

Evaluation of E-Learning Practices in Undergraduate Medical Education: Results of a Survey in Sri Lanka

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Abstract: *Objective:* The present study investigates the knowledge, perceptions and the utilisation of e-learning modalities in medical education by the students in Sri Lanka. We also examined the potential barriers which may prevent the uptake of e-learning strategies in health and medical education.

Methods: A questionnaire focusing on the knowledge, attitudes and expectations of medical students towards e-learning was distributed to all final year medical students (n=136) at the Faculty of Medicine, Sri Jayewardenepura University, Sri Lanka. The survey was conducted during their regular lectures and completed questionnaires were collected after their classes.

Findings: 100 surveys (74%) were completed and returned. Nearly half of the respondents (43%) admitted that they were familiar with the term e-learning. Only 19% of respondents stated that they had used e-learning modalities for educational purposes. The majority of respondents said that they had not used web-based learning material or multimedia resources for medical education. However, more than half of (56%) respondents agreed that e-learning modalities would be useful tools in medical education and 49% said that e-learning must be expanded in medical education.

Conclusions: Despite the majority of respondents believed that e-learning modalities can be a useful tool to address some of the problems in medical education in developing countries, a lack of technology and learning opportunities have restricted the potential benefits.

1 Introduction

The introduction of new learning technologies, the fast growth of the Internet and the advent of the World Wide Web (WWW) have made significant changes in education [Ba05]. Medical education has also undergone profound changes due to recent technological advancements [Ha02], [Da01]. Medical schools, particularly in the developed countries have invested heavily in information and communication technologies (ICT) not only to deliver education, but also with the conviction that knowledge and skills in new technologies will improve the quality of services that health professionals provide. Technology mediated teaching and learning or e-learning, as it is widely known today has been integrated into the traditional medical education system to address current challenges in the sphere of education [Ra01].

E-learning is a result of the historical progression of distance education where new technology is used in teaching and learning process. There are a number of advantages in e-learning. E-learning offers opportunities for flexible teaching and learning while enhancing the possibilities for more individualised and self-directed learning. Technology mediated education modes have been used to overcome geographic restrictions [Ba05]. Enhanced capacity for interactive teaching and learning is another advantage of e-learning. It is believed that e-learning is better suited for problem based education [Ha02]). E-learning can also be cost-effective. Studies have demonstrated that technology mediated learning can provide cost savings for both learners and providers [We03]. Technology used in e-learning can vary from a simple audio-tape or a DVD to sophisticated multi point videoconferencing facility supported by a satellite communication system.

Developing countries can be a particular beneficiary of this mode of education. Scarcity of human resources in health sector is a serious problem in developing countries. Finding effective methods to produce qualified medical professionals is an urgent need to address health problems in these countries. Lack of educational institutions and qualified medical educators, maldistribution of facilities and poor access are some of the issues to be addressed in regard to improve the quality of medical education in developing countries. However, the addressing of these problems needs long term policy implementations and significant investments. In this situation, the advanced technology can address at least some of these problems. In fact, international organisations such as the United Nations (UN) and the World Health Organisation (WHO) have acknowledged e-learning as a useful tool to address education needs in healthcare sector in developing countries [Dr05]. United Nations' Millennium Development Goals have articulated the significance of the use of ICT to address education and health problems in developing countries [Mi05].

2 Objectives

The objective of the present study was to examine the knowledge and attitudes of e-learning in medical students and the level of usage of this modality in medical education.

3 Methods

We designed and distributed a self-administered survey questionnaire to assess the knowledge, attitudes and the level of use of e-learning modalities of medical students. The survey was distributed to all final year students (n=136) studying at the Faculty of Medicine, Sri Jayewardenepura University (SJU), Sri Lanka. Questions were divided into the following sections: demographic details, knowledge and perceptions in e-learning, the use of computers and the Internet, the access to e-learning education and barriers for usage.

4 Findings

4.1 Demographics

A total of 100 (74%) students completed the survey. 54% of respondents were female. The majority of respondents (91%) were between the age of 26-30 years and the remainder were between 23-25 years of age. These were final year medical students who were studying general medicine. When, asked ‘what would be your future speciality?’ students indicated a wide range of specialities such as paediatrics, family medicine, surgery, gynaecology and obstetrics, and psychiatry as their aspired areas of speciality.

4.2 Knowledge and perceptions of e-learning

Table 1. Proportion of responses related to knowledge and perceptions on e-learning (n=100).

Statement	Percentage of Response		
	Yes	No	Not Sure
I am familiar with the term e-learning	43	22	35
I regularly use e-learning modalities in medical education	19	48	33
I regularly use multimedia resources	25	47	28
I have access to multimedia resources at the university	13	20	67
I use web-based learning in my studies	11	49	40
e-learning modalities are useful tools in medical education	56	20	24
e- learning must be expanded in medical education	49	12	39

More than half of all respondents either did not know (22%) or were not sure (35%) what was meant by e-learning (Table 1). However, 19% of respondents admitted that they had used e-learning modalities for educational purposes. 48% of respondents stated that they had not used e-learning modalities while 33% responded not sure. Respondents

also admitted that the use of e-learning modalities such as multimedia resources and web-based learning was extremely limited in their education. The majority of respondents stated that they had little or no access to e-learning resources. However, more than half of respondents agreed that e-learning modalities would be useful in medical education. Nearly the same number of respondents admitted that e-learning must be encouraged and expanded in medical education.

4.3 Use of Computers and the Internet

Information related to the knowledge and skills of the participants in computing and the frequency of computer use was also gathered. The results of the survey showed that the availability of computers and the Internet for students was low. They admitted that access to computers and the Internet was limited both at home and at the university. Only a very small number of students had frequent access to computers and the Internet. The majority of students used the Internet very rarely (Table 2). Nonetheless a large number of students admitted that they were comfortable using computers and the Internet. Also more than 50% admitted that they had formal computer education and training which may have enabled them to use computers and the Internet with ease. The majority of students expressed the desire to have better and more frequent access to computers and the Internet.

Table 2. Proportion of responses related to the use of computers and the Internet

Statement	Percentage of Response			
	<u>Daily</u>	<u>Weekly</u>	<u>Monthly</u>	<u>Rarely</u>
Frequency of the use of Internet (<i>n</i> =85)	4	21	10	65
I would like to spend more time on the Internet (<i>n</i> =97)	<u>Yes</u> 62	<u>No</u> 27	<u>Not sure</u> 11	
I am comfortable using computers (<i>n</i> =97)	69	31		
I am comfortable using the Internet (<i>n</i> =97)	51	49		
I have a formal computer education/training (<i>n</i> =97)	69	31		
I have access to the Internet at University (<i>n</i> =95)	31	69		

5 Discussion

Improving accessibility to medical education is one important way to address problems in the health sector of developing countries. There is a serious need to expand educational opportunities while implementing methods to improve the quality of knowledge and skills that medical personnel acquire. It is equally important to expand the opportunities for continuing medical education (CME) to update knowledge and skills of medical professionals. Integration of suitable e-learning modalities into traditional medical education can be an effective method to address some of these issues. There are various examples of successful integration of e-learning modes in medical

programs around the world. Technology has been effectively used to deliver learning material, enhance communication and administration [Ch05], [Ro03], [La04], [Gr01]. There is also evidence that e-learning has been useful in providing continuing medical education [Wu04]. Certainly the majority of evidence is associated with industrialized countries. Nonetheless, there is increasing evidence for effective use of e-learning modalities in medical education in developing countries [Ch04], [Wa05], [Sa04].

Our survey findings revealed that a considerable number of students were familiar with the term e-learning. Nonetheless, only a few had used e-learning modalities in their medical education. While a large number of students believed that technology assisted teaching and learning methods would be a useful means to complement the traditional medical education, the use of such tools has been extremely limited.

The main barrier to the use of e-learning modalities has been the lack of such opportunities. Medical education in Sri Lanka, like in other developing countries, is predominantly carried out in traditional fashion, i.e. using face to face lectures, hospital based training and paper based material. The use of web-based learning modes and multimedia resources is extremely limited. Studies have shown that for various reasons, medical education in developing countries has been slow to adopt innovative educational methods [Az04]. For decades the medical curriculum in most developing countries has been static. Policy makers, university administrators and even medical educators have paid scant attention to curriculum innovation and adoption of relevant and viable new educational methods. Studies have shown that the traditional teacher-centred and hospital based medical education has failed to provide the right quality and quantity of educational experiences and respond to the demands of the society [Az04].

Indeed, the limited access to technology is a serious barrier in developing countries [Mc03]. Our study found that the students had very limited access to computers and the Internet within the university and outside of it. Unlike in the industrialised countries, computers are still a luxury in the developing world (Table 3). The so called ‘digital divide’ is still a formidable barrier to overcome [No01].

Table 3. Information and Communication technology distribution

Countries	Main telephone lines per 100 persons	Residential main lines per 100 households	Monthly subscription as % of income per capita	Personal computers per 100 persons	Internet users per 10,000 persons	Internet hosts per 10,000 persons
Low income	2.9	11.4	14.1	0.6	62.2	1.0
Lower middle income	13.6	35.8	2.9	2.4	264.9	4.3
Upper middle income	22.7	59.8	2.0	8.2	992.6	78.7
High income	59.7	108.8	0.7	37.3	3992.9	1484.2
World	17.1	54.9	5.7	7.7	820.8	232.6
Africa	2.6	9.9	12.7	1.0	84.9	3.4
Americas	35.1	80.6	3.1	26.6	2164.3	1332.9
Asia	10.7	41.8	5.5	2.2	433.9	28.7
Europe	40.5	80.0	1.1	17.9	1804.5	191.5
Oceania	40.0	98.3	3.7	39.9	2771.6	885.2

Source: International Telecommunication Union, World Telecom Indicators 2002

Despite the fact that students have limited access to computers and the Internet, the majority of them were computer literate. An understanding of the usefulness of computers and the Internet may be the driving forces for them to gain knowledge in computing. Research has shown that there is a growing interest in computers and the Internet in the developing world [Sm03]. Our survey revealed that the majority of the respondents were comfortable working with the technology. Therefore it is fair to say that the limited use of e-learning modalities has little or no relation to the knowledge or perception of students towards technology. On the contrary, students are enthusiastic about embracing new technology and use ICT in their education and future practice.

While lack of technology and facilities are a problem, it is erroneous to conclude that the principal cause of limited use of e-learning modalities is this. In fact, it is a serious misconception that technology is the primary element in e-learning. The key components of introducing and implementing e-learning modalities (like in any other innovative implementation) are organisational and human factors. It is the initiative, enthusiasm and creativeness of governments, policy makers and medical educators that provides synergy for innovation. Such initiatives would lead to find the most suitable and available technology to achieve the objectives. There is evidence that effective e-learning activities can be carried out using simple and cheap technology such as email, the Internet, DVD, CD or other low-cost resources. In fact technology like email and the Internet is fast becoming available in developing countries while costs are also reducing. The access to valuable educational resources particularly on the Internet is fast becoming available for medical students (and medical professionals). The 'bmjlearning.com' (Student *BMJ*) the website supported by the British Medical Journal, Open Access and Learning International Network Consortium (LINC) of the MIT and Student *JAMA* are just a few examples. The main focus of most of these projects is to enhance educational opportunities for medical students in developing countries.

Governments, university-administrators and medical educators must take measures to incorporate suitable e-learning modalities to diversify teaching and learning at medical schools. Curriculum innovation must be given priority with a focus on outcome based education methods. Deliberate attempts must be made to promote low-cost e-learning modalities. International organisations like the World Bank, the WHO and the UN must take the initiative to promote low-cost e-learning modalities as an integral part of the promotion of health and education.

It is imperative to propagate the benefits of e-learning. Promotion of e-learning will not only help undergraduate medical education, but also encourage them to use suitable technology in their future practice. Exposure to e-learning modalities at undergraduate level might help utilise e-health applications.

Our findings further reinforce that concerted efforts must be made to narrow the digital divide. However, it is naïve to think that increasing the number of computers and other technology would solve the problems in medical education. What is needed is to carefully select the most suitable and viable e-learning methods and integrate them into

traditional medical education systems. Promotion of innovative teaching and learning and the outcome focused curriculum design must be at the heart of this process.

6 Conclusions

E-learning can be a useful tool to address problems in medical education in developing countries. There have been some initiatives by international organisations to promote e-learning in medical education in developing countries. The lack of technology and resources is still a serious limitation. It is also important to acknowledge the organisational and human factors as significant barriers to be overcome.

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