

Information Literacy and Use of Information Technology by Students in Shahrekord University of Medical Sciences

Nasrin Foruzandeh,^{1,*} Masoumeh Delaram,² Fatemeh Deris,³ Marziyeh Foruzandeh,⁴ and Somayeh

Darakhshandeh⁴

¹MSc, Department of Psychiatric Nursing, School of Nursing and Midwifery, Shahrekord University of Medical Sciences, Shahrekord IR Iran

²MSc, Assistant Professor, Department of Midwifery, School of Nursing and Midwifery, Shahrekord University of Medical Sciences, Shahrekord, IR Iran

³MSc, Department of Statistics and Epidemiology, School of Medicine, Shahrekord University of Medical Sciences, Shahrekord, IR Iran

⁴BSc, Midwifery Dept., Shahrekord University of Medical Sciences, Shahrekord, IR Iran

*Corresponding author: Nasrin Foruzandeh, MSc, Department of Psychiatric Nursing, School of Nursing and Midwifery, Shahrekord University of Medical Sciences, Shahrekord IR Iran, E-mail: nas_for@yahoo.com

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Abstract

Introduction: Nowadays, students of medical universities need to be familiar with computer and information technology (IT) to become successful. The aim of this study was to investigate the information literacy and the use of IT by students in Shahrekord University of Medical Sciences.

Methods: This survey is a descriptive-correlational study. The study population consisted of all students of the Shahrekord University of Medical Sciences and the sample size included 235 students. The instrument was a researcher-developed questionnaire with a validity confirmed by faculty members and a 0.83 reliability according to Cronbach's alpha. For data analysis, Pearson's correlation coefficient and Chi-square in SPSS 16 were used.

Results: The results revealed the frequency use of IT domains; Internet obtained the most frequently used domain (67.2%) followed by Windows (54.1%), word processing software (43.8%), search engines (41.1%), and e-mail (30.5%). The highest mastery was obtained over Internet use (58.6%) followed by Windows and word processing software (48.3%), search engines (34.4%), and software installation (31.4%). The use of IT was significantly associated with previous research activities such as having PC, the skill to use computers and Internet, the mean duration of computer use per week, and English language competency ($P < 0.05$).

Conclusions: The students' mastery over the use of IT is weak in the Shahrekord University of Medical Sciences, and certain plans are needed to educate these students by holding workshops, empowering them to do research, and revisiting the curricula to increase the credits of IT course.

Keywords: Students, Medical University, Information Literacy, Information Technology

1. Introduction

Currently, healthcare is considered an important area for application of information technology (IT). Recently, a variety of computer information systems, electronic health records, and telemedicine have emerged in healthcare centers (1). As information communication and technology (ICT) is developing rapidly and electronic databases are increasingly expanding, knowledge about IT is needed for mastery of information literacy (2). Computer knowledge or literacy refers to the science and ability to use computers and IT. This literacy enables people to use computer-related software and competencies (3). The mastery over IT is based on the ability to use computers and Internet (4). Recent advances in educational technology have created new opportunities in medical education, teaching methodology, learning, and development and implementation of curricula. Therefore, ICT has become an integral component of medical education in universities (5). In-

deed, electronic and Internet-based teaching/learning is a highly promising and growing achievement of ICT. Certain factors such as lack of educational space, availability of adequate information, and limited time of professors and researchers have necessitated this achievement (6). Moreover, the medical science is a research-oriented science. Review of literature and use of databases are main tools of conducting research. Nowadays, information retrieval and scientific concepts are revolutionizing because of growing development of IT and access to local and international networks, and access to electronic databases is considered an important educational and research tool (7, 8). Therefore, students and academicians comprise a main population of Internet users. Students can be connected to the main site of university and search for required information, enroll in university, and communicate with the professors and students of other universities, and even attend online classes (9). However, the efficient

use of these technologies requires appropriate education of faculty members and students (10). In the recent years, the attention paid to the growing use of computers in education and research has considerably changed the perspectives of universities about the provision of computer facilities for students (11). Additionally, updated resources about different aspects of disease, disease control and diagnosis, management, treatment, and education of patients could be accessed via IT. Hospital's staff of the future need to be familiar with these technologies. Computer technology can assist staff in accessing, organizing, manipulating, and displaying information. Obviously, these advances affect the management of patients and education of healthcare staff (12, 13). Moreover, evidence-based medicine is currently being emphasized in healthcare systems. The evidence-based medicine has recently been addressed as an approach to healthcare based on the latest findings. The access to latest findings about diagnosis and treatment of diseases requires the information literacy skills (14, 15). According to the studies, most computer users, particularly healthcare professionals in developing countries, have little knowledge about the use of IT (16). The study of Zarei et al. (13) indicated that students were lowly familiar with computers (35%). Compared to the students' basic knowledge about computers, the students' highest and lowest knowledge was reported to be about the use of computer and management of files (48%) and the management of Windows operating system (19%), respectively. Regarding the management of Microsoft Office, the highest and lowest familiarity was reported with PowerPoint (75%) and Access (9%), respectively. The familiarity rate of the students with Internet and Worldwide Web was reported to be 39%. Pouratashi and Rezvanfar (17) revealed that mastery over, support for, and ease of IT use were three important factors for students' use of IT. The mastery over IT use was the most important factor. Therefore, the students of medical universities need to be familiar with computers and IT probably for the following reasons:

Growing use of health information systems and planning for development of electronic health records in the near future, evidence-based medicine, and the need for accessing the latest medical findings via online databases.

1.2. Universities and Education Centers' Approach to E-Learning

In addition, many experts believe that given the development of IT across international community and the necessity of coordination with the growth pace of this technology in education centers of industrially developed and developing countries; development, codification, and implementation of IT development plan is essential in Iran's education system. Therefore, in the light of rapid growth

of IT use in medical sciences, the ability to use computers, namely computer literacy, has become very important to the students (18). To enable the students of medical sciences to use computers and IT in education and future professions, the knowledge about the students' computer literacy and interest in learning IT is necessary. The aim of this study is to investigate the information literacy and use of IT by Medical Science students in Shahrekord University of Medical Sciences in the 2012 - 2013 academic sessions.

2. Methods

This is an applied, field, descriptive (correlating) study conducted to measure the effective factors on the use of IT by Medical Science students in Shahrekord University of Medical Sciences in 2012 - 2013. In all, 327 medical, nursing, health students, and student of Allied Medical Sciences were selected according to the relevant formula of sample size calculation which is proportionate to the number of students in each discipline, among these students, 235 provided consent to participate in the study. The inclusion criteria into the study were being the student of second and subsequent semesters and providing the consent to participate in the study. The exclusion criteria were being the student of the first semester, attending computer courses, and not providing the consent to participate in the study. The sample size was derived as 327 according to the formula below and the total number of study population ($n = 22000$), confidence level; 95%, criterion error; 96.1%, and population proportion (p and q); 0.5.

$$n = N \times z^2 pq \div (N - 1) \times d^2 + z^2 pq = 327$$

$$n = 2200 \times 1.96^2 \times 0.5 \times 0.5 / (2200 - 1) \times 0.05^2 + 1.96^2 \times 0.5 \times 0.5 = 327$$

The data were collected by a researcher-developed questionnaire consisting of two sections. One section was to gather the data on demographic characteristics including age, gender, and marital status. Another section included the questions about the rate of IT use and mastery over IT consisting of basic concepts of IT, the ability to manage operating system, word processing software, PowerPoint, spreadsheet, statistical software, and Internet.

This section consisted of 29 questions. To measure the variables under study, the indexes representative of IT use were used in six-point Likert scale (most frequently to least frequently). To validate the instrument, content validity was measured. For this, the comments of 10 faculty members and experts of IT and biostatistics were elicited to revise the instrument if necessary. The reliability of the instrument was derived as 0.83 by Cronbach's alpha. This reliability has already been reported as 0.79 - 0.95 (19). The questionnaires were administered to the students in classroom after the necessary approvals were obtained from the

relevant authorities, the purpose of the research was explained to the students, and the students provided the informed consent to participate in the study.

The data were analyzed by descriptive and analytical statistics in SPSS 16, including frequency distribution, median, mean, and standard deviation. To investigate the association of the mastery over IT and rate of IT use with demographic characteristics, Pearson's correlation coefficient and Chi-square were used.

3. Results

The response rate was 72.98% in this study. The mean age of the students was 21.34 ± 2.59 (range: 18 - 24) years, 73.8% were women and 62.2% of the students were single. The mean duration of the students' use of computers was derived as 6.42 ± 4.73 hours per day.

The results presented the frequency use of IT domains; the Internet was the most frequently used domain (67.2%), followed by Windows (54.1%), word processing software (43.8%), search engines (41.1%), and e-mail (30.5%). The least frequently used domains were statistical software; SAS (3.7%) and SPSS (5.5%), followed by Access (4.8%) (Table 1).

The results revealed that the highest mastery was obtained over Internet use (58.6%) followed by Windows and word processing software (48.3%), search engines (34.4%), and software installation (31.4%). The lowest mastery was obtained over SAS (2.3%), followed by Access (3.7%), SPSS (3.1%), and video conference (4.5%) (Table 2). Regarding English language competency, the highest competency was obtained for reading and writing (Figure 1).

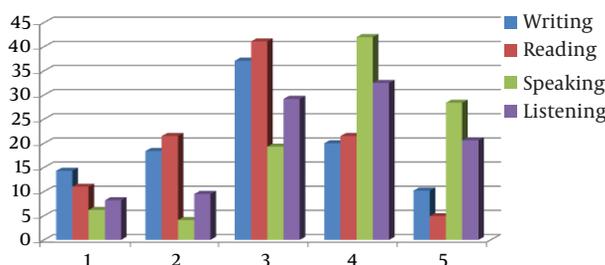


Figure 1. Frequency Distribution and Percentage of the Skill in English

According to Chi-square and Pearson's correlation coefficient, the use of IT was significantly associated with previous research activities, having PC, the skill to use computers and Internet, the mean duration of computer use per week, and English language competency ($P < 0.05$).

4. Discussion and Conclusions

The main purpose of this study was to investigate the information literacy and use of IT by medical science students in the Shahrekord University of Medical Sciences. Internet, Windows, word processing, and e-mail were the most frequently used IT domains, and the highest mastery was obtained over Internet use, Windows, word processing, search engines, and software installation. Seago et al. (20), in a 10-year study on medical students in a university in the USA, revealed that the students' highest computer-related knowledge was reported to be on Microsoft word (96% -100%) followed by the use of e-mail (74% -100%), computer games (96%), and searching for information (77% -95%).

A study by Hollander (21) reported the students' literacy of word processing software use to be 75% - 89%, and that the greatest mastery of the students was obtained over computer use followed by e-mail and searching for information via Internet. A study by Shaikh et al. (22) carried out in Islamabad, Pakistan reported the students' use of Internet to be 84.50%, and that 43.4% of the students searched for information about health. A study in Nigeria reported the students' literacy to be 50.6%, and that 60% of the students used word processing software (23).

A study by Jadoon et al. (24) carried out in Lahore, Pakistan revealed that 70.5% of the students used Internet while 34% derived skill by searching for articles indexed in PubMed. Ranasinghe et al. (25) study on the students in Colombo, Sri Lanka reported the use of word processing to be 95.6%, games and fun; 95%, search engines; 80.1%, PowerPoint; 76.8%, and Internet; 70.7%. Woreta's et al. (26) study on students in Ethiopia reported the information literacy to be 51% and the use of IT to be 46%. In addition, 47 and 39% of the students have never used electronic communications (e-mail and chat room) and word processing, respectively.

The inconsistency in the findings may be due to the difference in the students' access to computers or inadequacy of the IT courses offered in the universities. In addition, the students' more frequent use of Internet, Windows, word processing software, and e-mail could be explained by the need for these softwares to present better assignments and class projects. Moreover, the students' familiarity with searching for required materials using Internet was reported more frequently than other items. This is due to the students' need for new materials and accessing such materials easily through the Internet.

As IT is necessary to expand education in current communities, and education is mainly aimed at helping students with the required perspectives and skills to achieve the community's information, then the students are re-

Table 1. The Distribution of the Frequencies and Percentage of IT Usage^a

Items	Usage				
	Very low	Low	Middle	Much	Very much
Windows	27 (5.10)	29 (8.11)	57 (2.23)	71 (9.28)	62 (2.25)
Word	21 (6.8)	33 (5.13)	83 (0.34)	73 (9.29)	34 (9.13)
Power point	56 (0.23)	63 (9.25)	58 (9.23)	42 (3.17)	24 (9.9)
Excel	115 (4.50)	63 (6.27)	33 (5.14)	10 (4.4)	7 (3.1)
SPSS	145 (3.65)	39 (6.17)	26 (7.11)	3 (4.1)	9 (4.1)
SAS	170 (7.78)	28 (0.13)	10 (6.4)	2 (0.9)	6 8.2 ()
Access	148 (8.69)	33 (6.15)	21 (9.9)	5 (4.2)	5 (5.2)
Specialized software field	121 (8.55)	36 (6.16)	32 (7.14)	12 (5.5)	16 (4.7)
internet	17 (1.7)	18 (5.7)	44 (1.17)	74 (7.30)	88 (5.36)
chat	127 (8.53)	39 (16.5)	34 (14.4)	16 (8.6)	20 (5.8)
E-mail	81 (5.34)	40 (0.17)	39 (16.6)	38 (14.8)	37 (7.15)
Databases	94 (4.41)	33 (5.14)	38 (7.16)	31 (7.13)	31 (7.13)
Software packages	102 (9.45)	44 (8.19)	47 (2.21)	10 (6.8)	10 (4.5)
video conference	136 (0.61)	39 (5.17)	29 (0.13)	5 (2.2)	14 (3.6)
Search engines	80 (6.34)	26 (11.3)	30 (0.13)	45 (5.19)	50 (6.21)

^aValues are expressed as No. (%).

Table 2. The Distribution of the Frequencies and Percentage of Knowledge and Skills of IT

Items	Usage				
	Very low	Low	Middle	Much	Very Much

quired to be able to select appropriate tools needed for searching for information and enjoy appropriate strategies to access the required information rapidly (19, 27-30).

However, the frequent use of Internet and its use in education was lower than in other studies (31-35). This may be explained by lack of education and different problems of the students in relation to internet use as well as no access to online shared databases, no ability to search online shared databases including all databases such as updated databases. These could prevent the students from accessing Internet for learning and evidence-based medical education (31, 36). In addition, this study revealed that a small proportion of the students used electronic communications (e-mail or chat room). The number of these students was lower than that reported by the studies conducted in Nigeria (76.4%), University of Hadramout, Yemen (76.2%), and southern India (51%) (27, 37, 38). This may be attributed to the limited access to computers, the cost of Internet services, no Internet access, and inadequate education on the use of Internet.

Therefore, emphasis should be placed on ICT. ICT should be included in the universities curricula as an education, integrated subject for teaching and learning. Students should be required to acquire seven-fold computer skills, consisting of IT fundamentals, Windows, ICT (applied Internet), word processing, Access, and PowerPoint.

This study indicated that the students were adequately familiar with Internet and word processing and Windows software but not with other domains.

In this study, the students' use of IT was significantly associated with previous research activities, having PC, mastery over the use of computer and Internet, mean hours of computer use per week, English language competency, and environmental, technical, and economic factors. This is consistent with other similar studies (17, 39, 40).

These studies have also indicated that mastery over the use of computers and Internet is positively correlated with the use of IT. A possible explanation of this finding is that the Internet and computers offer the required tools to access research and educational resources, therefore univer-

sity students need computer-and Internet-related skills to access resources. Ranasinghe et al. (25) found that having a PC was an effective factor for the students' use of IT and computer literacy.

Mashhadi and Rezvanfar (19), Movahed and Iravani (39), and Pouratashi and Mokhtarnia (40) concluded that research activities and the number of scientific publications were associated with the use of IT, because Internet is a global resource being able to disseminate information to everywhere as rapidly and economically as possible by means of large research resources. Moreover, faculty members can communicate with their colleagues and, if necessary, receive information through Internet (40).

English language competency is significantly associated with the use of IT (17, 40, 41). This finding could be explained by many resources in English available in international databases. As a result, students' and teachers' English language competency is highly necessary.

Increasing growth of medical information, concurrent with advances of IT, highlights the knowledge and skills for using computers in medical science universities. In a study, the professionals of medical education reported that the knowledge and skills of using computer and scientific resources have not been promoted satisfactorily despite the fact that these facilities are adequately available. Moreover, they reported that the faculty members' and students' computer-related knowledge and skills should be addressed for efficient and comprehensive use of computers and Internet (42).

Therefore, in the light of the experiences of pioneering countries, universities' curricula can be fruitful if they are integrated into specialized education, such that this type of education is systematically incorporated into general education, learning, and assessment of goals and content of the course (43). Therefore, it is recommended to include at least a two-credit course of IT and introduction to database in universities' curricula.

Assessment of students' literacy regarding the use of IT has obviously revealed certain weaknesses and deficiencies. Students are not adequately familiar with and have not been educated regarding the methods of using search tools that are important for accessing databases in Worldwide Web. To achieve desirable and more accurate outcomes, we need to use available operators and search tools more widely.

Formal courses can enable students carry out educational and research activities more rapidly using new computer systems. Therefore, it is vital to plan for education about library facilities, resources, and their use as well as computers, computer accessories, internet, and any technology-associated entities. Therefore, it is necessary to organize tours for newly admitted students to introduce li-

brary and new ICT to these students and to educate them about the Worldwide Web, Internet, boolean operators, general and specialized search engines, specialized websites, the fundamentals of searching, and interpersonal relationships. Moreover, the education should be aimed at turning students into lifetime and dynamic learners.

Therefore, the course of information literacy, as an important and fundamental education subject, should be codified and offered in universities. In addition, educational materials about information literacy should be developed according to the application of this course in healthcare and research. Continuous education, as workshop, should be offered to promote the literacy level of students. Moreover, English language classes should be continuously held to improve English language competency of students.

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Footnotes

Authors' Contribution: This study was designed by Nasrin Foruzandeh. Data gathering was done by Masoumeh Delaram, Marziyeh Foruzandeh, Nasrin Foruzandeh and Somayeh Darakhshandeh. Data analysis was carried out by Fatemeh Deris.

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