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Original Article

The reported preparedness and disposition by students in a Nigerian university towards the use of information technology for medical education

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Abstract

Background: The computer and information technology (IT) revolution have transformed modern health care systems in the areas of communication, storage, retrieval of medical information and teaching, but little is known about IT skill and use in most developing nations.
Objectives: The aim of this study has been to evaluate the reported preparedness and disposition by medical students in a Nigerian university toward the use of IT for medical education.
Methods: A self-administered structured questionnaire containing 24 items was used to obtain information from medical students in the University of Ilorin, Nigeria on their level of computer usage, knowledge of computer software and hardware, availability and access to computer, possession of personal computer and e-mail address, preferred method of medical education and the use of computer as a supplement to medical education.
Results: Out of 479 medical students, 179 (37.4%) had basic computer skills, 209 (43.6%) had intermediate skills and 58(12.1%) had advanced computer skills. Three hundred and thirty (68.9%) have access to computer and 451(94.2%) have e-mail addresses. For medical teaching, majority (83.09%), preferred live lecture, 56.78% lecture videos, 35.1% lecture handout on web site and 410 (85.6%) wants computer as a supplement to live lectures. Less than half (39.5%) wants laptop acquisition to be mandatory. Students with advanced computer skills were well prepared and disposed to IT than those with basic computer skill.
Conclusion: The findings revealed that the medical students with advanced computer skills were well prepared and disposed to IT based medical education. Therefore, high level of computer skill is required for them to be prepared and favorably disposed to IT based medical education.

Keywords: Disposition, education, information technology, medical students, Nigeria, preparedness

Résumé

Arrière-plan: La révolution de la technologie (IT) informatiques ont transformé les systèmes de soins de santé modernes dans les domaines de la communication, de stockage, d'extraction d'informations médicales et de l'enseignement, mais peu élabore actuellement connues sur les compétences informatiques et l'utilisation dans la plupart des nations.
Objectifs: L'objectif de cette étude est d'évaluer la préparation signalée et la destruction par les étudiants en médecine dans une Université du Nigéria vers l'utilisation de l'information pour l'éducation médicale.
Méthodes: Un self-administré questionnaire structuré contenant des 24 articles a été utilisé pour obtenir des informations à partir des étudiants en médecine à l'Université de Ilorin, Nigeria sur leur niveau d'utilisation d'ordinateur, connaissance des logiciels et de matériel, de disponibilité et d'accès à l'ordinateur, la possession d'un ordinateur personnel et adresse e - mail, préféré à la méthode de l'éducation médicale et de l'utilisation de l'ordinateur comme un supplément pour l'éducation médicale.
Résultats: 479 D'étudiants en médecine, 179 (37.4%) avaient des compétences de base en informatique, 209 (43,6%) avaient des compétences intermédiaires et 58(12.1%) avait avancé des compétences en informatique. Trois cent trente

(68,9%) ont accès à l'ordinateur et 451(94.2%) - adresses électroniques. Pour l'enseignement médical, la majorité (83.09%), préféré vivants Conférence, vidéos de la conférence de 56.78%, 35,1% Conférence document sur le site web et 410 (85.6%) veut ordinateur comme un supplément de vivre des conférences. Acquisition du portable moins de la moitié (39,5%) veut être obligatoire. Étudiants avec des compétences avancées en informatique ont été bien préparées et disposé à l'informatique que ceux avec les compétences de base en informatique.
Conclusion: Les résultats ont révélé que les étudiants en médecine avec des compétences avancées en informatique étaient bien préparée et disposée à informatique basée formation médicale. Par conséquent, un niveau élevé de compétences de l'ordinateur est nécessaire pour qu'ils soient préparés et favorablement disposé à l'éducation médicale informatique basée.

Mots-clés: Disposition, l'éducation, de la technologie de l'information, les étudiants en médecine, Nigéria, préparation

Introduction

Information technology (IT) is an interconnected system of computers, ancillary equipments, hardware and software used in acquisition, storage, manipulation, management of data or information.[1] The IT via the internet consists of a global network of computers that allow information to be viewed or transferred from one computer to another. It offers facilities such as electronic mail, information transfer and the ability to search for information.[2] IT is becoming more popular in almost all disciplines and professions and has spread in the recent times in both developed and developing countries.[3,4] The use of computer technology has become an important component of education, as it plays a significant role in all the tiers of education particularly at the medical school level.[2,5,6] IT is a tool that "empowers" the teachers to teach more effectively and makes it easier for the students to understand difficult concepts and skills better. The student can have access to lecture notes, references, course materials and self-assessment questions posted by a lecturer on the internet and they can also take part in a tutorial from a distant location.[2] Today, computer-based test (CBT) is also increasingly being used for assessment of students' knowledge in many examinations.[7]

Several developed countries have chosen IT as one of the comprehensive learning objectives to be used as a guide for medical education.[8,9] The entrenchment of IT into medical school curricula was designed to promote the use of computer technology to enhance students' scientific and medical knowledge.[8,9] Apart from enhancing medical education, the knowledge and application of IT by future doctors would allow them to access, analyze, and manage information so that they can make educated decisions in patient care.[10] The use of IT is also essential for communication and information-sharing with colleagues and other health care professionals and for professional development as encompassed in e-health or telemedicine.[11,12] These advantages of information technology would be mirage if the medical students lack adequate computer skills and the necessary resources are not made available to ensure that they achieve substantive computer literacy to access and evaluate web-based information.[13-15]

In Nigeria, like most developing nations, the extent of use of IT particularly for student education is not well documented and as such, reinforcement of existing good practices and structures and filling of gaps can never be adequately addressed. Besides, neither is computer literacy taught or required at the University of Ilorin, Nigeria for medical education. This study therefore was designed to determine the reported preparedness and disposition by medical students at University of Ilorin, Nigeria to IT-based medical education.

Materials and Methods

Subjects

This study was conducted in May 2009 among full-time medical students in their clinical years (400 to 600 levels) at the College of Health Sciences, University of Ilorin, Ilorin, Kwara state, Nigeria. Students were educated on the purpose of the study, how to complete a questionnaire and the general content of the questionnaire. Students were also told that their participation in the study was voluntary and that the questionnaire was anonymous.

Study sample

The College of Health Sciences had a total of 512 students in the 400-600 level class. The sampled population was the total students' population. The rational for this sampling method was to give the entire student the opportunity to participate in the study. The questionnaires were distributed after class lectures to students who were ever willing to participate in the study. The questionnaires were allowed to be taken home for completion at their convenience and to be returned within a period of one week. The representatives of each class were asked to follow-up all respondents through issuances of reminders to ensure the completion and submission of the questionnaires within the defined period.

Survey instrument

A self-administered structured questionnaire that contains 24 items was administered to determine the reported preparedness and disposition by medical students in the College of Health Sciences, University of Ilorin toward the use of information technology for medical education. The questionnaire was used to ascertain their level of competency in computer usage, knowledge of computer soft and hardware, availability of computer at home, standby computer and projector in lecture rooms, possession of personal computer and email address, preferred method of medical education and rate of utilization of information technology as a supplement to teaching. The questionnaire was prepared by the authors and subsequently reviewed by a faculty member who is an expert in IT. The questionnaire was revised according to their comments and suggestions, and piloted among 20 students for face validity and clarity. The internal consistency of the test items of the questionnaire gave a Crohnbach's alpha of 0.8. Cronbach alpha is used to estimate the proportion of variance that is systematic or consistent in a set of test scores. It is more flexible than other internal consistency estimates and is often the appropriate reliability estimate for language test development projects and language testing research.

Definitions of computer operational terms

Basic computer skill is defined as the ability to use basic word processing and use internet.

Intermediate skill is defined as the ability to use word processing, internet and has additional skills such as use of other soft-ware program.

Advanced skill is defined as the ability to effectively use hardware and soft-ware, knowledge; ability for computer problem solving, advice and teaching.

Word processing is the ability to use the Microsoft word and Word perfect.

Spread sheet handling is the ability to use Microsoft excel.

Data base application is the ability to use Microsoft Access.

Presentation software involves the use of Microsoft Power point, Corel Presentation

Web site development and maintenance: developing a website and maintaining it

Data Analysis

Descriptive and frequency statistics were performed and Chi square χ^2analyses were obtained using Epi info version 3.5.1

Results

A total of 479 out of 500 questionnaires given to students were completed and returned to the investigators giving a response rate of 95.8%. The mean age of the participating student was 24.2± 8.8 years, 151 (31.5%) were females and 328 (68.5%) were males. Two hundred and five students (42.8%) were in 400 level class, 119 (24.8%) in 500 level and 155 (32.4%) in 600 level class. When 479 medical students were asked to asses their level of competency in computer usage, 179 (37.4%) claimed to have basic skills (ability to do basic word processing and use internet), 209 (43.6%) intermediate skills (capable of doing word processing, internet use and has additional skills such as use of other soft ware program), 58(12.1%) advanced computer skills (hardware and soft ware knowledge; ability for computer problem solving, advice and teaching) while 33(6.9%) had no computer skill [Table 1]. Of the 479 students, 330(68.9%) reported that they have access to computer and 149 (36.1%) have no access to computer. The distributions of the types of computer available to student are shown in Figure 1.

In this study, majority of the students, 451(94.2%), have e-mail addresses, 362(75.6%) had no access to internet facilities at home or in the hostels. Students were well disposed to the use of computer for medical studies and assignment 407 (85.0%), live medical teaching 398(83.1%), video medical

Table 1: Computer skill and usage among medical students

Computer skill and usage	Yes (n)	Percentage
No computer skill	33	6.9
Basic computer skill	179	37.4
Intermediate computer skill	209	43.6
Advanced computer skill	58	2.1
Internet usage skill	433	90.4
Word processing skill	350	73.1
Spread sheet handling	215	44.9
Data base application	105	21.9
Presentation software	242	50.5
Website development and maintenance	34	8.0

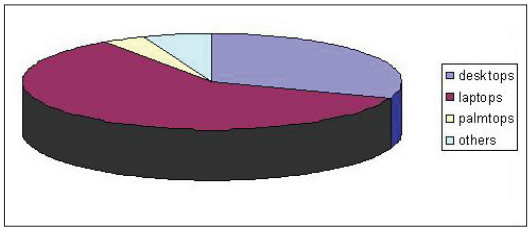

Figure 1: Types of computers available to medical students

lecture 272(56.8%) and computer supplemented medical teaching 410 (85.6%). Less than half of the students preferred lecture handout for medical education, 168 (35.1%) preferred that on web site and 189 (39.5%) opted for mandatory laptop ownership [Table 2]. Students with advanced computer skill were commonly disposed to the use of IT as supplement to teaching, replacement for some of the theoretical teaching, preference for lecture handout / figures on web site and use computer for medical studies and assignments [Table 3]. A large proportion of the student reported that more than 50% of their lecturers use computer for medical teaching and have 50-100% proficiency in the use of computer [Table 4].

Table 2: Disposition to IT based education among students

Disposition	Yes (n)	Percentage
Computer for medical studies and assignment	407	85.0
Life lecture for medical teaching	398	83.1
Lecture videos for medical teaching for viewing at my convenience	272	56.8
Lecture handout for medical teaching on web site	168	35.1
Diskette of lectures for medical teaching	193	40.3
Hard copies of lecture for medical teaching	231	48.2
Computer supplement to medical teaching	410	85.6
Computer replacing theoretical medical teaching	300	62.6
E- mail based medical education and discussion	376	78.5
Computer used from distance learning from home/ hostel	393	82.1
Don't want computer for medical services	440	91.9
Mandatory laptop acquisition	189	39.5

Discussion

The result of this study showed that 55.7% of the students have more than basic computer skills, that is, they were capable of using word processing, internet use and has additional skills such as hardware and soft ware knowledge; ability for computer problem solving, advice and teaching. This is however less than 72% obtained among osteopathic medical students in USA,[16] but in agreement with 59% final year medical and dental students at the College of Medicine University of Lagos and some other previous studies.[12,13,17-20] The high level of computer literacy among Nigerian students perhaps may due to increases in knowledge of computer as a result of introduction of IT into the curriculum of some Nigerian schools, particularly private primary and secondary schools. Furthermore, access to computer among the student was 68.9% and this might have contributed to the increased awareness, knowledge and skills of computer operation. Ameh and colleagues in northern Nigeria had reported that 90.0% of the clinical year medical students don't have regular access to computer.[21] Similarly, the high level of computer literacy may also be linked to the high number (94.2%) of the students having an electronic mail account. Our finding was very higher than 58.0% among dental and medical students in Lagos, 76.4% in Ibadan among clinical

Table 4: Lecturers' competency and computer usage

Computer usage	Yes (n)	Percentage
<25%	60	12.5
25-50%	94	19.6
50-75%	238	49.7
75-100%	87	18.2
Computer proficiency		
<25%	46	9.6
25-50%	124	25.9
50-75%	172	35.9
75-100%	75	36.5
Can't say	62	12.9

Table 3: Disposition to IT based education according to the computer skill level

Items on IT	Computer skills			*P*- values	χ^2
	Basic n (%)	Intermediate n (%)	Advanced n (%)		
Likes to use computer for medical studies and assignments	149(83.2)	183(87.6)	54(93.1)	0.001	16.28
Preference for lecture handout/figures on web site	47(26.3)	79(38.2)	34(58.6)	<0.001	22.61
Likes to use computer as a replacement for some of the theoretical teaching	106(59.2)	131(62.7)	42(72.4)	0.35	3.28
Prefer that you did not have to use computer during your medical studies	18(10.1)	16(7.7)	4(6.9)	0.53	2.22
Like the institution to make laptop ownership mandatory for students	72(40.2)	75(35.9)	32(55.2)	0.04	8.31
Likes to use computer as a supplement to teaching	150(83.8)	82(87.1)	55(94.8)	0.008	11.62

medical and nursing students[18,19] and 75% among medical students in Tanzania.[22]

In this study, most students (85.0%) supported the use of computer for medical studies. However despite supporting the use of information technology, 83.1% still preferred live lecture for medical teaching and only 56.8% supported the use of lecture videos for medical teaching, 35.1% supported the use of lecture handout for medical teaching on web site and 40.3% for diskette of lectures for medical teaching. The live lectures often afford the students the opportunities to interact and effectively learn from their lecturer than video lecture, printed lecture from website and diskette or hard copy of lecture handout. Majority of the students with advanced computer skill were more likely to use lecture handout and figures on web site (26.3 vs. 58.6 $P=<0.001$) and favorably disposed to computer replacing some theoretical teachings (59.2 vs.72.4 $P=0.35$) or as supplement to teaching (83.8 vs.94.8 $P=0.008$) than student with basic computer skills. This observation was comparable to other previous studies.[16,23] We also found that most students (85.6%) were of the view that IT should be used as a supplement to medical teaching and this was comparable to report of other workers.[14,24] However, less than half of the students (39.5%) want laptop acquisition to be mandatory despite their interest in IT based medical education probably due to the poor financial status of parents and guardians in a poor resource setting and inadequate electrical power which is a prerequisite for operating a laptop. Almost half (49.8%) of the students reported that 50=75% of their lecturers used information technology for teaching and 36.5% reported that their teachers are very efficient in the use of computer in teaching of students. The low efficiency of the lecturers in use of information technology may be because of the late introduction of computer into our academic programs and also because majority of the lecturers never had the opportunity of information technology during their education.

In conclusion, the findings of this study have revealed that the medical students with advanced computer skills were well prepared and disposed to IT based medical education and significant percentage were against mandatory laptop acquisition. Therefore, high level of computer skill is required for them to be prepared and favorably disposed to IT based medical education while government should provide personal laptops to students.

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