Information and Communication Technology (ICT) and Administrative Processes in Universities in South-Eastern Nigeria

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ABSTRACT

Information and communication technology (ICT) and administrative processes in universities are becoming challenging especially in developing nations, such as Nigeria, where governments place less emphasis on administration and education. Many government-owned public institutions, including federal public institutions, are finding it difficult to raise enough resources for such enterprise. This study investigated the ICT and administrative processes among staff of universities in south-eastern Nigeria. Three hundred and twenty seven (327) respondents were selected from two universities in south-east, Nigeria. The results show that availability of ICT, which is one of the administrative processes, contributed 11% to the unique variance in impact of ICT on administration ($\beta = .32$, $t(235) = 6.22$, $p < .001$). The study also reveals that there is a strong relationship between usage and impact of ICT on administration in south-eastern Nigeria. The gender and the universities of the respondents were also significantly related to the level of impact. The roles of the integration of ICT in universities in developing nations and in Nigeria in particular were discussed.

General Terms

Information and Communication Technology, Administration

Keywords

Administrative process, Universities, Education, ICT-data warehouse

1. INTRODUCTION

Information and communication technology has existed for decades in most developed nations of the world, but it is a recent phenomenon in many developing nations [1]. The role ICT plays in teaching and learning is rapidly becoming one of the most important and widely discussed innovations in contemporary educational policy [2].

Scholars, practitioners and most experts in the field of education agree that when used properly, ICT holds great promise to improve teaching and learning in addition to shaping workforce opportunities. ICT facilitates higher education sector of developing economies, in narrowing global digital divide and, thus producing knowledge-based societies which in turn is improving quality of learning and, educational outcomes [3,4]. Studies have also shown that knowledge and information are obviously crucial to organizational performance and organizational performance is often dependent on managers' skill of converting knowledge and information into action [5, 6, 7, 8]. When ICTs are not available, the universities' corporate objective may not be fully realized especially in this global age.

Apart from the role ICT plays in improved organizational performance, scholars are of the view that ICT has varied impact on student writing, research experiment, data collection, getting help, students' program information, students' and school information, extended student absence, library system, record keeping, curriculum documents, administration and planning, and distance education [9]. ICT links schools around the world, in order to improve education, enhance cultural understanding, and develop skills that youths use for searching for jobs in the 21st century. It is also the current choice of many developing and developed countries to upgrade their economies and become competitive in the global market place [10,11]. It therefore, becomes very necessary, that universities in Nigeria and developing nations adopt the use of ICT as communication tool to expand the frontiers of knowledge.

According to [12] modern organization's ability to achieve results, and the decision making effectiveness of contemporary administration are no longer dependent on the quality of the administration, but more important is the function of the quality of information and communication channels feeding and transmitting their actions. Apart from being useful for teaching and learning, scholars are of the view that ICT helped in streamlining administrative processes in the area of communication and in the universities [13,14]. Scholars have found that provision and usage of ICT, would decrease costs, and increase capabilities, be faster, less cumbersome and enable us to cross organizational boundaries easier [15]. ICT is a communication tool and if used prudently, could enable universities to expand access to and raise the quality of administration in universities. Prudence requires using ICT to strengthen government transparency and careful consideration of the interacting issues that underpin ICT use in the universities. The adoption of ICT, would help to increase efficiency of administrative processes within the university, lessen administrative burden faced by all staff and students during registration period, convert paper processes into electronic processes, with a goal to operate paperless office, improve productivity and performance in the university and introduce total transparency and accountability leading to better administration within the university [16,17,18].

However, this powerful agent of change has not been available in many universities in developing nations. Most universities in developing nations like Nigeria that have

provided ICT, sometimes lack knowledge of its operation and hence do not fully maximize the benefits. Currently, very few studies [e.g., 19,20,21] have examined impact of ICT on administrative processes. In all these, none has tried to examine ICT and administrative processes in Nigeria. In order to address the research gaps identified above, the study addresses ICT availability and usage in south-eastern universities in Nigeria and how that impact on administrative processes. Thus the study seeks to investigate availability and usage of ICT in universities in Nigeria with special focus on two questions. i) What is the relationship between availability of ICT and administrative processes in southeastern universities in Nigeria? ii) What is the impact of the use of ICT on administrative processes in southeastern universities in Nigeria?

1.2. Relevance of ICT in Universities

Studies have shown that the integration of ICTs in university in the 21st century would be of immense value to education and administration [22,23]. One of the commonly cited reasons for using ICTs in the classroom has been to prepare the current generation of students better for a workplace. Technologically, literacy or the ability to use ICTs effectively and efficiently is thus seen as representing a competitive edge in an increasingly global job market. Furthermore, studies have shown that ICTs can enhance the quality of education in several ways, by increasing learner motivation and engagement, facilitating the acquisition of basic skills, enhancing teacher training and could also be used to transform the environment into one that is learner centered [24,25,26,27]. Appropriate use of ICT could facilitate the paradigmatic shift in both content and pedagogy that is at the heart of most education reforms in many countries.

The proper design and implementation of ICT could promote the acquisition of the knowledge and skills that will empower students and staff for life-long learning. In addition, the proper use of ICT could introduce significant reform in education which will help the world to respond to, and shape global trends in support of both economic and social development. The application of ICT will bring changes in organizational structure and practices. The pervasiveness of ICT has changed the way people access information as well as the way they use information and create knowledge in the university, including, using the Internet to find jobs, communicate with relatives, do shopping, book flight, run offices, solicit donations, share photos, and post videos [27].

In the current socio-economic theory and practice, at least two significant changes have happened. One, there is a renewed interests on human resource development which has led to emphasis on the role of education and training in economic development. The importance of ICT use has been recognized as key to the transformation of socio-economies and process of processing information at the university context [28,29]. Current ICT trends such as e-commerce and e-administration have been viewed as routes to wealth creation [30,27]. The use of ICT though has increased among students but many researchers have noted that those students come into classrooms with new ICT skills and competencies but they are rarely drawn on the formal curriculum or are they able to use these skills to collaboratively solve complex real world problems [31,32]. Thus, the impact of ICT on work outcomes has not been fully explored.

ICT greatly facilitates the acquisition and absorption of knowledge, offers developing countries unprecedented opportunities to enhance educational system, improves policy formulation and execution, and widens the range of opportunities for business around the world. This new technology promises to improve the sense of solution and to open access to knowledge in ways unimaginable in the recent past [1]. With ICT, teachers, staff and learners will no longer rely solely on printed books and other materials in physical media, libraries and other materials available in limited quantities for their educational and work-related needs.

1.3.Theoretical Framework

We borrowed from the earlier work of [35] to explain the impact of ICT on administrative processes. [35] after reviewing the empirical findings of science policy analysts and macroeconomists [e.g. 34,19,23], that assessed the productivity effects of ICT and theoretical models, such as that developed by [21] concluded that there are contributing factors to an organizational adoption and effective use of ICT. These factors according to [35] may include: business environment, firm structural characteristics, human capital, competitive strategies, and internal firm organization. These forces are explained to interplay and help to define an organization's approach to pursuing its objectives. Based on this model, we examined five factors as possible explanatory variables for ICT adoption: university characteristics, university size, human capital, gender, and internal university organization. We also expanded this model by examining the availability and ICT usage as factors that determine the impact of ICT on administrative processes.

1.4. Hypotheses.

The following hypotheses were tested:

1. Availability of ICT in the university would be significantly related to impact of ICT on administrative processes in south-eastern universities.
2. ICT usage would be related to impact of ICT on administrative processes in south-eastern universities.

2. METHOD

2.1. Study Population.

The target population of this study is academic and non-academic staff of universities in Enugu State, which is in the southeastern Nigeria. In the state, there are two public universities – Enugu State University of Science and Technology (ESUT) and University of Nigeria, Nsukka (UNN). Enugu State University of Science and Technology is in the heart of Agbani which is situated in the eastern part of the country. Nsukka is a university town in the sense that the University of Nigeria is the major employer of labor in the town. ESUT is also the major employer of labor in Agbani. The population of academic staff in UNN is 1791 while administrative staff is 1718. In ESUT, the academic staff is 1250 while administrative staff is 1090. We did not include technical staff. We chose UNN because it is the first federal government-owned university in Nigeria and ESUT because it is the first and only state university in Enugu state. We also chose academic and administrative staff because we believe that they work hand–in-hand with students. It is expected that they would be more efficient if better equipped in the area of ICT.

2.2. Sample and Instrument

The sample size for the present study consisted of 346 (5% of the population) respondents drawn from two universities (a

state government-owned university and a federal government-owned university) in the southeastern state of Nigeria. But, only 327 copies of the questionnaire were retrieved. Among the participants were 170 male staff and 157 female staff. One hundred and fifty three (153) staff members were in state government-owned university while 174 were working in a federal government-owned university. The participants' ages range between 30 and 55 years. We adopted purposive sampling method in selecting our respondents because the study is focusing on a specialized population, (academic and administrative staff). As noted above the main objectives of this study is to assess the availability of ICT and usage in south-eastern universities in Nigeria, and also to examine the impact of ICT usage on administrative processes. On the basis of the theoretical and empirical literature cited above, controlling for other factors, we test the following: whether ICT availability is significantly associated with the type of university, university's size, gender, and age distribution of workers; and, if ICT adoption or usage is positively associated with higher administrative output.

Questionnaire was used to elicit information from the respondents. The questionnaire was categorized in two parts. The first part entails information regarding demographic data such as age, gender, university, and department. The second part focused on measures of variables of interest. Three instruments used in the study include, Availability of ICT Questionnaire, Use of ICT Questionnaire, and Impact of ICT Questionnaire.

2.2.1. Availability of ICT Questionnaire

The Availability of ICT Questionnaire was developed by the researchers to elicit information on the availability of information and communication technologies in the universities studied. The instrument is a 10-item self-report measure using a Likert-type four-point scale ranging from 4 (strongly agree) to 1 (strongly disagree). A sample item is "There is internet facility in my institution." The scale has internal consistency reliability (Cronbach's alpha) of .87.

2.2.2. Use of ICT Questionnaire

The Use of ICT Questionnaire was also developed by the researchers to ascertain the level of ICT use among the staff of selected universities in Nigeria. In the scale, staff were asked to rate how often they have used ICT facilities in their institutions on a four-point scale (i.e. Very Often (4), Often (3), rarely (2), Never (1]. The instrument is a 10-item self-report measure. A sample item is "I use the internet to send messages to students and staff" The scale has internal consistency reliability (Cronbach's alpha) of .93

2.2.3. Impact of ICT Questionnaire

The Impact of ICT Questionnaire is a 10-item scale that elicits information on the staff' rating of the impact of ICT on their work. In the scale staff was asked to rate how ICT has influenced their work in the universities on a four-point scale ranging from strongly agree (4) to strongly disagree (1). A sample item is "Administrative work is a lot easier now because of the use of ICT". The internal consistency reliability (Cronbach's alpha) for the present study is .88.

2.3. Procedure

The researchers administered the instruments directly to all the participants in their offices. Voluntary participation in the study was allowed to the participants. Also, informed consent was obtained before the study began, and the data collection processes ensured confidentiality of the responses. Respondents were asked to complete the survey and return directly to the researchers and the researchers collected the surveys after two weeks. Out of 346 copies of the questionnaire distributed, 327 were returned, representing overall response rate of 94.5%. 327 (94.5%) staff surveys comprised the final sample; and their responses were used for statistical analyses.

2.4. Statistical Analyses

We used the Statistical Package for the Social Sciences (SPSS) version 16, to analyze the data. To investigate the differences in impact of ICT among the employees surveyed, the mean scores on the impact of ICT was calculated and compared between male and female staff members; between younger and older staff members; and between staff in federal government-owned university and those from state-owned university. A Pearson correlation was then carried out to determine the inter-correlations among the study variables. Also, further analysis was carried out on the data using hierarchical regression in other to assess the amount of incremental variance explained by each type of predictor variable. We first, entered the demographic variables (gender, age, type of university). We thereafter entered the first predictor – availability of ICT, and later entered the second predictor – usage of ICT, in the regression analyses.

3. RESULTS AND DISCUSSION

Three levels of analyses were employed in the study. Table 1 presents the means and standard deviation of demographic variables on impact of ICT. Table 2 presents correlations among the demographic variables (gender, age, type of university), availability of ICT, usage of ICT, and impact of ICT on administrative processes in the university. Hierarchical regression analysis was employed to determine the contributing roles of gender, age, type of university, availability of ICT and usage of ICT on impact of ICT on administrative processes. The results of the regression analyses are presented in Table 3.

3.1. Background characteristics of respondents.

A total of 327 respondents of which 170 males and 157 females were surveyed based on their experiences of ICT. Descriptions of the socio-demographic characteristics of respondents show that the mean age of respondents is 38.75 years. Staff accounted for 100% of the respondents. Majority of the staff were senior staff [65.5%].

3.2. Factors that Determine Level of Impact among Staff.

Table 1 presents the means and standard deviation of demographic variables on impact of ICT. The result of the study showed that male staff reported higher mean scores on impact of ICT on administration (M = 2.70, SD = .58) than female staff (M = 2.50, SD = .70). Older staff also reported higher mean scores on impact of ICT (M = 2.62, SD = .70) than younger staff (M = 2.59, SD = .70). With regard to the type of university, staff in federal university reported higher mean scores on impact of ICT (M = 2.89, SD = .55) than those in state university (M = 2.29, SD = .72).

Table 1: Mean and standard deviation scores of the demographic variables on impact of ICT on Administrative processes.

		Mean	Standard Deviation	N
Gender	Male	2.70	.58	157
	Female	2.50	.78	170
Age	Young	2.59	.70	205
	Old	2.62	.70	122
University	State	2.29	.72	153
	Federal	2.89	.55	174
Total		2.60	.70	327

Table 2: Means, standard deviations, and inter-correlation among study variables

	Variable	M	SD	1	2	3	4	5	6
1	Gender	1.51	.50						
2	Age	38.75	6.88	.00					
3	University Status	1.52	.50	.14**	.14**				
4	Availability	2.22	5.69	.06	-.04	.57***			
5	Usage	2. 05	6.54	.25***	-.02	.05	.16**		
6	Impact	2.59	7.00	-.14*	-.09	.43***	.33***	.31***	

**NOTE: ***** = p < .001; **= p <.01; *= p <.05.

Raw scores of the participants were averaged to determine the individual's level of agreement with the statements in the questionnaire. The scores were coded so that higher scores indicated higher availability, usage or impact of ICT.

Table 2 presents correlations among the demographic variables (gender, age, type of university), availability of ICT, usage of ICT, and impact of ICT on administrative processes in the university. The results of te correlation analyses showed that gender was related to ICT usage (r = .25, p < .001), and impact of ICT (r = .14, p < .05). Also the university the employees were working in (state versus federal) was significantly related to availability (r = .37, p < .001), and impact of ICT (r = .43, p < .001). Age was found not to be significantly related to availability, usage and impact of ICT. The availability of ICT was also related to usage (r = .16, p < .01), and impact (r = .33, p < .001). As we expected, there was also significant correlation between usage of ICT and impact of ICT on administrative processes.

Table 3: Hierarchical Regression Analyses

Variables	1	2	3
Gender	-.29***	-.29***	-.20**
Age	-.006	-.006	-.006
University	.64***	.54***	.54***
Availability		.17*	.12
Usage			.25***
R	.48	.50	.54
R^2	.23	.25	.30
F value	F(3,323)=32.43***	F(4,322)=26.20***	F(3,321)=26.86***

**NOTE: ***** = p < .001; **= p <.01; *= p <.05.

The contributing roles of gender, age, type of university, availability of ICT and usage of ICT on impact of ICT on administrative processes were examined using hierarchical regression analysis. The results of the regression analysis as illustrated in Table 3, show that gender was significantly associated with participants' report of impact of ICT on administrative processes (β = -.29). The type of the employing university (state or federal) was also related to impact of ICT (β = .29). As a whole, the demographic variable contributed 23% to the unique variance in impact of ICT on administrative processes in the universities. Availability of ICT significantly contributed 25% to the unique variance in impact of ICT on administration above the contributions of the demographic variables F(3,323)=32.43, p < .001), confirming our hypothesis that availability of ICT in the university would be significantly related to impact of ICT on administration. Our hypothesis that ICT usage would be related to impact of ICT on administration was also confirmed. The results showed that participants' use of ICT contributed additional 30% to the unique variance in impact of ICT on administrative processes among the participants in the study F(3,322)=26.20, p < .001)

Findings from the study show that older staff reported better significant impact of ICT in administration than younger staff. This may be because the older staff are more sensitive to the use of ICT and also devote more time to it. In addition, the older respondents may have had more experience in ICT and so may be in a position to cope better than the younger respondents. It could also be that they have a better interpretation of the ICT situation. According [36], it could yet be that the older ones have developed much interest in ICT and therefore are zealous to know more about the use of ICT and its impact on administration.

Result from the present study also showed that there is a relationship between university of the staff and level of impact being experienced. In other words, staff from federal university reported that the use of ICT has contributed significantly to changing the working habits of staff and process of doing things than staff from state-owned university. University of Nigeria, Nsukka staff also reported that the attitude of students to learning and the attitude of teachers to teaching and research have also changed including the attitude of management to functional planning process and procedures. This may be because federal universities are better funded than state universities. Also, University of Nigeria, Nsukka being a first-generation federal institution

may be better exposed to procurement of ICT facilities. Again, the larger the university, the higher the probability of Internet adoption. Schools differ in terms of their goals for the introduction of ICT and in the pathways they have chosen to achieve their goals. Certainly, some government and institutions have invested more, attempted more and achieve more than others with regard to ICT. In trying to position Nigerian universities to become centers of academic excellence, providing world-class teaching, research and services relevant to sustainable development needs of society many tertiary institutions especially federal government-owned institutions, in Nigeria have turned to the use of ICT. According to [20,21,37], federal universities may be more established and could desire such services to boost their administrative processes and enhance and streamline students' education and to improve academic reporting facilities at both central and faculty levels.

Findings from the study revealed that male respondents reported higher mean scores (M = 27.03, SD = 5.84) on how ICT has impacted on their job than those of the female respondents (M = 25.04, SD = 7.03). However, one may argue that because of the low value the society places on women education in Nigeria, this may have also affected women's participation in ICT. In Nigeria, it is generally viewed that the place of the women is in the kitchen. Although, recently, there is a commendable increase in women enrolment into universities in Nigeria, but there are still some impediments [38,39].

Girl-child marriage, religion and culture still deny adequate and quality education to some women who are capable of undergoing university education. In the northern part of the country, for example, a greater percentage of the girls tend to get married very early in life. This trend is also evident in other parts of the country including the southeast, though at a lower trend. This may have probably contributed to the result above on the usage and impact of ICT among male and female respondents.

The findings suggest that the availability of ICT significantly contributed 11% to the unique variance in impact of ICT on administration among the participants ($\beta = .32$, $t(235) = 6.22$, $p < .001$). The relationship between availability and impact has been a subject of discourse among scholars. Some scholars are of the view that the availability of ICT would impact significantly on administration and learning whereas others are of the view that availability may not be necessarily related to impact since the facilities may be there without being used [22]. In the present study, availability contributed 11% to the unique variance in impact of ICT on administration and learning. Many reasons could be adduced to this. It is assumed that universities that provided ICT facilities (unit) would be better positioned to enhance and prepare the staff for a better workplace than those with minimal provision of ICT facilities. This being the case, universities with ICT facilities would want to ensure that their staff is ICT literate especially at this digital age. Secondly, it is generally believed that the procurement of facilities would automatically lead to the usage of the facilities which would invariably lead to impact. However, availability of ICT facilities may not necessarily lead to impact, but the impact is made more manifest when the facilities are in use [9]. Thus, the impact level may increase when available facilities are put in use.

The present study reveals that the participants' use of ICT contributed additional 17% to the unique variance in impact of ICT on administration and learning among the participants in the study. ($\beta = .26$, $t(235) = 5.09$, $p < .01$). There is a strong relationship between usage and impact and this has been proved in the study. The procurement of ICT facilities may not necessarily lead to significant impact but the usage of these facilities argued some scholars is critical in the impact of the facility on learning. The acquisition of basic skills and concepts that are the foundation of higher order thinking skills and creativity could be facilitated by ICT through drill and practice. At face value, the findings appear to be more consistent with the result of previous studies [e.g. 22,23] demonstrated that the greatest challenge facing us today is how to organize information into structured knowledge. We must rise above the obsession with the quantity of information and the speed of transmission, and focus on the fact that the key issue for us is our ability to organize the information once it has been amassed, to assimilate it, to find meaning in it and assure its survival. This, in effect, implies not only availability but also usage which is part of the communication process. However, the reality of the Digital Divide—the gap between those who have access to and control of technology and those who do not—means that the introduction and integration of ICTs at different levels and in various types of education will be a most challenging undertaking. Failure to meet the challenges would mean a further widening of the knowledge gap and the deepening of existing economic and social inequalities [40,41]. Therefore, the usage of ICT and not just availability would impact significantly on administration and learning as confirmed in our study. According to [42,43,44,45] ICT represent a potentially equalizing strategy for developing countries. ICTs greatly facilitate the acquisition and absorption of knowledge, offering developing countries unprecedented opportunities to enhance educational systems, improve policy formulation and execution, and widen the range of opportunities for business and the poor.

4. Conclusion

The paper has provided empirical evidence both on the factors that determine the usage of ICT and also the impact of ICT usage on administrative processes. As predicated, the study found that availability and usage of ICT impacted positively on administrative processes. Availability and usage of ICT are key factors to helping universities raise their productivity and competitiveness. The findings also gave valuable insights into the challenges that universities that have not adopted the use of ICT fully in Nigeria, and other developing nations may face. It also gave credence to policies which seeks to motivate universities to adopt the use of ICT in teaching, learning and administrative processes among other factors. Studies by [36], and [46], found that availability and usage of ICT impact significantly on administrative processes and learning. This is consistent with our findings. When people are aware of the importance of certain facilities, they tend to develop more interest in it. These being the case, there may be need for provision and adoption of ICT in Nigerian universities especially in state-owned universities.

Finally, there may be need for professionals such as computer engineers to develop educational and training programs that would focus on availability and usage of ICT. This may be by way of providing consultancy services that would enable universities understand the best way of procuring these facilities and best ways of training staff members to such facilities effectively. All these would go a long way in eradicating the gap between federal and state owned universities in ICT proficiency.

5. REFERENCES

[1] Boyoung M. Rosen, L. and Michelle, W. (1999) "Computer availability, computer experience and technophobia among public school teachers", Computer in Human Behaviour", 11, 9-31.

[2] Ahmed, I, Shahzad, A and Umar, M. 2010. "Information technology and SMEs in Pakistan", International Business Research, 3(4), 237-240.

[3] Aduwa-Ogiegbaen, S.E, and Iyamu, E. O. 2005. "Using information and communication technology in secondary schools in Nigeria: Problems and prospects", Educational Technology and Society, 8(1), 104-112.

[4] Selamat Z and Jaffer N. 2011. "Information technology acceptance: From perspective of Malaysian bankers". International Journal of Business and Management, 6(1), 207-217.

[5] Pfeffer, J. and Sutton, R. 2000 .The knowledge doing gap. How smart companies turn knowledge into action. Boston, MA: Harvard Business School Press

[6] Lucchetti, R. and Sterlacchini, A. 2004. "The adoption of ICT among SMEs: Evidence from an Italian survey", Small Business Economics, 23,151-168.

[7] Poole S. A 1996. "A new gulf in American education: The digital divide". New York Times, January 29.

[8] Shaukat M. Zafarullah M, 2010. "Impact of information technology on organizational performance. An analysis of quantitative performance indicators of Pakistan's banking and manufacturing companies". International Research Journal of Finance and Economics, 39, 229-243.

[9] Marielleden, H. and Henk G. 2001. "The impact of ICT on inter-organisational cordination. Guidelines from theory, Special Science on Information Exchange in Electronic Market", 4(3), 129-137.

[10] Ahmed, I and Gregor, S. 2007, "A comparative analysis of strategies for e-government in developing countries", Journal of Business Systems, Governments and Ethics, 2(3), 89-99.

[11] Shaukat, M. Zafarullah, M. and Wajid, R. 2009. "Impact of information technology in Pakistan: An analysis of problems faced in it by Pakistan's banking and manufacturing companies", Pakistan Journal of Social Sciences, 29(1),13-22.

[12] Eno E, Eyo, H. Anthony A. and Ime E. 2011. "Use of ICT and communication effectiveness among secondary schools administrators", Journal of Education and Sociology, 2(1).

[13] Gatautis, R.(2008), "The impact of ICT on public and private sectors in Lithuania", Engineering Economics 4(59), 1-28.

[14] Deeps Melita Suman K. 2011 "A scenario on the role of ICT in governance and educational system". International Journal of Computational Engineering and Management, 13, 100-109.

[15] Vahid, R. and Raja, B. 2011. "ICT impact on contribution of human resources development to economic growth". The India Journal of Industrial Relations, 46(4), 661-671.

[16] Su, K. 2008. An integrated science course designed with information communication technologies to enhance university students' learning performance. Computers & Education, 51, 1365-1374.

[17] Irfan, S. Saba, M. Faroog, A. Muhammad, M. and Chaudbry, A. 2011. " Measuring the impact of adopting ICTs: Evidence from developing economy. Interdisciplinary Journal of Contemporary Research in Business, 3(3), 831-843.

[18] Mbaeze, I. Ukwandu, E. and Amudu, C. 2010. "The influence of information and communication technologies on students' academic performance", Journal of Information Technology Impact, 10(3), 129-136.

[19] Bresnahan, T. F. and Trajtenberg, M. 1995. General purpose technologies - 'engines of growth'? Journal of Econometrics, 65, 83-108

[20] Utterback, J. and Suarez, E. 1993. Innovation, competition and industry structure. Research Policy, 22, 1-21.

[21] Spanos, Y. E., Prastacos, G. P. and Poulymenakou, A. 2002. The relationship between information and communication technologies adoption and management", Information & Management, 39(8), 659-675.

[22] Chacko, J. 2005. "Paradise Lost" Reinstating the human development agenda in ICT, policies and strategies". Information Technology for Development, 11(1), 97-99.

[23] Qureshi, S. 2005. " E-government and IT policy: Choices for government outreach and policy making". Information Technology for Development, 11(2), 101-103.

[24] Kozeta S. and Klodiara G. 2011. "The Role of Information and Communication in Quality Service Improvement", Global Conference on Business and Finance Proceedings, 6(2), 105-111.

[25] Elsadig M. 2011. "Assessing the impact of ICT and human capital impact on productivity of Asian Economies". Journal of Global Management, 1(1), 23-35.

[26] Brynjolfsson, E. and Yang, S. 1996. "Information technology and productivity: a review of the literature". Advances in Computers, 43, 179-214.

[27] Ali, W. Z. W., Nor, H. M., Azani H. & Hayati, A. 2009. "The conditions and level of ICT integration in Malaysian Smart Schools". International Journal of Education and Development using Information and Communication Technology, 5(2), 21-31.

[28] Baliamoune-Lutz, M. (2003), "An Analysis of the determinants and effects of ICT Diffusion in Developing countries". Information Technology for Development, 10(3), 151-169.

[29] Corea, S. 2007. "Promoting development through information technology innovation. The IT artifact, artfulness and articulation", Information Technology for Development, 13(1), 49-69

[30] Auto, D, Levy F. and Munane, R. 2003. "The skill content of recent technological change. An empirical explorations", Quarterly Journal of Economics, 118, 4-11

[31] Blurton, C. New directions of ICT in education" Available on linehttp://www.unesco.org/education/educprog//wf/dl/edict.pdf.accessed August, 2011.

[32] Haddad, W. and Zurich, S. 2002. "ICT for education potential and potency" in Haddad, W. and Drexler, A. (Eds), Technologies for education Potentials, Parameters and Prospects. Washington D.C Academy for Educational Development and ParisUNESCO. 34-37.

[33] Lim, C. 2004. Integrating ICT in education" A study of Singapore schools. Singapore: McGraw Hill.

[34] Breschi, S. & Lissoni, F. 2001. Localised knowledge spillovers vs innovative milieu: Knowledge "tacitness" reconsidered, Papers in Regional Science, 80, 255-273.

[35] Mutua, J. M. and Wasike, W. S. K. 2009. ICT adoption and performance of small-medium-sized enterprises in Kenya: Special Research Project on ICT and Economic Development in Africa. Nairobi: African Economic Research Consortium (AERC).

[36] Womboh, B. S. H. and Abba, T. 2008. The state of Information and Communication Technology (ICT) in Nigeria University libraries: The experience of Ibrahim Babangida Library, Federal University of Technology Yola. Library Philosophy and Practice (e-journal), Paper 224. Available: http://digitalcommons.unl.edu/cgi/viewcontent.cgi?article=1226&context=libphilprac

[37] Sultan,S. (2009), Correlates of Computer Anxiety among Employees. Pakistan Journal of Social Sciences, 29(2), 293-300.

[38] Bedi, T. 2006. Feminist Theory and The Right-wing women mobilize Mumbai', Journal of International Women's Studies, 7(4),

[39] Onah, R. 2001. "Unequal Opportunities and Gender Access to Power in Nigeria" In A. Rwomire (Ed.), African Women and Children: Crisis and Response. Westport, Connecticut: Praeger Publishers.

[40] Schwartz, D.L., J.D. Bransford, and D. Sears, 2005. Innovation and efficiency in learning and transfer. In J. Mestre (ed.), Transfer of Learning from a Modern Multidisciplinary Perspective. (pp. 1–51), Mahwah, NJ: Erlbaum.

[41] Law, N., Pelgrum, W. & Plomp, T. 2008. Pedagogy and ICT use in schools around the world: Findings from the IEA SITES 2006 study. Hong Kong: Springer.

[42] Pilat, D.2004." The economic impact of ICT: A European perspective". Paper presented at a conference on IT Innovation, Tokyo.

[43] Jung, I. 2002. "Issues and Challenges of providing on-line in-service Teacher Training: Korea's experience" available from http.//www.Pmodl.org/Content/Vz.//Jung. Pdf.

[44] Merisotis, P. and Phipps, R. A. 1999. "What's the difference: Outcomes of distance vs traditional classroom-based learning. Change: The Magazine of Higher Learning, 31(3), 12-17.

[45] World Bank (1998), The World Development Report 1998/99. New York: World Bank.

[46] Tusibira, F., et al, 2001. ICT implementation: Challenges and strategies for enterprises in Africa. Directorate for ICT support in Africa. Makerere University.