

## **EVALUATING THE INFORMATION-SEEKING BEHAVIOR OF POSTGRADUATE STUDENTS OF KERMAN UNIVERSITY OF MEDICAL SCIENCES BASED ON THE PRINCIPLES OF LEAST EFFORT AND COST-BENEFIT**

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### **ABSTRACT**

*Purpose of the study: The main objective of present study was to evaluate the information-seeking behavior of postgraduate students of Kerman University of Medical Sciences and to find their information-seeking weaknesses and strengths based on the principles of least effort and cost-benefit. Methodology: This research was a survey type of study. The data collection tool included a researcher-made questionnaire. The research population included postgraduate students of Kerman University of Medical Sciences. The sample of the research included 168 people. In analyzing the data, mean, standard deviation, t-test, Kolmogorov-Smirnov test, two-sample T mean and regression analysis in SPSS16 software were used. Results: The research revealed that gender had no effect in the quality and accessibility of information-seeking behavior based on the principle of the least effort and the principle of cost-benefit. In addition, the research results indicated that the field of study was an effective factor in the quality of information in students' information-seeking behavior, for example, students of Faculty of Management, more than other students, were seeking for quality of information and they gave more value for it. It might be due the fact that they have higher knowledge of databases and information-seeking skills due to the nature of their field of study. In addition, the field of study was not found to be an effective factor in information accessibility, as no difference was found among different faculties in terms of the accessibility of information. Conclusion: The research results could be effective in improving the information-seeking behavior of students. The conditions can be provided for presenting better and high-quality scientific products by identifying the current problems in accessing high-quality information.*

**Keywords:** Information-Seeking Behavior, Principle of Least Effort, Principle of Cost-Benefit, Accessibility of Information, Information Quality.

### **INTRODUCTION**

Since the beginning of human civilization, information and the use of information have been important and considered as a power (Azami et al., 2018). The need for information causes information-seeking behavior. To meet this need, the person is seeking information through information channels (YaminFirouz and Davarpanah, 2005). Information-seeking behavior is a set of processes leading finally to beneficial information (Davarpanah, 2007). Nowadays, research on the information-seeking behavior of different users (including students) has high importance owing to the diversity and complexity of information and information channels (Azami et al., 2016). Searching and using information are at the core of librarianship and informing studies (Horry and Keshavarz, 2004).

Moreover, the volume of information is dramatically increasing and information users are inevitably required to use these information channels to meet their information needs. However, the important issue in this regard is the way of using these channels and identifying their information-seeking behavior models (Azami et al., 2012). One of the methods helping us in evaluating the information-seeking behavior of users properly is the use of information-seeking theories and models. The principle of the least effort and the principle of cost-benefit are among the principles considered in the area of information-seeking behavior. The principle of the least effort is known as Zipf's law. This principle has been used in various sciences and disciplines including library and information sciences (Fisher et al., 2005). Based on the principle of least effort, if a user has to select one of the options of ease of access to information and the usefulness of the information, he will show higher tendency to select the sources that are easily accessible rather than those that are related to the given issue but are not accessible (Davarpanah, 2007). In other words, people tend to obtain the maximum amount of information with the least effort as possible (Bronstein & Baruchson, 2008). However, the least effort prevents them from obtaining high-quality sometimes, since they might merely rely on accessible sources and use only these sources to meet their information needs. In such situations, the users in fact show the principle of the least effort.

Other principle considered in information-seeking behavior is the principle of cost-benefit. Cost-benefit approach is concerned with informed decisions in trying to achieve a goal (Ling-feng et al., 2014). The principle states that as people seek information, they assess and evaluate the information based on their expected benefits and probable costs, and then, they select the information channel. It means that people select more beneficial channels. This approach emphasizes on rational information seeking and calculation of the benefits obtained through the most accurate and completes information. The principle of cost-benefit emphasizes on the quality of information obtained from communication channels (Fisher et al., 2005).

Accordingly, information seekers evaluate the expected benefits and cost of using the information channel which is the basis for selecting an information channel (Bronstein & Baruchson, 2008). The principle of the least effort predicts that information seekers will reduce the effort needed to find information, even in the expenses of less quality or quantity of information. However, the principle of cost-benefit has a continuous focus on using sources in the short term (Fisher et al., 2005). None of these principles (least effort and cost-benefit) in users' information-seeking behavior is rejected or approved, rather it is the users themselves who select the information channel based on the type of information they need and its importance. However, the quality of information may be sacrificed for its accessibility. In such situations, researchers can be helpful, since identifying and investigating the effect of the two principles that are effective in user information-seeking behavior, namely the least costly and cost-benefit, would help them better manage their information behavior and identify the barriers to achieve high-quality and relevant information in their area.

In order to understand whether students' information-seeking behavior is performed properly or not, frameworks and theories are required to evaluate the process of information seeking among users. Applying these principles is not only effective in identifying students' information-seeking problems, but also it helps to provide the appropriate solution to each problem. This research aimed to evaluate the information-seeking behavior of the research population under two principles of least effort and cost-benefit to provide appropriate



solutions to access high-quality information and to use appropriate information channels, and finally, to identify the factors affecting the information-seeking process among students.

### **Research questions**

1. Is there a relationship between gender and accessibility in users' information-seeking behavior based on the principle of least effort?
2. Is there a relationship between gender and quality of information in users' information-seeking behavior based on the principle of cost-benefit effort?
3. Is there a relationship between the field of study and quality of information in users' information-seeking behavior based on the principle of the cost-benefit?
4. Is there a relationship between the field of study and accessibility of information in users' information-seeking behavior based on the principle of the least effort?
5. What are the most important motivations for users to seek the needed information based on the principles of the least effort and cost-benefit?
6. What are the main barriers in users' information-seeking behavior based on the principles of least effort and cost-benefit?
7. What are the most important sources used by users to seek for the information based on the principles of least effort and cost-benefit?
8. What are the factors affecting users' information-seeking behavior based on the principles of least effort and cost-benefit?

### **METHODOLOGY**

This research is an applied study which is conducted through survey method. The research population included all postgraduate students of Kerman University of Medical Sciences. The sample of research calculated 168 people. In this research, a researcher-made questionnaire was used to collect data. To assess the validity of the questionnaire, a questionnaire was distributed to a number of librarianship experts and professors and its validity was approved. In order to assess the reliability of the research tool, the internal consistency method was used. Its Chronicle alpha was found 0.764. The bar and pie charts and tables were also used to describe the data. T-test, Kolmogorov-Smirnov test, two-sample T mean, and regression analysis were used for data analysis. In all tests, the significance level was considered to be 0.05 ( $\alpha = 0.05$ ).

### **RESULTS**

Based on the obtained data from the questionnaires, out of the 168 subjects participated in the research, 113 (67%) of them were female and 55 (33%) of them were male. The research population included postgraduate students of different faculties of Kerman University of Medical Sciences. Thirty and nine of them belonged to the Faculty of Health, 50 of them belonged to the Medical Faculty, 31 of them belonged to the Faculty of Management, 36 of them to the belonged Faculty of Nursing, 6 of them belonged to the Paramedical Faculty, 4 of them belonged to the Faculty of Pharmacy, and 2 of them to the belonged Center of Studies. Thus, the total number of students in the research was 168. Out of which, 140 (83%) were master students and 28 (17%) were PhD students.



To compare the means of accessibility in users' information-seeking behavior based on the principle of least effort between two groups of females and males, a Two-sample t test was used after examining the normality assumption in the groups by using Kolmogorov-Smirnov test. As shown in table 1, there was no significant difference between females and males in terms of accessibility.

**Table 1: Comparing the accessibility in students' information-seeking behavior based on the principle of the least effort among male students**

gender	mean	SD	p
males	12.45	2.41	0.618
females	12.65	2.47	

In comparing the quality of information on users' information-seeking behavior based on the principle of cost-benefit between males and females, after ensuring the normality of the data, the means test was performed in two groups. The data in Table 2 showed that the difference between the two groups was not significant ( $P = 0.1$ ). Thus, male and female students did not show any differences in information-seeking behavior in terms of information quality.

**Table 2: Comparing the quality of information in students' information-seeking behavior based on the principle of cost-benefit among male and female students**

Gender	mean	SD	p
males	20.87	3.09	0.105
females	20.04	3.16	

To compare the mean of the quality of information in the students' information-seeking behavior based on the principle of cost-benefit in various colleges, ordinary regression analysis was used. For this purpose, as 6 faculties were compared, five marker variables were defined and the postgraduate students of the medical faculty were considered as the base group. As shown in Table 3, the mean quality of information in the information-seeking behavior was more in master students of the Faculty of Management. Therefore, it can be concluded that the quality of information in the behavior-seeking information behavior of the students of the Faculty of Management based on the principle of cost-benefit was significantly more than that of students of the Medical Faculty, but other faculties did not have significant differences.

**Table 3: Mean and standard deviation of information quality in students' information-seeking behavior based on the principle of cost-benefit in the students of different faculties**

Faculty	mean	SD
medical	19.9	2.73
health	20.2	2.78
management	22.3	3.31
nursing	20.63	3.6
paramedical	21.6	2.5
Pharmacy	21.9	2.94

To compare the mean of the accessibility in the students' information-seeking behavior based on the principle of the least effort in various colleges, ordinary regression analysis was used.

For this purpose, as 6 faculties were compared, five marker variables were defined. In examining the results of students' information-seeking behavior based on the principle of the least effort among different faculties, as shown in Table 4, paramedical faculty had the highest mean (15.83) and the faculty of pharmacy had the lowest mean. However, medical faculty was considered as a base of comparison and by comparing this mean using the regression methods, shown in Table 4, accessibility in information seeking behavior of students of different faculties, no significant difference was found.

**Table 4: Results of the regression model for comparing accessibility in students' information-seeking behavior based on the principle of least effort among different faculties**

	mean	Effect coefficient	SD	p
Comparison group	14.52	12.15	0.76	
Health faculty	14.62	0.1	0.52	0.85
Management faculty	14.23	0.-04	0.57	0.94
Nursing faculty	13.94	0.-24	0.54	0.66
Paramedical faculty	15.83	1.76	1.06	0.09
Pharmacy faculty	13.5	0.-48	1.27	0.7

Based on Table 5, students considered having knowledge on the source of information as the most important factor in selecting a source. Feeling comfortable in using the information source was the second most effective factor in selecting the source of information and the capability to search keywords was considered as the third most important factor in selecting a source. The options of having appropriate level of detail, having different types of information in one place, and having access to the sources of information at home had the frequency close to each other. The interactivity of the source also had the least importance in selecting an information source.



**Table 5: Distribution of frequency of the most important factors in selecting an information source**

Affective factors	%	f
Having knowledge on information source	66.7	112
Feeling comfortable in using the source	54.8	92
Having appropriate level of details	35.1	59
Intractability of source	4.8	8
Source format	10.1	17
Having different types of information in one place	32.1	55
The capability to search the keywords	41.7	70
Closeness to information source	18.5	31
Access to information source at home easily	39.3	66

In addition, the participants of the study were asked about their motivation to provide information for each of the information needs. As shown in Table 6, the best motivation for students was information-seeking, writing thesis, performing research activities and enhancing specialized knowledge. Its reason was the involvement of postgraduate students in research activities and thesis writing.

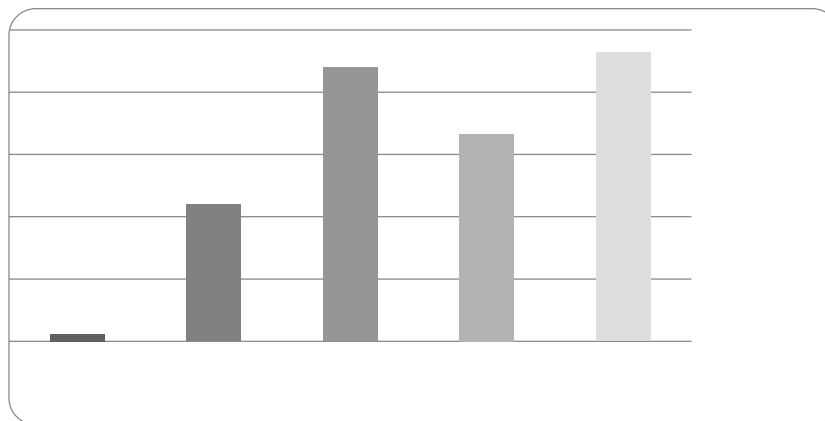
**Table 6: Frequency distribution of student motivation for information seeking for each of the information needs**

The goal of searching information	Very low		low		moderate		high		Very high	
	n	%	n	%	n	%	n	%	n	%
Enhancing the general knowledge	12	7.1	15	8.9	62	36.9	64	38.1	15	8.9
Enhancing specialized knowledge	0	0	2	1.3	28	16.7	85	50.6	53	31.5
Access to updated information	1	0.6	14	8.3	51	30.4	73	43.5	29	17.3
Performing research activities	3	1.8	9	5.4	37	22.3	62	36.9	57	33.9
Writing thesis	1	0.6	13	7.7	23	13.7	61	36.3	70	41.7
Learning the use of new technology	5	3	15	8.9	70	41.7	42	25	36	21.4

Moreover, 63.3% of students reported that non-richness of library was a major problem in not using it. They also stated that the problem to achieve the needed information and being updated with the new developments in the field and the lack of Internet speed were among the main problems. Students stated the most important reasons for using accessible sources versus the use of high-quality sources were the lack of knowledge on search method in the database and its cost. Most students reported the inability to use and locate new sources of information as the main barriers of their using of this source.

In general, 148 (88.1%) students used Internet, 83 (49.4%) used books, 67 (39.9%) used databases, 27 (16.1%) used journals, and only 18 (10.7%) of them used research reports to meet their information needs; and 7 (4.2%) of them did not use any of these methods to meet their needs. Based on the results, the Internet was the first and most widely used source for students to access the needed information.

As Chart 1 shows, 46.4% used basic and standard texts, 44% used review papers, 33.3% consulted with professors and experts, and 22% of them used abstracts as the sources of the information.



**Chart 1: frequency of sources used in searching information**

The subjects were asked on their information channel, and Table 7 shows, among the formal channels, the library of the faculty, and among the informal channels, consultation with the professors had the highest frequency.

**Table 7: Frequency distribution of different information channels used to collect information among students**

Type of information channel	Libraries, complexes and sources	Very low		low		moderate		high		Very high	
		n	%	n	%	n	n	%	n	%	n
Formal channels	Library of faculty	30	17.9	22	13.1	56	33.3	42	25	18	10.7
	Central faculty	59	35.1	42	25	39	23.2	20	11.9	8	4.8
	Personal library	45	26.8	37	22	43	25.6	36	21.4	7	4.2
	Public library	81	48.2	41	24.4	26	15.5	15	8.9	5	3
Informal channels	Consulting with professor	16	9.5	13	7.7	46	27.4	64	38.1	29	17.3
	Attending in conferences	37	22	41	24.4	56	33.3	29	17.3	5	3
	Internet discussion groups	66	39.3	43	25.6	37	22	18	10.7	4	2.4
	Scientific communities	59	35.1	53	31.5	33	19.6	18	10.7	5	3

The rate of using information sources was also asked from the subjects of this study. Based on the Table 8, To have access to the needed information, as compared to printed sources, electronic sources (general and specialized search engines and electronic journals and databases) were reported as the most used sources.

**Table 8: Frequency distribution of information sources used among students**

Type of sources	Information sources	Very low		low		moderate		high		Very high	
		n	%	n	%	n	n	%	n	%	n
Printed sources	A collection of papers	11	6.5	19	11.3	36	21.4	55	32.7	28	28
	Specialized journals	15	8.9	28	16.7	46	27.4	42	25	37	22
	Abstracts and indexes	27	16.1	46	27.4	48	28.6	34	20.2	13	7.7
Electronic sources	general and specialized search engines on the Internet	2	1.2	8	4.8	21	12.5	53	31.5	84	50
	Electronic journals and databases	14	8.3	12	7.1	26	15.5	51	30.4	65	38.7

With regard to the determination of factors affecting the information-seeking behavior of users based on the principles of least effort cost-benefit, a number of factors were determined. The students also were asked to express their ideas on the statement that "the previous use of an information source does not necessarily affect the information search process". Most of the students disagreed with this statement. It means that they considered the previous use of an information source as an effective information search process. It was also asked whether the correct interpretation of the information had a great effect on its use. Most people stated that



the correct interpretation of the information had a great effect on its use. Students were also more interested to obtain information about a topic which they had some background knowledge. Students also believed that experienced and skilled people were more successful in searching for information and also considered the skills of positioning, evaluating and use of information sources effective in information-seeking behavior. Finally, they were asked to express their ideas on the question of "To what extent the used language is effective in selecting the source of information". Most of the students believed that it was important to select the source of information. In general, students identified the following factors affecting their information-seeking behavior: the previous use of a source, a proper interpretation of the source of information, having a background in the use of the information source, having experience and skill, having positioning skills, evaluating the use of information source.

## CONCLUSION

Based on the results, the accessibility of information in information-seeking behavior is the same in males and females. In other words, no difference was observed between males and females in terms of accessibility of information. In addition, based on the results of the analysis, no significant difference was found in the information-seeking behavior of male and female students in terms of the quality of information. Thus, it can be concluded that there is no relationship between gender and the quality of information based on the principle of cost-benefit. In addition, there was a relationship between the quality of information and the field of study of the students. The results showed that the quality of information in the information-seeking behavior was better in postgraduate students of the management faculty than that of other faculties. It means that students of this faculty gave more value for the quality of information and the quality of information was a very important factor for them.

However, no difference was found among different faculties in terms of accessibility. Thus, there was no relationship between the field of study and accessibility of information based on the principle of least effort. Subjects of the research considered having knowledge on the information source as the most important factor in selecting a source of information. Feeling comfortable in using the information source was the second most effective factor in selecting the source of information. Results of other researchers also confirmed the results of the current research (Fidel and Green, 2004). The objectives of the study of these scientists were to evaluate the type of information needed by engineers as well as the reasons for selecting these sources. Among the most important factors stated by the engineers, recognizing the sources and quick responses and the physical proximity to the sources of information can be highlighted.

The results revealed that writing thesis, performing research activities and enhancing the specialized knowledge were the best motivations for students to access information, which was due to the involvement of these students in research activities. It means that more students were more seeking for information which was related to their research activities. This result has been also confirmed by other studies. For example, Kebed (2004) found that end-users reported their information needs as the content of information related to their daily tasks, the effective and accessible information for them, and the information that can be used more efficiently. The barriers of students' information-seeking behavior were also examined. Most of them reported that the inappropriate Internet speed was the most important problem in



accessing the information needed. The students also stated that lack of knowledge on the way of searching in databases and its cost were the reasons for preferring accessible information to high-quality information. The cost and lack of knowledge on the source of information (which could be due to linguistic barriers) were also considered as barriers in other studies. Bronstein & Baruchson (2008) examined four disruptive and inhibitory factors in information retrieval (cost, distance, lack of user-friendliness and time). The participants of the research were asked to state the barriers and difficulties encountered when using different information channels. Linguistic barriers were also stated as the significant barriers in the quantitative phase of study (Bronstein & Baruchson, 2008). Based on the results, the Internet was reported as the first and most widely used source, which students referred to it when they needed information. Another research showed that students preferred to find information through search engines rather than other communication channels and Google's search engine was generally their choice in this regard (Griffith and Bruffie, 2005).

In another study conducted by Liu and Yung (2004), they focused on the use of information in distance learning and they looked for important factors affecting the selection of information sources by students. In this research, the greatest number of participants selected the Internet as the first source of information, and the university library was ranked the second. Students reported the basic texts and review papers were mostly used sources. In addition, faculty library among the formal channels and consultations with professors among the informal channels had the highest frequency. It can be concluded that the principle of the least effort was effective in the information-seeking behavior since among the information channels introduced, students selected their closest and most accessible information channels (faculty library and consulting with professors). Other studies also indicated that the principle of the least effort was effective in the selection and use of information sources, and the results confirmed the selection, based on the speed and ease of information retrieval (Liu and Yung, 2004; Fidel and Green, 2004). Students reported the following factors affecting their information-seeking behavior: the previous use of information source, proper interpretation of information source, having a background in the use of the information source, having experience and skill, having positioning skills, evaluation and the use of information sources.

In the current research, an open-ended question was asked in the questionnaire, so that students reported another possible factor which could be effective in their information-seeking behavior. Most of them stated that the subject of source and its relevance to the field of study (due to the assignments which should be done) was an important factor in their information-seeking behavior. The researchers also concluded that the selection of sources by participants was closely associated with their field of study (Liu and Yung, 2004). In general, both of these theories (the least effort and cost-benefit) had an effect in information-seeking behavior of postgraduate students, and they followed both of these principles when seeking information. However, if their problems in information retrieval (most important of them were inappropriate Internet, speed, the cost of the source of information and lack of knowledge on the source of information) were resolved, they might prefer high-quality sources to accessible sources. At the same time, students paid special attention to the quality of information and they managed the barriers to access appropriate and relevant information in order to achieve the desired information.



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