Undergraduate Business students' pedagogical use of ICT: The case of Pentecost University College

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Abstract

This study was intended to investigate undergraduate business students' pedagogical use of ICT, their attitudes toward the use of ICT and factors contributing to their use of ICT. A total of 180 students participated in this study. Descriptive statistics, multivariate analysis of variance and multiple regression analysis were used to analyze the findings. The result of this study found that students' pedagogical use of ICT was high. Also, students showed positive attitudes toward the use of ICT. Factors such as affection, compatibility, simplicity ("complexity" before the negative items were reversed), peer support, competence and access were found to be related to technology use. Moreover, peer support and affection were found to be linked with students' ICT usage. Finally, peer support was found to be the strongest determinant of students' technology use.

Introduction

Technologies have revolutionised teaching and learning process since the mid-1960s. Technologies have helped teachers to control and spread knowledge, and offered new prospects for learners to improve their knowledge in many aspects (Wong, Teo & Russo, 2012: 1). The rapid growth in information and communication technology (ICT) has brought remarkable changes in the twenty-first century, as well as affected the demands of modern societies. ICT has become an important part of educational institutions these days. It provides educational institutions with the opportunity to use its tools to support classroom teaching and learning. ICT enhances student teaching and learning. ICT has also challenged the conventional teaching methods, transformed instructional practices and contributed to emerging new instructional methods. ICT has become an important component of educational reform and an integral part of school curriculum (Papanastasiou & Angeli, 2008).

According to the World Bank report (2007), many nations have invested in ICT to improve its integration into education by teachers and students. However, various studies have found that students do not use ICT in their learning effectively (Woreta, Kebede & Zegeye, 2013; Sarfo & Ansong-Gyimah, 2011). According to Selwyn (2003: 2), "one of the less celebrated elements of the higher education and technology debate is that students' and teachers' use of ICTs remains, at best, inconsistent". Though ICT has immensely contributed to the learning activities in (most) higher institutions (Gregorian, 1996; Okerson, 1996; Fuller, 1998), its use in daily learning activities by university students has been less noticeable. Despite universities' huge investments in ICT resources in the past decade, students' pedagogical integration of ICT has remained inconsistent and varies greatly from program to program and school to school (Arnold, 1999). Therefore, a new study, involving a number of students in different departments in Pentecost University

College, is necessary to identify their integration and attitudes toward the use of ICT in learning since there is a lack of publication on students' use and attitudes toward ICT. To achieve the research purpose, four research questions were addressed.

Research questions

In this study, the four research questions addressed were:
(i) What are students' pedagogical uses of ICT?
(ii) Are there any significant differences in the students' pedagogical use ICT with regards to gender, program of study and level of study?
(iii) What are students' perceptions of factors related to ICT use?
(iv) What is the relative importance of factors that relate to students' pedagogical use of ICT?

Literature review

The use of technology in higher education is an important development. Wims and Lawler (2007) asserted that "while education unlocks the door to development, increasingly, it is information technologies that can unlock the door to education" (p.7). Technology has been rapidly developing and influencing society and daily life.

Higher institutions in both developed and developing nations around the globe are investing heavily in ICT. ICT investment thus provides an opportunity for developing countries to significantly improve in their higher education sectors. Tinio (2000) reported that, "ICTs greatly facilitate the acquisition and absorption of knowledge, offer developing countries unprecedented opportunities to enhance educational systems, improve policy formulation and execution, and widen the range of opportunities for business and the poor. One of the greatest hardships endured by the poor, and by many others, who live in the poorest countries, is their sense of isolation. The new communication technologies promise to reduce that sense of isolation and to open access to knowledge in ways unimaginable not long ago" (p.6).

ICT acts as a catalyst for pedagogical change (Czerniewicz, Ravjee & Mlitwa, 2007). Pedagogy is defined as "the teaching strategies, techniques or approaches that teachers use to deliver instruction or facilitate learning" (Wang, 2008, p.412). According to Wang (2008). Pedagogy, social interaction and technology are three aspects of a technology -learning environment necessary to allow learners to integrate ICT into learning. The use of ICT in higher education institutions has attracted the attention of researchers from different countries. These include studies on ICT use in Norwegian higher education (Wilhelmsen et al., 2009), "Classroom Technology in Business Schools" (Parker & Burnie, 2009), "Students of the network age: A complex portrait of English university first year students" (Jones, 2010) and "Undergraduate Students and Information Technology" (Smith & Caruso, 2010). Dorup (2004) conducted an investigation into learners' use of ICT in higher institution. The study found that most students showed a strong affection for ICT resources to support learning. However, it is not clear whether learners use these resources effectively. These investigations indicated that pedagogical issues are key components in ICT integration into higher education. The use of ICT has the

potential to change current pedagogical practices in Ghana's higher education sector which currently relies on the traditional lecture approach. Therefore, this study was intended to investigate students' pedagogical use of ICT, their attitudes toward the use of ICT and factors contributing to their use of ICT since there are limited publications on these issues in Ghana.

Methodology

The target population for this study was limited to undergraduate business students studying accounting, banking & finance and commerce. The total population of students in these programmes was 900. A sample of 270 students was randomly selected for this study. A table of values of sample size determination was used to determine the sample size of students (Burke & Larry, 2008). A total of 200 questionnaires were received, representing a 74.1% return rate from 270 questionnaires distributed to students. Of these, 20 questionnaires were deemed un-usable, due to data incompleteness, and were subsequently dropped from the data set, leaving 180 questionnaires for data analyses.

The questionnaire consisted of 71 items and was categorized into eight sections. Section I consisted of 20 attitude items adapted from Albirini (2004). The attitude items were categorized into affective, cognitive and behavioural domains. The overall reliabilities of the affective, cognitive and behavioural subscales were 0.63, 0.60 and 0.58 respectively. Section II consisted of 18 items of computer attributes. The attributes' subscales were usefulness, computer compatibility and computer complexity. The overall reliabilities of the computer usefulness, compatibility and complexity were 0.70, 0.65 and 0.72 respectively. Section III comprised nine items relating to students' ICT competencies. The computer competence scale was adapted from Albirini (2004). The scale was measured on a five-point scale ranging from 1 (no competence) to 5 (very much competence). The overall reliability of the scale was 0.83. Section IV contained 3 items of ICT access. The access scale consisted of a three item question. The access scale was also adapted from Albirini (2004). The scale ranged from 1 (never) to 5 (daily). Section V consisted of four peer support items. The overall reliability of the scale was 0.81. A five-point scale ranging from 1 (strongly disagree) to 5 (strongly agree) was used. Section VI also consisted of four school support item statements. The range of scale was the same as that of the peer support scale. The overall reliability of the scale was 0.64. Section VII comprised students' ICT usage items. A five-point scale ranging from 1 (never) to 5 (daily) was used. The overall reliability of the scale was found to be 0.83. Finally, section VIII contained the demographic information of the students. Sections I, II, III and IV of the questionnaire were adapted from Albirin's (2004) while sections V, VI, VII and VIII were developed by the researcher. According to Kline (2005), an alpha value of .90 is considered excellent, .80 very good and .70 acceptable. Hair, Black, Babin and Anderson (2010) considered a value of .50 as suitable.

Analyses

SPSS 16 was used to analyse the data. Data were analysed using descriptive statistics, multivariate analyses of variances (MANOVAs), and multiple regression. The demographics of the students and research questions 1 and 3 were analysed using descriptive statistics. MANOVAs were used to find the mean differences and statistical significance of differences among two or more groups (Tabachnick and Fidell, 2012, p.245). MANOVAs were used to compare the mean scores on perceived value, expectancy and perceived cost scales of the instrument by gender, program and level of study. This was followed by univariate analyses of variance (F-tests) if the MANOVA was significant ($p < .05$). MANOVAs were used to analyse research questions 2. Multiple regression analysis was used to assess the relationship between the dependent variable (Pedagogical ICT use) and the independent variables (affective, compatibility, complexity, competence, access and peer support) (Tabachnick and Fidell, 2012, p. 117). Multiple regression analysis was used to analyze research question 4.

Results

Sample descriptions

Of 180 students, 53.3% were males and 46.7% were females. The age of the students ranged from 18 to 28 and above. 32.8% were between 22 and 23 years of age. 3.9% were over 28 years old. In terms of program of study, 34.4% studied Commerce, 32.8% Finance and Banking and 32.8% Accounting. With regards to ICT experience, 57.2% had more than 5 years ICT experience, 30.6% had between 3 and 4 years experience, 11.1% had between 1 and 2 years experience, while 1.1% had less than 1 year's ICT experience.

Research question 1: Students' pedagogical use of ICT.
Table 1 shows the distribution of students' responses to pedagogical use of ICT. Here, pedagogical use means students' use of ICT to support learning. Cronbach's alpha value of 0.70 for students' responses to these seven items showed an acceptable internal consistency. This is consistent with Kline (2005), that alpha value of .90 is considered excellent, .80 very good and .70 acceptable. As can be seen in table 1, 67.8% of the students "browse the relevant websites" daily. This is followed by "communicating with peers" through collaborative and inquiry based learning and "solving problems" with 54.4% and 52.8% respectively.

Table 1: Students' pedagogical use of ICT

Item	Percentage (%)					Mean	SD
	Never	Once a month	Once a week	Twice a week	Daily		
Download learning materials	3.3	16.7	18.8	18.3	28.3	3.72	1.19
Give presentation of class work	10.6	52.2	15.0	12.2	10.0	2.59	1.14
Complete assignments	3.9	16.7	17.8	22.8	38.9	3.76	1.24
Communicate with peers	3.3	7.2	12.8	22.2	54.4	4.17	1.11
Browse relevant website	2.8	3.3	7.8	18.3	67.8	4.45	.97
Process and analyze data	9.4	12.2	14.4	22.8	41.1	3.74	1.36
Solve problems	6.1	10.6	14.4	16.1	52.8	3.99	1.29
Overall pedagogical use	5.6	15.0	14.4	19.0	41.9	3.77	1.19

SD= standard deviation, Cronbach alpha = .83

Research question 2: Significant differences in students' pedagogical use ICT with regards to gender, program and level of study.

Prior to multivariate analysis of variance (MANOVA), the assumption testing was conducted to check for the homogeneity of variance-covariance matrices. For the assumption of homogeneity of variance-covariance matrices to be met, an alpha value of .05 was set, as suggested by Tabachnick and Fidell (2012). MANOVAs were used to find the mean differences and statistical significance of differences between two or more groups (Tabachnick and Fidell, 2012, p.245).

A one-way, between-subjects MANOVA was conducted to find the mean differences in frequency of the seven pedagogical uses of ICT by gender. Box's M test was not statistically significant (p = .42) indicating that the assumption of homogeneity of variance-covariance matrices was not violated. The multivariate result was not significant for gender (Wilks' lambda = .960, F [7, 172] = 1.027, p = .41, partial η^2 = .04). Tabachnick and Fidell (2012) suggest Wilks lambda for general use. This result indicates no real difference in the pedagogical use of ICT between male and female students.

Similarly, a one-way between-subjects MANOVA was conducted to find the mean differences in frequency of the seven pedagogical uses of ICT by the program of study. The Box's M test for school program variables was statistically significant (p = .002) indicating that the assumption of homogeneity of variance-covariance matrices was violated. Therefore, Pillai's trace was used to evaluate the multivariate F tests because of its robustness (Meyers et al., 2006). The multivariate effect was also not

significant for programs of study (Pillai's trace = .129, *F* [3, 344] = 1.712, *p* = .054, partial η^2 = .07). This result implies that students' pedagogical use of ICT is the same with respect to programs of study.

Finally, a one-way, between-subjects MANOVA was conducted to find the mean differences in frequency of the seven pedagogical uses of ICT by the level of study. The Box's M test for location of school variables was not statistically significant (p = .49) indicating that the assumption of homogeneity of variance-covariance matrices was not violated. The multivariate effect was not significant for levels of study (Wilks' lambda = .900, F [21, 489] = .871, p = .630, partial η^2 = .04). This result means that students' pedagogical use of ICT is the same with respect to current levels of study.

<u>Research question 3:</u> Students' perceptions of factors relating to the use of ICT.

Attitudes toward ICT use were measured in terms of affective, cognitive and behavioural components. Table 2 revealed that students' overall mean score for their behaviour toward ICT (behavioural domain) was the highest (M = 4.41, SD = 0.86). This was followed by their knowledge about ICT (cognitive domain) (M = 4.33, SD = .91) and liking of ICT (M = 4.22, SD = 1.02). Moreover, technology characteristics were measured in terms of usefulness, compatibility and complexity. The analysis revealed that the overall mean score for usefulness component was high (M = 4.38, SD = 0.81), followed by complexity component (M = 3.99, SD = 1.09). Also the students' overall competence level of ICT was high (M = 3.82, SD = 1.02). Further, the result found that students' access to ICT was high (M = 3.79, SD = 1.17). In addition, the students' perception of peer support was found to be high (M = 3.91, SD = .85). Finally, the participants' assessment of school support was found to be very high (M = 4.10, SD = .75).

Table 2: Overall Mean and standard deviations of factors

Variable	M	SD
Affective domain	4.22	1.02
Cognitive domain	4.33	0.91
Behavioural domain	4.41	0.86
ICT usefulness	4.38	0.81
ICT compatibility	3.98	0.97
ICT complexity	3.99	1.09
ICT competence	3.82	1.02
ICT access	3.79	1.17
Peer support	3.93	0.85
School support	4.10	0.75

M = Mean,   SD = Standard deviation

<u>Research question 4:</u> Relative importance of factors that relate to students' pedagogical use of ICT.

<u>Correlation and regression analyses</u>

Table 3 showed that there was no significant correlation between ICT use and cognitive and behavioural domains. The results also showed a non-significant relationship between ICT use and usefulness and school support. However, ICT use significantly correlated to affective, compatibility, complexity, competence, access and peer support.

Table 3: Summary of correlation among variables

Variable	ICT use
Affective	.327**
Cognitive	.075
Behavioral	.116
Usefulness	.078
Compatibility	.190*
Complexity	.229**
Competence	.162*
Access	.205**
Peer support	.336**
School support	.135

* $p < .05$; ** $p < .01$

In the linear regression analysis, the variables affective, compatibility, complexity, competence, access and peer support were used as the predictor variables. According to Gay & Airasian (2009), the independent variables that individually correlated with the dependent variable were used to perform the analysis. The dependent variable was ICT use. The results revealed that the affective domain (β = .25), simplicity ("complexity" before the negative items were reversed) (β = .15) and peer support (β = .26) predicted students' use of ICT. Peer support was the strongest predictor of students' ICT; this was followed by affective domain. Compatibility, competence and access were not significant predictors of students' ICT use. 20.6% of the variance in students' ICT use was explained by the independent variables.

Discussion

The results of this study indicate that students' pedagogical use of ICT in their learning was high. This could be attributed to their ICT competence and accessibility to computers. The study found no significant relationship with gender, programs of study and level of study, and technology use. This finding is not consistent with the previous study which suggested significant differences in technology integration with gender and program of study (Tezci, 2011, Rafiu, 2009). For instance, Teczi found that male students use ICT for learning purposes more than the female students. With regards to programs of study, Teczi also revealed that physical science students use ICT more often than social science students.

Generally, the students showed positive attitudes toward ICT as revealed by the mean score of affective, cognitive and behavioural components on a 5-point scale. This finding is in agreement with past studies conducted by Teczi (2011), Teo (2008) and, Kubiatko and Halakova (2009). The overall positive level of computer attitudes could be attributed to their liking for computers and the ICT support they receive from colleagues. The students perceived the use of ICT as helpful. Many studies give evidence of the effect of perceived usefulness on attitude towards ICT usage and behavioural intention (Rasimah et al., 2011; Teo, 2011; Wong & Teo, 2009; Sumak et al., 2011). Sumak et al. (2011) found that perceived usefulness and perceived ease of use were factors that affected students' attitudes, and perceived usefulness was the strongest variable of students' attitudes toward the use of ICT in learning.

Also, their perception of the importance of peer support, competence, access to computers and school support was found to be high. This discovery is consistent with other studies conducted in different places (Tezci, 2011, Niederhauser & Perkmen, 2010). Affective, peer support, competence and access to computers were also found to correlate with pedagogical use of ICT. Finally, this study found that peer support, simplicity ("complexity" before the negative items were reversed) and affective had a strong influence on students' use of ICT. Peer support was the strongest ($\beta = .26$) determinant of technology use, followed by affective ($\beta = .25$). This result suggests that students' strong affection for ICT might encourage teachers to integrate ICT into their learning. This finding agrees with other research studies elaborating on the relationship between students' affection and their use of ICT (Teo, 2008; Albirini, 2004).

Conclusion

This study investigated undergraduate business students' implementation of ICT use in learning. The aims of the study were to investigate students' use of ICT in learning, their attitudes towards the use of ICT in learning and factors contributing to their use of ICT in learning.

The study found that students' pedagogical use of ICT was high. Despite students' high level of technology integration in learning, this study found that students' integration of ICT depends on their affection for ICT and the support they receive from colleagues. It is important for students to provide support for their colleagues and also have affection for ICT since peer support and affection have been found to be correlated to ICT usage, variables that determine successful integration of ICT in classroom. Also, the study revealed that students' attitudes toward ICT were positive. This finding suggests that computer attitudes whether positive or negative affect students' ICT usage in a technology-rich learning environment. The results of this study indicate that affective and peer support components play an important part in successful use of ICT in students' learning. Since affection determines students' successful technology integration, this study suggests a need for stakeholders (i.e. teachers, school leaders, policy-makers) to provide students with the requisite ICT

training to develop the skills of peer coaching in order to support their colleagues in their use of ICT in learning. These findings are useful to university business teachers since their knowledge of students' affection for ICT should encourage them to teach their students with technology in classrooms. Also, teachers' awareness of peer support would inform their decision to pair students according to their ICT competence to facilitate teaching in technology-rich learning environment.

Limitations and implications for future research

The population of this study was business students in Pentecost University College only. Therefore, the findings of this study cannot be generalized. Future studies should include more tertiary business schools. Further, the survey instrument limits this study because of its lack of open ended questions that would increase the qualitative understanding of the research. More open-ended questions should be included in the questionnaire in future. As noted above, a number of incomplete questionnaires were dropped from the data set. Therefore ample time should be given to students to complete survey questions in future studies. Further, qualitative investigation into students' usage and attitudes toward technology should be carried out in future to get in-depth understanding of their usage and attitudes toward ICT. While the current study adopted cross-sectional methods to collect data, future research should employ longitudinal studies over a long period of time.

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