Assessing Information Technology Skills for Medical Students

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Indexing terms
Medical Informatics, MI, Medical Education.

Abstract
Background: Medical informatics is an essential component in the current and future medical practice and education. Results concerning the assessment of medical students' capabilities to acquire and use medical informatics tools were reported.
Purposes: This study aims to assess basic medical informatics skills of undergraduate medical students in King Saud University, and how taking courses in this field would be beneficial for them.
Methods: the capabilities of third year medical students of King Saud University in basic computer skills were examined using a poll for 101 students. The results were classified for male and female students to assess their readiness to accept further medical informatics courses.
Results: Results indicated that male and female students had very good basic computer skills; however they lacked professional medical informatics knowledge and skills.
Conclusions: Despite the good computer knowledge of the students, they needed more courses in the medical informatics to improve their skills in this field.

The main goals of medical education are to equip students and graduate clinicians with the required knowledge and to provide them with the strategies and skills for applying it in the real practice. Varity of strategies are applied for teaching in medical schools ranging from traditional one way lectures to interactive online methods. The way medicine is taught and learnt has changed dramatically in the past two decades.

Medical informatics (MI) has been defined as "the rapidly developing scientific field that deals with biomedical information, data, and knowledge, their storage, retrieval, and optimal use for problem solving and decision making."[1] or "the science underlying the acquisition, maintenance, retrieval, and application of biomedical knowledge and information to improve patient care, education, research, and administration"[2]

From these definitions, it is apparent that the revolution in information technology and the great advances in computer capacity can be utilized to enhance and improve medical informatics systems and education. Computer usage in medical education has grown as well to enhance traditional teaching strategies, and to provide new methods of learning. For under graduate students, computer-based learning can be applied in many ways including different educational methods such as drill-and-practice where the material is presented to the student and he is evaluated immediately by multiple-choice questions,

discrimination learning where the student is asked to differentiate between two apparently similar sets of clinical findings, and clinical teaching where the common "visit rounds" are replaced by patient computer simulated programs; as well as searching the Internet for medical information. Previous studies on the effects of teaching computer and medical informatics skills to students showed that the capabilities of medical students in acquiring and using knowledge improved significantly specially in the field of complex medical information retrieval when they were provided with sufficient computer training and courses.[3]

This study aims to assess the skills of undergraduate students in different computer fields ranging from data entry to Internet search, and to assess how ready they are to accept new medical informatics courses that would enhance their capabilities in acquiring and using knowledge. This study was conducted as part of a plan to introduce new MI course(s) for undergraduate medical students. Currently no MI or computers skills courses are provided apart from two computer skills lectures embedded in one special topic research course.

Methods

This study involved third year medical students in the College of Medicine, King Saud University. 101 students were involved in this study; 70 males and 31 females; with average age of 21 years old, and standard deviation of 0.9 year. Both males and females were included in this study to assess any gender differences in the results. A questionnaire was designed and presented to these students to assess their computer skills. The questionnaire was divided into four parts, the first part focused on the familiarity of students to perform important computer tasks including typing, copying and pasting text and graphical objects, creating and moving folders, file compression and decompression, downloading software; creating handouts with tables, virus scan; literature searching, efficient Internet browsing, writing HTML language; using real audio, spread sheets, Email attachments, and power point presentations. The second part involved assessing the importance of these tasks to the students. Part three focused on assessing how the students use their computers at home focusing first on whether the student has a computer at home and on tasks usually done at home like email, literature search, computer games (as a measure of familiarity with computers), budget programs, and word processing. The fourth part focused on how the student used his/her computer in the field of medical education, and the portals or programs used to search for medical information. These portals included Grateful Med, PubMed, OVID, MD consult, web of science, and ISI current content. In order to assess the student skills he/she was asked to rate himself/herself by a grade from zero to five where zero indicates the absence of the skill and five indicates excellence in using this skill.

Results

By analyzing the outcome of the questionnaire using SPSS (statistical analysis tool), significant results were observed. The first result of significance was that there is no notable difference in the questionnaire results between male and female participants. This

result is of significance since previous researches concerning medical education showed such differences [4 5]. The results showed that 97% of the students had computers at home. The results also showed that the students were familiar with basic computer skills like typing, copying and pasting, and using real audio. However, the file handling skills including file compressions, and folder management were less familiar to the students. Microsoft Office applications including Word, Excel, and Power Point were also not familiar to the students.

For the Internet related skills including efficient browsing, literature search, file download, and email attachments, the students showed familiarity with these skills (about 85%). Figure 1 shows these results in percentages of the total number of students participating in the questionnaire. More significant results were obtained when the students were asked about the importance of these skills to them.

As figure 2 shows, in most cases the percentage of students thinking a skill is important were higher than the students familiar with that skill. This shows how the students are aware of the importance of these skills in their study and practice. Regarding the use of computer at home, 79% of the students used their computers for email, 74% for Internet browsing, 46% for literature search, and 21% for computer games. Regarding the use of computer in learning medicine 66% indicated that they use the Internet for medical learning, and 61% used different medical portals to retrieve medical material, and 72% used educational programs to test themselves in their studied subjects. In addition, 77% of the students indicated their desire to have more medical informatics training in college.

Conclusions

Most of the students own and use computers at home, and they actually are familiar with some of the basic computer skills like typing, and folder handling. However, they lacked knowledge in other areas like using different office tools.

The results also indicated the students' lack of professional medical informatics knowledge, and necessary medical students' skills, with high level of access to its technology. The students have a strong interest in learning and acquiring medical informatics skills and they are aware of their importance.

This clearly points out the immense need for medical informatics to be integrated in the undergraduate medical curriculum so that students at the time of graduation are able to utilize the always developing advances in medical informatics, and medical technologies to the benefit of their patients. Computer-based education and medical informatics have the potential to help students to develop problem solving skills; and improve and provide new methods of learning[6]. New programs become available everyday that can improve students' medical skills, and it is through more familiarity with medical informatics and computer skills that students can benefit from such programs. The UMI-21 medical schools in USA reported increases in levels of educational experiences over two years after introducing medical informatics as a component of medical student education[3]. It was suggested that medical informatics is an important curriculum topic in medical schools[3].

In conclusion, medical informatics is becoming an important tool in medical education, and its skills are needed in both medicine learning and practice; the students' basic computer knowledge should be utilized to introduce different levels of medical informatics courses to enable the students to advance in their study and career.

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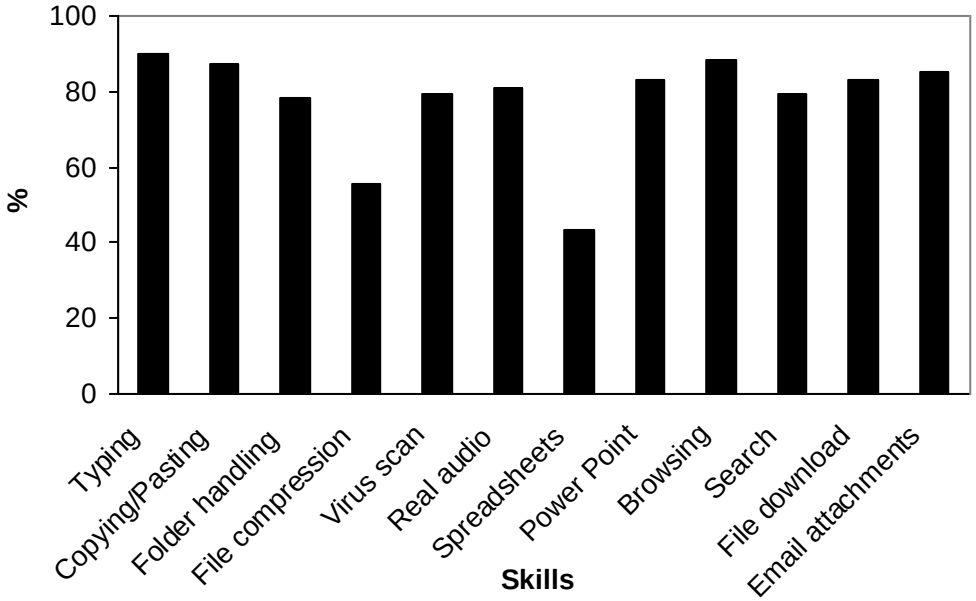

Fig.1.Skill level

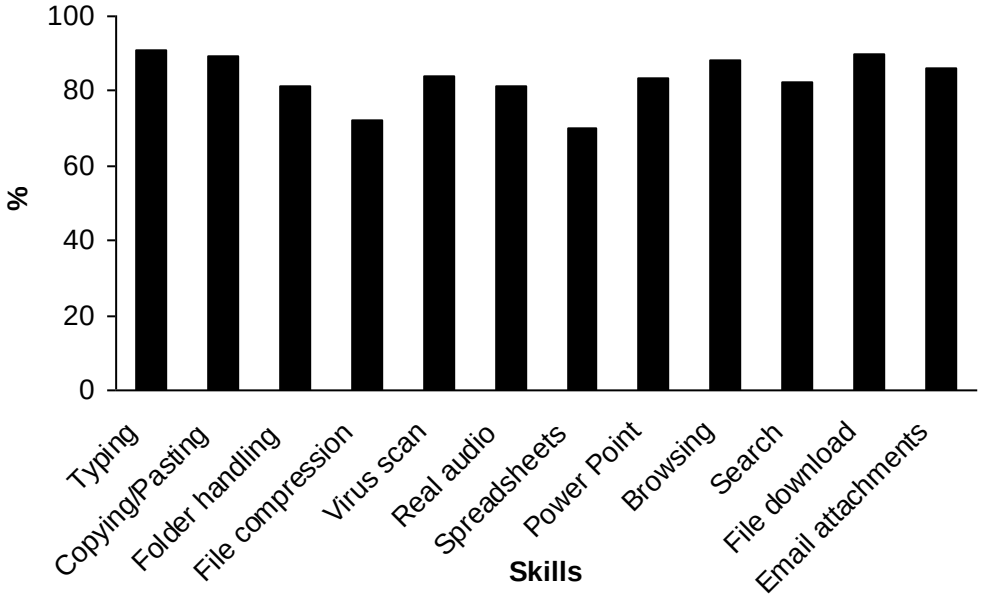

Fig.2. Skill Importance