Computer Self Efficacy, Computer-related Technology Dependence and On-line Learning Readiness of Undergraduate Students

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The study investigated undergraduates' computer self-efficacy, computer-related technology dependence and their online learning readiness. It adopted a correlational study and using simple random sampling technique 129 first year undergraduates were sampled. Major findings indicated that male undergraduates have higher mean scores in computer self-efficacy and online readiness than female students, while females had slightly higher mean scores in computer related technology dependence. Gender significant differences occurred only in computer self-efficacy. Self-efficacy increased significantly with years of experience. However, students' years of use of computer did not account for significant differences in computer-related technology dependence and their online learning readiness. There was significant relationship between computer self-efficacy, and computer-related technology dependence of undergraduates (r=.323, p<.05). Computer self-efficacy also significantly correlated with students' online-readiness (r=.330, p<.05). Positive correlation occurred between students' computer-related technology dependence and their online readiness (r=.273, p<.05). Computer self-efficacy and computer-related technology dependence predicted students' online learning readiness. It was recommended that stakeholders should endeavour to provide the computer facilities; train students; build up their computer self-efficacies; and to motivate female undergraduate students in the use of computer related technologies.

Keywords
computer self-efficacy
online learning readiness
computer-related technology dependence

Introduction

The advent of information communication technology (ICT) brought about tremendous global transformation in such a way that knowledge, skills and competences that were thought irreplaceable have been modified or replaced to fit into the demands of the 21st century. Modern school curriculum is driven by ICT knowledge and skills, and other 21st century skills. Little wonder why Hong, Chiu, Shih and Lin (2012:71) stated that the 'emergence and success of new technology sectors in both new and established educational settings is inextricably linked with individuals [being] able to recognize new opportunities and lead their exploitation'. They stressed that new technologies are driven by those with self-efficacy, that is, those with confidence in their ability to perform the task at hand.

Self-efficacy originates from social learning theory of Bandura (Brosnan, 1998), a theoretical framework regarded as '"triadic reciprocal determinism" and widely accepted in predicting individual behavior and identifying methods in which behavior can be modified or changed' (Shu, Tu, Wang, 2011:925). Bandura (2000) and Bandura, Barbaranelli, Capara, and

Pastorelli (2001) have noted that self-efficacy occupies a central role in the causal structure of cognitive theory because it affects adaptation and change through their impact on other determinants. Bandura (1994; 1997) defined it as a belief in one's own ability to organize and perform certain tasks or designated levels of performance that exercise influence over events that affect their lives.

Definitions of self-efficacy have centered on an individual's conscious conviction and confidence in his/her abilities to perform a particular task (Zulkosky, 2009; Lunenburg, 2011; Hong, Chiu, Shih & Lin, 2012; Min-Hsun & Pey-Chewn, 2012). Self-efficacy has been conceived to have an important role in shaping an individual's attitude (Ekizoglu & Ozcinar, 2010), and perceived self-efficacy affects choice of activities, efforts given in an activity, determination, duration and the level of anxiety and confidence when an individual encounters difficulties (Bandura 1982 in Ekizoglu & Ozcinar, 2010; Bandura, 2001). Self-efficacy is regarded to be context specific or the self evaluation or assessment of self through specifically defined situations, and this judgment influences people's decisions, goals, amount of effort expended in conducting a task, and the length of time they would persevere through obstacles and difficulties (Sam, Othman, & Nordin, 2005; Bandura, 1997).

Performing tasks is influenced by certain underlying psychological constructs such as the attitude of the individual to the tasks, motivation, expectations, belief on one's ability, etc. Self-efficacy belief which is one of these psychological constructs has been extended to specific domains such as computer use (Khorrami-Arani,2001). Barbeite and Weiss (2004) noted that computer self-efficacy is a variable that has been proved to influence computer use or performance. They further noted that computer self-efficacy is a specific type of self-efficacy. James (nd:2) defines computer self-efficacy as a 'judgment of ability in specific computing tasks, which are frequently organized in application domains such as word processing, spreadsheets, databases'. It has to do with an individual's conscious evaluation of his/her ability to perform specific tasks in the use of computer. Individuals who perceive themselves as having higher computer self-efficacy tend to have positive attitude to the use of computer and have better computer performance.

Computer self-efficacy has received serious attention and has been empirically studied by researchers. Shu, Tu and Wang (2011) studied the impact of self-efficacy and technology-related dependency on computer-related technostress and result indicated that employees with higher self-efficacy have lower technology-related technostress. Simsek (2011) examined the relationship between computer anxiety and computer self-efficacy and found moderate, negative but significant relationship. Computer self-efficacy has been found to be positively related to attitude to computer use, performance and negatively related to computer anxiety. This implies that one who has a high computer self-efficacy will be positively attuned to computer use and invariably expend more time in the use of computer and as well brace new advances in the information and communication industry.

Society is increasingly becoming dependent on computer related technology. Internet connected mobile phones are handy and affordable, and at any time and in any place, students communicate and source information via this means. Shu, Tu, and Wang (2011) observed that

people are becoming dependent on computer-related technology at work, and they went further to develop computer-related technology dependency as a construct and explored its relationship with computer self-efficacy and computer-related technostress. The reliance on the use of computer and other allied technologies to perform daily routines can be referred to as computer related technology dependency. Some people prefer to carry out their work with the aid of computer-related technology. Although, Shu, Tu and Wang studied employees whose routine jobs depend on computer technology, it has also become very difficult for one to engage in any meaningful academic voyage without recourse to a kind of computer-related technology and this has made it imperative for students to be dependent on these technologies. Cases of over-use of these technologies in universities have been identified (Chou, Condron, & Belland, 2005) which can be termed addiction.

Some universities today deliver some lectures online. A learner can study along side with others even at a very long distance while a teacher can teach even from his office. The trend continues in this direction. As more learning opportunities are made available online, it becomes imperative for researchers in education to first assess learners' online learning readiness (Smith, 2005). Galy, Downey, and Johnson (2011:1) have noted that 'modern classroom, whether online or campus-based, uses e-learning tools and Learning Management Systems that capture student cognition and engages them in the learning process via technology, while increasing their need for self-directedness'. Smith sees online learning as a kind of learning which learning resources are available electronically, and supported by a groupware system (computer-mediated communication) where learners can interact among themselves and with their instructor. Schreurs, Sammour and Ehlers (nd) has suggested that before the implementation of e-learning that learners' readiness should be determined. To them 'readiness includes learners' ability to adapt to technological challenges, collaborative training and synchronous as well as asynchronous self-paced training. It also depends on their motivation and their discipline to learn in a self-driven mode and to respond to online instructions' (p.2). Online learning readiness involves the technical skills of computer usage and site navigation, learners' dispositional attitude, and effective strategies for students' engagement with online learning (Alexander, Polyakova-Norwood, Johnston, Christensen, & Loquist, 2003 in Smith, 2005; Smith, 2005).

In Nigeria, there have been several efforts by the government to make the economy an ICT driven one and this can be possible when the education sector and its curriculum is driven by ICT. The bold attempts by the government include: policies, the establishment of the National Information Technology Development Centre (NITDC) in 2001, the National Open University, the National Virtual Library, the Mobil Internet Units which are buses equipped with computer systems and other accessories with VSAT installed on the buses for internet access, making acquisition of ICT skills mandatory for teacher education and the development of computer studies curriculum at the secondary school level (Salau, 2012). Undergraduate students are encouraged to use the internet for their work. And a greater majority of their work is dependent on the internet. As schools are adopting/adapting these new technologies it is pertinent to ascertain students' online readiness, their dependence on computer-related technologies and

their computer self-efficacy. Ability to excel in this ICT dependent age can be promoted/hampered by one's conviction of his ability to use the computer and individuals lacking this conviction will hardly venture into new technologies. It can, therefore, be argued that if computer self-efficacy is related to attitude to computer usage, it can equally be related to computer related-technology dependence and also the online learning readiness of undergraduate students. Knowledge of this will enable relevant authorities to know how, when and to what extent full scale online programmes for undergraduate students can be implemented. Hence the following research question and hypotheses were asked and tested to ascertain the relationship between computer self-efficacy, computer related-technology dependence and online readiness of undergraduate students.

a. What are the mean scores of computer self-efficacy, computer related-technology dependence and online learning readiness of the undergraduate students under study?

$H_{1:}$ Undergraduate students' self-efficacy is not related to their computer related-technology dependence and their online readiness.

$H_{2:}$ Undergraduate students' self-efficacy and computer related-technology dependence do not individually combine predict their online readiness.

$H_{4:}$ Undergraduate students' computer self-efficacy and computer related-technology dependency do not combine to predict their online readiness.

Method

The study adopted the correlational research design since the researchers are interested in determining the extent the variables correlate and the extent predictor variables could determine the criterion variable without the intension of manipulating any of the predictor variables. The population of the study consisted of 129 randomly sampled first year undergraduate students of the 2012/2013 academic session in the Faculty of Education.

The researchers adopted three instruments for computer self-efficacy, computer related technology dependence and online learning readiness. The instrument for computer self-efficacy scale was adopted from the questionnaire used by Sam, Othman, & Nordin (2005). It is made up of 29 items originally on a 5-point Likert scale but the present researchers adopted a 4-piont scale, which ranges from strongly agree (4 points) to strongly agree (1 points). Respondents were asked to self-rate their perceived confidence on their computer abilities. The instrument for computer related technology dependence was adopted from the questionnaire developed by Shu, Tu and Wang (2011) based on the works of Hoffman et al (2004). It is made up of seven items on 7-point Likert scale, ranging from 1 (strongly agree) to 7 (strongly disagree). However, the present researchers adapted it to 4-point scale, ranging from 4 (strongly agree) to 1 (strongly disagree). For online readiness, McVay's (2000, 2001) Readiness for Online Learning questionnaire as used by Smith (2005) was used. The questionnaire comprises 13 items on a 4-point scale of strongly agree (4 points), agree (3 points), disagree (2 points) and strongly disagree (1 point).

One hundred and fifty copies of questionnaire were distributed but only one hundred and twenty-nine copies were returned representing 86%. Sixty-one male (47.29%) and sixty-eight

(52.71%) female undergraduate students were sampled. Mean, t-test, ANOVA, Pearson product moment correlation coefficient and regression analysis were used as statistical tools.

Results

Table 1: Mean scores of undergraduate male and female students on computer self-efficacy, computer-related technology dependence and online readiness

Source	No	Computer self-efficacy mean(x)	Computer related technology dependence mean(x)	Online readiness Mean(x)
Male	61	90.44	42.56	43.49
Female	68	90.34	42.96	42.35
Total	129	180.78	85.52	85.84

Table 1 shows the mean scores of male and female students on computer self-efficacy, computer-related technology dependence and online readiness. Male undergraduate students have higher mean scores in computer self-efficacy and online readiness than female students, while girls had just a slight higher mean score in computer related technology dependence than male undergraduate students.

Table 2: Mean scores of undergraduate students on computer self-efficacy, computer-related technology dependence and online learning readiness according to years of use of computer

Period of computer usage	No	Computer self-efficacy	Computer related technology dependence	Online learning readiness
0-5 years	61	85.49	41.48	42.97
6-10 years	22	97.41	43.77	43.73
11-15 years	7	96.57	44.29	46.43
16 years and above	39	91.00	42.72	41.77

Table 2 shows the mean scores of undergraduate students on computer self-efficacy, Computer related technology dependence and online readiness considering the number of years they used computer sets. Those who have used computer from 0-5 years scored the least mean, followed by those who said that they have used the system for 16 years and above. Those who have used computer from 6-10years had the highest mean score followed by those who have used computer for 11-15years. For the computer related technology dependence, those who have used computer for 11-15 years scored the highest mean score the followed by those who have used computer for 6-10 years, 16 years and above, and 0-5 years in that order. In online readiness, those who have used computer for 11-15 years score the highest score, followed by 6-10years, 0-5 years and 16 years and above.

Table 3: t-test on male and female undergraduate students' mean scores on computer self-efficacy

Source of variance	N	X	SD	DF	t-cal	t-crit	Sign
Male	61	90.44	17.82	127	.036	1.149	.286
Female	68	90.34	15.42				

The t-test table above shows that the null hypothesis tested at 0.05 alpha level is significant; hence the null hypothesis that significant differences do not occur in male and female undergraduate students' mean scores on computer self-efficacy was rejected. This implies male undergraduate students' computer self-efficacy is significantly higher than that of the female undergraduate students.

Table 4: t-test on male and female undergraduate students' mean scores on computer related technology dependence

Source of variance	N	X	SD	DF	t-cal	t-crit	Sign
Male	61	42.54	8.52	127	-.271	.059	.808
Female	68	42.96	8.84				

Table 4 above shows that significant differences did not occur in male and female undergraduate students' mean scores on computer-related technology dependence; hence the null hypothesis was accepted.

Table 5: t-test on male and female undergraduate students' mean scores on online learning readiness

Source of variance	N	X	SD	DF	t-cal	t-crit	Sign
Male	61	43.4918	5.11737	127	1.212	.006	.938
Female	68	42.3529	5.50919				

Table 5 above shows that significant differences did not occur in male and female undergraduate students' mean scores on online readiness; hence the null hypothesis was accepted.

Table 6: ANOVA of computer self-efficacy of undergraduate students based on their period of use of computer

	Sum of Squares	Df	Mean Square	F	Sig.
Between Groups	2143.346	3	714.449	2.731	.047
Within Groups	32698.049	125	261.584		
Total	34841.395	128			

ANOVA table above shows that significant differences occur in computer self-efficacy of undergraduate students as a result of disparity in the period they have used computer.

Table 7: ANOVA of computer-related technology dependence of undergraduate students based on their period of use of computer

	Sum of Squares	Df	Mean Square	F	Sig.
Between Groups	55.049	3	18.350	.240	.868
Within Groups	9542.501	125	76.340		
Total	9597.550	128			

Table 7 above shows that the period students have used the computer did not account for any statistical difference in their computer-related technology dependence.

Table 8: ANOVA of online learning readiness of undergraduate students based on their period of use of computer

	Sum of Squares	Df	Mean Square	F	Sig.
Between Groups	152.289	3	50.763	1.854	.141
Within Groups	3422.935	125	27.383		
Total	3575.225	128			

Table 8 above shows that the period students have used the computer did not account for any significant differences in their online readiness.

Table 9: Correlation matrix coefficient of students' computer self-efficacy, computer-related technology dependence and online readiness.

		Self-efficacy	Technology dependence	Online readiness
Self-efficacy	Pearson Correlation	1	.323**	.330**
	Sig. (2-tailed)		.000	.000
	N	129	129	129
Technology dependence	Pearson Correlation	.323**	1	.273**
	Sig. (2-tailed)	.000		.002
	N	129	129	129
Online learning readiness	Pearson Correlation	.330**	.273**	1
	Sig. (2-tailed)	.000	.002	
	N	129	129	129

**. Correlation is significant at the 0.01 level (2-tailed).

Table 9 shows that there is significant positive relationship between computer self-efficacy, and computer-related technology dependence of undergraduate students with the Pearson product moment correlation coefficient ($r=.323$, $p<.05$). Computer self-efficacy also significantly correlated positively with students' online-readiness with the Pearson correlation coefficient ($r=.330$, $p<.05$). Also found is a positive correlation between students' computer-related technology dependence and their online readiness ($r=.273$, $p<.05$). Therefore we reject the hypothesis that there is no correlation between computer self-efficacy and computer-related technology dependence; self-efficacy and online readiness of undergraduate students; and computer-related technology dependence and online readiness.

Table 10: Regression summary of composite contribution of computer self-efficacy and computer-related technology self-rating scores

Model	R	R Square	Adjusted R Square	Std. Error of the Estimate
1	.374[a]	.140	.126	4.98936

a. Predictors: (Constant), Technology dependence, Self-efficacy

Table 10 shows that the multiple regression correlation coefficient indicating the relationship between the independent variable (computer self-efficacy and computer-related technology dependence) and students' online readiness is 0.140. The adjusted R square is 0.126, meaning that the independent variables accounted for 12.6% variation in students online learning readiness. Further verification using multiple regression ANOVA produced $F_{(2,\ 126)}$ =10.241; P<0.05 meaning that there was a significant positive linear relationship between students' computer self-efficacy, computer-related technology dependence and online readiness of undergraduate students.

Table 11: Regression summary of the relative contribution of students' self-efficacy and self-rating scores

		Unstandardized Coefficients		Standardized Coefficients		
Model		B	Std. Error	Beta	T	sig
1	(Constant)	30.113	2.862		10.520	.000
	Self-efficacy	.087	.028	.269	3.087	.002
	Technology dependence	.115	.054	.187	2.137	.035

a. Dependent Variable: Online readiness

Table 11 above shows that both computer self-efficacy and computer-related technology dependence have relative significant contribution. From the table the coefficient of computer self-efficacy is significant at 0.05 alpha level, (B=.087, $t_{(127)}$= 3.087; P<0.05) while the coefficient of computer-related technology dependence is significant at 0.05 alpha level, (B=.115, $t_{(127)}$= 2.137; P<0.05). Computer related technology dependence has larger relative significant contribution in predicting online readiness.

Discussion

Overall it could be said that the undergraduates under study have good computer-self efficacy, to a great extent depend on computer-related technology in carrying out their activities and as well are online ready for their academic works. Male undergraduate students had higher mean scores in computer self-efficacy than female undergraduate students; however, t-test analysis revealed no significant differences in their computer self-efficacy mean scores. This is in agreement with the studies conducted by Bauer (2003); Vekiri and Chronaki (2008) in which there are significant differences in the mean scores of computer self-efficacy beliefs male and female respondents. Also, Hsiao, Lin, and Tu (2010) in a study found gender differences in their computer self-efficacy. The study contrasted the study by Galpin, Sanders, Turner and Venter (2005) which revealed that among secondary school students that there were no significant differences in general computer self-efficacy as a result of gender. This may have resulted as a

result of differences in population or in setting. This work did not reveal gender equality in computer receptivity and perceived computer self-efficacy such as the work of Sam, Othman, and Nordin (2005). It appears that the era of male dominance in scientific domains such as computer usage and the sciences might not have faded away as is applicable in some more ICT developed nations. Both male and female undergraduates did not see themselves as having equal capacity to surf the net, use software in their systems, etc.

Also, the longer students used computer, the more they have higher computer self-efficacy beliefs. Students that had used computer for 0-5 years had the least mean score in computer self-efficacy. This is anticipated in the sense that one's past experiences constitutes a source for self-efficacy; for example, if one's past experiences received positive feedback as a result of exhibited competence one is bound to perceive himself as having the ability to complete a task (Siegle & McCoach, 2007; Zulkosky, 2009). Surprisingly, as self-efficacy kept on increasing with the number of years of using computer it dropped slightly when it got to those who have used computer for the highest number of years in comparison with those preceding them and this may be explained by the fact that both groups have attain a certain level of competence in the use of computer that they now have strong belief in their abilities. It may equally be explained by looking at the fact that the more experience ones are in a better position to adjudge their self-efficacy correctly; that is, they may not over blow their perceived abilities perhaps as a result of the fact that they might be exposed to more complex computer-related technologies (Doyle, Stamouli & Huggard, 2005). ANOVA revealed that there are significant differences in computer self-efficacy of undergraduate students as a result of disparity in the period they have used computer. Though Scheff test was not conducted to show direction of differences, experience with the use of computer has been found to have significant relationship with computer self-efficacy (Bauer, 2003; Hsiao, Lin, & Tu, 2010; Doyle, Stamouli, & Huggard, 2005). This finding points out to the fact that computer self-efficacy may be influenced by the period of use. As one continues to use the computer, ones abilities will likely improve which will lead the individual to belief in the efficiency of his abilities.

Results indicated that undergraduate students show great dependence on computer-related technology in carrying out their daily activities. They depend on computer-related technology in carrying out their assignment, project work, seminars, etc. Surprisingly female students are slightly more dependent on computer-related technology than male students. It should have been expected that male undergraduate students will depend on computer related technology more than female students more especially as they had greater mean score in computer self-efficacy. And the mean scores in computer related dependence continued to increase very slightly till it dropped for those who have used computer for 16 years and above. The motivational capacity of computer-related technologies and the zeal to learn more about the use of these technologies to solve problems in schools may account for the above result. T-test and ANOVA revealed that there were no significant differences as a result of gender and period of use respectively.

In online readiness, undergraduate could be said to be online ready for their academic activities. Male had higher mean score than female respondents and those who have used

computer for 11-15 years score the highest score, followed by 6-10years, 0-5 years and 16 years and above. The drop in online readiness among those with the highest number of use could have a relationship with the drop in their self-efficacy. They are expected to be more self-efficacious than others. It could be that one's belief in one's computer self-efficacy could affect even his perception on being online ready. The more the self-efficacy the better the way the individual perceives his online readiness. t-test and ANOVA revealed that there were no significant differences as a result of gender and period of use respectively. This agrees with the study of Hung, Chou, Chen and Own (2010) that gender made no statistical differences in the five online learning readiness scales (OLRS) dimensions.

Correlating the three variables, it was found that there were significant relationships among the three variables. This shows that if computer self-efficacy increases, one's dependence on computer-related technology will also increase and the readiness for online learning will increase. Increased computer self-efficacy will enable one to venture into and explore new technologies. By so doing some technical skills and competences for online learning readiness will be developed since students who are not technically prepared do not do well in online learning programmes (Cintrón, & Lang, nd). Going further computer self-efficacy and computer-related technology dependence of undergraduate students combined to predict their online learning readiness. This implies that for effective online learning programme to be mounted efforts should be made to improve students' computer self-efficacy and computer-related technologies be provided. However, students' computer-related technology dependence predicted their online learning readiness better than their computer self-efficacy which indicates that better computer and internet skills and competencies are required for successful online learning readiness of undergraduate students (Peng, Tsai & Wu, 2006 in Hung, Chou, Chen, & Own, 2010).

Recommendations

For the fact that there exist significant relationships among computer self-efficacy, computer-related technology dependence and online readiness of undergraduate students, it is recommended that for any online learning programmes to be mounted in schools efforts must be made by relevant authorities: to provide the computer facilities; train and retrain students; build up their computer self-efficacies; and to motivate and encourage female undergraduate students in the use of computer related technologies, and facilities should be made available for them.

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