

Computer Skills and the Training of Medical Students in a Ghanaian Medical School

Emmanuel Kusi Achampong¹, Kingsley K. A. Pereko²

¹Department of Medical Education and IT, School of Medical Sciences, University of Cape Coast, Ghana

²Department of Community Medicine, School of Medical Sciences, University of Cape Coast, Ghana

Abstract

The relevance of the inclusion of medical informatics into the curriculum of medical education cannot be overemphasised. The effects of medical and health informatics on health professional education are as profound and demanding of change as those on health consumers and clients. The effects reach far beyond the occasional use of computers in technology-assisted learning for health professionals. The study was conducted to ascertain the computer literacy level of medical students. A computing skills survey was administered to forty (40) second year students at the University of Cape Coast School of Medical Sciences, Ghana. The survey was conducted on the computer use, skills, and attitudes of second-year medical students. The results indicated that 89.9% of respondents had some average to advance knowledge and use of the basic computer software (windows, word, excel, PowerPoint, database, internet and email). The knowledge and use of database (62.5%) was however low as compared to the other basic software programs. Male students had a higher percentage (95.8%) as compared to female students (84.6%) with respect to knowledge and use of basic computer software. Female students, on the other hand, had a higher percentage (100%) of internet use as compared to the males with 93.4%.

Keywords: Medical Informatics, Education, Computer

1. Introduction

The spread of computers among a large and rapidly increasing segment of the population, and their interconnection through the Internet and millions of servers, has brought an entirely new and largely unexpected quality to health and medical informatics, and is effecting changes that we are only beginning to fathom [1].

Developments in information and communication technology occur at an astonishing rate. The World Wide Web (WWW) doubled in size during the first 6 months of 2000 and by 2005 the number of Internet users was likely to pass the one billion mark [2]. This has had huge implications for medical practice throughout the world. One estimate suggests that by 2010 more than 30% of a physician's time will be spent using information technology tools [3]. But these developments are

occurring in a world that many of our colleagues cannot access. The International Labour Organization's World Employment Report for 2001 noted that barely 6% of people in the world had ever logged onto the Internet, and 85–90% of these are in the industrialized countries [4]. In September 2000, the digital divide was highlighted by the World Health Organization as 'more dramatic than any other inequity in health or income [5].

The development of online databases allows medical professionals throughout the developed world immediate access to hundreds of e-journals at the touch of a button, a striking contrast to the plight of many of their colleagues in developing countries who are forced to trawl empty libraries. Highlighting one of the greatest tragedies of the digital divide, it threatens the very communities that could benefit the most from the developments in ICT.

According to many assessments, health care is among the foremost reasons for resorting to the Internet. Numerous dedicated sites have emerged, offering health literature, general advice, access to direct medical consultation, health assessments, the purchase of drugs, information on specialized treatment facilities and, perhaps most importantly, access to the community of persons afflicted by specific diseases or health problems. Cancer patients can consult other cancer patients and can get information of those people's experiences with specific treatment facilities or care providers. Beyond affecting the outcome of health care measures, in diverse ways, these opportunities significantly enable afflicted persons to be in a position of control, a position of choice among alternatives beyond anything conceivable so far. Thereby, they profoundly alter the relationship from that of a patient and a provider, to one on more equal terms, perhaps that of client and professional. This situation, which especially emerged over the last five (5) years, will require an evolution in attitude and behaviour of the health professional beyond "bedside manners." This poses a challenge to the education of health professionals [1].

Textbooks [6], medical journals [7], colleagues and electronic resources (including the internet) [8] are the most common resources physicians historically use to find answers to clinical questions. A recent systematic review indicates that while textbooks are the most common source of medical information followed by colleagues, use of electronic resources and the internet has risen 3-fold since 1992 [9].

The field of medical informatics brings together the various medical sciences (medicine) and other relevant fields including information science, computer science and cognitive science. The focus of this emerging field is to promote the effective organisation, analysis, management and use of information in health care in order to facilitate optimal health care delivery [10],[11]. An important mission of the medical informatics field is to prepare practitioners/students to utilise health data for direct care as well as in support of optimal health services organisation and delivery, public health surveillance and practice and clinical research.

2. Methodology

2.1. Setting

The University of Cape Coast School of Medical Sciences (UCCSMS) is a new medical school in Ghana. The school is in its third year. The school is running an ICT based curriculum with forty (40) computers connected to the internet which make access to information easy for students. There is a wireless network for students with laptops to have access to the computer network. Most students have acquired for themselves laptops which they use to access the university-wide wireless network. The medical students have access to most online medical journals

through the University of Cape Coast computer network which subscribe to these journals through the university library.

2.2. Study Design

A cross-sectional survey was used in this study. A computing skills survey was administered to forty (40) second year medical students. The survey was conducted on the computer use, skills, and attitudes of second-year medical students. An adapted version of a questionnaire developed by Jeannette Murphy j.murphy@chime.ucl.ac.uk at the Centre for Health Informatics and Multiprofessional Education (CHIME, <http://www.chime.ucl.ac.uk>) in London, UK, to assess ICT skills amongst first year medical students (MD1s) attending University College London (UCL).

This questionnaire was modified to suit our situation for the study. The survey was administered at the beginning of the second year orientation session, prior to other medical school activities.

2.3. Survey Content

The survey included questions asking respondents to rate their overall confidence in the use and knowledge about computers on a three (3) point scale (2=very confident using computers, 1=can cope with computers, 0=lack confidence in using computers). Using a four (4) point Likert scale (0=none, 1=basic, 2=average, 3=advanced), respondents were also asked to rate their ability to use software applications to perform specific tasks (Table 1). In addition, respondents were asked where they got their training in the basic computer software from, whether from school, work or self. Respondents were also asked the rate at which they use computers. They were also asked sources of reference materials that are used for their problem-based learning and research and these included electronic textbooks, journals and online journals. Finally, respondents were asked their views on the relevance of computers to medicine.

3. Data Analysis

Data analysis was conducted using SPSS for Windows, version 16.0® (SPSS, Inc). Mean values were calculated for responses to Likert-scale questions for the students. Simple response frequencies were calculated for all other questions.

3.1. Specific Computer Skills Assessed in the Survey

3.1.1. Basic Software Applications

- Word processing, Spreadsheets (Excel), PowerPoint, Databases-its use and design
- File management-save, delete, copy, merge, search and find

3.1.2. Resources for references in medical studies

- Textbooks, photocopies of textbooks
- Lecture notes made by self and lecture notes made by others
- Electronic textbooks and online journals

- Videos and journals
- Confidence of using computers
- Very confident using computers
- Can cope with computer usage
- Completely lack confidence

3.2. Results

A total of 35 of 40 (92%) second-year medical students returned the survey. Table 1 shows the mean age and gender information for respondents.

	Mean Age	Male (%)	Female (%)	Age Range
Medical Students	21.29	46.90	53.10	16-29

Table 1: Demography data for survey respondents.

3.2.1. Computer at Home and Training

There were high percentages of respondents with computers at home and those who were of the view that medical students should receive training in the use of computers as indicated by the results in table 3.

Computer at Home	Training
91.40	94.3

Table 2: Computer at Home and Training in Computer Use

3.2.2. Correlates of Computer Use

Cross-tabulation analysis of computer skills responses is given in the table below. This compares the computer use and knowledge between male medical student and female medical students.

Basic software	Males (n=15)	Females (n=17)	Total (n=32)
Word processing	15(100.0%)	16 (94.1%)	31 (96.9%)
Spreadsheets	15 (100.0%)	15 (88.2%)	30 (93.8%)
PowerPoint	13 (86.7%)	15 (88.2%)	28 (87.5%)

Table 3: Use of basic software.

E-mail	15 (100.0%)	14 (82.4%)	29 (90.6%)
Databases	13 (86.7%)	7 (41.2%)	20 (62.5%)
Internet	14 (93.3%)	17 (100%)	31 (96.9%)
Windows	15 (100.0%)	15 (88.2%)	30 (93.8%)
File management	15 (100.0%)	16 (94.1%)	31 (96.9%)

Table 3: Use of basic software.

	Males (n=14)	Females (n=17)	Total (n=31)
Very confident using computers	13 (92.9%)	11 (64.7%)	24 (77.4%)
Can cope with computers	1 (7.1%)	4 (23.5%)	5 (16.1%)
Completely lack confidence in using computers	0 (0.0%)	2 (11.8%)	2 (6.5%)

Table 4: Confidence in use and knowledge about computers.

	Males	Females	Total
Textbooks	15 (100.0%)	16 (94.1%)	31 (96.9%)
Photocopies of textbooks	9 (60.0%)	11 (64.7%)	20 (62.5%)
Videos	6 (40.0%)	2 (11.8%)	8 (26.0%)
Electronic textbooks	12 (80.0%)	2 (11.8%)	14 (43.8%)
Journals	8 (53.3%)	6 (35.3%)	14 (43.8%)
Online journals	11 (73.3%)	11 (64.7%)	22 (68.8%)

Table 5: Resources of reference for medical students.

4. Discussion

The results demonstrate a trend toward increasing use of and comfort in using computers among medical students. Most of the students found the use of the basic software packages comfortable with the exception of the database software. Modern medical education should not only concentrate on the core areas (anatomy, physiology, biochemistry, etc) but also the efficient use of information and communication tools to facilitate their studies and for research purposes. It was noticed that medical students used textbooks for their research more often than the use of other resources.

Two studies from Nigeria show that there is poor knowledge of computer use. Ajuwon [12], reports that only 42.6% of the sample studied could use the computer. In Lagos [13], 79% of students had little or no computer skills. In comparison from the study, 77.4% of UCCSMS medical students indicated that they are very confident in using computers; this supports the integration of information technology into the curriculum of medical education and the infusion of Medical Informatics into medical education and can also be attributed to the regular visit to the internet and the weekly presentations that compel students to use computers for their presentations and report. A high percentage of students (89.9%) were conversant with the use of basic software (word processing, database software, etc.). The confidence in use

of packages such as PowerPoint and Excel was also noticeable. This can be attributed to the fact that many of the students have laptops which they use for their presentations and assignments making them more confident with use of computers. Most students use computers on daily basis for sending mails, doing research and doing their assignments. Only 6.5% of the students completely lacked confidence in the use of computers and this small number can be separated and catered for in the training in computers before the actual training in medical informatics.

From table 3, males have a more than average use and knowledge of the basic software for computer usage as compared to females. Male students are more likely to explore new grounds and this may account for the high percentage as compared to female students.

It is good to note that more than half (68.8%) of the students found the use of online journals comfortable and easily accessible. Although 96.9% of students use textbooks which are readily available at the libraries, it is noteworthy that students still find some time to search other important resources for their research. Students have been very active in the use of online journals since they are required to do a lot of research using both textbooks and journals in order to make strong points in their discussions and presentations. This has increased the use of the internet and online resources in their studies.

Medical students (90.0%) indicated frequent use of the internet for sending mails and searching for information. This is concordant with the reports from Nigeria where 76.4% of first year clinical and nursing students in Ibadan [12] and 58% of final year medical and dental students in Lagos [13] have used email. This high rate of Internet and email use amongst medical students is also similar in other countries, such as Denmark [14], Finland [15], India [16], Malaysia [17] and the United Kingdom [18]. The main reasons for using a computer for Tanzanian Medical Students was to communicate by email (75%), Internet navigation (33%), learning purposes (27%), and to prepare reports (22%) [19]. Only 21 students (23%) had ever consulted an electronic journal, and nearly 70% did not use any electronic resource [19]. As compared to UCCSMS students, online journal use by students (68.8%) is far higher than that of the Tanzanian students whilst 90.6% of UCCSMS students use email for communication.

Similar studies were done in Nigeria, India and Tanzania in 2003 and 2004 respectively, and showed a similar uptake and comfort with technology compared with the current study in reference to internet use and communicating by emails. This is due to the fact that the use of emails for communication and the internet to search for information and to do research has become critical to their studies. Students are encouraged to read published research papers online and dedicated health-related websites as supplements to their studies. Even though the current study was undertaken in 2009 which is after some years as compared with the other studies, there is not much difference between the use of the internet and sending and

receiving emails. However, there is a difference in the use of computers in general (Microsoft Office Suite). Two studies undertaken in Nigeria in 2002 and 2003 and a study in Tanzania in 2004 indicated poor knowledge in computer use (Microsoft Office Suite) among medical students which is in contrast with the current study where medical students showed a comparatively high computer use. This can be explained by the fact that prices of computers along the years (six years down the line) have greatly reduced and students find it easy to access and use computers for their work making them more knowledgeable in it.

5. Conclusion

Information technology use in the training of medical students is critical to the curriculum of the University of Cape Coast School of Medical Sciences. The study was therefore focused on the acquired computer skills by medical students. The study found that medical students have high interest in the use of computers for their studies and research and suggest that internet use as a tool coupled with other resources for research is now a part of medical training and students are encouraged to use these resources to make them better students and physicians after school.

A high percentage of students (90.0%) were comfortable and confident with the use of the internet and simple office software applications for research and preparing for their presentations.

Students are introduced to online databases at the beginning of the academic year, where they can access journals and academic papers for their academic work and research. From the study, a high percentage of students use the internet (online textbooks (43.8%), online journals (68.8%) and online databases) for most of their studies. Students have had to visit the internet quite often for their academic work.

The study indicates that UCCSMS students use computers more often for their studies and research as compared to other medical schools in Africa.

References

1. Jochen RM, Andrew, G. Medical informatics and medical education in Canada in the 21st century. *Clinical & Investigative Medicine*. 2000; 23(4):278
2. Larkin M: Non-US web use rising fast. *Lancet*. 2000; 356:1451.
3. Skinner H, Biscope S, Poland B: Quality of internet access: barrier behind internet use statistics. *Social Science and Medicine*. 2003; 57:875-80.
4. International Labour Organization: <http://www.ilo.org/public/english/support/publ/wer/index2.htm>. The World Employment Report 2001: Life at work in the information economy. Geneva: ILO 2001.

5. Edejer TT. Disseminating health information in developing countries: the role of the internet. *British Medical Journal*. 2000; 321:797-800.
6. Ramous K, Linscheid R, Schafer S. Real-time information-seeking behavior of residency physicians. *Family Medicine*. 2003; 35:257-60.
7. McAlister FA, Graham I, Karr GW, Laupacis A. Evidence-based medicine and the practicing clinician. *Journal of General Internal Medicine*. 1999; 14: 236-42.
8. Kim GR, Bartlett EL Jr, Lehmann HP. Information resource preferences by general pediatricians in office settings: a qualitative study. *BMC Medical Informatics and Decision Making*. 2005; 5: 34.
9. Davies K. The information-seeking behavior of doctors: a review of the evidence. *Health Information & Libraries Journal*. 2007; 24(2): 78-94.
10. Englebardt SP, Nelson R. *Health Care Informatics. An Interdisciplinary Approach*. St. Louis, MO. 2002.
11. About Informatics. American Medical Informatics Association. Website: <http://www.amia.org/informatics>.
12. Ajuwon GA. Computer and internet use by first year clinical and nursing students in a Nigerian teaching hospital. *BMC Medical Informatics and Decision Making*. 2003; 3:10.
13. Odusanya OO, Bamgbala OA. Computing and information technology skills of final year medical and dental students at the College of Medicine University of Lagos. *Nigerian Postgraduate Medical Journal*. 2002; 9:189-93.
14. Dorup J. Experience and attitudes towards information technology among first-year medical students in Denmark: longitudinal questionnaire survey. *Journal of Medical Internet Research*. 2004; 6:e10.
15. Virtanen JI, Nieminen P. Information and communication technology among undergraduate dental students in Finland. *European Journal of Dental Education*. 2002; 6:147-52.
16. Inamdar SC, Rotti SB. Computer use among medical students in an institution in southern India. *National Medical Journal of India*. 2004; 17:8-10.
17. Nurjahan MI, Lim TA, Yeong SW, Foong AL, Ware J. Utilization of information technology in medical education: a questionnaire survey of students in a Malaysian institution. *Medical Journal of Malaysia*. 2002; 57(Suppl E):58-66.
18. Asgari-Jirhandeh N, Haywood J. Computer awareness among medical students: a survey. *Medical Education*. 1997; 31:225-9.
19. Samuel M, Coombes JC, Miranda JJ, Melvin R, Young EJW, Azamina P. Assessing computer skills in Tanzanian medical students: an elective experience. *BMC Public Health*. 2004; 4:37.

Correspondence

Emmanuel Kusi Achampong
Department of Medical Education
School of Medical Sciences
University of Cape Coast
Cape Coast
Ghana
Phone: +233242522445
kusiachampong@yahoo.com