

Comparison on information-seeking behavior of postgraduated students in Isfahan University of Medical Sciences and University of Isfahan in writing dissertation based on Kuhlthau model of information search process

Mahnaz Abedi, Hasan Ashrafi-rizi¹, Firoozeh Zare-Farashbandi¹, Rasoul Nouri, Akbar Hassanzadeh²

Department of Medical Library and Information Science, School of Medical management and Information Sciences, ¹Health Information Technology Research Center, ²Department of Epidemiology and Biostatistics, School of Health, Isfahan University of Medical Sciences, Isfahan, Iran

ABSTRACT

Introduction: Information-seeking behaviors have been one of the main focuses of researchers in order to identify and solve the problems users face in information recovery. The aim of this research is Comparative on Information-Seeking Behavior of the Postgraduate Students in Isfahan University of Medical Sciences and Isfahan University in Writing Dissertation based on Kuhlthau Model of Information Search Process in 2012. **Materials and Methods:** The research method followed is survey and the data collection tool is Narmenji questionnaire. Statistical population was all postgraduate students in Isfahan University of Medical Sciences and Isfahan University. The sample size was 196 people and sampling was stratified randomly. The type of statistical analyses were descriptive (mean and frequency) and inferential (independent *t* test and Pearson's correlation) and the software used was SPSS20. **Results:** The findings showed that Isfahan Medical Sciences University followed 20% of the order steps of this model and Isfahan University did not follow this model. In the first stage (Initiation) and sixth (Presentation) of feelings aspects and in actions (total stages) significant difference was found between students from the two universities. Between gender and fourth stage (Formulation) and the total score of feelings the Kuhlthau model there has a significant relationship. Also there was a significant and inverse relationship between the third stage (Exploration) of feelings and age of the students. **Conclusion:** The results showed that in writing dissertation there were some major differences in following up the Kuhlthau model between students of the two Universities. There are significant differences between some of the stages of feelings and actions of students' information-seeking behavior from the two universities. There is a significant relationship between the fourth stage (Formulation) of feelings in the Kuhlthau Model with gender and third stage of the Feelings (Exploration) with age.

Address for correspondence: Dr. Hasan Ashrafi-rizi,
Health information Technology Research Center, Isfahan University of
Medical Sciences, Isfahan, Iran.
E-mail: hassanashrafi@mng.mui.ac.ir

Key words: Graduate students,
information-seeking behavior, Isfahan
University of Medical Sciences, Isfahan
University, Kuhlthau model of information
search process, writing dissertation

Access this article online	
Quick Response Code:	Website: www.jehp.net
	DOI: 10.4103/2277-9531.139633

Copyright: © 2014 Abedi M. This is an open-access article distributed under the terms of the Creative Commons Attribution License, which permits unrestricted use, distribution, and reproduction in any medium, provided the original author and source are credited.

This article may be cited as: Abedi M, Ashrafi-rizi H, Zare-Farashbandi F, Nouri R, Hassanzadeh A. Comparison on information-seeking behavior of postgraduated students in Isfahan University of Medical Sciences and University of Isfahan in writing dissertation based on Kuhlthau model of information search process. *J Edu Health Promot* 2014;3:88.

INTRODUCTION

Since the dawn of civilization, information and its use had been one of the most important issues of humanity. In today's societies, information has become one of the key tools in human relationships, which can affect human activities from the simplest to the most complex. Due to the sheer volume of new and accumulated information, our age is known as the age of information. In this age, accessing correct and reliable information in an appropriate and useable manner can reduce the waste of time and resources and duplicated works, which makes this the ultimate goal of managers of information systems.^[1]

The recovery of information has always been known as one of the most basic needs of specialists for development and progress, and information-seeking behaviors have been one of the main focuses of researchers in order to identify and solve the problems users face in information recovery. Many studies have been conducted concerning the information need and information-seeking behavior of different societies; it seems, however, that information-seeking behaviors and the knowledge of such behaviors are more prominent in scientific and academic societies. Postgraduate students are among the most important users of technical information. The importance of this groups' access to information and their role in scientific and technological development prompted many studies about the sources and methods they use for information seeking in different countries.^[1] To this date, many models have been introduced and used for the study of information-seeking behaviors and the only model with a process approach to library and information-seeking skills that emphasizes the development of transferable cognitive skills and utilizes the user performance in information seeking and use of library and Internet search, is the Kuhlthau model.^[2]

Kuhlthau believes that the information-seeking process has three areas, including emotions—feelings; cognitive thoughts; and physical—actions;^[3] and each one of these areas can be described in six stages that consist of Initiation, Selection, Exploration, Formulation, Collection, and Presentation. Kuhlthau model is a learning method based on development, which provides media experts and academic librarians with a suitable framework for their educational planning and information services. The scope of this model is beyond the traditional educational methods and always focuses on the information services of the libraries, using them to facilitate better access to contents and ideas. Kuhlthau in a study titled “The Role of Media Experts of High school Libraries,” found out that regardless of the students' familiarity with references and the library, the students that engage in work and preparing their research papers, show a behavioral pattern that causes them to become confused and discouraged. It seemed that these students did not have enough motivation for their researches. Kuhlthau in this study pointed out that this pattern has six stages and each of these stages emphasizes on the elements of thought, feelings, and actions and that each

of these elements can clarify the activities of the students during their search.^[2] Among the other studies conducted about this model, the following are noteworthy.

Narmenji and Nowkarizi in a study titled “An Investigation on Information Seeking Behaviors of Graduate Students in Birjand and Ferdowsi Universities on the basis of Kuhlthau Model of Information Search Process” discovered that the graduate students of Birjand and Ferdowsi universities follow the stages of Kuhlthau model with small differences in their dissertation research. They also reported that there was no meaningful difference in the emotions and thoughts governing the Kuhlthau information-seeking process for male and female students or the students from different educational backgrounds.^[4]

Ghazi Dezfuly in her study called “comparison of information Search the Internet search process Islamic Azad University engineering students by information Search process Carroll Kuhlthau” showed that most students experienced the stages described in Kuhlthau model. She also claimed that the gender and major of the students play a meaningful role in stages two (topic selection), four (topic specialization), five (gathering information concerning the topic), and six (writing dissertation) of the Kuhlthau model.^[5]

Ghazi Dezfuly also in a study titled “Search information on the Internet by computer field students and compare it with Model Kuhlthau” claimed that most students follow the stages of Kuhlthau information-seeking model and that there is no meaningful relationship between the gender and execution of Kuhlthau model stages. She also showed that students require aid from librarians in stages one (start), three (reviewing the information regarding the topic), and five (data gathering).^[6]

Bigdeli *et al.*, in their study called “A Comparison of Internet Searching Process with Kuhlthau Model among PostGraduate Students of Shahid Chamran University” showed that there are some differences in the information-seeking stages of the graduate students that can be used to draw a new model for information-seeking behavior of students of Shahid Chamran University. The order of the information-seeking process for these students is (1) concentration, (2) excavation, (3) collection, (4) selection, and (5) presentation or use.^[2]

Friel in a study called “The Information Research Process with Low-Achieving Freshmen using Kuhlthau's six-stage model and the interventions that facilitate the process” showed that students can significantly experience the stages of Kuhlthau's model and that great changes in thought patterns and confidence of those that experience these stages are apparent and their general thoughts gain a more centered and detailed outline.^[7]

Burdick showed the significant effect gender has on Kuhlthau's model stages on his study “Gender in Information Search Process: An Exploratory Study of Students' Experience” and claimed that gender affects selection, formulation, and

collection stages. He also showed that most of the students experience significant stress and confusion.^[8]

Swain conducted a study called “Information Search Process Model: How Freshmen Begin Research” and showed that most students preferred to make some changes to the stages of Kuhlthau’s model and that they recommended a mixture of Kuhlthau’s model’s stages during the information-seeking phase.^[9]

Shamo conducted a study named “University Students and the Internet: Information Seeking Study” in 2001, which showed that most participants have experienced the fifth stage of Kuhlthau’s model (data collection) and that meaningful differences could be found between genders and the feeling domain of Kuhlthau’s model.^[10]

Whitmire in a study titled “Study of the Relation between Epistemological beliefs and the information-seeking behavior of undergraduates using Kuhlthau’s model and Four expanded cognitive psychological models” showed that items such as interferences, search tools, data validation, and the ability to understand the data were among the ones effecting the Epistemological beliefs of the students. His findings also showed that among different stages of Kuhlthau’s model, selection, codification, and collection have the most effect of the Epistemological beliefs of the students and therefore on a useful search.^[11]

Maschi *et al.* conducted a study called “Mapping Social Work Students’ Perceptions of the Research Process: A Qualitative Follow-Up Study” in order to better understand the feelings, thoughts, and actions of the students during a research period. Their findings showed that supports and internal and external barriers affect the students’ researches and might decrease their satisfaction during their research period.^[12]

Luo *et al.* conducted a study titled “Uncertainty, Affect, and Information Search” in order to investigate the use of Kuhlthau’s model for Internet data seeking. The statistical population of this study was 30 Internet users who were asked to use Kuhlthau’s model’s information in a simple search. The results showed that the emotional response of the people using simple models differed from the ones using complicated ones.^[13]

Moskina, in a study titled “Information Seeking Behavior of National Minorities’ Secondary School Students for Scientific Research Purposes” tried to understand the information-seeking methods of students for educational uses. The results showed great similarity between the behavior of the students and Kuhlthau’s model. Finding all the required information for a research increases the satisfaction and interest of the students, which is in agreement with Kuhlthau’s model.^[14]

Due to the differences in the nature and purposes of the academic disciplines of Ministry of Health and Medical Education

and the Ministry of Science, Research and Technology, the following study aimed to compare the information-seeking behavior of postgraduate students of Isfahan University of Medical Sciences and University of Isfahan in writing their dissertation in the year 2012–2013 (1391) in order to identify the information-seeking pattern of the students and devise ways to improve these patterns.

MATERIALS AND METHODS

This study used a survey method and the data gathering tool was Narmanji questionnaire localized based on Kracker questionnaire called “Research process survey.” This questionnaire was designed according to Kuhlthau’s model.^[4] Validity of the tools was verified by library and information technology experts and their reliability was verified using Cronbach’s alpha, which was 78% for cognitive elements (thought) and 87% for emotional elements (feelings). The information seeking in Kuhlthau’s model consists of six stages: at the first stage in order to specify the sequence of following these stages, the students were presented by seven phrases (beginning, topic selection, investigating information related to the topic, topic specification, data collection, writing dissertation, and others), which showed the six stages of Kuhlthau’s model. The seventh phrase (others) was used in anticipation of probable clutters. The students were asked to sort these phrases to show the stages they went through in order to write their dissertation. By considering the “start” stage as evident for all participants, the five remaining stages each accounted to 20% of the 100% total compliance to the model. The questions in the second section (6 questions) were used to identify the compliance with the actions of Kuhlthau’s model (total of 6 points). The third section contained 24 questions that used 12 direct and 12 indirect phrases to investigate the emotions and feelings of Kuhlthau’s model. The indirect phrases were used to measure the reliability of the answers. The participants rated their agreement or disagreement with each phrase based on a five options (with total agreement being worth 5 points and total disagreement being worth 1 point). The statistical population consisted of all postgraduate students of Isfahan University of Medical Sciences and University of Isfahan from class 2011 (1390) and before who had finished their dissertation proposals. Based on the information received from postgraduate office of the universities, the number of these students was 595 for Isfahan University of Medical Sciences and 776 for University of Isfahan, which amounts to the total of 1371 students. The sample volume was calculated using the following equation: $n = (Z_1 + Z_2)^2 (2S^2)/d^2$ and were 98 students from each university. The sampling method was random sampling done in eight faculties of Isfahan University of Medical Sciences (for a total of 98 samples) and in the 10 faculties of University of Isfahan (for a total of 98 samples). The questionnaire was given to the students in person in order to gather the data. The gathered data were analyzed using descriptive statistics (mean score and frequency distribution) and inferential statistics (the *t* test and Pearson’s correlation) and with SPSS20 software.

RESULTS

Findings showed that the female student participation was greater than male student participation (64.3% for Isfahan University of Medical Science and 79% for University of Isfahan). In University of Medical Sciences the highest participation was for the faculty of medicine (23.5%) and the highest participation rate for University of Isfahan belonged to the faculty of educational sciences (23%). The age of the participants was similar in both universities and was between 22 and 34 years.

The postgraduate students of both the universities followed the Kuhlthau's model in almost identical sequence that was different from Kuhlthau's model's sequence. Based on Kuhlthau's model, students must go through different stages in a predetermined sequence (beginning, topic selection, investigating information related to the topic, topic specification, data collection, writing dissertation) but the results showed that the sequence of the stages in Isfahan University of Medical Sciences is beginning (53.6%), topic selection (34.7%), data collection (36.7%), investigating information related to the topic (35.1%), writing dissertation (45.9%), topic specification (45.9%), and other data-seeking methods (66%), whereas the same sequence for University of Isfahan is beginning (43.8%), data collection (40.2%), topic selection (30.6%), investigating information related to the topic (29.5%), and writing dissertation (38.9%). In other words students of Isfahan University of Medical Sciences only had a 20% match to Kuhlthau's model's sequence, whereas the students of University of Isfahan did not follow Kuhlthau's model's sequence at all.

Table 1 shows the mean score of the emotion domain for students of Isfahan University of Medical Sciences and University of Isfahan. It can be seen that there is no meaningful relationship between the mean score of the emotion domain of the two universities ($P > 0.05$). The expected emotion in the first stage is uncertainty. Students were asked to express the amount of uncertainty they faced at the beginning of their work. The mean score of emotion for students of Isfahan University of Medical Sciences is 3.22 (from the total of 5), whereas the same mark for the students of University of Isfahan is 2.91. *t* Test there is a meaningful distinction between the emotions of the students about the first stage between these two universities ($P < 0.05$).

Optimism is the emotion governing the second stage of Kuhlthau's model, which measures the amount of optimism and relaxation of the participants. The mean score of emotion for this stage for students of Isfahan University of Medical Sciences is 3.31, whereas the same mark is 3.30 for the students of University of Isfahan. *t* Test showed no meaningful distinction between the two universities in this stage ($P > 0.05$).

Confusion, frustration, and doubt are the expected emotions in the third stage of Kuhlthau's model. The mean score of

emotion for this stage for students of Isfahan University of Medical Sciences is 3.23, whereas the same mark is 3.19 for the students of University of Isfahan. *t* Test showed no meaningful distinction between the two universities in this stage ($P > 0.05$).

The fourth stage is the turning point of Kuhlthau's model and it is in this stage that the uncertainty is replaced by clarity. The phrases concerning the emotions in this stage focus on the certainty and ability of the participant for finding a specific topic. Based on Table 1, the mean score of emotion of this stage was 3.44 for the students of Isfahan University of Medical Sciences and 3.35 for the students of University of Isfahan. The *t* test showed no meaningful distinction between the students of the two universities in this stage ($P > 0.05$).

The sense of direction and confidence must increase according to the fifth stage of Kuhlthau's model. Based on Table 1, the mean score of emotion of this stage was 3.64 for the students of Isfahan University of Medical Sciences and 3.58 for the students of University of Isfahan. The *t* test showed no meaningful distinction between the students of the two universities in this stage ($P > 0.05$).

Based on Kuhlthau's model, at the last stage the students must feel a sense of satisfaction or disappointment. According to the mean scores in Table 1, the emotion mark of the students in the last stage for Isfahan University of Medical Sciences was 3.41, whereas the same mark was 3.11 for the students of the University of Isfahan. *t* Test showed a meaningful difference between the students of the two universities ($P < 0.05$).

Table 2 shows the mean score of the thought domain for the students of Isfahan University of Medical Sciences and the University of Isfahan. Based on this information there is no meaningful relationship between the mean score of thought of the two universities ($P > 0.05$). Based on Kuhlthau's

Table 1: Meaningfulness test for the difference related to emotion domain of Kuhlthau's model's stages in students of Isfahan University of Medical Sciences and University of Isfahan

Kuhlthau's model's stages	Isfahan University of Medical Sciences		University of Isfahan		P value
	Mean score	Standard deviation	Mean score	Standard deviation	
First stage (beginning)	3.22	1.05	2.91	1.06	0.04
Second stage (topic selection)	3.31	0.94	3.30	0.91	0.90
Third stage (data investigation)	3.23	0.95	3.19	0.90	0.78
Fourth stage (topic specification)	3.44	0.81	3.35	0.77	0.44
Fifth stage (data collection)	3.64	0.79	3.58	0.73	0.55
Sixth stage (writing dissertation)	3.41	0.82	3.11	0.86	0.01
Total	3.83	0.06	3.24	0.06	0.15

model, a person's thought must be vague at the first stage. At this stage, the phrases were designed so that a higher mark showed a less vague thought pattern. Based on Table 2, the mean score for this stage for the students of the Isfahan University of Medical science was 2.76 and the same mark was 3.07 for the students of University of Isfahan. Also the *t* test showed no meaningful difference between the two universities in this stage ($P > 0.05$).

According to Kuhlthau's model, the thought patterns of the second stage must be general and as a result, the phrases related to this stage were designed so that a higher mark showed a more general thought pattern. The mean score of students of Isfahan University of Medical Sciences for this stage was 3.31, whereas the Students of University of Isfahan had a mean score of 3.06. *t* Test showed no meaningful difference between the students of the two universities in this stage ($P > 0.05$).

The thought patterns in the third stage of Kuhlthau's model must be somewhat specific and the phrases were designed so that a higher mark showed a more specific thought pattern. In this stage the mean score was 3.04 for Isfahan University of Medical Sciences and 2.52 for University of Isfahan and *t* test showed no meaningful distinction between the students of the two universities ($P > 0.05$).

A person's thoughts in the fourth stage of Kuhlthau's model must be more specific compared to the third stage. In this stage the mean score for the Isfahan University of Medical Sciences and University of Isfahan were 3.62 and 2.92, respectively, and the *t* test showed no meaningful distinction between the students of the two universities ($P > 0.05$).

The thoughts of the fifth stage must be more specific, stronger, and more developed. The mean scores of this stage were 3.17 and 3.30 for Isfahan University of Medical Sciences and University of Isfahan, respectively, and no meaningful distinction was observed between the two ($P > 0.05$).

The thought on the sixth and last stage must be clearer and more precise. In this stage the mean score was 3.18 for Isfahan University of Medical Sciences and 3.52 for University of Isfahan and *t* test showed no meaningful distinction between the two universities ($P > 0.05$).

Table 3 shows that the mean score for the action domain for students in University of Isfahan (3.72) is higher compared with students of Isfahan University of Medical Sciences (3.24) and that according to the *t* test, a meaningful distinction exists between the two universities ($P < 0.05$).

Table 4 shows that there is a meaningful relationship between the mean score of emotion of the students and gender in total and in the fourth stage ($P < 0.05$). In other stages the mean score for male and female students was close and above the middle value (mark 3). Also *t* test showed that no meaningful relationship exists between the mean score of the thoughts domain and the gender of the students ($P > 0.05$).

Pearson's correlation was used in order to investigate the relationship between age and different stages of Kuhlthau's model. As shown in Table 5, the only meaningful relationship with age exists in the third stage of the emotions domain of Kuhlthau's model ($P < 0.05$), whereas other stages of this domain or in thoughts or actions domain have no meaningful relationship with the age ($P > 0.05$).

DISCUSSION

The results of the current study show that the postgraduate students of Isfahan University of Medical Sciences and University of Isfahan used the information-seeking model of Kuhlthau with changes in the order of its stages and showed emotions, thought, and actions almost similar to what was expected from each stage. The different order of stages in using Kuhlthau's model has been seen in a number of previous studies, such as the studies by Ghazi Dezfily;^[5] Narmenji and Nowkarizi;^[4] Bigdeli *et al*.^[2] in Iran and studies by Burdick^[8], Swain^[9], Shamo^[10], and Whitmire^[11] in other countries.

The information-seeking behavior of the students of Isfahan University of Medical Sciences matched the Kuhlthau's model in all stages, except the first emotion stage (uncertainty) and the sixth stage of thought (very precise). In the first stage in emotion domain, the students of Isfahan University of Medical Sciences showed above mean score certainty at the

Table 2: Meaningfulness test for the difference related to thoughts domain of Kuhlthau's model's stages in students of Isfahan University of Medical Sciences and University of Isfahan

Kuhlthau's model's stages	Isfahan University of Medical Sciences		University of Isfahan		P value
	Mean score	Standard deviation	Mean score	Standard deviation	
First stage (beginning)	2.76	0.97	3.07	0.90	0.08
Second Stage (topic selection)	3.31	0.94	3.06	0.92	0.90
Third stage (data investigation)	3.04	0.51	2.52	0.71	0.11
Fourth stage (topic specification)	3.62	0.76	2.92	1.02	0.33
Fifth stage (data collection)	3.17	0.92	3.30	0.91	0.41
Sixth stage (writing dissertation)	3.18	0.89	3.52	0.55	0.37
Total	3.18	0.05	3.06	0.05	0.13

Table 3: Meaningfulness test for the difference related to action domain of Kuhlthau's model's stages (sum of all stages) in students of Isfahan University of Medical Sciences and University of Isfahan

Mean score of all Kuhlthau's model's stages	Isfahan University of Medical Sciences		University of Isfahan		P value
	Mean score	Standard deviation	Mean score	Standard deviation	
	3.24	1.36	3.72	1.42	0.017

Table 4: Meaningfulness test for the difference between domains and stages of Kuhlthau’s model for male and female students

Kuhlthau’s model’s domains	Kuhlthau’s model’s stages	Male		Female		P value
		Mean score	Standard deviation	Mean score	Standard deviation	
Emotions	First stage (beginning)	3.23	1.02	3.00	1.08	0.18
	Second stage (topic selection)	3.50	0.87	3.23	0.94	0.071
	Third stage (data investigation)	3.36	0.92	3.15	0.92	0.16
	Fourth stage (topic specification)	3.60	0.79	3.32	0.78	0.02
	Fifth stage (data collection)	3.78	0.71	3.54	0.80	0.06
	Sixth stage (writing dissertation)	3.30	0.88	3.25	0.82	0.70
	Total	3.34	0.66	3.25	0.64	0.04
Thoughts	First stage (beginning)	2.70	0.98	3.07	1.01	0.56
	Second Stage (topic selection)	3.50	0.87	3.06	0.94	0.07
	Third stage (data investigation)	3.04	0.64	2.52	0.49	0.32
	Fourth stage (topic specification)	3.65	0.79	2.92	0.71	0.35
	Fifth stage (data collection)	3.15	0.91	3.30	0.91	0.74
	Sixth stage (writing dissertation)	3.25	0.85	3.52	0.93	0.26
	Total	3.21	0.54	3.09	0.55	0.15
Actions	Sum of all stages	3.47	1.43	3.48	1.4	0.94

Table 5: Meaningfulness test for the difference between domains and stages of Kuhlthau’s model and the age of the students

Kuhlthau’s model’s domains	Kuhlthau’s model’s stages	Age	
		Pearson’s correlation	P value
Emotions	First stage (beginning)	-0.04	0.56
	Second stage (topic selection)	-0.12	0.08
	Third stage (data investigation)	-0.17	0.01
	Fourth stage (topic specification)	-0.001	0.98
	Fifth stage (data collection)	-0.04	0.56
	Sixth stage (writing dissertation)	-0.04	0.51
	Total	-0.09	0.16
Thoughts	First stage (beginning)	-0.03	0.62
	Second stage (topic selection)	-0.12	0.08
	Third stage (data investigation)	-0.11	0.10
	Fourth stage (topic specification)	-0.04	0.55
	Fifth stage (data collection)	-0.1	0.14
	Sixth stage (writing dissertation)	-0.1	0.14
	Total	-0.09	0.19
Actions	Sum of all stages	-0.04	0.54

start of their work, which does not match the Kuhlthau’s model but agrees with the studies conducted by Ghazi Dezfily^[5] and Narmenji and Nowkarizi.^[4] The reason behind this difference can be found in the questions in the actions section. Because most students were familiar with the topic of their dissertation beforehand, their certainty at the beginning of their work was higher than mean score. Also in the sixth stage of thought domain (very precise), the students had more than mean score doubts, which disagrees with the studies of Ghazi Dezfily^[5] as well as Narmenji and Nowkarizi.^[6]

Except the sixth stage of emotions domain (satisfaction), and third and fifth stages of thought domain (specific and strengthening) the information-seeking behavior of the students of University of Isfahan matched that of Kuhlthau’s

model. According to Kuhlthau’s model, one should expect a sense of satisfaction at the last stage, whereas the students of University of Isfahan acted opposite to this pattern, which agrees with the studies by Ghazi Dezfily,^[5] Shamo,^[10] and Whitmire but disagrees with the results presented by Narmenji and Nowkarizi.^[4] Also based on Kuhlthau’s model the thought patterns in the third stage must be somewhat specific but the students in the University of Isfahan showed above mean score specific thought patterns, which does not match Kuhlthau’s model. Also based on the same model, at the fifth stage the thoughts must become more specific and develop but the thought mark of the students in this stage was decreased, which does not match the model. This is in agreement with the studies by Narmenji and Nowkarizi^[4] but was not mentioned in other studies. The reason behind this difference is the difference in questionnaire.

According to the findings of the current study, the difference between the thoughts and emotions in some of the stages of Kuhlthau’s model between the students of the two universities had caused the actions of the students to also show meaningful distinctions.

About the relationship between gender and Kuhlthau’s model, it was found that there is a meaningful distinction between male and female students in the fourth stage of the emotion domain and in the emotion domain in total but no meaningful distinction was observed in other stages or in other domains. The effect of gender on the information-seeking behavior of Kuhlthau’s model was mentioned in the studies by Ghazi Dezfily^[5], Shamo^[10], and Burdick. The relationship between the age and information-seeking behavior of the students shows that there is a meaningful connection between the third stage of emotion domain and the age of the students, which was not investigated in any of the previous studies. The emotion of the third stage is doubt and the results show that the doubt decreases with the increase of age.

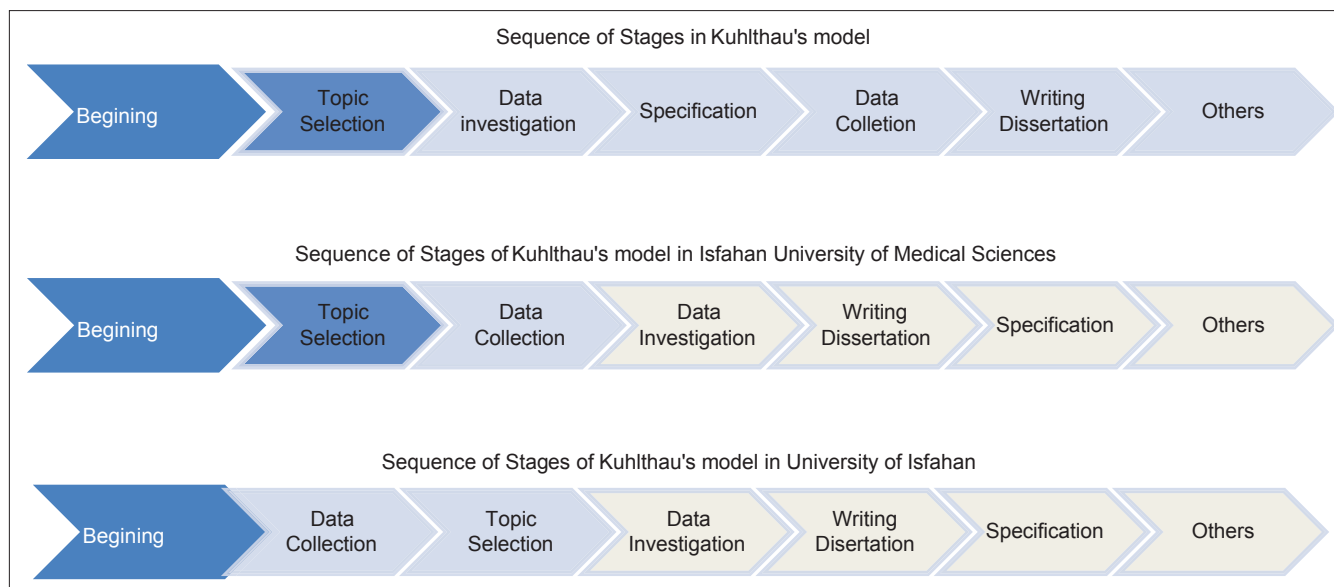


Figure 1: The model of information seeking in Kuhlthau's model and information-seeking models identified in Isfahan University of Medical Sciences and University of Isfahan

CONCLUSION

The results showed that the students of Isfahan University of Medical Sciences follow 20% of the sequences of the stages of Kuhlthau's model and the students of University of Isfahan did not follow this sequence at all. Figure 1 shows the information-seeking process in Kuhlthau's model and the two universities investigated in this study.

As can be seen in Figure 1, the expected logical sequence of the stages in information search process after topic selection, which involves data investigation, topic specification, data collection, and writing dissertation is not followed in either university. Figure 1 also shows that the last three stages of the procedure are similar in both the universities, although the logical sequence of the stages is not followed. Little to no overlap with the sequence of stages in Kuhlthau's model can be due to limited knowledge of the students about the basic principles of information seeking.

Because Kuhlthau's model was designed based on human emotions and thoughts, it was expected for variables such as age or gender to effect the students' information-seeking behaviors and the results also showed that in total emotion's domain and in its fourth level (increased certainty) a meaningful difference between male and female students exists. In other words, male students make the topic more specific compared with female students in the fourth stage and as a result their certainty shows a meaningful difference compared with female students. Also the third stage of emotion domain (uncertainty) is inversely proportional to the age of the students and with the increase of age, students show less uncertainty in information seeking.

Useful suggestions

According to the results of this study it is proposed that

1. Training workshops must be held to familiarize the librarians and information technology experts of both the universities with basics of information seeking behavior in order for them to help postgraduate students in information-seeking process and during writing their dissertation
2. Workshops should be held for the students of both the universities in order to teach them the principles of information seeking
3. The students should be suitably informed of the fundamental role of librarians and information experts in teaching the ways of information seeking and in encouraging the students to use the help of librarians and information experts in writing their dissertations.

REFERENCES

1. Parvini Z, Jalali Dizaji A. A Survey of information seeking behaviors of PostGraduate Students of Razi Universities in the World Wide Web Environment. *Research on Information Science and Public Libraries*. Q J Epistemol 2010;3:17-32.
2. Bigdeli Z, Farajpahlou A, Ghazizadeh H. A Comparison of internet searching process with Kuhlthau model among PostGraduate students of Shahid Chamran University. *Libr Inf Sci* 2011;14:11-4.
3. Kuhlthau CC. Inside the Search Process: Information Seeking from the Users Pers Pective. *J Am Soc Inf Sci* 1991;5:361-71.
4. Narmenji M, Nowkarizi M. An Investigation on Information Seeking Behaviors of Graduate Students in Birjand and Ferdowsi Universities on the basis of Kuhlthau Model of Information Search Process. *J Inf Sci Technol* 2010;1:145-66.
5. Ghazi Dezfuly S. comparison of information Search the Internet search process Islamic Azad University engineering students by information Search process Carroll Kuhlthau [MS Dissertation]. Ahvaz: Univ. Islamic Azad University, Science and Research Branch; Islamic Azad University Press 2009.
6. Ghazi Dezfuly S. Search information on the Internet by computer field students and compare it with Model Kuhlthau. *National studies on librarianship and information organization* 2010;4:102-20.

7. Friel LD. The Information Research Process with Low-Achieving Freshmen using Kuhlthau's six-stage model and the interventions that facilitate the process [Doctoral Dissertation]. Massachusetts: Univ. Massachusetts Lowell; 1995.
8. Burdick T. Gender in Information Search Process: An Exploratory Study of Students Experience [Doctoral Dissertation]. Florida: Univ. The State of Florida; 1995.
9. Swain DE. Information Search Process Model: How Freshmen Begin Research. Proceedings of the ASIA Annual Meeting, 1996: 95-99.
10. Shamo E. University Students and the Internet: Information Seeking study. [Doctoral Dissertation]. Texas, United States: University of North Texas; 2001.
11. Whitmire E. Epistemological beliefs and the information-seeking behavior of undergraduates. *Libr Inf Sci Res* 2003;2:127-42.
12. Maschi T, Probst B, Bradley C. Mapping Social Work Students' Perceptions of the Research Process: A Qualitative Follow-Up Study. *Journal of Baccalaureate Social Work* 2009;2:63-77.
13. Luo MM, Nahl D, Chea S. Uncertainty, Affect, and Information Search. Proceedings of 44th System Sciences (HICSS); Hawaii: Proceedings, 4-7 Jan 2011, Koloa, Kauai, HI, USA.
14. Moskina V. Information Seeking Behaviour of National Minorities' Secondary School Students for Scientific Research Purposes. Proceedings of 79th IFLA World Library and Information Congress; 2013 August 17-23, Singapore.

Source of Support: Health Information Technology Research Center,
Conflict of Interest: None declared