy. Further, his research showed that users seldom used 'truncation', 'synonyms & suitable keywords' as well as 'field searching' and that they heavily relied on 'title' and 'author's name' search strategies.

Findings of Mehrad and Shourezari (2003) showed that variables such as familiarity with language and database, computer literacy, search experience and subject specialty can affect search quality respectively.

Rassi (2006) in his research found that most problems of users in search were due to

not using the 'OR' operator. His research also showed that those students majoring in Computer Sciences had the most, and those in Humanities had the least, search skills. Likewise, there was a positive correlation between the duration of the Internet use and having more skills in search.

Habibi (2007) in his article stated that appropriate keyword selection, determining synonyms and the relationship amongst keywords as well as the correct use of Boolean operators were effective factors in retrieving information. Nevertheless, university faculty at Ardebil University of Medical Sciences never used Boolean operators and had little knowledge about searching tools.

Hildreth (1997) investigated keyword and Boolean search skills of users of the online catalog at the University of Oklahoma. His findings showed that users of this online catalog used the keyword search more than any other type of search (54.2%). Nevertheless, their keyword searches were often not successful. The majority of users did not know how the system processed their keywords and felt they needed online help to proceed.

Sit (1998) considered the middle-aged users' errors within the framework of Bergman's 3-level knowledge model namely, 'conceptual knowledge', 'semantic knowledge' and 'technical skills'. He found that the most severe difficulties were those related to the conceptual knowledge and searching the library catalog.

O'Hanlon (2002) described the Internet skills of Fresh men of the Ohio State University. She found that although most of the students often self-reported high skill levels, the self-report and real test scores were not correlated with each other. Further, the rate of responses varied by race, class, gender, and educational background.

By means of experimental tests and multiple-choice questions, Bronander and his colleagues (2004) determined the skills and the efficacy of medical physicians in getting access to information by the use of learning efficient Boolean operators. They found that both groups had deficiencies in identifying the appropriate Boolean phrases. This deficiency led to retrieving false drops.

Griffith and Brophy (2005) found that students shaped their search strategies by trial and error. Many of them made minor changes in their keyword search and followed the very common behavior of the less-experienced users.

Monoi, O'Hanlon and Diaz (2005) by use of a 12-question list about online search skills found that the scores related to the use of Boolean operators, proximity skill, determining the advantage of browsing over searching, and the use of subject terms suggested by the database increased by at least 2.5 points after training.

Methodology

Participants

The total population of this survey consisted of 3351 post graduate candidates of University of Shiraz (M.A. and Ph.D.) out of which 360 were selected as sample at $p < 0.05$ using Cochran sampling method. In total, 347 questionnaires (96.4%) were completed and returned by the participants.

Data gathering

The questionnaire included 33 questions (2 open-ended and 31 multiple-choice questions arranged on the Likert scale). The questionnaire had content validity, that is, essential changes were implemented after designing the questionnaire according to the specialists' views, review of the literature and results of the pilot study. Test-re-Test method was used to assess the reliability of the questionnaire. Comparison of the first and the second tests and computing the Pearson correlation coefficient revealed a reliability equal to 76%, which is significant at $P < 0.001$.

Data analysis

To analyze the data, Repeated Measure Test, Analysis of Variance and Pearson Correlation Coefficients were used.

Results

In all, 347 candidates took part in this study from whom 133 participants (38.4%) were women and 214 (61.6%) were men. They were between 19 to 50 years old. The most frequent age group was that between the 23 to 30 year old (79.8%) participants. Totally, 270 (77.8%) were M.A. and 77 (22.2%) were Ph.D. candidates. The academic majors of participants were categorized into 9 groups: Sciences, Humanities, Engineering, Agriculture, Law, Art and Architecture, Veterinary Medicine, Social Sciences, and Education. Viewing the participants from another aspect, 15.3% of them declared themselves as having attained the students-of-high-talent category, and 7.5% did not answer the question.

Research Questions

1. Is there any significant difference between the M.A. and the Ph.D. candidates as regarding the types of online search skills used?
2. In which skills did the participants have the highest ability?
3. Is there any correlation between the real scores of search skills and the participants' self-report scores?
4. According to the respondents, how far do search skills help to facilitate retrieval

of information?

Research question 1

In order to answer the question, "Is there any significant difference between the M.A. and the Ph.D. candidates as regarding the types of online search skills employed?" a use was made of the repeated measure test.

Table 1

Mean & Standard Deviation of the 7 Search Skills as Computed for the M.A. & the Ph.D. Candidates

Academic degree	mean St.d	Synonyms & suitable keywords	Time limitation	Truncation	Field	Proximity	Phrase searching	Boolean
M.A.	mean	0.60	0.84	0.66	0.66	0.50	0.77	0.62
	St.d	0.38	0.37	0.47	0.38	0.50	0.32	0.25
Ph.D.	mean	0.64	0.82	0.66	0.68	0.42	0.74	0.65
	St.d	0.36	0.39	0.48	0.38	0.50	0.33	0.27
Total	mean	0.61	0.84	0.66	0.66	0.49	0.76	0.63
	St.d	0.38	0.37	0.47	0.40	0.50	0.32	0.26

As Table 1 shows, the mean of each of the seven skills, except the proximity, is higher than the mean. Further, the mean of the time limitation skill is higher than the others, namely the Boolean, phrase, field, truncation, synonyms & suitable keywords and proximity search skill. According to the findings, Pillai's Trace test for the seven skills was 0.26, which is significant at $P < 0.001$. Therefore, the difference amongst the seven skills is significant. It is concluded that the sample have less ability in the proximity skill compared to the other skills. Therefore, the null hypothesis is rejected at $P < 0.001$. But the mean interaction effect between the skills' scores of the M.A. and the Ph.D. participants is not significant (Pillai's trace test=0.15). So, the null hypothesis cannot be rejected and there is not a significant difference between the M.A. and the Ph.D. candidates.

Results of the repeated measure test about the interaction between the search skills of the participants and their degree shows that there is not any significant interaction between these two variables. So, the M.A. and the Ph.D. candidates do not have any significant difference in this regard.

Table 2

Results of the ANOVA Test

Test	Variance sources	SS	DF	MS	F	P<
Within-group effect	skills	19.155	6	3.192	27.512	0.001
	Interaction between the skills' scores and the academic degree	0.753	6	0.126	1.08	0.371
	error	240.89	2076	0.11	----	----
Between-group effect	Academic degree	0.017	1	0.017	0.047	0.829
	error	126.68	346	0.366	----	----

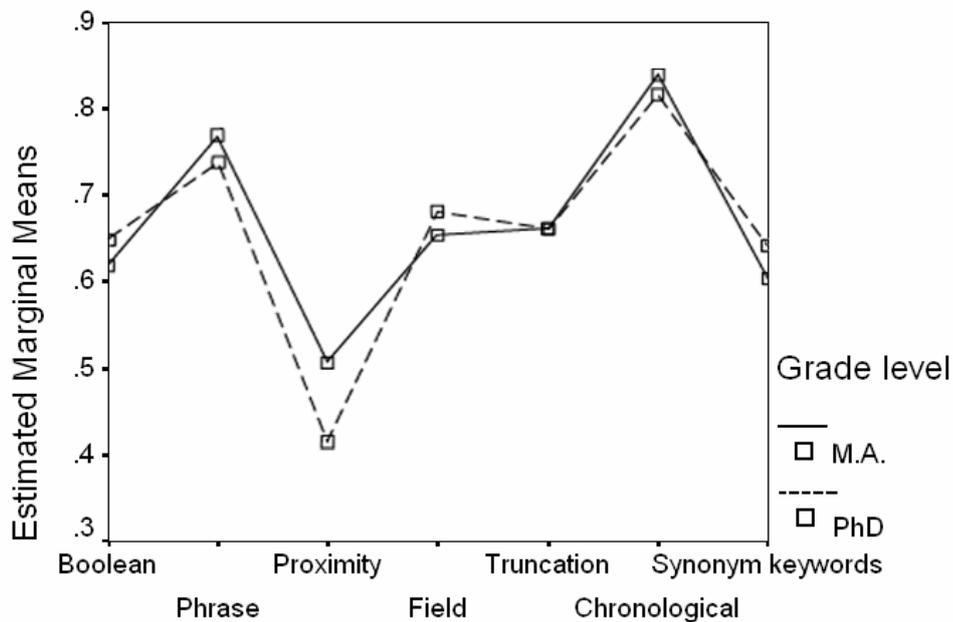


Figure 1. The main effect and the interaction effects between the two groups with regard to the 7 search skills.

To test the significant differences found in the repeated measure test, the dependent t-test with Benfroni correction was employed. Table 3 shows the results of comparing the seven search skills.

Table 3

Significant Difference between Each Pair of Skills

Mean	Skills	Boolean	Phrase searching	Proximity	Field	Truncation	Time limitation	Synonyms & suitable keywords
0.63	Boolean	1.00						
0.76	Phrase searching	*0.13	1.00					
0.49	Proximity	*0.13	*0.27	1.00				
0.66	Field	-0.035	*0.103	* -0.17	1.00			
0.66	Truncation	-0.035	*0.103	* -0.17	0.001	1.00		
0.84	Time limitation	*0.21	-0.071	*-0.35	*0.17	*-0.17	1.00	
0.61	Synonyms & suitable keywords	0.012	*0.15	*-0.12	0.048	0.048	*0.22	1.00

Note: An asterisk indicates a significant difference at $p < 0.001$.

As Table 3 shows, out of the 21 pairs of skills, there is a significant difference between the two skills in 14 pairs. According to this table, the time limitation skill holds a significant difference with the Boolean, proximity, field searching, synonyms & keywords, and truncation search skills. The phrase skill is in significant difference with the Boolean, proximity, field searching, truncation, and synonyms & keywords search skills. The truncation skill, field, Boolean, and synonyms & keywords are significantly different from the proximity searching. In other words, the proximity search skill has a meaningful difference with the other skills.

Research question 2

To analyze the second research question of the study that read "In which skills did the participants have the highest ability?" the mean scores of all the seven skills were computed and compared. The results show that the time limitation skill has the highest mean (84%) whereas the proximity searching has the lowest one (49%).

Research question 3

The third research question was "Is there any correlation between the real scores of search skills and the participants' self-report scores?"

To answer this question, the scores on the questionnaire were compared with the

self-report scores of the participants. In fact, the items on the questionnaire had been arranged so as to allow the participants not only to answer the questions about online search skills, but also to report their abilities in each skill on the Likert scale. These two groups of questions made it possible to test the correlation between the two groups of scores. The Pearson Correlation Coefficients was used to study the correlation between the self-report and the real scores of the participants. The results of this test are shown in Table 4.

Table 4

Results of the Pearson Correlation Coefficients

variables	Mean	St.d	Correlation Coefficient	P<
Self-report scores	8.57	2.75	0.27	0.001
Real scores	24.45	4.79		

The results of the Pearson correlation coefficients test show that the variables are correlated positively at $P < 0.001$.

Research question 4

Regarding the research question "According to the respondents, how far do search skills help to facilitate retrieval of information?" more than 86% of the participants have considered this rate to be high and very high, and only less than 14% have declared that the contribution of these skills on facilitating information retrieval is very low or low.

Table 5

Usefulness of Skills for Retrieving Information

Usefulness of skills for retrieving information	Frequency	Percentage
Very high	172	49.4
High	129	37.1
Middle	28	8.2
Low	12	3.6
Very low	6	1.7
Total	347	100

Discussions and Findings

According to the findings, the M.A. and the Ph.D. candidates did not show a significant difference regarding their online search skills some reasons of which may be that they share rather similar levels of knowledge; similar educational routines;

emphasis of the university faculty is on research; searching is the first prerequisite to research at both degree levels, and finally continuous use of the Internet. Further, as Pao and his colleagues (1993) declared, continuous use of the Internet and increasing the search time results in better search skills.

Also the results showed that there was a significant difference amongst the seven skills (Boolean, phrase, proximity, field, truncation, time limitation and finding synonyms & suitable keywords). This means that the participants have a significant difference with each other in each skill, and probably each person is skillful only in one skill and weak in others.

In other words, although the skills' scores they obtained were more than the mean, the post graduate students of University of Shiraz are weak in some skills and their low scores (in some skills) have been made up for by their good scores in other skills. The mean of each skill computed for the M.A. candidates showed that the time limitation, phrase, field & truncation, Boolean, synonyms and suitable keywords, and proximity search skills ranked 1-6 respectively.

The mean skills' scores of the M.A. and the Ph.D. candidates showed that in each group, the time limitation, phrase, field, truncation, Boolean, synonyms and suitable keywords, and proximity search skill ranked 1-7 respectively. Findings of Monoi, O'Hanlon and Diaz (2005) showed that the mean proximity skills' score was about 50 %, meanwhile after the implementation of the training course, this score increased to 75 to 85%. The similarity between the findings of this research and those of Monoi and his colleagues (2005) supports the fact that because of the repetition and application of their learnings in search and as Chang and Perng (2001) said because of their dependency on their classmates in search, the participants are only familiar with simple and common search skills and are not aware of skills like proximity search, which needs a closer inspection of the database or consulting the help option. In fact, these skills need to be directly or indirectly taught by librarians, computer centers' search assistants and teachers, and/or through watching a successful search carried out by another user.

In addition, users at both degree levels obtained the lowest scores on the Boolean and synonyms & suitable keywords search skills. Although the synonyms & suitable keywords search skill is viewed as the first step in a successful search and as Hildreth (1997) mentioned, it is the main factor in running a successful search, it achieved only the second lowest score amongst the seven skills with a mean of 61%.

Students' low score in this skill is in line with the findings of Hepworth (1999) which emphasized on the rare application of this search skill by students in Singapore. Also, the results of the dependent t-test with Benfroni correction on these seven skills showed that there was a significant difference amongst these seven skills.

On the whole, the mean scores of the whole participants showed that because of

repetition in their search; passing through different degree levels, and the indispensable and consistent role of search in such degrees, the candidates have acquired a good command of such skills, and although formal teaching is necessary for mastery of these operators and as Dinet, Favart and Passerault (2004) stated, experience and practical use of Boolean operators are more effective in their successful application), practical use of these skills by the post graduate candidates of University of Shiraz has brought them a higher score. Also, the results showed that the participants believed their familiarity with these skills would help them retrieve the relevant information in the least amount of time.

Conclusion

In this section the conclusions to be drawn from the findings of the study will be summarized.

Changes in users' search patterns, the widespread application of the Internet, and the ease of access to the Internet are the main factors that have caused users to use the Internet more than before. Users' view regarding the Internet as a source of information with unlimited subject coverage has increased their interest in surfing the Net.

University students and especially post graduate students are amongst the consistent Internet users. The findings of this study regarding the participants' abilities in the seven skills showed that Time limitation, Phrase searching, Field search & truncation, Boolean, synonyms & suitable keywords, and proximity searching ranked 1-6 respectively. The candidates' weakness in some skills is due to lack of training programs. On the contrary, their ability in some skills is due to their repeated use, necessity, and the common search basis in most of the databases.

The results of the Pearson Product-Moment Correlation Coefficient showed that there was a positive correlation between students' self-report scores and their real skills' scores. In other words, post graduate candidates of University of Shiraz are aware of the rate of their ability in search and if, for example, their answer to a question on proximity search indicated low ability, they also reported low ability regarding this skill on the self-report. This indicates that the participants' real search scores are correlated with their self-report scores. But O'Hanlon (2000) argued that although the freshmen at Ohio State University self-reported a high level of skill in search, in practice they did not know these skills.

Likewise, more than 84% of the participants declared that knowing these skills had helped them, at very high and high levels, retrieve information in the least amount of time and that was the main source of their zeal in learning more about these skills. Approximately, if knowing online search skills can save 15 minutes for each candidate on each search, 5 hours per month will be saved for each person taken they carry out 20

searches during the same period. The amount of time budgeting will amount to 60 hours (equal to 2.5 days) per year. An overview of the number of post graduate candidates in University of Shiraz indicates that by even a short training course we can save up to 23 years for 3351 candidates.

Suggestions

A- If it is not possible for the University of Shiraz to incorporate online search courses and training programs (optional or compulsory) into the curricula, there is a need to transfer such skills, in one way or another, to the candidates.

B- It is suggested that besides purchase of updated databases, the computer centers of the university be equipped with modern technology and access be allotted to students' at all degree levels because according to recent findings, the amount of the Internet use and familiarity with different databases improve students' search skills.

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