International Journal of Education and Development using Information and Communication Technology (IJEDICT), 2012, Vol. 8, Issue 1, pp. 91-103.

Students' perceptions on incorporating e-learning into teaching and learning at the University of Ghana

Michael Tagoe
Institute of Continuing and Distance Education, University of Ghana

ABSTRACT

Technological advancement has led to significant changes in the way university education is being provided in the developed countries. Whilst their universities have made great strides in addressing issues of access, cost of higher education and quality through e-learning, Africans are in the 21st century still grappling with these issues. Although the University of Ghana has as one of its strategic directions, the introduction of e-learning, very little information has been provided on its policy direction. This study which is based on the Technology Acceptance Model (TAM), examines students' perceptions on incorporating e-learning into teaching and learning. Using survey research, a total of 534 responded to the survey which relied on the questionnaire. Results from the study show that students entered the university with computer skills which are critical to the introduction of e-learning; male students were more likely to use the internet than female students; there was a relationship between the length of time students have been using the internet and frequency of use of the internet; students preferred mixed mode and web supplemented courses in the immediate future than web dependent and fully online courses. To make e-learning a reality there should some further strategies to improve access to personal computers, improve the broadband width. Special efforts should be made to target female students to use the internet to improve their computer skills.

Keywords: E-learning, higher education, learning, technology acceptance model

INTRODUCTION

The rapid development of information, communication and technologies (ICT), internet technologies and Web-based applications have initiated unparallel transformation in universities all over the world (Cheng 2010). Electronic learning (e-learning) is changing the way teaching and learning is taking place on university campuses (Ahmed, 2010). Though the up-scale of e-learning in developing countries especially in Africa is slow compared to their Western counterparts, the last decade has witnessed some concerted efforts on the part of university administrators to implement e-learning strategies in order to catch up with their counterparts in the developed countries. Essentially, e-learning is usually defined as a type of learning supported by information and communication technology (ICT) via the internet, intranets, extranets or many others to improve the quality of teaching and learning. A broader definition of e-learning is provided by Selim (2007:397) as "the delivery of course content via electronic media, such as internet, intranet, extranets, satellite broadcast, audio/video tape, interactive TV, and CD-ROM. E-learning is divided into different types ranging from web-supplemented courses, through web-dependent to mixed mode courses and finally to fully online courses (OECD, 2005).

In 2005, the university articulated a clear vision in its policy document on ICT, where ICT would be (a) integrated into teaching, learning, research and drive most of the university's administration services, such that teachers/researchers use ICT as a basic tool to teach, communicate and collaborate with students, peers, and researchers within and outside; (b) students (on-campus and off-campus) use ICT for learning and accessing learning resources over various multimedia platforms; and (c) lecture rooms and classrooms are ICT-enabled to promote e-learning (University

of Ghana, 2007). However, although e-learning has made some gains with respect to payment of fees and registration of students online; and posting of university calendar and handbook on the intranet; very little gains have been made with respect to incorporating e-learning into teaching and learning at the University of Ghana.

This situation is not particular to Ghana, most African universities are still struggling to incorporate e-learning into teaching and learning. Recently, Macharia and Nyakwende (2010:73) have noted that a survey by UNESCO in Africa on e-learning concluded that "e-learning is still very much in its infancy across most of the continent," though there is much enthusiasm amongst university administrators to fully develop e-learning systems. The developing of e-learning systems on university campuses, there is urgent need for universities to increase their understanding and knowledge on the successful adoption and diffusion of e-learning (Macharia and Nyakwende, 2009; 2010). Unfortunately, little research has been done in Ghana to determine the perceptions of students towards incorporating e-learning into teaching and learning in Ghanaian Universities (Afari-Kumah and Achampong, 2010). Another gap which needs to be addressed is the disregard by universities of what their students want and appropriate when it comes to introducing e-learning (Mallak, 2001 cited in Jung, Loria, Mostalghel, and Saha, 2008). Recently, there have been calls for the inclusion of the views of students towards the incorporation of e-learning in universities (Keller and Cernerud, 2002; Jung et al., 2008; Mahdizadeh, Biemans and Mulder, 2008; Saade, Nebebe, and Tan, 2007). Consequently, to bridge these gaps, this paper aimed to assess the perception of students' towards incorporating e-learning into teaching and learning at University of Ghana.

THEORETICAL FRAMEWORK

Students' perception of e-learning in university education may be influenced by several variables. Keller and Cernerud (2002) have identified variables such as age, gender, previous experience of computers, technology acceptance and individual learning styles as major predictive factors when discussing acceptance of technology by students. There are various theories of technology acceptance used to appreciate the perceptions of students. One of such models is the technology acceptance model (TAM) developed by Davis (1989 cited in Saade, Nebbe and Tan, 2007; McFarland, 2001 and Pituch and Lee, 2006). According to Pituch and Lee (2006) and Hayashi, Chen, Ryan and Wu (2008), TAM was built upon Fishbein and Ajzen's (1975) theory of reasoned action (TRA) which posits that beliefs could influence attitudes, which lead to intention, to use and finally actual usage behavior. TAM as proposed by Davis describes that a person's behavioural intention to use e-learning is determined by perceived usefulness and perceived ease of use (Mahdizadeh, Biemans and Mulder (2008).

Although TAM's ultimate goal is actual usage, it could also be used to explain why individuals may accept or not accept a particular technology such as e-learning (Jung et al., 2008). In this paper, one selects predictive variables such as access to computers, computer skills of students before entering university, gender and confidence or computer self-efficacy to use e-learning if it should be incorporated in teaching and learning to determine perceived usefulness and perceived ease of use of e-learning at the University. These variables have been described by most writers on TAM as external variables. One set of external variables is access to infrastructure such as computers and improved bandwidth has been found to be an important predictive variable in the use of e-learning. Another external variable crucial to this study is prior computer experiences. Prior technical skills or computer experiences may be influenced by age and gender and may influence intent to use a variety of technology applications (Pituch and Lee, 2006). Saade, Nebebe and Tan (2007) have noted that individuals will use technology when they perceive that the technology will enhance their performance.

OBJECTIVES AND HYPOTHESES

As indicated in the theoretical framework, the use of TAM has been applied to the acceptance of technology in many universities and among students. However, in Ghana, very few studies have been done to explain why students may accept or reject e-learning which may have far-reaching implications for teaching and learning. The goal of the study is to help university administrators, developers and deliverers of e-learning understand how students' perception are critical to incorporating e-learning and what strategic policies need to be in place to enhance teaching and learning through e-learning (Park, 2009). To measure students' perceptions the following objectives are outlined:

1. To determine how far access to computers and internet will affect the acceptance of e-learning among male and female students at University of Ghana.

2. To assess how perceived ease of use of e-learning will affect students' intention to use e-learning.

3. To assess how perceived usefulness of e-learning will affect students' intention to use e-learning.

4. To determine the challenges and benefits that may be faced by students with the scaling-up of e-learning at University of Ghana.

In order to measure these objectives, the following hypotheses were formulated to be tested.

H1: Access to computers will have effect on students' adoption of e-learning

H2: Distribution of computer usage is different between genders

H3: Prior computer experience of students will affect the perceive ease of use of e-learning

H4: Students' frequency of use of the internet will influence their perceive usefulness of e-learning.

H5: Students' attitude towards adoption of e-learning will influence their intention to use the e-learning system.

METHODS

The population comprised all undergraduate students of University of Ghana. The University of Ghana undergraduate student population is 15,761, comprising the following programmes and number of students: Bachelor of Arts (12,047); Bachelor of Science (2555); Bachelor of Science in Administration (1052); and Bachelor of Science in Engineering (107). Using stratified sampling, a total of six hundred students were selected comprising Bachelor of Arts (300); Bachelor of Science (150); Bachelor of Science in Administration (125); and Bachelor of Science in Engineering (75). The gender distribution comprised 54.1% males and 45.9% females. The age distribution shows that 77.2% of students are found in the 20-24 age range. Students are represented at all the Levels (Level 100 17.6%; Level 200 37.7%; Level 300 29.3%; Level 400 15.4%) and from the Faculty of Social Studies (49.1%); Science (27.5); and the University of Ghana Business School (23.4%). The percentage of students who are residential was 46.3%, whilst 53.7% of students are non-residential.

The study which was survey research, adopted the descriptive and explanatory survey design. A questionnaire was developed for the study which had thirty-five questions and comprising seven (7) sections. Out of the 600 students who received the questionnaire, 534 completed and returned the questionnaire given an eighty-nine percent (89%) rate of return. The first section gathered information about the demographic characteristics of students. The rest of the sections had questions on access to computers (four items), prior experience (four items), perceived ease of use (five items), perceive usefulness (five items), attitude towards e-learning (four items) and behavioural intention to use e-learning (four items) (Davis, 1989; Ong, Lai, and Wang, 2004). Students were asked to indicate their agreement or disagreement with several statements using a 5-point Likert-type scale ranging from strongly agree to strongly disagree. The Likert scales were later recoded into agree, neutral, disagree to test for the various hypotheses.

DATA ANALYSIS

The data was analysed using the SPSS version 16. The study tested for reliability of each of the constructs using Cronbach's alpha. Although the values as shown in Table 1 are either close to or above 0.70, and therefore not as high as those obtained in some of the prior studies that had used the same items, they are still in the range that are deemed acceptable, based on the common threshold values recommended by accepted literature (Nunnally & Berstein, 1994 cited in Moran, Hawkes & Gayar, 2010). Further analysis was done through exploratory factor analysis using principal components factor extraction. Factor analysis with varimax rotation was performed to ascertain if perceived ease of use, perceived usefulness, attitude and behavioural intention were distinct constructs of the study as shown in Table 2. The following commonly used decision rules were applied to identify factors (Field, 2005): (1) minimum Eigenvalue of 1; and (2) minimum factor loading of 0.4 for each indicator item. Factor loadings for all variables were greater than 0.50, indicating good discriminant validity (Moon & Kim, 2001). The Kaiser-Meyer-Olkin (KMO) test for sampling adequacy was 0.863, whilst the Barlett test for sphericity was (X^2 = 3880.0, df = 153, $p < 0.000$).

Table 1: Alpha Coefficients for Constructs with Multiple Items

Construct	Number of Items	Cronbach Alpha
Perceived Ease of Use (PEOU)	5	0.741
Perceived Usefulness (PU)	5	0.897
Attitude (ATT)	4	0.614
Behavioural Intention (BI)	4	0.741

Table 2: Factor Analysis

	Component			
Items	1	2	3	4
I will find e-learning useful	.815			
Using e-learning system can enable me to accomplish tasks more easily	.804			
Using e-learning can make it easier to do my tasks	.803			

using e-learning system at the university can improve teaching	.766			
Using e-learning system can improve my performance	.729			
I think web supplemented when introduced will improve teaching and learning	.641			
I think mixed mode when introduced will improve teaching and learning	.568			
Learning to use e-learning system will be easy		.758		
It is easy to use to become skilful		.710		
I will find e-learning system easy to use		.657		
E-learning is user friendly		.623		
I have been using KEWL[1]		.542		
I think fully online when introduced will improve teaching and learning			.824	
I intend to use fully online			.803	
I intend to use web dependent			.735	
I think web dependent when introduced will improve teaching and learning			.642	
I intend to use mixed mode				.828
I intend to use web supplemented				.792

FINDINGS

Access to Computers

Table 3: Do you own a personal computer by gender?

Gender	Do you own a personal computer		
	Yes	No	Total
Male	184 (63.9)	104 (36.1)	288 (100.0)
Female	165 (67.6)	79 (32.4)	244 (100.0)

χ^2 (1) = 0.816; p □ .001

Table 4: Types of Computers owned by Students by Gender

Gender	Types of computers			
	Desktop	Laptop	Both	Total
Male	25 (13.6)	146 (79.3)	13 (7.1)	184 (100.0)

[1] KEWL is Knowledge Environment for Web-Based Learning. An open source software developed by University of Western Cape, South Africa.

Female	6 (3.6)	153 (92.7)	6 (3.6)	165 (100.0)

χ^2 (2) = 13.39; p < .05

In terms of access to computers, 65.5% of students had computers. On the types of computers owned by students, 8.9% of students indicated they had desktops, 85.7% had laptops, whilst 5.4% had both computers. Of the students who had no computers, the majority of them used computers at the following locations: the university (61.3%); Cybercafé (37.6%); and at the workplace (1.1%). The study did not a significant relationship in terms of ownership of computers by gender and age. However, a chi-square test of statistic of χ^2 (6) = 31.01; p < .001 indicated that young students (15-24 years) are more likely to own laptop computers. Furthermore, a chi-square test statistic of χ^2 (2) = 13.39; p < .001 revealed that there was an association between gender and ownership of laptop computers as shown in Table 4. Female students are more likely to have laptop computers than male students.

Prior Experience

Table 5: How long have you been using computers by gender?

Gender	How long have been using the computer			
	Less than one year	1-2 years	More than two years	Total
Male	30 (10.5)	49 (17.1)	208 (72.5)	287 (100.0)
Female	25 (10.5)	49 (20.5)	165 (69.0)	239 (100.0)

χ^2 (2) = 1.04; p □ 0.05

Table 6: Please indicate how long you have been using the internet by gender

Gender	Please indicate how long you have been using the internet			
	Less than 1 year	1-4 years	5 years and more	Total
Male	19 (6.7)	113 (39.6)	153 (53.7)	285 (100.0)
Female	11 (4.5)	107 (43.9)	126 (51.6)	244 (100.0)

χ^2 (2) = 1.74; p □ 0.05

Table 7: Please indicate how often you use the internet by gender

Gender	Please indicate how often you use the internet					
	Several times a day	Once a day	Few times a week	Few times a month	Rarely	Total
Male	106 (36.9)	43 (15.0)	105 (36.6)	23 (8.0)	10 (3.5)	287 (100.0)
Female	77 (31.6)	28 (11.5)	102 (41.8)	25 (10.1)	12 (4.9)	244 (100.0)

χ^2 (4) = 4.62; p □ 0.05

Students acquired computer literacy skills from varied sources. These sources were: having the skills and knowledge before entering the university (53.8%); ICT was integrated into their university programmes (7.5%); special courses for ICT skills provided by the ICT directorate (13.3%); ICT courses outside the university (6.0%); self-taught with manuals and handouts

(6.8%); taught by friends (7.5%); taught by family members (4.9%); and at work (0.2%). There was no significant difference between gender and use of the computer; how long one has been using the internet and frequency of internet usage. However, there was a significant relationship between the number of years students have been using the computer and the number of years using the internet (χ^2 (4) = 123.7; $p < 0.001$) as shown in Table 8. However, there was no relationship between length of time using the computer and frequency of internet use.

Table 8: How long have you been using the computer*How many years have you been using the internet?

	How many years have you been using the internet			
How long have you been using the computer	Less than 1 year	1-4 years	5 years and more	
Less than 1 year	16 (30.2)	23 (43.4)	14 (26.4)	53 (100.0)
1-2 years	10 (10.3)	64 (66.0)	23 (23.7)	97 (100.0)
More than 2 years	4 (1.1)	129 (34.5)	241 (64.4)	374 (100.0)

χ^2 (4) = 123.7; $p < 0.001$

Table 9: Perceived Ease of Use

	Strongly agree		**Agree**		**Neutral**		**Disagree**		**Strongly disagree**	
	F	%	F	%	F	%	F	%	F	%
I will find e-learning system easy to use	168	31.5	238	44.6	93	17.4	29	5.4	6	1.1
Learning to use e-learning system will be easy for me	188	35.5	254	48.0	65	12.2	19	3.6	3	0.6
It is easy to become skilful at using e-learning	152	28.6	245	46.1	109	20.5	23	4.3	2	0.4
E-learning is user friendly	92	17.4	230	43.6	168	31.8	37	7.0	1	0.2
I have been using KEWL and therefore will be able to because e-learning	15	2.8	47	8.9	250	47.3	161	30.4	56	10.6

On perceived ease of use, a higher percentage of students agreed with three statements: I will find e-learning system easy to use; learning to use the e-learning system will be easy for me; and it is easy to become skilful using e-learning. However, students disagreed with the statements that e-learning would be user friendly and KEWL will help them use e-learning. There was a relationship between those students who indicated that they will find e-learning easy to use and computer ownership (χ^2 (2) = 17.92; $p < .001$). Similar relationships were found between those who said e-learning will be easy to use and number of years students have been using the internet (χ^2 (4) = 24.91; $p < .001$), as well as frequency of use of the internet (χ^2 (4) = 24.91; $p < .001$).

Table 10: Perceived Usefulness

	Strongly agree		Agree		Neutral		Disagree		Strongly disagree	
	F	%	F	%	F	%	F	%	F	%
Using e-learning system can improve my performance	151	28.4	257	48.4	92	17.3	28	5.3	3	0.6
Using e-learning system can enable me to accomplish tasks more quickly	176	33.1	274	51.6	64	12.1	12	2.3	5	0.9
Using e-learning system can improve teaching	191	35.8	250	46.9	69	12.9	18	3.4	5	0.9
I will find e-learning useful	195	36.7	282	53.0	48	9.0	5	0.9	2	0.4
Using e-learning can make it easier to do my tasks	170	31.8	278	52.1	73	13.7	12	2.2	1	0.2

On perceived usefulness, a higher percentage of students indicated their agreement with all the statements. A relationship was found between number of years students have been using the computer and a possible improvement in their performance (χ^2 (4) = 14.69; $p < .05$). Similarly, a relationship was found between using e-learning to do tasks quickly and number of years of using the internet (χ^2 (4) = 14.17; $p < .05$). A relationship was found between the frequency students use the internet and finding e-learning useful (χ^2 (8) = 34.91; $p < .001$); as well as e-learning can improve teaching at the university (χ^2 (8) = 26.71; $p < .05$).

Table 11: Attitudes towards adoption of e-learning

	Strongly agree		Agree		Neutral		Disagree		Strongly disagree	
	F	%	F	%	F	%	F	%	F	%
I think web supplemented when introduced would improve teaching and learning	225	42.2	242	45.4	44	8.3	18	3.4	4	0.8
I think mixed mode when introduced would improve teaching and learning	257	48.4	211	39.7	50	9.4	10	1.9	3	0.6
I think web dependent when introduced would improve teaching and learning	113	21.3	214	40.3	116	21.8	63	11.9	25	4.7
I think fully online when introduced would improve teaching and learning	66	12.5	152	28.7	119	22.5	128	24.2	65	12.3

Table 11 shows that a higher percentage of students indicated that the introduction of mixed mode (e.g. online discussions, assessment, online project/collaborative work replace some face-to-face teaching and learning) and web-supplemented learning (putting course outline and lecture notes online, use of email, links to external online resources) would improve teaching and learning at the University. Students were however, not too sure with respect to web dependent (e.g. use of the internet for key elements such as online discussions, assessment, online project/collaborative work – but without significant reduction in classroom time) and fully online.

Table 12: Behavioural Intention of Use of E-learning

Intention to use e-learning mode	All students (Total)	Male	Female
Web-supplemented			
Next year	399 (77.0)	216 (76.9)	181 (77.0)
2 years time	89 (17.2)	53 (18.9)	36 (15.3)
3 years time	30 (5.8)	12 (4.2)	18 (7.7)
Mixed Mode			
Next year	388 (74.6)	213 (75.5)	173 (73.3)
2 years time	102 (19.6)	55 (19.5)	47 (19.9)
3 years time	30 (5.8)	14 (5.0)	16 (6.8)
Web-dependent			
Next year	268 (52.5)	147 (52.8)	120 (52.2)
2 years time	131 (25.7)	78 (28.1)	52 (22.6)
3 years time	111 (21.8)	53 (19.1)	58 (25.2)
Fully online			
Next year	239 (46.8)	133 (47.8)	105 (45.5)
2 years time	122 (23.9)	68 (24.5)	54 (23.4)
3 years time	150 (29.3)	77 (27.7)	72 (31.2)

In an answer to the question, which of the e-learning modes should be implemented and when they should, the study shows that most of the students suggested the introduction of web-supplemented and mixed mode next year as shown in Table 12, whilst web-dependent and fully online could be introduced later. Most students disagree with the statement that they will prefer fully online to face-to-face teaching. Rather, they will prefer a combination of some aspects of e-learning with face-to-face teaching at the University as shown in Table 13. Some of the challenges students mentioned to support their position were:

> *Not all the students have computers. Internet is really slow and sometimes it does not work.*
>
> *In the first few years it might face some challenges since not all the students are computer literate. Also, not everyone owns a personal computer and students cannot access the University's ICT facilities at all times.*
>
> *Poor internet connectivity and glitches could make online learning a very big challenge which could actually slow down the learning process.*

We do not have enough computers and wide area coverage and easy accessibility of the internet. Right now the internet is very slow so am wondering what will happen if let us say almost all students are using it at the same time.

There are inadequate computers at the ICT laboratory for students to use. Internet connectivity will be difficult since most students do not have laptop or personal computers. There is also frustration from internet failure and slow internet connectivity.

Table 13: Students' intention to use e-learning

Students' intention to use e-learning	Strongly agree	Agree	Neutral	Disagree	Strongly disagree
I will prefer fully online to face-to-face	48 (9.0)	74 (13.9)	118 (22.2)	177 (33.3)	115 (21.6)
I will prefer a combination of some aspects of e-learning with face-to face	254 (47.8)	201 (37.9)	51 (9.6)	18 (3.4)	7 (1.3)
I think the university should continue to offer face-to-face and not bother about e-learning	42 (7.9)	69 (13.0)	94 (17.7)	200 (37.7)	126 (23.7)

DISCUSSION

The results of study show that acceptance of e-learning depends on three critical factors. These are computer ownership, prior experience and perception of students about e-learning. With respect to computer ownership, the study found out that access to computers was quite high among students. However, female students were more likely to own laptop computers than their male counterparts at the university. Computer skills of students have improved significantly at the University because of the increasing number of students having acquired those skills before entering the university. Those who did not have these skills, the university, friends and family members provided opprotunities for these students to acquire computer skills. These findings support the study of Nicholson, Macleod & Haywood (2005) which revealed that students were developing their technical fluency through sources such as family and friends, integration of ICT in school classes, special ICT courses at schools, and by self-taught with the aid of books.

Although the study did not find striking differences between male and female students with respect to number of years they have been using computers; the study found a relationship between the length of time they have been using the internet and frequency of use of the internet, as similar to the findings of Gefen & Straub (1997); Link and Marz (2006); Yee, Luan, Ayub & Mahmud (2009) and Teo (2010). This probably is the result of the penetration of internet access on the University campus where most students now have access to the Internet (Dadzie, 2009). The study found out that male students have been using computers longer than female students, while male students have also been using the internet longer and severally in a day than their female counterparts. The study found out that there was a strong relationship between the years of using the computer and the frequency of internet use.

With respect to perceived ease of use, the study found that age and level of students had no significant relationship with perceived ease of use. This supports a similar finding by Afari-Kumah and Achampong (2010). However, the study found a significant relationship between finding e-learning easy to use and computer ownership (χ^2 (2) = 17.92; $p < 0.001$). Other relationships were found among variables such as e-learning system easy to use and years of using the internet (χ^2 (2) = 24.91; $p < 0.001$), as well as frequency of internet use (χ^2 (8) = 32.18; $p < 0.001$). This also complements the finding of Afari-Kumah and Achampong (2010) which found a

positive relationship between prior experience and perceived ease of use. Prior use of the Knowledge Environment for Web-based Learning (KEWL), an open source learning management system which the University of Ghana has been using for some time now to improve teaching had no significant relationship with perceived ease of use. Dadzie (2009) has revealed that very few students use the software. The study found a significant relationship between perceived usefulness and the frequency that one uses the internet.

Perception of students shows that students would accept mixed and web supplemented courses in the immediate future than web dependent and fully online courses. These findings support other findings which have established that mixed mode, web-supplemented and web-dependent hold more promise than fully online (Larsen & Vincent-Lancrin, 2005; Buzzeto-More & Sweat-Guy, 2006; OECD, 2005; Guri-Rosenblit, 2005; Buzzette-More, 2008). Students were unanimous over the statement that there should be some combination of online and face-to-face teaching at University of Ghana. They however, disagreed that fully online courses should replace all face-to-face teaching at undergraduate level. This finding supports the evidence of OECD (2005) that fully online provision at campus-based institutions will remain very much in the minority for the short to medium term.

CONCLUSION

In spite of the benefits that will accrue to students when e-learning is incorporated into teaching and learning at University of Ghana, there are three challenges which need the immediate attention of university authorities. These are: (a) access to hardware (computers); (b) improvement in bandwidth infrastructure; and (c) skills training. Computer ownership has been identified as critical to adoption of e-learning. Although, there has been some improvement in the number of computers at the various University of Ghana ICT laboratories, there is the call for some further strategies to improve access to personal computers, especially, laptops to attain the computer/user ratio of 1:20, the target set in the Strategic Plan of University of Ghana. Special efforts should be made to target female students to use the internet to improve their computer skills. The other challenge in relation to access to computers is the unreliable Internet connectivity.

The present bandwidth places severe restrictions on the number of people who could have access to the Internet. Although most students have intimated that e-learning will enhance teaching and learning, they also attribute the slow adoption of e-learning to the frustrations they experience due to the frequent interruptions with the connectivity. One lecturer has noted that the university will experience serious challenges when students are allowed to use the intranet to access lecture notes and course outlines if lecturers should post their lecture notes and course outlines on the University of Ghana Intranet.

REFERENCES

Afari-Kumah, E & Achampong, A. (2010). Modelling computer usage intentions of tertiary students in a developing country through the Technology Acceptance Model. *International Journal of Education and Development using Information and Communication Technology* (IJEDICT), 6, 1, 1-15.

Buzzetto-More, N & Sweat-Guy, R. (2006). Incorporating the hybrid learning model into minority education at a historically black university. *Journal of InformationTechnology Education*, 5, 153-164.

Buzzetto-More, N. (2008). Student perception of various e-learning components. Interdisciplinary Journal of E-learning and Learning Objects, 4, 113-135.

Dadzie, P. (2009). E-learning and e-library services at the University of Ghana: prospects and challenges. *Information Development*, 25, 3, 207-217.

Davis, F. (1989). Perceived usefulness, perceived ease of use, and user acceptance of information technology. MIS Quarterly, 13, 3, 319-340.

Field, A. (2005). *Discovering Statistics using SPSS* (2nd Edition). London: Sage.

Fishbein, M & Ajzen, I. (1975). *Belief, Attitude, Intention, and Behavior: An Introduction to Theory and Research*. Reading, MA: Addison-Wesley.

Gefen, D & Straub, D. (1997). Gender differences in the perception and use of e-mail: an extension to the Technology Acceptance Model. *MIS Quarterly*, 24, 4, 389-400.

Guri-Rosenblit, S. (2005). Eight paradoxes in the implementation process of e-learning in Higher Education. Higher Education Policy, 18, 5-29.

Hayashi, A., Chen, C., Ryan, T & Wu, J. (2008). The role of social presence and moderating role of computer self efficacy in predicting the continuance usage of e-learning systems. *Journal of Information Systems Education*, 15, 2, 139-148.

Jung, M., Loria, K., Mostaghel, R & Saha, P. (2008). E-learning: Investigating University Students' Acceptance of Technology. *European Journal of Open, Distance and E-Leaning* [online] http://www.eurodl.org./materials/contrib/2008/Jung_Loria_Mostaghel_Saha.htm

Keller, C & Cernerud, L. (2002). Students' perception of e-learning in university education. *Journal of Educational Media*, 27, 1-2, 55-65.

Link, M & Marz, R. (2006). Computer literacy and attitudes towards e-learning among first year medical students. *Bio Med Central (BMC) Medical Education*, 6, 34, 1- 8. Available at http://www.biomedcentral.com/1472-6920/6/34.

Macharia, J & Nyakwende, E. (2010). Influence of university factors on the students' acceptance of internet based learning tools in higher education. Journal of Communication and Computer, 7, 10, 72-82.

Macharia, J & Nyakwende, E. (2009). Factors affecting the adoption and diffusion of internet in higher educational institutions in Kenya. Journal of Language, Technology and Entrepreneurship in Africa, 1, 2, 6-23.

Mahdizadeh, H., Biemans, H & Mulder, M. (2008). Determining factors of the use of e-learning environments by university teachers. *Computers & Education*, 51, 142-154.

McFarland, D. (2001). *The Role of Age and Efficacy on Technology Acceptance: Implications for E-Learning*. World Conference on the WWW and Internet Proceedings (Orlando, FL, October 23-27, 2001).

Moon, J. & Kim, Y. (2001). Extending the TAM for a World Wide Web context. *Information and Management*, 38, 4, 217-231.

Moran, M., Hawkes, M & Gayar, O. (2010). Tablet computer integration in higher education: Applying the unified theory of acceptance and use of technology model to understand supporting factors. Journal of Educational Computer Research, 42, 1, 79-101.

Nafukho, F. (2007). The place of e-learning in Africa's institutions of higher learning. *Higher Education Policy*, 20, 19-43.

Nicholson, S., Macleod, H & Haywood, J. (2005). E-Learning: Who is leading whom, and where might the road be going? 3rd International Conference on Universal Access in Human – Computer Interaction (UAHCI).

Ong, C., Lai, J & Wang, Y-S. (2004). Factors affecting engineers' acceptance of asynchronous e-learning systems in high-tech companies. Information & Management, 41, 795-804.

Organization for Economic Co-operation and Development (OECD) (2005). *E-learning in Tertiary Education: Where Do We Stand*? OECD.

Park, S. (2009). An analysis of the technological acceptance model in understanding university students' behavioural intention to use e-learning. Educational Technology & Society, 12, 3, 150-162.

Pituch, K & Lee, Y-K. (2006). The influence of system characteristics on e-learning use. *Computers and Education*, 47, 222-244.

Saade, R., Nebede, F & Tan, W (2007). Viability of the "Technology Acceptance Model" in multimedia learning environments: A comparative study. *Interdisciplinary Journal of Knwoledge and Learning Objects*, 3, 175-183.

Selim, H. (2007). Critical success factors for e-learning acceptance: Confirmatory factor models. *Computer & Education*, 49, 396-413.

Teo, T. (2010). Establishing gender structural invariance of Technology Acceptance Model (TAM). *The Asia-Pacific Education Researcher*, 19, 2, 311-320.

University of Ghana (2007) ICT Strategic Plan (2005-2010). Version 3.0. October.

Yee, H., Luan, W., Ayub, A & Mahmud, R. (2009). A review of the literature: determinants of online learning among students. *European Journal of Social Sciences*, 8, 2, 246-252.