

Assessing computer skills and attitudes towards electronic learning and internet use in a sample of third year medical students of Baghdad Medical College-Iraq.

Ahmed. S. Al-Naaimi*

MBCbB, MSc, PhD

Summary:

Introduction: Medical schools and medical education look different as we advance into the 21st century. The call for medical students to become literate in the uses of information technology has become a familiar reform. Teaching medical students to be computer-literate will not only enable them to use information technology competently, but will foster their ability to assess the adequacy of one's knowledge and to direct one's ongoing learning well in a rapidly changing world.

Methods: A cross sectional study on a convenient sample 124 third year medical students in Feb, 2008. A specially designed semi-structured questionnaire was used. The instrument gathered data about: availability of personal computer, sources of computer knowledge, purposes of current computer and internet usage, type of computer software with basic knowledge and attitude towards computer. The questionnaire format was self administered.

Results: A small proportion of students (7.3%) had no PC (personal computer) at home. The most important source of computer knowledge reported was self learning and peer assistance (66.1% and 17.7% respectively). Basic knowledge in e.mail client programs was the most frequently reported computer software (52.4%). Word processor and web browser programs ranked second in basic knowledge (46% and 42.7% respectively). The majority of subjects (87.1%) use the internet. Using the internet for medical education was reported in less than two fifths of students. Only 13.7% perceived computers as an indispensable tool for medical education.

Conclusion: Third year medical students in the oldest Iraqi medical college have not fully utilized the opportunity associated with the use of computer and internet for medical education. Expansion of computer-assisted learning requires careful strategic planning after obtaining the results of computer literacy survey.

Key Words: Medical students, Iraq, Computer literacy, Medical education.

Fac Med Baghdad
2011; Vol. 53, No. 1
Received Oct., 2010
Accepted Nov., 2010

Introduction:

The call for medical students to become literate in the uses of information technology has become a familiar reform. Over 25 years ago, the Association of American Medical College's GPEP Report recommended that medical schools incorporate into their curricula training the use of such technology. The need for such changes has grown more compelling with the passage of time. Teaching medical students to be computer-literate will not only enable them to use information technology competently, but will foster their ability to assess the adequacy of one's knowledge, to efficiently redress identified deficiencies, and to direct one's ongoing learning well in a rapidly changing world(1). Exposing medical students early in their training to the vast profusion of electronic information resources can help produce a generation of practitioners who have a different orientation toward knowledge and learning. Three different approaches to computer-literacy training: learning about computers, learning through computers (i.e., using computers as tools for instructional delivery), and learning with computers (i.e., requiring students to use computers in their work on a day-to-day basis).

Learning with computers offers the most powerful means of preparing students to practice medicine in the future.(1) Several literatures addressed the impact of computers on performance of medical students. A study in Copenhagen, as early as 1993, and another one by Devitt et al, 2001 stated that the majority of students considered the use of computer-assisted instruction in medical education of ophthalmological emergencies a valuable or very valuable addition to traditional methods of teaching. This type of instruction system may improve the quality of ophthalmic teaching without increasing teaching staff requirements. The material and the medium may also act as a stimulus for further learning(2)(3). Buchowski et al, 2002 concluded that computer assisted teaching of nutritional anemias and diabetes to first-year medical students was associated with an effective increase in students performance at exams(4). A Prospective blinded randomized-control trial conducted on a cohort of 47 first-year medical students showed that computer assisted learning (CAL) was associated with a significantly greater improvement across both subjective and objective outcome measures when compared to the text-based group. Additionally, students favored learning via the CAL modality, which further suggests that CAL is a valuable

*Dept. of Community Medicine-College of Medicine-University of Baghdad.

means of imparting procedural knowledge to novice medical trainees(5). As early as 1998 at least 15 North American medical schools required their students to have computers, each school's software and hardware requirements were listed and how each expects students to use the computers; and who covers the cost of the computers (the students or the school) was specified. Major institutional commitment is needed for computers to be successfully integrated into any medical school curriculum(6). Medical schools and medical education look different as we advance into the 21st century. Iraq has seen a dramatic increase in the number of medical colleges in the last decade. Most schools practice traditional teaching method. The present study aims to explore the current level of computer literacy in addition to use electronic multimedia and internet services in medical education in a sample of Baghdad Medical College students.

Subjects and Methods:

Study Design: Cross sectional study.

Study sample: During Feb 2008, a convenient sample of 130 third year medical students was targeted. The planned sample size represents almost 40% of the study population.

Study instrument: A specially designed semi-structured questionnaire was used. The instrument was based on tools designed and tested in previous studies that assessed computer literacy and attitudes towards e-learning (7-9). The instrument was modified to suit the exploratory nature of present work. The instrument gathered data about availability of personal computer, sources of computer knowledge, purposes of current computer and internet usage, type of computer software with basic knowledge and attitude towards computer. The questionnaire was pre-tested among a group of 20 students, and revised to enhance its clarity and comprehension. **Data collection:** A group of 13 students volunteered in the phase of data collection. They were trained on administering the instrument and approaching eligible study subjects. Each volunteer was responsible for securing 10 study subjects of the same grade colleagues. The questionnaire format was self administered. A total of 124 forms were completely filled and suitable for statistical analysis resulting in a very high response rate (124/130=95.4%). **Ethical consideration:** Verbal informed consent was obtained from the students by disclosing that the data collected was for research purpose, that the questionnaire was anonymous, and that their participation in the study was voluntary.

Statistical analysis: Statistical analysis was computed aided using SPSS ver 13 software. Frequency distribution for selected variables was the only analysis used, since the sample is a convenient sample.

Results:

A total of 124 forms were analyzed. Females constituted 55.6% of study subjects, table 1. About two thirds (65.3%) of subjects

had a PC (personal computer) at home for the common use of the family and another quarter (27.4%) had a PC devoted for their personal use only. The remaining 7.3% had no PC at home. More than two thirds (69.4%) of study sample had a PC system older than 4 years since purchase, table 2. The most important source of computer knowledge reported was self learning and peer assistance (66.1% and 17.7% respectively). Formal sources of learning such as the computer course at college for first grade students and support of computer department and professors were less frequently reported as possible sources of knowledge (15.3%, 4.8% and 4% respectively). Only 25.4% of surveyed students were satisfied with the formal computer course they had in the first year of study, table 3. As shown in table 4, basic knowledge in e-mail client programs was the most frequently reported computer software, however even here only half (52.4%) of students had a basic knowledge in this part of computer programs. Word processor and web browser programs ranked second in basic knowledge (46% and 42.7% respectively). Only a third (33.1%) of students had basic knowledge about virus protection and another quarter (28.2%) knew about file management. These last two programs are important for computer maintenance. It is interesting to note that 26.6% of students reported basic knowledge in some kind of programming language. There was a low level of basic knowledge in programs concerned with numerical aspects like database spread sheet and statistical analysis. The majority of subjects uses a computer (94.4%) and 87.1% uses the internet, figure 1. The most frequently reported purpose for computer use is entertainment (55.6%) and internet surfing (53.2%). Only two fifths (41.9%) of students use the computers to watch educational materials and one fifth (21%) use it for writing lectures. A small proportion (16.9%) use PC to read reference books, table 5. Only 60% of students have access to internet services at home and 18.5% use the services provided by computer department at college. The most frequently reported purpose of internet use is correspondence with others (54%). Other uses concerned with medical education ranged between 25% and 40.3% respectively. As shown in figure 2, about one fifth of subjects (21.8%) viewed computers as a luxury tool and only 13.7% thought it is an indispensable tool for medical education.

Table 1: Frequency distribution of the study sample by gender.

gender	N	%
Male	55	44.4
Female	69	55.6
Total	124	100

Table 2: Frequency distribution of the study sample by availability of PC at home.

Availability of computer system	N	%
PC available for use at home	81	65.3
PC devoted for your personal use only	34	27.4
Do not have PC at home	9	7.3
Total	124	100

Note: 69.4% of study sample had a PC system older than 4 years since purchase.

Table 3: Relative frequency of reported sources of computer knowledge.

Source of computer knowledge (n=124)	N	%
Self learning (trial and error)	82	66.1
Peer assistance	22	17.7
Reading books and manuals	19	15.3
Compute course at college (first grade)	19	15.3
The support of teachers in high school	19	15.3
Attending lectures	15	12.1
The support of computer department staff at medical college	6	4.8
The support of professors in medical college	5	4

Note: 25.4% of study sample reported being satisfied with the computer course during first year at medical college.

Table 4: Relative frequency of reported types of computer software in whom the student has basic knowledge.

Basic knowledge in computer software (n=124)	N	%
E.mail client	65	52.4
Word processor	57	46
Web browser	53	42.7
Virus protection	41	33.1
File management	35	28.2
Programming language	33	26.6
Document reader (PDF)	24	19.4
Presentation	20	16.1
Data base management	19	15.3
Statistical analysis	8	6.5
Spread sheet	4	3.2

Table 5: Relative frequency of reported purposes of current computer usage.

Purpose of current computer usage (n=124)	N	%
Entertainment (PC games/multimedia)	69	55.6
Internet surfing	66	53.2
Watching educational materials (multimedia)	52	41.9
Writing and printing lectures and study notes	26	21
Reading reference books	21	16.9

Table 6: Relative frequency of reported sources of internet services used.

Source of internet services used (n=124)	N	%
At home	75	60.5
At a private internet service provider	31	25
college (computer department)	23	18.5

Table 7: Relative frequency of reported purposes of internet usage.

Purpose of internet use (n=124)	N	%
Correspondence with others (Having an email address)	67	54
Entertainment	51	41.1
Medical education	50	40.3
Visiting internet sites recommended by your peers (friends) or professors and use it for medical education	48	38.7
Searching for reference material	33	26.6
being a member in a medical student forum	31	25

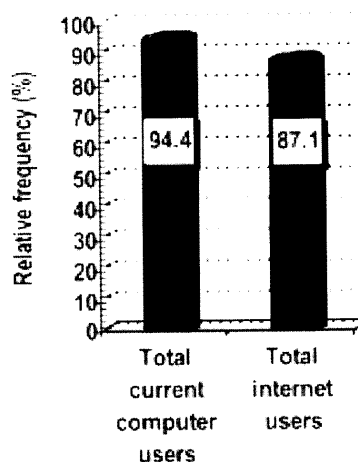


Figure 1: Bar chart showing the relative frequency of current computer and internet utilization among the total sample of students (n=124).

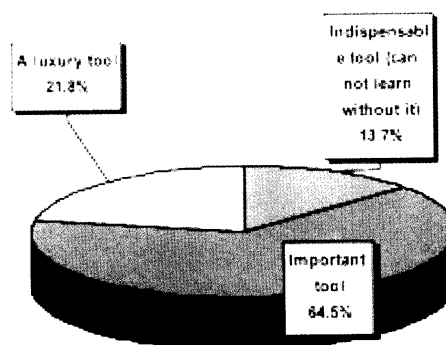


Figure 2: Pie chart showing the frequency distribution of the study sample by personal opinion about the role of computers in the life of medical students.

Discussion:

The computer literacy survey provides a snapshot of students' past and present use of technology and guidance for the development of services and facilities (8). Although several studies in different countries have explored the extent to which medical students use the computer and the internet, few (if any) researches are available on this subject in Iraq. The current study is an attempt to provide a baseline assessment of computer literacy level among medical students in a community where computers and internet services are a relatively new commodity. Identifying possible deficiency in computers availability, skills and uses will help in strategic planning to improve the quality of medical education. Special measures should be taken to prevent students who lack computer skills from being disadvantaged or from developing computer-hostile attitudes. Internet-based e-learning is comparably easy to integrate into the curriculum and is well accepted by medical students (10). However, one of the many challenges clinicians face is applying growing medical knowledge to specific patients. There is an information gap between information needs and delivery. Digital information resources could potentially bridge this gap. Exposing medical students to electronic resources early in their education makes them more comfortable using computer-based information resources within clinical interactions. Peterson et al, 2004, demonstrated that medical students embrace and use electronic information resources much more than has been reported among practicing clinicians. The current generation of students may be the leaders in a medical culture shift from paper to electronic resources (11). In the current study the following deficiencies in computer knowledge and use were noticed. A small proportion (7.3%) of students had no access to a PC at home. The role of formal computer courses and professors in college as sources of acquiring knowledge about computers was of marginal importance as perceived by students. Almost half of students lack basic knowledge in important computer software like e-mail client word processor and web browser programs. More than two thirds lack basic knowledge in computer maintenance. Although a high proportion of students (87.1%) use the internet, only two fifths make use of it for medical education purposes. This proportion is almost comparable to reported use of computers for medical education purposes. About one fifth of students had poor attitude towards computers and viewed them as a luxury tool. The above reported figures are slightly better than those reported in another example of a poor and developing country like Nigeria. A slightly more than half (58%) of the medical students are computer literate and only 60.7% had ever used the internet. Only 26.7% were sufficiently familiar with computer tools to perform advanced tasks. Most students (90%) had no regular access to a computer and none owned a computer (12, 13). Those students are however comparable to the present study subjects in considering self teaching as the most important source of knowledge about computer use. Results comparable to those of the current study were reported from Sudan, where 78.9% of medical students use the internet,

over a third using it for non-academic purposes (14). A study from KSA (Kingdom Saudi Arabia) showed that internet use by medical students was 82%, with a high proportion (78%) using the internet for medical education purposes. Over half (53%) perceiving computers and Internet as important and major contributors to their professional skills (15). Compared to medical education in developed countries the situation in Baghdad medical college is far from ambition. At the Medical University of Vienna, most information for students is available only online. Only a small percentage (12.1%) of students lacks basic computer skills and/or is very skeptical about e-learning (9). The majority of Rockford regional site of the University of Illinois at Chicago College of Medicine students entered medical school, in 1996, with good skills in using e-mail and word processing, but many lacked the skills necessary to search the medical literature or to use computer-assisted instructional programs (7). Computer literacy surveys were performed on annual bases from 1991 through 2000, for incoming medical students at the School of Medicine at Virginia Commonwealth University (USA). The results of these surveys were employed to plan major changes concerned with integrating electronic education in the curricula (8).

Conclusion:

Third year medical students in the oldest Iraqi medical college have not fully utilized the opportunity that the use of computer and internet offer for medical education. Expansion of computer-assisted learning requires careful strategic planning, resource sharing and staff incentives. Efforts towards motivating students to use the already available computer laboratories in college in addition to guidance from tutors and elaborate use of electronic material in the curricula needs to be tested as possible strategies in this context. The possible uses of the newly developed web site for medical college in electronic learning are expected to offer great opportunities.

References:

1. Koschmann T. Medical education and computer literacy: learning about, through, and with computers. *Acad Med.* 1995 Sep;70(9):818-21.
2. Lonwe B, Heijl A. Computer-assisted instruction in emergency ophthalmological care. *Acta Ophthalmol (Copenh).* 1993 Jun;71(3):289-95.
3. Devitt P, Smith JR, Palmer E. Improved student learning in ophthalmology with computer-aided instruction. *Eye (Lond).* 2001 Oct;15(Pt 5):635-9.
4. Buchowski MS, Plaisted C, Fort J, Zeisel SH. Computer-assisted teaching of nutritional anemias and diabetes to first-year medical students. *Am J Clin Nutr.* 2002 Jan;75(1):154-61.
5. Glicksman JT, Brandt MG, Moukarbel RV, Rotenberg B, Fung K. Computer-assisted teaching of epistaxis management: a Randomized Controlled Trial. *Laryngoscope.* 2009 Mar;119(3):466-72.
6. McAuley RJ. Requiring students to have computers: questions

for consideration. *Acad Med.* 1998 Jun;73(6):669-73.

7.Hollander S. Assessing and enhancing medical students' computer skills: a two-year experience. *Bull Med Libr Assoc.* 1999 Jan;87(1):67-73.

8.Seago BL, Schlesinger JB, Hampton CL. Using a decade of data on medical student computer literacy for strategic planning. *J Med Libr Assoc.* 2002 Apr;90(2):202-9.

9.Link TM, Marz R. Computer literacy and attitudes towards e-learning among first year medical students. *BMC Med Educ.* 2006;6:34.

10.Stahl A, Boeker M, Ehlken C, Agostini H, Reinhard T. [Evaluation of an internet-based e-learning ophthalmology module for medical students]. *Ophthalmologe.* 2009 Nov;106(11):999-1005.

11.Peterson MW, Rowat J, Kreiter C, Mandel J. Medical students' use of information resources: is the digital age dawning? *Acad Med.* 2004 Jan;79(1):89-95.

12.Ajuwon GA. Computer and internet use by first year clinical and nursing students in a Nigerian teaching hospital. *BMC Med Inform Decis Mak.* 2003 Sep 18;3:10.

13.Ameh N, Kene TS, Ameh EA. Computer knowledge amongst clinical year medical students in a resource poor setting. *Afr Health Sci.* 2008 Mar;8(1):40-3.

14.Ahmed AM, Yousif E, Abdalla ME. Use of the Internet by Sudanese doctors and medical students. *East Mediterr Health J.* 2008 Jan-Feb;14(1):134-41.

15.Mansoor I. Computer skills among medical learners: a survey at King Abdul Aziz University, Jeddah. *J Ayub Med Coll Abbottabad.* 2002 Jul-Sep;14(3):13-5.