

Computer Efficacy as Determinant of Undergraduates' Information Communication Technology Competence in State-Owned Universities in the South-West, Nigeria

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Abstract The study examined computer efficacy as determinant of information communication Technology Competence in the South-West, Nigeria. The descriptive survey design was adopted for the study. Five State-owned Universities (Adekunle Ajasin University, Akungba Akoko, Ondo State, Ekiti State University, Ado-Ekiti, Nigeria, Lagos State University, Lagos State, Nigeria, Olabisi Onabanjo University, Ogun State, Nigeria and Osun State University, Osogbo, Nigeria) were purposively selected. Three departments; English, Geography and Biochemistry, were randomly selected from the faculties of Arts, Social Sciences and Sciences respectively. The stratified sampling technique was used to select 1798 respondents among 200 level to 400 level students from the selected departments. Questionnaire was used as instrument for data collection; out of one thousand, seven hundred and ninety eight (1798) copies of questionnaire distributed to the students in the three selected departments, one thousand, five hundred and twenty nine (85%) were returned with valid responses. The data collected were subjected to Cronbach Coefficient Alpha to determine its reliability ($\alpha = 0.94$). Data were analysed using descriptive statistics and Pearson product moment correlation at 0.05 level of significance. The results indicated that majority of the undergraduates ($\bar{X}=52.33$) had the highest level of computer efficacy; Biochemistry Undergraduates had the highest ICT Competence ($\bar{X}=32.28$) than Geography and English Undergraduates. Computer Efficacy ($r = 0.63$) had significant relationship with ICT competence. The study recommended the need to promote computer efficacy and ICT competence among undergraduates.

Keywords Computer Efficacy, State-owned universities in Nigeria, Undergraduate ICT Competence

1. Introduction

Computer-efficacy which is often referred to as computer self-efficacy theory is the basic variable in this study. It is derived from Bandura's self-efficacy construct which in turn is based on social cognitive theory. Bandura (1977) defined self-efficacy as a person's belief in his ability in specific situations. According to him, self-efficacy consists of three dimensions of strength, magnitude and generalizability. Strength refers to the confidence possessed by an individual in his ability in various computing tasks; magnitude is an individual with high computer self-efficacy, while generalizability reflects the scale to which judgement is limited to a particular computing action. In another vein, Bandura (1986) advanced the concept of self-efficacy as people's judgement of their capabilities to organise and execute causes of action required to attain designated types

of performance. This required performance is what this study referred to as competence.

It has been observed that university undergraduates with a strong sense of efficacy will be able to adapt and be competent in the use of ICT and will be able to adapt in their learning and research activities in the university system. But those who are beset with low efficacy will suffer physical and emotional strain (Bandura, 1996). He concluded that the stronger the self-efficacy, the more likely will the person pursue challenging tasks, persist on them and perform them successfully and competently. An individual might have high computer self-efficacy using the internet but low computer self-efficacy when asked to design a database.

Self-efficacy is seen by some as being a better predictor of performance than actual capability because a person's judgements, based on prior experience often determine how a person will use the skills and knowledge he has in specific domains (Smith, 2001). Karsten and Schmidt (2008) observed that frequency of use is a factor that has a bearing on computer self-efficacy. An individual's computer self-efficacy toward an application can decline during periods of inactivity with that particular application. Similarly,

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frequency of use is likely to increase computer self-efficacy. Gibbs (2009) observed that, since computer self-efficacy refers to a person's perception of his computing ability, fundamentally, this suggests that a person's perception of his ability in certain tasks can very much depend on whom they are comparing themselves with and the past experiences with computer tasks. Smith (2001) in his own view on the influence of efficacy on competence, observed that computer self-efficacy is a better predictor of performance than actual capability because a person's judgement based on prior experience often determines how he will use the skills and knowledge they have in specific domain. It is germane to know that self-efficacy is not a static concept; it is continually being actualized in an individual's mind, which Bandura refers to "mastery experience". For example, if university undergraduates value their interpersonal skills and believe that they are capable of maintaining ICT competence by pursuing a goal to its logical conclusion, their self-efficacy in that area will likely contribute to positive goal attainment.

2. Statement of the Problem

Developments in Information and Communication Technologies (ICT) have been making a great impact on almost every aspect of human sectors, thus technology is challenging and redirecting human lives. To a large extent, Information Technologies (IT) is a dramatic influence in the education arena. In view of the demands of the labour market, institutions of higher learning in developing countries such as Nigeria are striving towards making institutions' environments ICT compliant to gain more effectiveness in the teaching and learning process. Recent trends in instructional process witness immeasurable alteration and transformation by the emergence of an avalanche of computer technology innovations.

Nigerian University undergraduates have long realized the importance of ICTs, particularly the Internet for information access to improve their job performance and research output. Studies indicated that researchers in the developed world use ICTs extensively to acquire, produce and disseminate information more than their counterparts in developing countries simply because access to global knowledge is made readily available to them through the availability of information infrastructural facilities couple with enabling working environment.

The functional inadequacies exhibited by Nigerian University undergraduates in the area of ICTs use coupled with their limit their research output. Anxiety, stress, depression and narrow vision of how best to face challenges limit their research and learning. The Internet sources of information available to Nigerian university undergraduates are not readily accessed due to their low computer efficacy skills. Besides, there are financial constraints on the part of University undergraduates to provide 24/7 Internet network connectivity. The deplorable infrastructural facilities,

insufficient Internet facilities, low bandwidth and limited computers terminals among others, are added obstacles compounding meaningful educational research and learning. The scenario of incremental change in the development and funding of the mechanisms and infrastructure for scholarly research productivity in developing countries are highly unlikely to result in any breakthroughs in the quantum or quality of academic output of university undergraduates.

In the light of these findings, therefore, this study intends to examine computer efficacy as determinant of undergraduates' information communication technology competence in state-owned universities in the south-west, Nigeria.

3. Objectives of the Study

1. Find out the level of computer efficacy of undergraduates in the selected universities
2. Determine the level of undergraduates ICT competence in the selected universities
3. Establish the significant relationship between computer-efficacy and undergraduates' ICT competence in the universities under study

4. Research Questions

1. What is the level of computer efficacy of undergraduates in the selected universities?
2. What is the level of undergraduates ICT competence in the selected universities?

5. Research Hypothesis

HO₁: There is no significant relationship between computer efficacy and undergraduates' ICT competence in the universities under study.

6. Significance of the Study

The ICT competence in an academic environment like the university is considered essential among the undergraduate for their educational and career advancement. The ability of the undergraduates to locate the needed information with the aid of ICT is crucial and paramount for efficient academic work. The problem of mutilating library books and other anti-social behaviour of undergraduates who are not ICT compliant in searching for relevant information shows that they lack necessary computer efficacy skills for information handling as well as other information seeking behaviour traits. Thus, this could serve as a guide for stakeholders who are charged with the responsibility of making digital information sources available to the users, to teach undergraduates computer efficacy skills that could enhance their ICT competence. It is expected that from the findings

and recommendations of this study could emerge a new body of knowledge that could enhance ICT competence of undergraduates this making them to have in depth knowledge on the importance of computer efficacy skills and ICT competence, thereby taking positive steps to develop their information system to match with the new age. Finally, the study could avail the crucial role of computer efficacy in ICT competence thereby bringing about academic achievement. It could also add to existing literature on computer efficacy and be undergraduates ICT Competence

7. Literature Review

Computer efficacy (also known as 'Computer self-efficacy') which itself was derived from "self-efficacy." Bandura was the first writer to use the term self-efficacy. Bandura (1986) defined self-efficacy as people's judgement of their capabilities to organise and execute courses of action required to attain designated types of performances. Further studies by Bandura discussed the psychological construct of self-efficacy as a concept that referred to beliefs in one's capabilities to mobilize the motivation, cognitive resources and courses of action needed to meet situational needs (Bandura and Wood 1989) have described the importance of not confusing self-efficacy with self-esteem. Although self-efficacy and self-esteem are both concerned with the judgements of individuals they do not share any direct relationship with each other. They noted that self-efficacy was concerned with self-capability, whereas self-esteem was concerned with self-worth. In the same vein, Bandura (1997) also affirmed that self-efficacy beliefs develop in response to four sources of information. These are enactive experience, vicarious experience, verbal persuasion, and physiological and affective states. Enactive experience implies that success in the performance of a given task will increase the self-efficacy of the person who has successfully performed the task. The vicarious involves experiences where other people are seen to succeed or fail and how that can affect one's own self-efficacy. Verbal persuasion, if realistic, can encourage efforts that are more likely to increase efficacy through success, while physiological and affective conditions such as stress can also affect self-efficacy. His view has also been supported by Schwarz (1999) who generalised self-efficacy and linked it to a global confidence in one's coping ability across a wide range of demanding or novel situations which has a broad and stable nature.

Having confidence in one's ability to tolerate and to overcome (Bandura, 1977), to build up organisations (Baum and Locke, 2004) and engage in other activities is a critical predictor of improved performance and creativity. "Without self-efficacy, individuals give up trying to accomplish their goals, making self-limiting decisions that foreclose opportunities even though individuals have the necessary skills to follow a path of action." (Lucas and Cooper, 2005). In the work of Stajkovic and Luthans (1998) 114 studies were identified that used a task performance view of self-efficacy. Bandura (1977) also looked at how

self-efficacy is to computer use, liking, computer use with educational achievement, especially since computer provides a ready means for self-directing learning. This is computer self-efficacy and ICT competence. He further opined that disparities in computer skills can create disparities in educational development. It is this construct of Bandura's computer self-efficacy that this study derived the computer efficacy concept.

Most investigations on self-efficacy in academic settings have sought to determine the predictive value of self-efficacy believe on varied performance. This is why Bandura (1996) argued that the stronger the self-efficacy the more likely the person is to select challenging tasks, persists at them successfully. ICT competence being a product of academic achievement depends heavily on the students' personal conviction of being in charge of their own fate. The high achievers did not ascribe their fate to luck or vagaries of chances, but rather to their own personal decisions and efforts. In the same vein, students who rarely experience success in the classroom and perceive themselves as academic failures often develop a syndrome that includes a variety of self-defeating motives. This also goes for undergraduates who are ICT incompetent users.

Tella, Ayeni, and Omoba (2007) carried out an empirical study on undergraduates in Faculty of Education, University of Ibadan on self-efficacy use of ICT and academic performance. They noted germane role of self-efficacy and use of ICT as predictors of academic performance. They observed that ICT services available to students are not used to their full potential. This could be as a result of their low level computer self-efficacy. It can therefore be noted from the above that computer self-efficacy is another determinant of ICT competence. The above mentioned Studies already conducted by Tella et al (2008) on self-efficacy and the use of ICT suggest that the two variables would be related to ICT competence thus bringing about academic performance. They further stated that the need for electronic information for the purpose of research and learning in various institutions has posed challenges to ability and access of ICT facilities for the purpose of competence. They concluded that correlation exists among their research independent variables- self efficacy and the use of electronic information, and their dependent variable- academic performance.

This agrees with this research correlation of computer self-efficacy and ICT competence, since ICT competence is a product of good academic performance. Tella et al (2007) now posited that a report by NCREL (2006) found that 99% of schools in the United States have access to the internet. They opined that this can enhance their computer self-efficacy thereby bringing about competence. In a similar report by Lenhert, Madden and Hittlin (2005), approximately 80% of American youths use the internet on daily basis. They went further that in developed world, computers are like pen and pencil, while in Africa, it is still a luxury. Students with little belief in their ability to use computer might perform more poorly on computer-based tasks whereas better computer self-efficacy could increase

persistence and success in studying computer, (Sam, Othman and Nordim, 2005) and carrying out computer-based tasks. Khorrami (2001), highlighted several researches which demonstrated the impact that computer self-efficacy may have on increasing performance thereby bringing about competence. Porter (2005) however, stated that in developed countries librarians in different universities have developed a number of information literacy programmes for science based fields of study, such as Biology, Chemistry, to mention a few, to enhance their competence. Petzold, Winterman and Montooth (2010) also gave similar development for science based area. All this enhances their ICT competence than other areas like science and social sciences.

It is suggested that a person's judgment of his ability in certain tasks can very much depend on whom he is comparing himself with and the past experiences he has had (Karsten and Schmidt, 2008; Gibbs, Steel and Kuiper, 2011). Some researchers go so far as to say that computer self-efficacy is a better gauge of actual performance than actual competence, because a person's is aligned with previous experiences and may determine how a person approaches a task in a given domain (Smith, 2001). However, discrepancies in a person's computer-self efficacy may occur because of misjudgements of knowledge or task requirements (Bandura, 1977). Many students begin university with immense confidence in their ability to use computers, but are often not capable of completing tasks without extensive instructions (Smith, 2001).

Waldman (2003) asserted that it is important to note that computer self-efficacy can be explained in terms of academic self-efficacy beliefs which vary according to subject matter. Undergraduates can have high computer self-efficacy in one field of study but may not have in another, depending in their mastery and vicarious experience in a particular subject area. Ren (2000) explained further that students with self-efficacy will be more likely to take advantage of what is around them. This is because those in the ICT related fields would be familiar and also feel comfortable with ICT. They would use it to enhance their learning competence.

Tella, Tella, Ayeni and Omoba (2007) undertook a research to determine the level of influence of self-efficacy and use of electronic information resources as predictors of students' academic performances. Its participants were 700 students randomly selected from the Faculty of Education, University of Ibadan. The results indicated that self-efficacy and use of electronic information jointly predict and contribute to academic performance of the students' vis-à-vis the lecturers. Studies carried out in Nigeria affirmed the role that computer self-efficacy plays in the fields of study of undergraduates in order to attain ICT competence. Ibegum (2004) carried out a study on the use of the internet by students of the college of Medicine, University of Lagos, Nigeria. He found out that majority of the students used it to search for academic materials and visit other university websites. Ajuwon (2003) also carried out a study on the use of computer and the internet among first year clinical and

nursing students in University College Hospital, Ibadan, Nigeria. He discovered that the students used these facilities to search for relevant information for their studies. The above studies show the role of science related field of studies and computer self-efficacy on undergraduates ICT competence. However, in another field like education undergraduates are expected to be competent enough to use ICT but some of the lecturers that teach them in education as a field of study exhibit a certain degree of low computer self-efficacy, this may invariably affect the students negatively (Orhin 2002; Albion, 2003).

In the studies of college students who pursue science and engineering courses, high self-efficacy has been demonstrated to influence the academic persistence necessary to maintain high academic achievement (Brown, 1999). In a study of ICT skills and computer efficacy of research students in Institute of Bahauddin Zakariya University, Multan, Pakistan carried out by Zabzwari, Bhatti and Ahmed (2012), the study showed that most of the students use ICT in their field of study for learning and research.

8. Research Methodology

The study used the descriptive survey research design. This design was deemed most appropriate because there was no manipulation of any of the variable in the study. The population of the study was 4499 students in state-owned universities in the faculties/departments of the five selected state-owned universities in the South-West, Nigeria. This consists of all students from 200L to 400L from departments of English, Geography and Biochemistry from Faculties of Arts, Social Sciences and Sciences respectively in the state owned five universities used for the study. However, the multi-stage sampling technique was adopted for this study. This was considered appropriate because the method that was used involved many stages since it was not possible to reach the actual subjects of the sample directly. In the first stage, five state-owned universities in the South-West, Nigeria, were purposively selected out of the eight in the zone because; the courses of interest in this study were present in these institutions. Second stage, three departments, English, Geography and Biochemistry were randomly selected from the faculties of Arts, Social Sciences and Sciences respectively. Third stage, the stratified sampling technique was used to select 1798 respondents among 200 level to 400 level students from the selected department. One thousand five hundred and twenty nine copies were filled, returned and found useful for the study. The same number goes to the ICT competence test. This represented 85% response rate. The choice of undergraduates from 200 to 400 levels is because they must have had useful experience of ICT in their various universities. The 100 level undergraduates did not participate in the study because they are still regarded as fresh students who are just adjusting to the university system thus they may not have had enough opportunity of using ICT for learning in the university

system. Table 1 shows the sample size from 200 to 400 level in the universities used for the study.

Three faculties were selected in each university and one department was selected in each Faculty. However, Ladoke Akintola University of Science and Technology, Ogbomoso, Ondo State University of Science and Technology, Okitipupa and Tai Solarin University of Education, Ijebu-Ode were not used for the study.

A Questionnaire tagged “Computer Efficacy level as determinant of Information Communication Technology Competence Questionnaire (CEDICTCQ)” was used as instrument for data collection. The instrument was divided into two sections A and B. Section A consists of demographic data from respondents, section B consists of information on the literacy skills by students and utilization of information. The instrument was given to two experts in the faculty of Education University of Ibadan to validate while face validity of the instrument was done through another expert in the same university. The reliability of the instrument was ascertained through a trial testing conducted on 30 undergraduates apart from those used for study. The data collected were subjected to Cronbach Coefficient Alpha to determine its reliability ($\alpha=0.94$). Data were analysed using descriptive statistics and pearson product moment correlation at 0.05 level of significance.

9. Results and Discussions

1. Research Question 1: What is the level of computer efficacy of undergraduates in the selected universities?

In Table 2, the rating of the items on Computer-efficacy of undergraduates is shown thus: Working on a personal computer (Mean =3.53) was ranked highest in the mean score rating and was followed by using a printer to print out their work (Mean =3.31), they could complete a task using

ICT if they had seen someone else demonstrate how it could be used (Mean =3.27), second to the last, understanding terms relating to computer hardware (Mean =3.06), followed by Learning advanced skills within a specific application software (Mean =3.04) and lastly followed by they could complete a task using ICT if there was no one around to tell them what to do (Mean =2.93).

Table 3 indicates that 953 of the respondents had the highest computer-efficacy with a mean score of 52.33 while 576 respondents had Low computer-efficacy level with a mean score of 38.18. This means that, the majority of the respondents had high computer-efficacy.

2. Research Question 2: What is the level of undergraduates ICT competence in the selected universities?

Table 4 indicates that Biochemistry had the highest mean score of 32.2821, this is followed by English with a mean score of 31.8000 and lastly Geography had a mean score of 29.0098 respectively. This is also in line with Fortin (2000) who discovered a sharp difference among ICT users from humanities, social sciences and sciences; this shows the influence of field of study in the use of ICT. The result here also supports Adodo (2012) who reported that the students that are not science oriented may not be versatile in ICT like the science based students.

HO₂: There is no significant relationship between computer-efficacy and undergraduates' ICT competence in the universities under study.

Table 5 showed that there was a moderate positive significant relationship between ICT competence and computer - efficacy of undergraduates with ($r = 0.63$, $N= 1529$). This implies that computer- efficacy of undergraduates had significant moderate positive correlation with ICT' competence. This hypothesis is rejected.

Table 1. Selected departments and faculties in the universities and sample size used for the study

Faculty/Dept	Level	Universities									
		AAUA		EKSU		LASU		OOU		UNIOSUN	
		SP	SS	SP	SS	SP	SS	SP	SS	SP	SS
Arts-(English)	200	96	38	168	67	106	42	120	48	203	81
	300	71	28	149	60	107	43	87	35	128	51
	400	55	22	160	64	110	44	100	40	109	44
Sciences-(Biochemistry)	200	97	39	204	82	68	27	121	48	110	44
	300	98	39	148	59	62	25	89	36	72	29
	400	105	42	113	45	149	60	400	160	125	50
Social Science-(Geography)	200	56	22	145	58	20	8	60	24	37	15
	300	55	22	106	42	16	6	30	12	21	8
	400	65	26	76	30	32	13	30	12	20	8
Total		698	278	1269	507	670	268	1037	415	825	330

SP – Study population = 4499 SS – Sample size = 1798

Table 2. Computer-efficacy of the undergraduates in the selected universities

S/N	Statements	SD	D	A	SA	Mean	Std
1	I feel confident Working on a personal computer	58 3.8%	67 4.4%	413 27.0%	991 64.8%	3.53	.75
2	Using a printer to print out my work	81 5.3%	123 8.0%	563 36.8%	762 49.8%	3.31	.83
3	I could complete a task using ICT if I had seen someone else demonstrate how it could be used	103 6.7%	104 6.8%	594 38.8%	728 47.6%	3.27	.86
4	Using the user's guide when help is needed	98 6.4%	111 7.3%	641 41.9%	679 44.4%	3.24	.85
5	Entering and saving numbers or words into a file	102 6.7%	104 6.8%	647 42.3%	676 44.2%	3.24	.85
6	Copying a disk	107 7.0%	167 10.9%	533 34.9%	722 47.2%	3.22	.90
7	Making selections from an on-screen menu	100 6.5%	158 10.3%	683 44.7%	588 38.5%	3.15	.85
8	Exiting from the application software	92 6.0%	182 11.9%	668 43.7%	587 38.4%	3.14	.85
9	Retrieving a data file to view on the monitor screen	98 6.4%	180 11.8%	682 44.6%	569 37.2%	3.13	.85
10	Handling removable storage devices correctly	108 7.1%	193 12.6%	653 42.7%	575 37.6%	3.11	.88
11	Getting software up and running	70 4.6%	222 14.5%	732 47.9%	505 33.0%	3.09	.81
12	Using the computer to analyse numeric data	101 6.6%	208 13.6%	672 44.0%	548 35.8%	3.09	.87
13	Understanding terms relating to computer hardware	134 8.8%	174 11.4%	691 45.2%	530 34.7%	3.06	.90
14	Learning advanced skills within a specific application software	97 6.3%	219 14.3%	743 48.6%	470 30.7%	3.04	.84
15	I could complete a task using ICT if there was no one around to tell me what to do	142 9.3%	284 18.6%	647 42.3%	456 29.8%	2.93	.92

Table 3. The general mean score on computer-efficacy of undergraduates

Computer -efficacy	Mean	Std. Deviation	N
Low computer-efficacy	38.1753	11.3193	576
High computer-efficacy	52.3305	4.0388	953

Table 4. Comparison of the Mean scores of the level of ICT competence of Undergraduates by field of Study

Course of Study	Mean	Std. Dev.	Rating
Geography	29.0098	12.5540	3
Biochemistry	32.2821	10.5118	1
English	31.8000	11.8693	2

Table 5. Relationship between ICT competence and computer- efficacy of undergraduates

Variable	Mean	Std. Dev.	N	R	P	Remark
ICT competence	129.7050	37.3534	1529	0.63	.000	Sig.
Computer-efficacy of undergraduates	46.9980	10.2692				

10. Conclusions and Recommendations

This study investigated the contributions of computer efficacy, computer use, and computer phobia to Nigerian undergraduates' academic performance in a computer graphics course. To enhance good performance in computer related courses in institutions of higher learning, stakeholders of the education industry would need to reconsider developing students' computer usability skills in order to maximise the potential of the technological facilities for academic benefits and possible reduction of unnecessary anxiety. The 21st Century also called ICT Literacy not only the Traditional concept of Literacy, but also encompasses the ability to incorporate the new technologies into research and learning.

The results of this study indicate the essential significance of computer use and efficacy as antidotes to exercise fear towards accomplishing given academic tasks via the computer. The realisation of the potential of good quality of visual instructional resources is gaining more ground in the field of education in view of continuous advancement in

Information and Communication Technology and the available graphics software. In Nigeria, for educators to motivate students' unrestrained attempt to use computers "meaningfully" to reflect improved standard of education for a better tomorrow; the following are recommended:

- A practically oriented and students centred introduction to computer course should be made a minor, but a must do for all students at the first year of their programmes in the university so as to expose them to early acquisition of the needed computer skills, knowledge and build the necessary computer confidence in them;
- Efforts should be made to ensure that every student has unrestricted access to computers in the university
- Government and University authorities should establish and enforce rules that would compel lecturers to adopt ICT oriented methods for instructional purposes
- Authorities of institutions of higher learning should endeavour to establish and operate functional and standard computer cluster rooms at campus's strategic points. This would reduce the number of hours students spend at the cybercafés to queue for turn taking over computer use as well as the hours spent on unnecessary chatting, viewing inappropriate materials, etc.;
- University authorities should endeavour to encourage online lecturer and students interaction for discussion, submission of assignments, and other related academic activities in order to assist the "computer weaklings" get out of their web of anxiety towards using computers;
- Computer counselling centre should be established in each of the faculties of all universities so as to encourage students who have low computer efficacy to overcome technology anxiety, save their academic career from sudden collapse and provide succour to already frustrated students.

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