EFFECTIVE UTILIZATION OF INFORMATION AND COMMUNICATION TECHNOLOGY (ICT) FOR SUSTAINABLE MANPOWER DEVELOPMENT AMOUNG COMPUTER EDUCATORS IN COLLEGES OF EDUCATION IN SOUTH EAST GEO-POLITICAL ZONE OF NIGERIA

BY

OLELEWE, CHIJIOKE JONATHAN
DEPARTMENT OF COMPUTER SCIENCE EDUCATION
FEDERAL COLLEGE OF EDUCATION EHA-AMUFU, P.M.B 2001 ENUGU STATE
cjolelewe@yahoo.com, PHONE: 08034961625

AND

AMAKA, EUGENIA NGOZI (Mrs)
DEARTMENT OF COMPUTER SCIENCE EDUCATION
ENUGU STATE COLLEGE OF EDUCTION TECHNICAL

ABSTRACT

The challenges for TVET today is to re-orient and redirect its curricula to imbue trainers and trainees on sustainable use of resources to enhance appropriate work skill development as new and employment opportunities emerge such as recycling, ICT, repair, waste management etc. This paper is therefore focused on the effective utilization of ICT for sustainable manpower development among computer educators in Colleges of Education in South East geo-political zone of Nigeria. The study adopted survey research design. The population of the study comprised all the 119 Computer Educators (89 Lecturers and 17 instructors) in the three Federal Colleges of Education, three State Colleges of Education and five Private Colleges of Education that offers Computer Education as a course of study in the zone. Three research questions and three null hypotheses were formulated to guide the study. The instrument used for data collection was structured questionnaire. Mean and Standard deviation were used to analyze the data for answering research questions while analysis of variance (ANOVA) was used to test the three null hypotheses at 0.05 level of significance. The study revealed that computer educators utilizes ICT effectively as a tool in their teaching and learning basically in instructional delivery and individualized learning process. However, there is poor utilization of ICT in evaluation of learning. Based on the findings, it was recommended that retraining programmes and workshops among others should be organised for Computer Educators on the use of ICT as a tool for enhancing teaching and learning in Colleges of Education.

INTRODUCTION

Background of the Study

Vocational Technical Education and Training (TVET) play a vital role in the social and economic development of a nation. Owing to the dynamic nature of TVET, it is continuously subject to the forces driving change in our schools, industries and society at large. Fien & Park (2008) opined that the issue today is not only on the value and importance of TVET but also on how to ensure its relevance, responsiveness and value in an increasingly global economy. They stressed that the major challenge facing the global world is how to find ways of sustaining living and working as new industries and employment opportunities emerge such as recycling, waste management, pollution control, repairs, troubleshooting etc which requires skilled workers who have the requisite technical knowledge demanded by these new roles created. According to UNESCO-UNECOV (2008) these new roles demands a change in TVET curriculum that will integrate sustainable development into TVET in three potential strategies:

1. To include sustainable development concepts in all courses for everyone
2. To enhance focus upon sustainable development in occupationally relevant areas e.g. auto repairs, fabrication, ICTs, mining, service sectors etc.
3. To indicate that new jobs will become available in sustainable industries.

One of the occupationally relevant areas of TVET today is computer education and Information and Communication Technology (ICT). Computer education/ICT, therefore, constitutes core subject in TVET in that it cuts across all technical subjects either as a course of study or as a tool for teaching and learning. The United Nations Scientific Educational and Cultural Organisation (UNESCO, 2005) defined ICT as the combination of the computer, telecommunication and media technologies. They are electronic technologies used for accessing, processing, gathering, manipulating and presenting or communicating information in education system. It encompasses software, hardware and even the connectivity (Anderson &

Baskin, 2002). Information and Communication Technologies (ICTs) continues to impact positively on every aspect of human existence, thereby creating a powerful force for changes on how people conduct their daily businesses and in fact, determine the status of the Nation.

The use of ICT in teaching and learning of computer education in Colleges of education can assist in reducing the lecturer's workloads through its use for lecture preparation and instructional delivery, individualized and collaborative learning as well as learning evaluation. Thus lecturers become learning facilitator, collaborator, coach, mentor, knowledge navigator, and co-learner and not only a dispenser of knowledge (Ogwo, 2005). Instructional content can be delivered in textual, audio, visual, and audio visual forms. Thus equity can be ensured for all categories of learners (disabled and geographically disadvantaged learners that cannot attend regular school etc.). The educational reform policies aimed at integrating the use of ICT, particularly the computer, in the Nigerian school system. The Nigerian National policy for Information and Technology (FRN, 2001) recognising the need for application of ICT in education emphasized three major objectives namely: empower youths with ICT skills, to prepare them for competitiveness in a global environment, integrate ICT into the mainstream of education and training, and establishment of multifaceted ICT Institutions as centres of excellence. The document specifically noted the need for restructuring the education system at all levels to respond effectively to the challenges of manpower development, imagined impact of the information age and the allocation of a special IT development fund for education at all levels. To achieve these objectives, nine major strategies were outlined, among which include; making the use of ICT compulsory at all educational Institutions, developing ICT curricular for all levels of education, using ICT in distance education and ICT companies investing in education.

However, Yusuf (2005) noted in his analysis of the Nigerian National policy for Information Technology (FRN, 2001) that the policy was inadequate for positive impact on the Nigerian education system. This, he noted, stems from the fact that the philosophical frame of reference is market driven, with little emphasis on the integration of ICT in instructional delivery. If ICT should properly be utilized in TVET programmes, it will definitely improve the quality of education and training in several ways such as increasing learners' motivation and

engagement, facilitating the acquisition of basic skills and enhancing teacher training (Wadi & Sonia, 2004). New and emerging technologies challenge the traditional process of teaching and learning and the way education is managed. The new communication technologies has the promise to reduce the sense of isolation and open access to knowledge in many ways, thus changing the process of teaching and learning by adding elements of vitality to learning environment. The new technologies make it possible for complicated collaborative activities of teaching and learning by dividing it in space and time with seamless connectivity between them. However, ICT has turned from being a technology of communication and information to a curriculum creation and delivery system for educators and learners (UNESCO, 2004). There is an unresolved tension around the issue of ICT as a subject on its own that comprises the knowledge, skills and understanding to make appropriate, productive use of ICT, or as a set of tools with which to deliver and absorb other subjects in the curriculum. Smith (1999) maintained that the focus is on the subject being taught or studied rather than developing pupils' skills with knowledge of the technologies. Dale, Robertson and Shortis (2002) predicted that qualitative and quantitative gaps between the pupils' and the teachers' understanding of the affordances of ICT as a technology of teaching are much greater than has been the case with any other teaching technology.

ICT, when used as a tool, has the potential to transform the way education is delivered. ICT can facilitate differentiation and individualization in education. This makes it possible to tailor both the content and the presentation of the subject matter to the individual background, experience and needs of students. According to Schiller & Tillett (2004) ICT enhances what is possible: by providing what teachers are able to do, by providing an entry point into the content and enquiries that were not possible without the use of ICT, by extending what students are able to produce as a result of their investigations and by providing teachers with the opportunities to become learners again.

Learning is the process of acquiring and modifying existing knowledge, skills, habits or action tendencies through experiences and practice exercises (Wiki, 2007). Learning can also be viewed as a knowledge or skill that is acquired by instructions or study. Constructivists believe

that learners construct their own reality and at least interpret it based upon their perceptions and experiences. So an individual's knowledge is a function of one's prior experiences, mental structures and beliefs that are used to interpret objects and events (Jonnassen, 1991). Various learning technologies (such as computer and multimedia resources) are increasingly being used in support of the learning process, presenting new challenges and opportunities for staff and students. Teachers need to understand a subject enough to convey its essence to students. While conventionally, this has involved lecturing on the part of the teachers using new instructional strategies to put the teachers more into the roles of course designers, discussion facilitators and coaches and at the same time puts the students more into the role of active learners, discovering the subject of the course with the goal of establishing a sound knowledge base and skills on which students will be able to build as they are exposed to different life experiences. A teacher according to Ogwo (2005) is essentially a facilitator of learning. As much as possible, the teacher facilitates learning by permitting the learner's own interests, attitudes, aptitudes and experiences to influence the kind of learning that will take place. He maintained that the teacher is a parent to the students, a model, a dispenser, a cultivator and a technician. The computer teacher must be knowledgeable in programming, maintenance and troubleshooting, networking, installation, web design etc and above all, posses teaching qualification.

The role of a teacher is often formal and ongoing, carried out by way of occupation or profession at a school or other place of formal education. In many countries, a person who wishes to become a teacher must first obtain a professional qualification or credentials from a University or College of Education.   On the other hand, a teacher in the University or tertiary institution is referred to as a lecturer who by his academic experiences leads research groups and supervises research students, as well as teaching while instructors in the higher education are meant to teach undergraduate students introductory courses and practical in the laboratory. A good teacher can translate information, good judgement and wisdom into relevant knowledge that a student can understand, retain and pass to others employing appropriate method(s) under a conducive school environment.

Education in a broad sense is any act or experience that has a formative effect on the mind, character or physical ability of an individual (Wikipedia, 2009). Technically, education is the process by which the society deliberately transmits its accumulated knowledge, skills and values from one generation to another. Teachers in educational institutions direct the education of students and might draw on many subjects, including reading, writing, computing etc. The educational system in Nigeria is classified essentially into primary, secondary and tertiary levels. The tertiary level of education is the third level of educational pursuit opens to a learner namely Colleges of Education, Polytechnics and Monotechnics (FRN, 2004). Colleges of Education offer post secondary National Certificate in Education (NCE) training programmes with the responsibility of producing quality products that will teach at primary, junior secondary schools and technical colleges. However, teachers have become marginalized and the profession seems the most impoverished of all sectors of the labour force in Nigeria (UNESCO, 1996).

Computer education is a type of education (skill training) given to learners to equip them with the ability to use the software and hardware of a computer which are relevant for employment or self-employment. As personal computers become common place and more powerful, the concept of computer education is moving beyond basic functionality to more powerful applications under the heading of multimedia education. It is frequently assumed that as computers and internet access are common place in the world, it is expected that everyone must have equal and ready access to the technology and acquire skills on how to utilise computers effectively.

Utilization according to Ngurukwem (2005) is the proportion of the available time a system is operating. By this description, ICTs can be used for various purposes, especially for achieving the objectives for establishing its global integration. Utilization can also be viewed as a fraction of a specified time period that is actually used to produce quality work. It therefore becomes necessary that the utilization of computers in Nigerian Colleges of Education be explored to determine their applications for knowledge delivery.

Statement of the Problem

Available research evidences (Stewart, 1999 & Afolabi, 2001) have shown that higher institutions that have not adopted the use of ICT in teaching and learning would be out of competition in the educational market. Despite the keenness of some Institutions of higher learning to establish ICT education programmes, they are confronted with enormous problems that may impede the proper utilization of these programs. The most significant of these is poor ICT penetration and usage among Nigerian tertiary institutions especially among Colleges of Education practitioners. Almost all the Colleges of Education in South East geopolitical zone of Nigeria have inadequate ICT infrastructure namely lack of access to electricity and poor telecommunication facilities. Above all, this lack of access to much needed infrastructure is the result of insufficient funds' allocation to the institution (Ololube, Ubogu & Egbezor, 2007). These observed short-comings cast doubts on whether the existing Colleges of Education in South East geopolitical zone of Nigeria utilizes ICT facilities in their teaching processes.

Purpose of the Study

The main purpose of this study is to determine the effective utilization of Information and Communication Technologies (ICTs) in enhancing the teaching-learning of Computer Education in Colleges of education in South East geopolitical zone of Nigeria. Specifically, the study sought to:

i.   determine the utilization of ICT in Instructional delivery process in Colleges of Education in South East geo-political zone of Nigeria.

ii.   determine how ICT could be utilized in carrying out individualized instruction in Colleges of Education in South East geo-political zone of Nigeria.

iii.   determine the utilization of ICT in evaluation of learning in Colleges of Education in South East geo-political zone of Nigeria?

Research Questions

i.   What is the utilization of ICT in instructional delivery process in Colleges of Education in South East geo-political zone of Nigeria?

iii.   What is the utilization of ICT in individualized instruction in Colleges of Education in South East geo-political zone of Nigeria?

iii.   What is the utilization of ICT in evaluation of learning in Colleges of Education East geo-political zone of Nigeria?

Hypotheses

The following three null hypotheses were formulated to guide the study and were tested at 0.05 level of significance.

Ho_1:   There is no significant difference ($p<0.05$) among the mean ratings of Computer Educators in the Federal, State and Private Colleges of Education on the use of ICT in Instructional delivery process in the South East geo-political zone of Nigeria

Ho_2:   There is no significant difference ($p<0.05$) on the mean responses of Computer Educators in the Federal, State and Private Colleges of Education on the utilization of ICT in carrying out Individualized instruction in Colleges of Education in South East geo-political zone of Nigeria.

Ho_3:   There is no significant difference ($p<0.05$) among the mean ratings of Computer Educators in the Federal, State and Private Colleges of Education on utilization of ICT in evaluation of learning in Colleges of Education in South East geo-political zone of Nigeria.

Population of the Study

The population of the study comprised all the 119 Computer Educators (89 Lecturers and 17 Instructors) in the 3 Federal Colleges of Education, 3 State Colleges of Education and 5 Private Colleges of Education that offer computer education as a course of study in the zone.

Instrument for Data Collection

A researcher constructed a 25-item structured questionnaire as the instrument for data collection. The questionnaire was designed in line with three specific purpose of study under a

4-point scale of Very Highly Utilized (4 points), Highly Utilized (3 points), Rarely utilized (2 points), and Not Utilized (1 points). Section A is made up of 8-items which address research question 1. Section B is made of 8-items designed to address research question 2 while section C is made up of 9-items to in line with research question 3.

Validation of the Instrument:

The instrument of data collection was face validated by one expert from the department of Vocational Teacher Education, University of Nigeria, Nsukka. The instrument was assessed properly to ensure its clarity of the question items.

Reliability of the Instrument

The Cronbach Alpha coefficient technique was used to determine the internal consistency of the instrument. A pilot study of 20 Lecturers from Federal College of Education Obudu Cross River State, College of Education Katsina-Ala Benue State and College of Education Gboko Benue State. The reliability coefficient for the three clusters yielded 0.80, 0.68, and 0.77 while the overall clusters yielded a reliability index of 0.82

Method of Data Collection

The researcher administered the copies of the questionnaire to the respondents with the help of 10 trained research assistants, one for each College of Education in the zone. A total number of 119 copies of questionnaire were distributed to the respondents and later retrieved and used for the statistical analysis.

Method of Data Analysis

Data collected was analysed using mean and standard deviation to answer all the three research questions while ANOVA was used in testing the three null hypotheses at 0.05 level of significance. Based on the 4-point rating scale, the mean of the scale is 2.50. Therefore, mean ratings up to and above 2.50 were regarded as indication of highly utilized while mean ratings below 2.50 were regarded as indications of poorly utilized. Any item where p-value is greater than 0.05, the hypothesis of no significant difference was upheld at probability of 0.05 level of

significance; but where the p-value is less than 0.05, the hypothesis of no significant difference was rejected at 0.05 level of significant and at 117 degree of freedom.

Data Analysis and Presentation

TABLE 1: Mean and standard deviation ratings of respondents on utilization of ICT in carrying out instructional delivery in Colleges of Education

S/N	ITEMS	$\bar{X}$	SD	DEC
1	The use of multimedia projectors in lesson presentation	2.85	0.86	HU
2	Using On-line methods for delivering lectures	2.65	0.95	HU
3	The use of tutorial packages on CD-ROMs to deliver lectures	2.86	0.80	HU
4	use of video conferencing to deliver lectures	2.04	0.90	NU
5	Using teleconferencing to deliver lectures	2.32	0.88	NU
6	Use of internet to post information to the class	2.84	0.85	HU
7	use of virtual learning class with colleagues and students	2.43	0.78	NU
8	The use of internet chartrooms as discussion forum with students and colleagues	2.78	0.84	NU

The data presented in the table 1 revealed that four of the eight items listed had their mean responses more than the cut-off of 2.50. This shows that Computer educators utilized ICT in instructional delivery process in Colleges of education in south east geo-political zone of Nigeria. Use of ICT in form of multimedia projectors, tutorial packages of CD-ROMs and use of internet resources recorded a very high mean indicating high utilization by educators. The standard deviation of items 1-8 ranges from 0.78-0.90. This revealed that the respondents' were close to one another in their opinion thus indicating that the respondents' are not far from the mean.

TABLE 2: Mean and standard deviation ratings of respondents on Utilization of ICT in carrying out Individualized Instruction in Colleges of Education

S/N	ITEMS	$\bar{X}$	SD	DEC

S/N	ITEMS	X̄	SD	DEC
1	Use of internet to facilitate individualized learning	2.93	0.81	HU
2	The use of internet helps individuals to access web based learning	2.71	0.87	HU
3	Use of tutorial packages on CD-ROMs HELP menu options	2.87	.94	HU
4	The use of typing tutor packages on CD-ROMs facilitate mastery of skills	2.68	.97	HU
5	Using internet search engines to achieve self directed learning	2.92	.86	HU
6	Learners use internet to explore different options of learning activities at their own pace	2.65	0.61	HU
7	Accessing and downloading original source documents for individualized learning	2.79	0.69	HU
8	Use of virtual library in improving students learning at any time	2.81	0.81	HU

As indicated on table 2, all the responses on the utilization of ICT in individualized instruction by computer educators in colleges of education had there means above the cut-off point of 2.50 showing that computer educators utilize ICT in carrying out individualized instruction. The use of internet resources, web-based learning and virtual library recorded the highest means thus indicating very high utilization. The standard deviation of all the items ranges from 0.61-0.94 indicating that the respondents are not far from their opinions.

TABLE 3: Mean and standard deviation ratings of respondents on utilization of ICT in evaluation of learning in Colleges of Education

S/N	ITEMS	X̄	SD	DEC
1	The use of ICT resources in simulating projects designs	2.13	.83	NU
2	The use emails and web address in giving and assessing the students' assignment	2.30	1.01	NU
3	The use of ICT resources in conducting exams for students	2.44	.68	NU
4	The use of ICT resources in marking students' exams	2.41	.79	NU
5	The use of ICT resources in computing students' results	2.32	.79	NU
6	Use of ICT resources in data analysis and presentation of results	3.22	.61	HU
7	Use of ICT resources in storing, retrieval and sharing research and project ideas	3.16	.78	HU
8	Computer educators use ICT in generating exam questions	3.23	.71	HU

As shown in the table 3, five out of the eight items recorded mean responses of less than the cut-off point of 2.50. This indicated that ICT is still poorly utilized in evaluation of

learning in Colleges of education. Three out of eight items on the table recorded a mean rating above the cut-off point of 2.50. Computer educators' use of ICT in generating exam questions, computing students' results and data analysis recorded the highest mean of 3.23, and 3.32 respectively. The standard deviation of the eight items ranges from 0.68-1.01 showing that respondents are not too far from one another in their opinions.

Hypotheses 1

Ho_1: There is no significant difference among the mean ratings of Computer Educators in the Federal, State and Private Colleges of Education in the South East geopolitical zone of Nigeria on the use of Information and Communication Technologies in instructional delivering.

Table 4: Analysis of Variance (ANOVA) of the Mean ratings of respondents on the utilization of ICT in instructional delivery in Colleges of Education in South East geopolitical zone of Nigeria

Source	Sum of squares	df	Mean Square	F-ratio	Sig.	Remark
Between Groups	3.509	2	1.754	2.726	0.070	NS
Within Groups	70.143	109	.644			
Total	73.652	111				

The one-way ANOVA presented in table 4 presented the result of F-ratio not to be significant at 0.05 level of significant: F(2,109) = 2.726; p>0.05.The F-ratio of 2.726 with a p-value as 0.07 calculated at 0.05 level of significance and at 109 degree of freedom to be greater than 0.05. The null hypothesis was therefore rejected not to have any significant difference in the mean ratings of computer educators in Federal, State and Private colleges of education in the South East geopolitical zone of Nigeria on the utilization of ICT in instructional delivering.

Hypothesis 2

Table 5: Analysis of Variance (ANOVA) of the mean ratings of respondents on the utilization of ICT in carrying out individualised instruction in Colleges of Education in South East geopolitical zone of Nigeria

Source	Sum of squares	df	Mean Square	F-ratio	Sig.	Remark
Between Groups	0.12	2	.006	.011	.989	NS
Within Groups	60.815	109	.558			
Total	60.827	111				

The one-way ANOVA presented in table 5 presented the result of F-ratio not to be significant at 0.05 level of significant: F(2,109) = 0.011; p>0.05.The F-ratio of 0.011 with a p-value of 0.989 calculated at 0.05 level of significance and at 109 degree of freedom to be greater than 0.05. The null hypothesis was therefore rejected not to have any significant difference in the mean ratings of computer educators in Federal, State and Private colleges of education in the South East geopolitical zone of Nigeria on the utilization of ICT in carrying out individualised instruction in their teaching and learning process.

Hypothesis 3

Table 6: Analysis of Variance (ANOVA) of the mean ratings of respondents on the utilization of ICT in evaluating learning in Colleges of Education in South East geopolitical zone of Nigeria

Source	Sum of squares	df	Mean Square	F-ratio	Sig.	Remark
Between Groups	.452	2	.226	.366	.695	NS
Within Groups	67.429	109	.619			
Total	67.882	111				

The one-way ANOVA presented in table 6 presented the result of F-ratio not to be significant at 0.05 level of significant: F(2,109) = .366; p>0.05.The analysis yielded a result of F-ratio of 0.366 and a p-value of 0.695 calculated at 0.05 level of significance and at 109 degree of freedom to be greater than 0.05. The null hypothesis was therefore rejected not to have any significant difference in the mean ratings of computer educators in Federal, State and Private colleges of education in the South East geopolitical zone of Nigeria on the utilization of ICT in evaluating of computer education programme.

Discussion

Computer educators utilizes ICT in their teaching and learning process basically in three modes namely instructional delivery, individualized instruction and evaluation of learning.

Computer educators agreed that there is no significant difference in the way ICT is utilized in teaching and learning in colleges of education. ICT resources are most effectively utilized by computer educators in divers ways mostly in the use of multimedia projectors for lesson presentation, use of tutorial packages on CD-ROMs as well as intensive use of internet chart rooms and search engines in their teaching and learning process. However, the study revealed that computer educators are yet to maximize the potentials of some ICT resources such as video-conferencing and teleconferencing in their instructional delivery processes and therefore still posses a great challenge towards skill training and sustenance of TVET programme.

Individualized instruction according to Eczema (2007) provides new educational technologies based on well designed computer program and course ware that allows students to teach and learn for themselves at their own pace. However, there is poor utilization of ICT resources in evaluation of students' achievement among computer educators. This stems from their inability to apply ICT resources in simulation techniques such as project designs, use of computer in conducting examinations, marking and computing of students' and cumulative grade points.

Conclusions

The utilization of ICT in teaching and learning of computer education has not been most effectively utilized in Colleges of Education in teaching-learning process. The effective utilization of ICT resources in the Nigerian Colleges of Education requires that Computer Educators be equipped with ICT skills and facilities needed to effectively function in the knowledge based economy. Hence, the utilization of ICT in lecture preparation and presentation, instructional delivery, individualized learning, as well as collaborative and evaluation of learning will significantly be of great benefit to our society.

Recommendations

Based on the findings of this study, the following recommendations were made:

1. National Commission for Colleges of Education (NCCE) should initiate and develop regular programmes through workshops that will retrain Computer Educators on the use of ICT as a tool for teaching.

2. Computer Educators should see the need for adopting the current methods in teaching and learning using interactive learning tools such as laptops, television and multimedia projectors, computer software (learning tutors on CD-ROMs) that combine text, sound, colourful images etc., that can provide challenging and authentic content that enhances students learning process.

3. The Ministry of Education should ensure that adequate ICT resources needed for proper utilization of ICT as a tool for teaching and learning in Colleges of Education in Nigeria are provided in right number.

References

Afolabi, M. (2001). Internet and Internet Connectivity: Library services and Research potentialities in Isyaku, K.M., Anikweze, C.M., Maiyanga, A.A. & Olokun. M. (edited), Teacher Education in Information Technology Age. Abuja: NCCE publisher.

Anderson, N. & Baskin C. (2002). Can we leave it to chance? New Learning Technologies and the problem of professional competence. *International Education Journal,* 3(3), 126-137. ePrints.jcu.edu.au/135381 Retrieved January, 2004 from http://rej. Cjb. Net.

Dale, R., Robertson, S. & Shortis, T. (2002).Constructing ICT and "Teaching and Learning" *Journal of Computer Assisted Learning* 20(6). (p.456-470)

Daniel E.E.,Ololube P.N. & Andrew E.U. (2007). *Journal of Information Technology Impact*.7(3) (p181-194), 2007 www.jiti.com/vo7/jiti.v7n3.181-194 pdf

Eczema, J. O. (2007). The place of Computer and Internet in Information Science; Implications for Teaching in the 21st Century: Nigeria. en.wikipediaorg/wiki/information.L

Federal Ministry of Education, (2004). Ministerial Initiative in e-Education System for Nigerian Educational System. Abuja Federal Ministry of Education.

FRN, (2001). National Policy in Education, NERDC; Press. Lagos.

FRN, (2001). Nigeria National Policy for Information Technology (IT). Retrieved from http://www.ntda.gov/does/policy/ngitpolicy.pdf. Retrieved October. 2004.

FRN, (2004). National Policy on Education (4th edition). Lagos. NERDAC press.

Jonnassen, D.H. (1991). Objectivism versus Constructivism. Do we need a new Philosophical Paradigm? *Educational Technology Research and Development*, 39(3) 5-14. Sensei.Isi.uned.es/../node55.html

Ngurukwem, E. C. (2005). Refocusing Teacher Education for Sustainable Development: A Case for Continuous Teacher Development Programmes

Ogwo, B. A. (2005). Modern Instructional Techniques and their applications in Technical Vocational Education (TVE) programmes of Polytechnics and Monotechnics. A Commission paper presented at the Capacity Building workshop for lecturers of polytechnics and monotechnics in Nigeria by the Education Trust Fund (ETF) held at Mushood Abiola Polytechnic August 24, 2005, Akwa Ibom Polytechnic, Ikot Osurua, Sept. 21, 2005 and Federal Polytechnic Auchi Nov. 2, 2005.

Olubode, M.P., Ubogu, A.E. & Egbezor, D.E. (2007). ICT and Distance Education Programs in a Sub- Saharan African. www. ololube.com/newonlinecv.doc

Schiller, J. & Tillet, B. (2004). Using Digital Images with young children: Challenges of Integration. Early Child Development and Care.

Smith, H. (1999). Opportunities for Information and Communication Technology. Staffordshire. Tentham Books Limited.

Smith, M.K. (1999). Andragogy in the Encyclopedia of Informal Education. Retrieved Sept 7,2009 from sites.google.com/a/nau.edu/education

Stewart, J. K. (1999). The Cyber-Cafe and the Community. Retrieved from http://www.cybercaptive.com

UNESCO (2004). A need to Reform Science and Technology Education. Portal.unesco.org/science/en/ev.php

UNESCO (1996). World Education Report, Teachers and Teaching in a Changing World.www.unesco.org/../wholewer98.pdf

UNESCO (1998). Harnessing Information Technology for Development in Africa, www.unesco.org/education/eduoporg/iwf/dod/a/.html

UNESCO, (2005). Information and Communication Technology in Schools. A Hand Book for Teachers.

UNESCO (2005). United Nations Decade of Education for Sustainable Development 2005-2014. Retrieved April 10, 2006 from http://portal unesco.org/education/en/ev.php-URL_ID=27234 and URL-DO=DO-TOPIC and URL-SECTION=201 html

Wadi, A. and Sonia, G. (2004). Evolving Role of ICT in Teaching, Research and Publishing. Nigeria Tribune, Friday, 30 April, 30-31.

Wiki educator (2007). ICT in Education in Nigeria ICT 4 Africa/Country report Nigeria. Retrieved from file http://www.wikieducator.org.ICT4Africa/Country Report Nigeria on 11/5/2007.

Wikipedia; Retrieved August, (2010) from http://en.wikipedia.org/wiki/Information and Communication Technology

Wikipedia: Retrieved 29 March (2009) from http://en.wikipedia.org/wiki/Information and Communication Technology.

Yusuf, M. (2005). Information and Communication Technology and Education. Analysing the Nigerian National Policy for Information Technology.