Computer Literacy and e-learning: Attitudes among First Year Students in a Ghanaian Medical School

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ABSTRACT

This study sort to provides empirical evidence that would inform how to integrate fact to face instructional methods such as small group meetings with into e-learning, in medical education curricula within settings in Africa. The study found ICT illiteracy and fear of social isolation as the two main factors that account for resistance to e-learning and concluded that effective implementation of collaborative learning together with interventions aimed at improving ICT literacy may help lessen this resistance.

Keywords

Computer Assisted Instruction, Medical Education, Developing countries

1. INTRODUCTION

Information communication technology (ICT) has gained wide acceptance in medical education especially in the developed world [1], a campaign promoting it as a conduct for improving medical education worldwide is currently underway [2]. Proponents cite many benefits to be realized from adopting ICT [3]. In spite of the benefits to be derived from using ICT in medical education, there are concerns that developing countries lack the relevant infrastructure and appropriate skill base to successfully integrate ICT into medical education [3]. Integration of ICT into medical education in Africa is not extensive, across the continent efforts at integration are been hampered by costs, poor technology and sociocultural barriers [4]. Addressing the challenges to ICT adoption by medical schools in Africa is an imperative, given the formidable problems facing healthcare delivery in Africa [5]. Africa has 24% of the world's disease burden and only an estimated 3% of the world's health workforce [6]. This disparity has been highlighted within and outside the continent, international bodies such as the Joint Learning Initiative [7], and the WHO in its 2006 World Health Report have all drawn attention to it [6]. Initial interventions included calls for increased production of community health workers [8], and non-physician clinicians [9]. Recent recommendations are now focused on education and retention of medical doctors in Africa, advocates are quick to admit that doctors alone would not solve the vast unmet health needs of the continent, they however argue that no health system can function effectively without a significant cadre of doctors participating in clinical and public health work, management, education, and policy making [10]. Through its medical schools, Ghana like many other countries begun a drive to boost medical education by setting up new medical schools, with the goal of increasing the number of doctors at her hospitals, the School of Medicine and Health Science (SMHS) at the University for Development Studies (UDS) has surge up its intake of students in response to this initiative. As it was noted in a previous study[11], the SMHS is facing strong social, scientific and pedagogical currents, that are threatening scale-up, the results of that study also indicated that web based learning (WBL) might be appropriate for the SMHS. Web based learning also known as e-learning is a medium through which instruction is accomplished primarily or solely using the internet or a local intranet using hypertext – based information [12, 13]. The has been an explosion in web based educational initiatives or interventions due in part to the flexibility of the web, and the rapid growth of the internet, indeed by the end of the millennium the web had carved a place for itself in medical education, culminating in a proliferation of educational websites, a phenomenon that is still occurring [14]. WBL has many potential advantages [15] such as distance learning, economics of scale, flexible scheduling, ease of updating, individualized instruction and the availability of novel instructional methods. Nonetheless there are significant disadvantages, including social isolation, de-individualized instruction, high development and maintenance costs, technical problems, and instructional design issues [14]. Deciding on when and how to use WBL involves delicate balancing of the advantages, and disadvantages, taking into consideration the application (learning objectives, and context) and the e-learning configuration. The balancing act evolves into a strategy that minimizes instructional and learner isolation [14] a major weakness of e-learning, such strategies have often adopted one of two methods; the formation of online learning communities [16] and blended learning [17] or blended instruction [18]. The purpose of the current study is to provide evidence that would inform this balancing act within the context of integrating e-learning with other instructional media, such as face-to-face lectures or small group sessions

2. METHODS AND MATERIALS

This study is the result of a survey among first – year students in a Ghanaian Medical School using a questionnaire designed to investigate entry – level skills in ICT, and student attitudes towards incorporating ICT into the medical school curriculum. Completion of the questionnaire was taken as consent to participate in the study. Participants were classified based into ICT literate and non-literate depending on their response to questions assessing their knowledge and skill in using ICT related resources such as websites, databases etc. to access information appropriate to solving a problem in a learning setting.

2.1 Setting and Participants

A cohort of 250 students of the School of Medicine and Health Sciences, University for Development Studies, Tamale, Ghana. The non – response rate was approximately 4%. The students were informed of the Purpose of the study, the requirement to complete a questionnaire, and the general content of the questionnaire. They were also told that their participation in the study was voluntary and that no personal identifiable information was going to be taken. The University for Development studies, Tamale is located in the north of Ghana and is one of the third generations of tertiary Universities to be established in the country. At the moment, the medical school has no public access to computers for medical students, it however provides broadband internet access for staff and students, and computers are not available in the library for students to use, currently the University has eight faculties spread throughout four campuses. All students at the medical school take a mandatory course in basic ICT skills (introduction to computers, and the internet, windows, Microsoft application programs), at the beginning of their University studies

2.2 Survey Instrument

The students were asked the following questions pertaining to: instructional methods, educational tools, ICT skill types: Basic (able to do basic word processing and use the internet), Intermediate (Have mastered the basics and have developed additional skills, including the use of different software programs), Advanced (Knowledgeable about hardware and software), ability to perform certain task with computers. A drafted version of the questionnaire was administered to students (n=100) in June, 2011. Internal reliability (Cronbach's alpha) obtained from combining items with ordinal responses was 0.82 (95% CI) for intra class correlation coefficient; 0.79 to 0.88. The questionnaires were administered to the students who consented to participate in the study.

2.3 Data Analysis

Statistical analysis was performed using STATA (version 11.0, StataCorp. 2009). In order to identify medical students' preference and attitudes, an analysis of frequencies of items derived from responses to questions related to 'instructional methods', 'educational tools' and ICT skills was undertaken. Categorical variables were analyzed using chi-square

3. RESULTS
General findings

Out of the 250 questionnaires administered 239 students returned their questionnaires, indicating a response rate of 95.6%. The age range of responding a student was 18 – 47 and above. Among this group of students 40.6% were literate in information communication technology (ICT), 36.1% of literate students and 3.5% of ICT non literate students visited internet sites daily. Generally a considerable number of students were using ICT related applications irrespective of ICT literacy level, however more literate students than non – literate students were using such resources. A difference in the usage of ICT resources by gender was significant. There were no significant differences in demographic characteristics among students in the two groups (Table 1). Background characteristics as summarized in Table 1 indicate that none of the demographic variables influence the level of ICT literacy.

Table 1 Stratification of study population (n=239) by literacy in ICT

Participant characteristics			
Age	ICT literate (n=97)	Not ICT literate (n=142)	P-value
18-22	72(74.2%)	94(66.2%)	0.1857
23-27	16(16.5%)	37(26.1%)	0.0806
28-32	2(2.1%)	6(4.2%)	0.3612
33-37	5(5.2%)	1(0.7%)	0.0308
> 47	2(2.1%)	4(2.8%)	0.7141
Female	37(38.1%)	60(42.3%)	0.5253
Male	60(61.9%)	82(57.7%)	0.5253
ICT Related Application			
internet use	35(36.1%)	5(3.5%)	< 0.000
word processing	24(24.7%)	16(11.3%)	0.0061
spread sheets	15(15.5%)	25(17.6%)	0.6632
presentation software	7(7.2%)	33(23.2%)	0.0011
Database application	15(15.5%)	25(17.6%)	0.6632
website development & maintenance	1(1.0%)	38(26.8%)	< 0.000
Attitude to weekly meeting with lecturer			
to ask a question			
I would attend every meeting	75(77.3%)	116(81.7%)	0.4076
I would attend some of the meetings	11(11.3%)	13(9.2%)	0.581
I would not attend any of the meetings	2(2.1%)	3(2.1%)	0.9785
to discuss a specific case presentation			
I would attend every meeting	3(3.1%)	7(4.9%)	0.4862
I would attend some of the meetings	5(5.2%)	1(0.7%)	0.0308
I would not attend any of the meetings	1(1.0%)	2(1.4%)	0.7968
*won't feel part of a class	17(17.5%)	42(29.6%)	0.0339
won't feel part of a school	20(20.6%)	47(33.1%)	0.0349
113 students answered no to this question			

3.1 Attitudes towards e-learning

Students who were reluctant to have their lectures online because they would not feel part of a school were more than those who felt they would not be part of a class if they did so. Male students (25.0%) felt they would not be part of a class, while female students (32.4%) were concerned that they would lose out on been part of a school if all their lectures were over the internet. Resistance to online learning was strongest among students aged between 23 and 27 years (43.8%) Table 3, significantly, more ICT non-literate students than ICT literate students felt they would not be part of a class if all their lectures were delivered online, a similar trend was

observed among those who felt they would not be part of a school if all their lectures were over the internet.

3.2 Attitudes towards small group sessions

Assessment of responding student's attitudes towards small session meetings (a question and answer session, and a tutorial discussion session) with a lecturer indicated that, pertaining to small group question and answer meeting sessions, majority of ICT non-literate students would attend every meeting (87.3%), while ICT literate students were willing to attend some (11.5%) or none (4.1%) of such meetings. No ICT non-literate student said they would absent from any of such meetings. With regard to small group tutorial discussion sessions, more literate student's (5.2%),

than non-literate students (0.7%) said they would attend every one of such meetings, the difference was significant. Majority of the students who were willing to attend only some of the meetings were ICT non-literate students (7.0%) Table1. Generally more male student's favored small group discussion sessions than did their female counterparts. Majority of the students who preferred small group tutorial discussion sessions were females (Table2).

A favorable attitude towards small group question and answer sessions was observed among students irrespective of their age; whereas support for small group discussion sessions was not consistent among students in the different age groups (Table3).

Table 2. stratification of ICT literate students by gender

	Total (n=97)	Gender		P-value
		Female (n=37)	Male (n=60)	
Age				
ICT Related Application				
internet use	35(36.1%)	18(48.6%)	17(28.3%)	0.043
word processing	24(24.7%)	15(40.5%)	9(15.0%)	0.0046
spread sheets	15(15.5%)	2(5.4%)	13(21.7%)	0.0314
presentation software	7(7.2%)	0(0.0%)	7(11.7%)	0.031
Database Application	15(15.5%)	1(2.7%)	14(23.3%)	0.0063
website develop't & maintenance	1(1.0%)	1(2.7%)	0(0.0%)	0.2005
Attitude to weekly meeting with lecturer				
to ask a question				
I would attend every meeting	75(77.3%)	24(64.9%)	51(85.0%)	0.0214
I would attend some of the meetings	11(11.3%)	8(21.6%)	3(5.0%)	0.0121
I would not attend any of the meetings	4(4.1%)	4(10.8%)	0(0.0%)	0.0093
to discuss a specific case presentation				
I would attend every meeting	5(5.2%)	0(0.0%)	5(8.3%)	0.0714
I would attend some of the meetings	1(1.0%)	0(0.0%)	1(1.7%)	0.4299
I would not attend any of the meetings	1(1.0%)	1(2.7%)	0(0.0%)	0.2005
Won't feel part of a class	17(17.5%)	2(5.4%)	15(25.0%)	0.0137
Won't feel part of a school	20(20.6%)	12(32.4%)	8(13.3%)	0.0239

Table 3. STRATIFICATION OF ICT literate students by age

Participant characteristics						
	Total (n= 97)	18-22 (n=72)	23-27 (n=16)	28- 32 (n=2)	33- 37 (n=5)	>47 (n=2)
Gender						
Female	37(38.1%)	27(37.5%)	6(37.5%)	1(50.0%)	2(40.0%)	1(50.0%)
Male	60(61.9%)	45(62.5%)	10(62.5%)	1(50.0%)	3(60.0%)	1(50.0%)
ICT Related Application						
internet use	35(36.1%)	26(36.1%)	6(37.5%)	1(50.0%)	1(20.0%)	1(50.0%)
word processing	24(24.7%)	18(25.0%)	5(31.25%)	0(0.0%)	1(20.0%)	0(0.0%)
spread sheets	15(15.5%)	10(13.9%)	2(12.5%)	1(50.0%)	2(40.0%)	0(0.0%)
presentation software	7(7.2%)	6(8.3%)	0(0.0%)	0(0.0%)	0(0.0%)	1(50.0%)
Database application	15(15.5%)	11(15.3%)	3(18.75%)	0(0.0%)	1(20.0%)	0(0.0%)
website develop't & maintenance	1(1.0%)	1(1.4%)	0(0.0%)	0(0.0%)	0(0.0%)	0(0.0%)
Attitude to weekly meeting with lecturer						
to ask a question						

I would attend every meeting	75(77.3%)	56(77.8%)	12(75.0%)	1(50.0%)	4(80.0%)	2(100.0%)
I would attend some of the meetings	11(11.3%)	8(11.1%)	2(12.5%)	0(0.0%)	1(20.0%)	0(0.0%)
I would not attend any of the meetings	4(4.1%)	3(4.2%)	1(6.25%)	0(0.0%)	0(0.0%)	0(0.0%)
to discuss a specific case presentation						
I would attend every meeting	5(5.2%)	4(5.6%)	0(0.0%)	1(50.0%)	0(0.0%)	0(0.0%)
I would attend some of the meetings	1(1.0%)	1(1.4%)	0(0.0%)	0(0.0%)	0(0.0%)	0(0.0%)
I would not attend any of the meetings	1(1.0%)	0(0.0%)	1(6.3%)	0(0.0%)	0(0.0%)	0(0.0%)
I feel part of a class though my lectures are over the internet	17(17.5%)	12(16.7%)	3(18.75%)	0(0.0%)	1(20.0%)	1(50.0%)
I feel part of a school though my lectures are over the internet	20(20.6%)	14(19.4%)	4(25.0%)	0(0.0%)	1(20.0%)	1(50.0%)

4. DISCUSSION

Complimenting face to face classes with e learning in a blended learning (BL) or blended instruction (BI) settings create synergistic environments that harness the advantages of face to face classes and online course delivery together with enhanced technical tools to create environments that are as close to reality as much as possible. In addition such environments serve as a framework for adopting a wide range of instructional (Lecture-based, Problem based, and a combination of the two) and learning models (situated association, systematic and constructivist learning). Thus BL or BI is ideal for overcoming problems such as small class room space, shortage of staff, poor class attendance, etc. Nonetheless success often depends on the design of the learning environment, the ICT literacy level of students.

Our results indicate that 40.6% of the students who participated in this study are literate in ICT. The observed level of literacy in ICT is however lower than the 55.0% level of proficiency in ICT that was reported among this group of students that was reported among this group of students [11]. The apparent difference between the levels of literacy and proficiency in ICT suggest that even though a lot more students are highly skilled in using ICT related tools as indicated by the high level of proficiency only a small number of them have the knowledge on how to use these skills to facilitate access to information from websites, databases, etc. in order to find solutions to problems that may arise in the course of their studies. Thus such students may be able to function optimally in an e learning environment. In conformity with this assertion, more literate students than non - literate students reported using the internet.

4.1 Attitudes towards e learning

Analysis of the attitudes of students towards e learning suggest that resistance to online learning is influenced by the level of literacy in ICT, it was observed that more non – literate students than literate students were reluctant to having all their lectures on line because they would either not feel part of a class or part of a school. Generally reluctance to online learning was due more to fear of not been part of a school than not been part of a class, this suggest that students more apprehensive about losing the broader social network opportunities that been part of a larger community such as

may be found in school setting, as opposed to the nucleic set up provided by a class. Our results provide mixed explanations' for this observed trend, we note that gender seems to be a significant deciding factor, male students felt they would not be part of a class while female students felt they would not be part of a school if all their lectures were over the internet. The observed influence of literacy in ICT on student attitudes to learning observed in this study is consistent with the findings of previous studies [18-22].

4.2 Attitudes towards Small group Sessions.

It has been stated that it is not the learning environment itself that influences learning but the way students perceive it [17, 23, 24]. Thus it's important to take student perceptions and attitudes into consideration when designing learning environments. Our results on the attitudes of students towards small group session meetings suggest such meetings were favored more by ICT non-literate students than literate students, also non-literate students prefer such meetings to be question and answer sessions, while literate students preferred devoting such meetings for discussion, reasons for this observed trend is not immediately clear, however they point to the fact that resistance to   e learning may be shaped by the relationship between ICT literacy levels and fear of social interactions. Thus improving social interaction by means small group sessions may help reduce resistance to e learning.

5. CONCLUSION

This study has established that the attitudes of students towards e learning is influenced by their ICT literacy levels and also that effective implementation of collaborative learning techniques such as small group sessions meetings either online or in a classroom setting to foster social interactions that enable knowledge sharing among students together with interventions aimed at improving ICT literacy may help lessen resistance to e-learning at the school of medicine and health science at the University for Development Studies.

6. ACKNOWLEDGMENTS

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