

APPLICATION OF ICT INTEGRATION IN ENTREPRENEURIAL SKILL ACQUISITION & SELF-DIRECTED LEARNING IN TECHNICAL VOCATIONAL EDUCATION IN RIVERS STATE

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Abstract

This paper examined the extent to which lecturers and students applied ICT integration or pedagogical principles in facilitating entrepreneurial skill acquisition and self-directed learning in Technical and Vocational Education (TVE) in 3 tertiary institutions in Rivers State 214 TVE lecturers and 300 year 2 students served as the sample for the study. four research questions and two hypotheses guided the study. A checklist as well as questionnaire entitled "Entrepreneurial Skill Acquisition and Self-directed learning instrument"(ESA&SI) were developed, validated, tested for reliability and administered on TVE lecturers and students for data collection. The research questions were answered using the mean while t-test was used to analyze the hypotheses. Results showed that ICT integration hardware and software are not available in TVE departments, the TVE lecturers and students in tertiary institutions in Rivers State do not utilize ICT facilities like computer, multimedia projectors, radio/TV, VCD/DVD machines and plates, video conferencing approach, interactive electronic or clever board, closed circuit television, lynx software nor starboard software etc. during instructional development. Lecturers and students do not apply ICT integration or

pedagogical principles to enhance students entrepreneurial skill acquisition, self-directed learning and highly engaging instruction in TVE. Most of the TVE lecturers and students find it difficult to use free online educational resources like skype, twitter, Wikipedia, google, facebook and so on for instructional purposes. Based on the findings and conclusion, the researchers recommended, among other things, that: Government should procure and distribute ICT facilities to departments of TVE in tertiary institutions in Rivers State. TVE lecturers and students should be trained through workshops, in-service training and seminars on the application of ICT facilities and that its integration principles to enhance students entrepreneurial skill acquisition, self-directed learning and highly engaging instruction in students of Technical and Vocational Education (TVE).

Nigeria as one of the developing nations of the world is saddled with series of problems ranging from unemployment, poverty, youth restiveness, population explosion, and environmental degradation (Bart, (1992). The economic and social life of the nation has been sliding down as a result of the economic recession. There are closure of industries, premature retirement and retrenchment of workers, inflation in the prices of goods and services, unemployment, scarcity of petroleum products, irregular payment of salaries, among others (Oviawe, 2010).

Through policies and various programmes, the government has made deliberate efforts to check massive youth and graduate unemployment, poverty and youth restiveness. In the same vein, frantic efforts have been channelled towards encouraging job and wealth creation and self-reliance through various ancillary intervention programmes which could have wrestled the unemployment to the ground, but the above laudable schemes have not done much and seem not attractive to the youth and the jobless ones, hence the unemployment situation in Nigeria has reached catastrophic proportions (Obi, 2010:11-12). There is increase demand for better condition of living, Technical and Vocational Education (TVE) strives to solve these pressing problems of today and tomorrow. TVE is a skilled-oriented programme that prepares individuals for purposeful living. Students at these levels need to be exposed to the real world of work to develop the practical skills and spirits that are vital to sustain a business after graduation. This component is crucial now than ever in the face of global economic depression, mass and graduate unemployment, compulsory retirement and retrenchment of workers in the public and civil service. In other words, TVE provide opportunities for skill acquisition or for the youths to be entrepreneurial (i.e. to get involved in making conscious effort geared towards the education and development of entrepreneurial knowledge and skills for effective performance of entrepreneurial functions) (Use, Jeremiah & Iniobong,2012).

Exploratory studies have shown that the use of conventional teaching methods such as use of the chalk-talk and lecture methods employed by technical and vocational

education lecturers during lesson presentations have not been effective and do not cater for learners peculiarities or students learning style in view of individual differences. The emergence of computer based learning / Computer assisted Instruction has given birth to the concept **ICT Integration**, a “diverse set of technological tools and resources used to communicate, and to create, disseminate, store, and manage information”. These technologies include computer, the Internet, broadcasting technologies (radio and television), and telephone. (Bandhana, 2012).

Statement of the Problem

The Federal Government of Nigeria realizes the importance of Technical and Vocational Education for national development. It is for this reason that it is enshrined in section seven of the National Policy of Education with the sole objective of training students in technologies and related sciences for the acquisition of practical skills, attitudes, understanding and knowledge relating to occupations in various sectors of economic and social life (FRN, 2004:23-24).

The Federal Government of Nigeria has set up various agencies for the implementation of Technical /Vocational Education programme. After several years of implementation of the TVE programme, youth unemployment is still the order of the day. Available data as reported by the National Bureau of statistics, Nigeria reveals that from 2006 to 2015 rate of unemployment is on the increase (Obi,2010). Available data as reported by the National Bureau of statistics, unemployment rate in Nigeria averaged 11.93% from 2006 until 2015 (www.tradingeconomics.com/Nigeria/Unemployment-rate). Part of the reason for failure of TVE to boost economic development may be over reliance on the conventional chalk-talk method that is no longer effective (Akpore, 2011). Recently, ICT integration is the modern teaching-learning method of the 21st century. It generates innovative processes in education, among other things. This study set out to determine the extent to which ICT integration or pedagogical principles are applied in achieving self-directed learning, highly engaging instruction and skill development in TVE programme.

Objectives of the Study

The objectives of the study are as follows:

To determine availability of hardware and software for ICT integration in Technical and Vocational Education (TVE)

To determine the extent to which ICT pedagogical principles are applied for self-directed learning in TVE

To determine the extent to which ICT pedagogical principles are applied for highly engaging instruction in TVE

To determine the extent to which ICT pedagogical principles facilitate entrepreneurial skill acquisition in TVE

Research Questions

This study is guided by the following research questions:

1. What ICT Integration hardware and software are available in TVE?
2. To what extent do the use of ICT pedagogical principles for entrepreneurial skill acquisition applied in TVE
3. To what extent are ICT pedagogical principles for self-directed learning applied in TVE?
4. To what extent are ICT pedagogical principles for highly engaging instruction applied in TVE?

Hypotheses

1. There is no significant difference between the mean scores of lecturers and students responses on application of ICT pedagogical principles for entrepreneurial skill acquisition in TVE
2. There is no significant difference in the mean scores of lecturers and students responses on application of ICT pedagogical principles for self-directed learning in Technical Vocational Education
1. There is no significant difference between the mean scores of lecturers and students responses on application of ICT pedagogical principles for highly engaging instruction in TVE

Significance of the Study

Nigerian youths can be empowered through Technical and Vocational Education in this present millennium for a better future and career prospect. Nigerians have, therefore, come to realize that there ought to be a significant change in our country as regards our economic and technological development. This study will stress the need for teachers and students to approach technical and vocational instruction with a realistic alternative to the conventional means of teaching and learning of TVE and keep their eyes on the heights of technical and vocational education attained by developed world.

Theoretical / Conceptual Framework

The theoretical frame works underpinning this study on application of ICT integration principles in self-directed learning & highly engaging instruction in technical & vocational education in Rivers State are the constructivist and behavioural learning theories. Whereas the former emphasizes a learning process in which individuals construct meaning based on prior knowledge and experiences (Piaget, 1957 & Vygotsky, 1978) the later is committed on the impact of group reinforcers and rewards on learning (Skinner, 1968; Watson, 1914 & Thorndike, 1932).

The Concept of Technical & Vocational Education

Technical and Vocational Education contend with ‘educational process that involves, in addition to general education, the study of technologies and related sciences and the acquisition of practical skills, attitudes, understanding and knowledge relating to occupations in various sectors of economic and social life’. Simply put, it is education that leads to the acquisition of practical and applied skills as well as scientific knowledge (Federal Republic of Nigeria, 2004). In other words, technical and vocational education is a programme designed to assist students to acquire industrial-technical knowledge and skills through creative and problem-solving learning experiences that involve such activities as experimenting, planning, constructing, evaluating and the use of tools, machines, materials and processes. The instructional and workshop experiences that are offered help students to make wise educational and career choices (Usoro & Edu, 2006:3-4).

Technical and Vocational Education have also been conceptualized as any form of education, training and retraining designed to prepare persons to enter or continue in a paid employment in a recognized occupation (Unesco, in ILO, 2002).

Technical and Vocational Education programme is intended:

i) To assist the students develop an insight and understanding of industry and its place in our society. Since industry is a constructive, dynamic force in the world today, it is the responsibility of the school to provide opportunities for each students to understand this force better

ii) To assist the students develop problem-solving abilities related to materials, processes and products of industry. The problem-solving approach in technical and vocational education involves creative thinking and gives the students the opportunities to apply principles of planning and design, construction techniques and computations to the solution of problems

To assist the students develop skills in the proficient and safe use of tools and machines

To assist students to make choices regarding educational and occupational goals

To train students to exhibit safe behaviours in the workshop and relate these to situations in the school, home and community.

To assist students to evaluate manufactured and constructed projects on the bases of set criteria such as quality of construction, appropriateness of materials, function, utility or purpose (Usoro and Edu, 2006).

Provide trained manpower in applied science, technology and commerce particularly at sub-professional levels

Provide the technical knowledge and vocational skills necessary for agricultural, industrial, commercial and economic development.

Provide people who can apply scientific knowledge to the improvement and solution of environmental problems for the use and convenience of man

Give an introduction to professional studies in engineering and other related technologies

Give training and impart the necessary skills leading to production

Enable youths, men and women have intelligent understanding of increasing complexity of technologies

Provide trained manpower in applied science, technology and commerce (Nwatah, 2013).

The Concept of ICT Integration?

The term "ICT integration" connotes a range of learning environments from a stand-alone computer in a classroom to a situation where the teaching is done by the computer through pre-packaged "teacher-proof courseware" (Laferriere, 1999). ICT integration in education basically refers to the "use of technology in communication, data processing and data storage to impact the knowledge on learners" (<http://www.tslgafrika.com>).

Richards (2013) viewed ICT integration in education from two perspectives. First, ICT integration is seen as the incorporation of technological infrastructures and systems into the educational environment for improved teaching and learning encounter. Second, ICT integration is seen as the utilization of ICT materials and programs in terms of social constructivist learning principles to support the teaching and learning process. The convergence and effective application of the pedagogical principles and technological aspects of ICT into the teaching and learning environment holds a promise for enhanced students academic performance (Papert, 2012).

David (2006) noted that schools are drifting towards ICT integration for the following reasons:

- increase access to instructional resources through the Internet;
 - share experiences through the Internet;
 - increase access to teacher development through distance teaching and learning;
- and
- increase flexibility in what to learn, how to learn and when to learn

Principles Guiding the Integration of Information Communication Technologies into Instruction

The Technical and Vocational Education lecturers and students are expected to apply or abide by the following ICT integration principles in their effort to advance learning:

1. Identify and assess the capabilities of computer software and networking technologies to be able to develop targeted educational competencies.
2. Utilize ICT effectively to build networks for information sharing and professional development in the teaching fields and practices

3. Carry out proper judgment and be sensitive to things concerning the actual benefits and limitations of ICT as an instructional material
4. Utilize ICT effectively in problem solving. This is to say that, with the emergence of ICT, teachers are now required to effectively explore other ways of working: how they structure collective teaching, teamwork, individual work in the classroom, and homework.
5. Provide support system or services to student learning using ICT. Students have to be aided to get acquainted with ICT and use it to carry out learning activities, assess their own use of ICT, and exercise critical judgement toward the information they find on the Internet.
6. Maintain an activity bank in such a way as to aid students learn properly and also lend effective support to other educational practices
7. Carry out thorough analysis of educational software in which case the user will have to evaluate appropriately the content of an instructional package and problem-solving steps
8. Observe students activity in terms of processing information and connecting it to previous knowledge.
9. Present information from different perspectives
10. Evaluate the learning process using some specific questions, online self-evaluative learning technique, among things (Bandhana, 2012).

ICT Integration Hardware and Software

There are various ICT integration hardware and software which the TVE lecturers are expected to be conversant with and utilize in their effort to facilitate students learning

Some of the hardware include: television, cine film projector, communication satellite, closed circuit television, digital Video Editing and productive systems, multimedia projector machine, Multimedia Kit, Radio, projectors, Video Disk Recording Equipment.

The ICT Integration Software or educational software include learning management systems (LMS), course content management system (CCMS), multimedia, hypermedia courseware, web-based courseware, learning resource banks, computer-assisted testing systems, framework software such as modelling and Micro world environments, educational gateways, educational management systems and other application software. Others are hypermedia courseware, video-on-demand, computer games and simulation, digital video editing and productive systems, On-line Tutorial using Web Design Package, Graphical Package, virtual library, multimedia database, VCD, interactive video, Slide films, sound Filmstrip, dictionary audio package, power point software, video conferencing and tel-conference systems, audio conference, audio-graphic conference and video Conference, DVD, and video tapes (Papert, 2012).

Besides, both lecturers and students of TVE in the present dispensation need to explore the rich advantages of free online educational resources like google, twitter, facebook, Wikipedia, skype, The Khan Academy: Web 2.0 Guru Wikispaces in improving students understanding of concepts and technological or entrepreneurial processes (Emeka, 2013).

Integrating ICT for Entrepreneurial Skill Acquisition, Self-directed Learning and Highly Engaging Learning in Technical and Vocational Education

ICT Pedagogical Principles for Entrepreneurial Skill Acquisition

The Nigerian youths need to be entrepreneurial, that is, have the ability to assume the risk of bringing together the factors of production and receiving reward in form of profit from market value of one's own products (encyclopaedia Americana, 1989). Skills acquisition education in the Nigerian educational system acts as a rehabilitation, motivation and empowerment to the under-privileged (children of poor parents). In recognition of the huge contribution skilled workers make towards organizational growth and development, organizations (like the TetFund) in development-conscious nations of the world, spend huge sums of money on employee skills upgrading and re-training programmes (Obi, 2010),

This days, new industries spring up thereby placing new demands for training and retraining in new skills in the existing and new occupational areas so that people might fit into today's and tomorrow's world of work. Technical and vocational education programmes tries to reflect the modern trends and development in occupations and skills acquisition especially as regards to relevant and needed skills to meet up with the demands of modern commerce and industry. To be involved in skill acquisition means to get acquainted with the theory of the trade, be exposed to practical as well as challenges in the trade.(Okoro, 2000).

ICT Pedagogical Principles for Self-directed Learning

Self-directed learning, to begin with, occurs when learners establish their own goals, then monitor, regulate or direct, and control their thoughts and behaviours as they seek to achieve those goals (Pintrich, 2000). The following ICT integrated software can be used to enhance self-directed or individualized learning in Automobile Technology Education learning: ICT facilities include: computer slides/power point, hypertext facilities, film projector, overhead transparencies, video clips, radio sets and projector screen using transparencies. The learning material is structured in such a way that it can facilitate individual learning. Also, a self-directed learner require immediate feedback in the things he or she has learnt in Automobile education.

ICT Pedagogical Principles for Enhancement or Highly Engaging Learning

The technical and vocational education teachers need to organise learning; plan how to use ICT pedagogical principles and facilities to achieve high engagement

classroom. The present time calls for highly engaging instruction or quality instruction; a time when the degree to which presentations and the ordering of elements in a task should approach the optimum for a given learner (Dean, 2010). A highly engaging instruction can be achieved in TVE courses whereby the teacher applies ICT pedagogical principles in teaching and learning process. He or she is expected to come up with;

Well stated instructional objectives

Well sequenced and paced content

Content presented from different perspectives

Use alternative teaching approaches/styles and media materials

Content filled with motivators

User guides/instructions lucidly presented

Take care of learning styles

Incorporate formative evaluation

Incorporate principles from learning theories, and

Incorporate optimum conditions/facilities (Dike, 2006:180)

Research Methodology

Research Design

The survey design was adopted for this study.

Population of Study

The available population of the study comprises 214 Technical and Vocational education lecturers and 500 year two Technical and Vocational education students from the 3 tertiary institutions in Rivers State – R/S University of Science & Technology, Port Harcourt; Ignatius Ajuru University of Education, Port Harcourt and Federal College of Education (Technical), Omoku (Records from Faculty Officers /Admission departments).

Sample Size/Sampling Technique

A sample size of 200 (out of 214) TVE lecturers and 300 (out of 500)

Instruments for Data Collection

The researcher made use of two research instruments for data collection: A checklist to determine availability of ICT integration hardware and software and questionnaire

Validity of the Instrument

The instruments were further validated by a pilot study which involved TVE teachers and students outside the areas of the study, and feedback from them were also used for necessary corrections.

Reliability of the Instrument

The reliability of the technical and vocational education lecturers and students questionnaires were determined through the test – retest approach. Using SPSS, The Cronbach's Alpha statistics was used for computations. The questionnaires for TVE lecturers and students were administered on 20 Technical and Vocational Education teachers and students, respectively outside the sample areas within an interval of two weeks. The TVE lecturers' questionnaire gave .758 result and that of the students .748. These were high enough and hence found reliable for use for the study.

Administration of Instrument

The researchers used a research assistance to administer and retrieve the instruments

Method of Data Analysis

A mean score of 2.5 was used as a criterion for acceptance or rejection of an item on the questionnaire. Mean score of each item on the questionnaire above the cut-off point is accepted (i.e. Agreed) while mean score below the cut-off point is rejected (i.e. Disagreed). The researcher used independent t-test to analyze the hypotheses. Statistical mean was used in analyzing the research questions. A 4-point Likert scale of measurement was used: Strongly Agreed 4 point, Agreed 3 point, Strongly disagree 2 and Disagree 1 point.

Analysis

Table 1: Lecturers Responses on ICT Integration Hardware Available in TVE Depart in the 3 Higher Institutions Under Study

S/ N o.	Item	Mea n	Not Availab le
1.	Computer equipment, TV, Radio, Multimedia projector, VCD/DVD machine, Satellite equipment	0.0	Not Available
2.	Video editing machine (character generator)	0.0	Not Available
3.	Teaching machine Land telephone, Compact Disc equipment	0.0	Not Available
4.	Film projectors, Digital camera	0.0	Not Available
5.	Interactive clever board, loud speaker	0.0	Not Available
6.	Personal handset telephone	3.0	Available
7	Photocopying machine	1.3	Available but not sufficient

Table 2: Lecturers Responses on ICT Integration Hardware Available in TVE Depart in the 3 Higher Institutions Under Study2

S/N	Item	Mean	Not Available
1.	VCD plates, DVD plates Flash drive	0.0	Not Available
2.	Transparencies	0.0	Not Available
3.	Starboard software	0.0	Not Available
4.	Slides, Radio cassette	0.0	Not Available
5.	Fugichrome, Interactive video tapes	0.0	Not Available
6.	Filmstrip	3.0	Available
7.	Graphic application software:	0.0	Not Available

Hypothesis Test Result 1:

Table 3: An Independent t-test Statistical Analysis of TVE Lecturers and Students Responses on Application of ICT Pedagogical Principles for Entrepreneurial Skill Acquisition in TVE

VAR000o2	N	Mean	Std Deviation	STD Error Mean	t-value	df	P-Value (Sig//2Tailed)	Alpha Level
VAR00001	18	449.6667	72.64418	17.12240	- 6.970	34	.000	0.05
	1.00	18	685.9444	124.13203				
2.00								

Decision: As shown in the SPSS computer analysis above, P-value of 0.00 is less than the alpha level of 0.05. which means that it is significant. In other words, it shows that there is significant difference between the mean scores of the TVE lecturers and students responses on the application of ICT pedagogical principles for entrepreneurial skill acquisition.

Hypothesis Test Result 2:

Table 4: An Independent t-test Statistical Analysis of TVE Lecturers and Students Responses on Application of ICT Pedagogical Principles for Self-directed Learning in TVE

VAR000o2	N	Mean	Std Deviation	STD Error Mean	t-value	df	P-Value (Sig//2Tailed)	Alpha Level
VAR00001	17	443.4706	98.57175	23.90716	- 4.936	32	.000	0.05
	1.00	17	669.4706	160.99267				
2.00								

Decision: Since P-value (.000) is less than the alpha level (0.05) that means the null hypothesis is significant. This also means that there is significant difference between the mean scores of the TVE lecturers and students responses on the application of ICT pedagogical principles for self-directed in TVE

Hypothesis Test Result 3:

Table 5: An Independent t-test Statistical Analysis of TVE Lecturers and Students Responses on Application of ICT Pedagogical Principles for Engagement of learning in TVE

VAR000o2	N	Mean	Std Deviation	STD Error Mean	t-value	df	P-Value (Sig//2 Tailed)	Alpha Level
VAR00001	12	449.6667	124.18779	35.84993	-3.609	22	.000	0.05
	12	683.4167	172.83647	49.89359				
2.00								

Decision: As shown in the SPSS computer analysis above, P-value of 0.00 is less than the alpha level of 0.05. which means that it is significant. In other words, it shows that there is significant difference between the mean scores of the TVE lecturers and students responses on the application of ICT pedagogical principles for entrepreneurial skill acquisition.

Findings

The Following were the major findings of the study:

- Most technical and vocational education departments in tertiary institutions in Rivers State lack ICT facilities
- The TVE lecturers in tertiary institutions in Rivers State do not utilize computer, multimedia projectors, TV, radio cassette, VCD, video conferencing, facebook, twitter, wikipedia, etc. to facilitate the teaching and learning process
- ICT pedagogical principles are not being incorporated into TVE instruction in order to enhance entrepreneurial skill acquisition,
- No good effort is made by the TVE lecturers to really apply ICT pedagogical principles to encourage self-directed learning in the students
- Also, the TVE lecturers do not seem to encourage highly engaging instruction or learning in the students through the application of ICT pedagogical principles

Discussion of Findings

The departments offering courses in TVE actually lack ICT facilities required to be used to facilitate teaching and learning. One had expected that TVE lecturers and students should effectively use ICT to enhance the connections between curriculum, instruction and assessment if these facilities are available. But in a situation whereby

the lecturers and students are handicapped, ICT facilities lacking in technical and vocational education departments, it becomes difficult for them to integrate ICT into the TVE curriculum (Jianwei, 2004). It became difficult creating a dependable and flexible infrastructure that supports widespread and effective use of ICT. The present 21st century or information technology age requires the presence ICT facilities or digital media technological equipment for lecturers and students to use to advanced learning.

ICT pedagogical principles are not being used in TVE programme to facilitate the teaching and learning process as to enhance entrepreneurial skill acquisition, self-directed learning and, in fact, highly engaging learning as shown in tables 3,4 & 5 above. In the present dispensation, the ability to read, write, and count is not enough for the developments, technology has become widely adopted in the society. Because of this, skills in the use of ICT pedagogical principles are becoming a necessity that individuals have to acquire as their use enhances self-directed learning, highly engaging learning as well as skills development,

Conclusion / Implication of the Research Result

ICT facilities are not available in the departments of TVE in higher institutions in Rivers State. Lecturers and students in TVE departments in higher institutions in Rivers State do not integrate or utilize ICT pedagogical principles to enhance entrepreneurial skill development, self-directed learning and highly engaging learning in TVE. This situation does not take care of learners peculiarities and does not equally motivate the students hence students academic achievements are affected adversely in TVE.

Recommendations

Based on the findings and conclusions of this study, the researcher here under forward the following recommendations:

- Both the Federal and Rivers State Governments should procure and distribute ICT hardware and software as well as other necessary facilities to the TVE departments for lecturers and students use, in institutions of higher learning in the State. All lecturers in TVE departments should be provided with laptops and multimedia projectors.
- Standard Information Technology Centre or Educational Technology Centre should be built in institutions of higher learning in Rivers State and well equipped with ICT facilities and personnel to assist the TVE lecturers and students in effective integration of ICT pedagogical principles in instruction
- Technical and vocational education lecturers and students should be well trained through workshops, in-service training and seminars on the application of ICT pedagogical principles in TVE as well as maintenance of ICT facilities
- The Technical and vocational education lecturers and students in tertiary institutions in Rivers State should effectively apply ICT pedagogical principles to

enhance entrepreneurial skill development, self-directed learning as well as highly engaging instruction,

- ICT facilities as well the free online educational resources should be used to advance learning and motivate the students to put in their best at learning.
- Constant electrical power should be supplied to aid the use of ICT integration facilities

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