Original Article

Effect of information literacy training course on information literacy skills of undergraduate students of Isfahan University of Medical Sciences based on ACRL standards

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ABSTRACT

Background: Information literacy is the basis for lifelong learning. Information literacy skills, especially for student in an environment that is full of information from multiple technologies are being developed is equally important. Information literacy is a set of cognitive and practical skills and like any other science, proper training is needed, and standard-based education is definitely better and evaluation would be easier. This study aimed to determine the impact of information literacy training course on information literacy skills of Isfahan University of Medical Sciences students based on ACRL standard in 2012. **Materials and Methods:** The study method is semi-experience with two group design (with pre-test and post-test) and applied. The data collection toll was a questionnaire assessing student's information literacy that developed by Davarpanah and Siamak and validity was confirmed by professional librarians and reliability as measured by Cronbach's alpha, was 0.83. The sample consisted of 50 undergraduate students from Isfahan University of Medical Sciences that by random sampling method was perch in both case and control groups. Before and after the training (once a week), a questionnaire was distributed between the two groups. This training was held in a classroom equipped with computers with internet access and in addition to training using brochures and librarian presentation, interactive methods such as discussion and exercises were used. The data were analyzed using SPSS version 20 software and two level of descriptive (mean and SD) and inferential statistics (*t*-test and t-paired). **Results:** The results showed that the students' information literacy scores before the training was lower than average, so that in the control group was 32.96 and in the case group was 33.24; while information literacy scores in the case group significantly increased after the training (46.68). Also, the effect of education, respectively had a greater impact on the ability to access information (the second standard), ethics and legal use of information (the third standard), effective use of information (the fourth standard), critically evaluate information and its sources (the fifth standard). **Conclusion:** This study showed that the training was effective on enhancing students' information literacy skills as the greatest impact was on increasing

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the ability to access information. Due to low mean score information literacy in the context of object recognition, there is a need for more training in this area.

Key words: ACRL Standards, information literacy, Isfahan University of Medical Sciences, training course, undergraduate students

INTRODUCTION

Information literacy is the basis of lifelong learning. This type of literacy is common for all courses, learning environments as well as all educational levels. Information literacy is an intellectual framework for understanding, finding, evaluating and using information, namely the activities that some parts of them meet by the conversancy in IT, other parts by deep research methods, but most of all with reasoning and critical scrutiny.[1]

Regarding to the definition of information literacy, it can be said that the information literacy is a skill, a skill that enables a person to recognize the need for information, and found it to be used effectively.[2] According to the definition provided by the America Library Association (ALA), information literate is a person who has the ability to recognize the need to the information and can locate, evaluate and use the needed information effectively and begin learning how to learn. Such a person knows the way of organizing information, so that others can learn from him/her. Such a person is ready for lifelong learning because he/she can always find his/her needed information on any task or decision.[3] Therefore, information literacy enables learners to dominate the information content and expand their searches, enhance their directions as well as gain greater control over their learning.[1]

In an information society, access to information regard as an inalienable right for life improvement and the ability to acquire the specific information to meet a wide range of personal and business requirements considered as the main needs of this age. Therefore, the new generation of the students needs more information to broaden their ideas and the basis of their knowledge; and the growth of the knowledge would not be possible by teaching information literacy skills.[4]

Lifelong learning is a prerequisite for continued existence in today's society and the key to lifelong learning is the information literacy. They all need to learn information literacy; due to rapid development in the information environment, it is necessary to know some essential skills. For each member of the community who can benefit from the information in their personal and professional lives, information literacy is a basic require for everyone, especially students.[5] Information literacy is more than a tool to empower students; it considers as a life and forever skill of the twenty-first century. As the students live in an environment full of multiple-information and technology is developing rapidly, information literacy regards as an important issue. In addition, observing the rapid aging of the knowledge, students need the information literacy skills to be able to access, understand and benefit from their up-to-date knowledge.[4] In summary, student with

information literacy is a dynamic individual that not only during train but also in all areas of life is able to solve their personal and social needs by basic using of information search skills.[6] One of the desired outcomes of higher education is access to information literacy. If the Individuals achieve this issue, they will be intelligently able to evolve in all process of their life and collaborate as an informed citizen.[7] About information literacy, a variety of research has been done in Iran and other countries. Including:

Parirokh conducted a research entitled "Measuring effectiveness of information literacy workshops." The results showed that almost all the students need information literacy skills and there was a significant difference between information literacy skills before and after participation in the workshop. The results also showed that the workshop and the methods used to teach information literacy was effective and useful, but more training needs to identify the information requirements of the students and their ability to turn it into an understandable question.[8]

Tabib Nia carried out a research entitled "Evaluation of information literacy of graduate students in Alameh Tabatabaei University." Results showed that information literacy of graduate students in this school was above average; there was a significant difference between students' information literacy and library use as well as the information literacy of graduate and postgraduate students.[9]

Beranvand and his colleagues did a research entitled "Evaluation of performance impact library training programs on ability to use the library in graduate students in Science and Research Unit of Islamic Azad University. Findings showed that over 60% of the students have not sufficient familiarity to use library resources at the university entrance. The study population was not able to take advantage of the resources before training in the use of libraries, and provided training was useful in this regard.[10]

Hassanzadeh and Asadi performed a research by title "Evaluating of Training Information Literacy on Academic Performance". Results showed that there was a significant difference between academic performance of test and control groups. Between the ability to detect and determine the information needs of both groups, there was also a significant difference. There was a statistically significant difference between creation and placement capabilities in terms of access to information. Between the effective and responsible use of information regarding the capabilities and use of information resources in libraries, there was significant difference between the two groups.[11]

Pandpazir and Cheshmehsohrabi in their study entitled "Evaluating of information literacy in Kermanshah University of Medical Sciences graduate students based on the six great skills Eisenberg and Berkowitz "showed that level of information literacy of university graduate students was above average.[12]

Parirokh, Arastoopoor and Naderi, carried out a research entitled "Effectiveness information literacy workshop for graduate students in context-oriented approach." Findings revealed that though in pre-test stage, the first group indicated that they had no adequate understanding of the concepts of information literacy, but both groups at post-test stage understood concepts and replied related answers to the questions. Outcomes of post-test stage also indicated that they all were satisfied of the workshop content and found how to limit the scope of the topic and use the information in the study.[13]

Mohammadi, Shakeri and Akbari-Darian, conducted a study entitled "Assess the Level of Information Literacy of Visitors to the National Library and Archives of Iran Based on ACRL Standards." Results showed that subjects were very much out of information literacy. In addition, among the five levels of information literacy, ethical issues related to research and identification of information literacy need had the highest and lowest points, respectively.[3]

Siamak, Alipur-Nodushan and Khaleghi in their research entitled" Assessment of information literacy Qom University of Medical Sciences Students" showed that the mean score of students' information literacy was low and there was no significant difference between information literacy level and examined variables such as gender and students' scientific output.[14]

In a study entitled "Information Literacy Education in University" Flaspohler selected a sample from two groups of first-year students. The results of the study showed that although students have adequate computer literacy, but certainly they are not fully information literate.

Well as a large number of students in their studies cited to low content sites and journal articles. He also mentioned that the collaboration of the library and university is fundamental for information literacy education.[15]

Wema and Hepworth conducted a research by title of "The evaluation of an information literacy training course at Dar Es Salaam." This study examined the effects of various parameters on information literacy of the final-year students of University of Dar Es Salaam, Tanzania. Findings showed that students have collected information from a variety of meetings and conferences which have been orally and video. These methods help students' critical science, problem solving skills, direct learning skills and teamwork skills. Results of this study demonstrate the success of the program through the essential skills of information literacy and information technology by the learners.[16]

Jorosi carried out a study entitled "Information literacy skills in community junior secondary schools in Gaborone, Botswana". Results revealed that respondents had differing interpretations of information literacy education training. In his view, the main approach to information literacy training is bibliographic instruction as well as the use of the English language. Well most of them insisted on teaching information literacy skills.[17] Jill and Aliki in the study titled "Integrating evidence-based practice and information literacy skills in teaching physical and occupational therapy students" examined the level of students' information literacy skills. Results showed that the best method is to increase information literacy skills through education and almost all students agreed with this. Well as the collaboration of librarians and faculty members was highly effective in improving outcomes.[18] Lalor, Clarke and Sheaf did a research entitled "An evaluation of the effectiveness of information literacy training for undergraduate midwives to improve their ability to access evidence for practice. In this research, mainly discussion was on the results of the students' search strategy to the answer of the questions before and after holding a 16-hour training course. Results showed that information literacy training improved search function and enhanced information literacy skill in the study population.[19] Kratochvil conducted a study entitled "Evaluation of e-learning course, information literacy, for medical students" Results showed that students were satisfied with e-learning course and stated that course issues like electronic search methods on websites have helped them to speed up the learning as well as interactive learning.[20]

Despite the importance of information literacy, the evidence showed that students with no sufficient information literacy are good to learn some lessons. On the other hand, the most investigations in the field of information literacy only examined this issue and have conducted in survey research method; and the impact of information literacy skills has received little attention. While the most important way to convey the appropriate skills in using information and empower people to live in an information society is training information literacy and information literacy should be part of the educational experience of each individual. Therefore, the present study is important because of being deal with information literacy training. In addition, information literacy is not restricted only to the field of LIS but includes all theoretical and applied areas that always call for information and knowledge; and their skills and abilities should be developed in the area of information literacy.

So, the study aimed to identify the effect of information literacy training course on information literacy skills of undergraduate students of Isfahan University of Medical Sciences based on ACRL standard.

The mentioned standard is an international standard that has been prepared according to the general abilities of students in different countries and currently is being used in various universities. Thus, information literacy of Iranian students

can be assess according to this standard regarding to the five general capabilities and skills expected at the International level.[1]

In order to achieve the research objectives, the following hypotheses were discussed:
- The mean score of information literacy in undergraduate students at Isfahan University of Medical Sciences before holding the course in the control and experimental groups is the same
- The mean score of information literacy in undergraduate students at Isfahan University of Medical Sciences after holding the course in the control and experimental groups is different
- The mean score of information literacy in undergraduate students at Isfahan University of Medical Sciences before and after holding the course in each standards of information literacy in both control and experimental groups show a significant difference.

MATERIALS AND METHODS

The study used quasi Experimental (Semi-empirical) and applied method and data collection tool was questionnaire of measurement of students' information literacy -DAS- (Davarpanah and Siamak) that was gathered by Davarpanah and Siamak in 2008 based on ACRL standard. Reliability of the questionnaire was confirmed by librarians and information professionals and alpha cronbach level was 0.83. Questionnaire was closed and different options were provided following each question to the students to choose their desired response. Questionnaire had 55 questions based on outcome measurements listed below each functional indicators of the standard. In order to condense the questionnaire content, some concepts of the outcome measurements were presented jointly in form of one question and some outcomes had no designed questions. So that six questions were belong to the first standard, 22 questions were about the second standard, 8 questions to the third standard, and 9 and 10 questions were belong to the fourth and fifth standards, respectively. The study population was consisted of undergraduate students of Isfahan University of Medical Sciences who were studying during 2012 and they were 2005 members that among them 50 individual (25 experimental and 25 control) were selected using the formula $n = (Z_1 + Z_2)^2 (2S^2)/d^2$.

To collect the sample, firstly it was called to participate in the study and training information literacy course at the university, then from registered students the sample was selected and were randomly assigned into two groups of control and experiment.

The two-group study (pre-test, post-test) was performed, initially, the pre-tested questionnaire was distributed among the participants, then the information literacy education courses was hold at the School of Management and Medical Information of Isfahan University of Medical Sciences in classroom equipped with computer systems. Course content

was based on ACRL standard. In this course, in addition to the required teaching curriculum such as brochures and professional librarian's lecture, more interactional ways like discussion, question-answer and exercises based on the information needs of students can also be used. A week after training session, questionnaire was again distributed among students of experimental group. Regarding the number of the questions and their related options, the total score for an information literate student will be 87. The statistics were descriptive (mean and standard deviation) and inferential statistics (independent and pair t test), and finally the data were analyzed using SPSS version 20 [IBM Corp.: Armonk, NY].

RESULTS

The study sample was 50 undergraduate students from Isfahan University of Medical Sciences. Among the 25 participants in both the experimental and control group, 5 individuals were male (20 percent) and 20 females (80 percent), and the two groups were quite similar in terms of gender.

According to Table 1, related to the mean score of students' information literacy before and after training session in two groups, independent t test revealed that before the training of information literacy, the average score of students› information literacy in both experimental and control groups showed no significant difference ($P = 0.86$); while after holding the training, the mean score of the students› information literacy in the experimental group was significantly higher than the control group [Table 1] ($P < 0.001$).

Pair t test showed that the mean score of students› information literacy in the control group before (32.96) and after (33.24) training session was not statistically different ($P = 0.2$), while in the experimental group, the mean score of students› information literacy after training session increased significantly (43.68) [Table 1] ($P < 0.001$).

Also, according to the data in Table 2, the independent t test revealed that before the training session, the mean score of information literacy on each of the standards of information literacy had no significant differences in two groups; while pair t test showed that after the training session, the mean score of students› information literacy in experimental

Table 1: The mean and standard deviation scores of students' information literacy in the two groups before and after the training session					
Group	**Before the training session**		**After the training session**		***P* value (*t*-test)**
	Average	**Standard deviation**	**Average**	**Standard deviation**	
Control	32.96	6.08	33.24	6.26	0.2
Test	33.24	5.03	43.68	8.48	>0.001
P value (Independent *t*-test)	0.86		>0.001		

Table 2: Means and standard deviations of students' information literacy for each of the standards of ACRL before and after the training session

Standards	Before the training session		After the training session		P value (pair *t* test)
	Average	**Standard deviation**	**Average**	**Standard deviation**	
The first standard (identifying the need for information and determines the nature of the issue)					
Controls	2.79	1.12	2.84	1.17	0.425
Experimental	2.9	1.13	4.72	1.81	<0.001
P value (independent *t* test)	0.709		<0.001		
The second standard (the ability to access information)					
Controls	13.96	3.19	13.88	3.04	0.43
Experimental	13.76	3.23	17.68	3.8	<0.001
P value (independent *t* test)	0.827		<0.001		
The third standard (critically evaluating information and its sources)					
Controls	5.24	2.14	5.28	2.05	0.664
Experimental	5.08	1.14	7.32	1.88	<0.001
P value (independent *t* test)	0.757		<0.001		
The fourth standard (effective use of information)					
Controls	7.6	2.5	7.72	2.5	0.185
Experimental	7.68	2.47	10.4	2.27	<0.001
P value (independent *t* test)	0.91		<0.001		
The fifth standard (ethics and legal use of information)					
Controls	3.4	1.52	3.52	1.44	0.2
Experimental	3.84	2.26	6.56	2.02	<0.001
P value (independent *t* test)	0.86		<0.001		

ACRL=Association of College and Research Libraries

group (first standard: 4.72, the second standard: 17.68, third standard: 7.32, fourth standard: 10.4, fifth standard: 6.56) was significantly higher than the control group (first standard: 2.84, the second standard: 13.88, third standard: 5.28, fourth standard: 7.72, fifth standard: 3.52) ($P < 0.001$).

The paired *t* test showed that the average score of students in information literacy, information literacy standards for each of the control group had no significant difference before and after each training session, while the average score of information literacy in the experimental group, was significantly increased in each standards of information literacy after the workshop [Table 2].

Accordingly, training respectively influenced on the second standard (the ability to access information) with a mean increase of 13.76 to 17.68; fifth standard (ethics and legal use of information), with a mean increase of 3.84 to 6.56; fourth standard (effective use of information) with a mean increase of 7.68 to 10.4; third standard (critically evaluating information and its sources) increased from a mean of 5.08 to 7.32 and finally the first standard (identifying the need for information and determines the nature of the issue) with a mean increase from 2.9 to 4.72.

DISCUSSION

Information literacy as a necessity in these days equip people with the skills of diagnosis the need to the information, identification of information needs, location, evaluation

and use information effectively and responsibly, mostly ensures living in this era.[21] Promoting information literacy is a pedagogical strategy that can effectively struggle with the formula and cliché attitudes of the individuals and develop critical thinking in them so that, it help them to solve the problems, decision making as well as creative thinking.[22] Since information literacy pay attention to the individual's abilities, it is considered as a response to the needs of the information society, the ultimate goal of any information literacy program is not only training, but also changing a training receiver to an active learner and strengthening the skills of lifelong learning.[23] This study focused on the impact of information literacy training on the students' information literacy skills. The results of the first hypothesis confirmation showed that the mean score of students' information literacy was lower than average before training session and the significant difference was not observed between mean scores of students in information literacy before training courses. The second hypothesis also showed that the mean score of the information literacy in the students in the experimental group after course was significantly more than the control group. Results in this section were aligned with Parirokh's findings that showed almost all the students' have not adequate information literacy, and no significant difference was seen between information literacy skills of students before participating in the workshop. In addition, the results by Siamak, Alipur-Nodushan and Khaleghi[3] and Wema and Hepworth[15] that also examined the level of students' information literacy in survey research method showed that that students' information literacy is not in desirable

level and is consistent with the results of this study. The results of Beyranvand and colleagues,[10] Hassanzadeh and Asadi,[11] Parirokh, Arastoopoor and Naderi,[12] Flaspohler,[14] Jorosi,[16] Jill and Aliki,[17] Lalor, Clarke and Sheaf,[18] and Kratochvil[19] that was in empirical and semi-empirical methods and through workshops compare and assess the students' information literacy have indicated that the average of students' information literacy was not in desirable level and before holding the course the students' information literacy was not sufficient, the results of the present study was align to above mentioned findings. While TabibNia,[9] Pandpazir and Cheshmehsohrabi[23] and Mohammad, Shakeri and Akbari Darian[13] showed that information literacy of students was a higher than average level that is not consistent with the obtained results.

Results of the third hypothesis confirmation showed that before holding the training course, the average of students' information literacy in each area of information literacy standards was not significantly different in two groups, whereas the mean of information literacy in students in the experimental group was significantly increased after holding the course, and significant difference between the average of information literacy score before and after was the training session was seen. Findings in this section, was aligned with the results of Parirokh,[8] Beyranvand and colleagues,[10] Parirokh, Arastoopoor and Naderi,[12] Hassanzadeh and Asadi,[11] Lalor, Clarke and Sheaf[18] and Kratochvil,[19] that showed a significant difference between the students' information literacy skills before and after participating in the workshop.

The results of the third hypothesis also indicated that the training was effective in increasing students' information literacy skills, so that the greatest impact was on increasing students' ability to access the information (second standard) and the least effect on students' ability in detect the need for information and the nature of the subject (the first standard). Findings in this section did not align with the results of Pandpazir and Cheshmehsohrabi.[23] The results of Pandpazir and Cheshmehsohrabi showed that the students have a favorable perception of their information need. Parirokh study[8] showed that the mean score of students in information literacy in field of recognizing the need to information is lower than the average, and these results were coordinated with the present study. Mohammadi, Shakeri and Akbari Darian Rayyan have also stated that among the five levels of information literacy the lowest rating is belong to the recognition of information need, that was coordinated with the present study findings. Lalor, Clarke and Sheaf[18] also stated that the training can improve the information search performance to achieve the needed information and it was also aligned with the current study.

CONCLUSION

Regarding to the importance of information literacy and the necessity of having information literacy skills for student and noting that education has always been one of the best ways

to keep pace with the development and empowerment of the people and also the particular status of educational centers and universities and their role in producing a society with information literacy, it is essential for these centers to step effectively in this program by improving their educational programs and the inclusion of information literacy courses in the students' program because individuals due to various problems are not able to do self-training alone i.e., information literacy is the set of cognitive and practical skills, and like any other science and skill should be taught. No doubt, information literacy training based on standards would be very useful. On the other hand, applying librarians in the teaching of this important will lead to better results, because of their proficiency in the field of information and their skill to access, organize and evaluate it as well as knowing the ethical principles to access and use the information and generally they themselves considered to be information literate; so they can be used to teach information literacy.

Given that in the field of information literacy, despite the extensive conducted research in this field, our country is lower in comparison with developed countries, and information literacy score of Iranian students has a considerable distance with even half of the standard information literacy score, macro planning and long-term program should be performed to teach this issue. The hope is to remove the scientific gap between Iran and developed countries in the near future by precise planning in this area.

The study revealed that the training has a key role in promoting information literacy skills of the students and it seems that they have less information literacy in the first stages of their research i.e identifying the need for information and determines the nature of the issue. Thus citing the results of this study and other research conducted in the area of information literacy it can be inferred that training in these areas is essential and if the information literacy training workshop be held regularly basis or be included in the students' curriculum, students' information literacy skills will be increased and they will be lifelong learners who would be involved in society progress.

SUGGESTIONS

- Holding information literacy workshops in collaboration with librarians and faculty members for Students with different courses based on the needs of variety of topics
- Adding a course titled "Information literacy training" for students with different courses.

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Conflicts of interest

There are no conflicts of interest.

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