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Guest Editors

Jacinta A. Opara, PhD
Samir M. Alredaisy, PhD
Anthonia U. Ejifugha, PhD
Hanna David, PhD
Austin N. Nosike, PhD

Rome, Italy 2012
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Introduction

The papers collated in this edition of Journal of Educational and Social Research (JESR) are a publication designed to expand the flow of ideas among social scientists, educators, and development scholars. Written by seasoned scholars, the papers were among the 200 papers received by the International Scientific Committee of the International Conference on Teaching and Learning (ICTL2012) and International Technology, Education and Environment Conference (TEEC2012) held at Abuja, Nigeria.

This publication project is an initiative where ideas are seen as crucial for sustainable development. Its goal is not only disseminating current knowledge about development but is also engaged in furthering this understanding. This work consequently contributes to the contemporary debate on development management and capacity building as well as examining lessons of experiences for policy from an interdisciplinary perspective.

Jacinta A. Opara, PhD

Visiting Associate Professor, Universidad Azteca, Chalco-Mexico and President, African Association for Teaching and Learning
Overcoming the Challenges of Sustainable Development through Science and Technology Education

S. A. Adesola

Department of Computer Science, Federal College of Education (Special), Oyo. Nigeria

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Abstract

It is now generally recognized that the world’s present approach to growth is built upon foundations that are not sustainable because of resource depletion and the negative impacts of pollution and greenhouse gas emissions on the relationship between people and the planet. Climate change in particular is having an impact not only on people’s lives and livelihoods, but on the increasingly urgent search for “green growth,” that is to say for alternative economic strategies that meet the needs of the present without compromising the opportunities of future generations. It is also widely recognized that new technologies, particularly ICTs, are having a major impact on economic and social relationships among individuals, communities and nations. High-speed telecommunications have been a major driving force of globalization in capital, labour and product markets. Mobile telephones have, for the first time, made immediate communications at a distance available to the majority of individuals worldwide. This paper therefore takes a look at the issues of Sustainable development, Science education, Sustainable Development issues for Education, How Science and Technology Education can relate to Sustainable Development. A comparison of similarities and differences in philosophical emphases between ‘Science through Education’ and the alternative ‘Education through Science’ was also given. Finally, conclusion were drawn and recommendations given.

Keywords: Sustainable Development, Science Education, Science, Technology Education, and Scientific Literacy

Introduction

In the late 1980s and early 1990s, the World Commission on Environment and Development and the subsequent UN Summit, held in Rio de Janeiro and popularly known as the Earth Summit, focused the world’s attention on sustainable development (Souter, 2010). They recognized that growth that depended on short-term depletion of natural resources could not lead to long-term prosperity or welfare. They defined sustainable development as “development that meets the needs of the present, without compromising the ability of future generations to meet their own needs.” (WCED 1987, part 1, sec. 2, para. 1).

The importance of sustainability has been increasingly recognized in development policymaking since the Earth Summit took place. Although it is concerned with economic and social as well as ecological sustainability, environmental issues—and particularly climate change—have continued to sharpen this emphasis.

Comparable attention to Information and Communication Technologies (ICTs) in development arose in the late 1990s and early years of the present century, and also focused around a UN Summit; in this case, the two-part World Summit on the Information Society held in 2003 and 2005 (Souter, 2010). Dramatic changes in the technology and economics of communications enabled
rapid and far-reaching expansion of communications access and the range of communications services, including the advent and spread of the Internet.

At the least, these changes in communications have had profound effects on economic and social structures and on individual behaviour. For many in the field, these—and potential changes yet to come—represent the transition to a post industrial Information Society, in which knowledge and networks play a more prominent role than capital and hierarchy.

It is now generally—if not yet universally—recognized that the world’s present approach to growth is built upon foundations that are not sustainable because of resource depletion and the negative impacts of pollution and greenhouse gas emissions on the relationship between people and the planet. Climate change in particular is having an impact not only on people’s lives and livelihoods, but on the increasingly urgent search for “green growth,” that is to say for alternative economic strategies that meet the needs of the present without compromising the opportunities of future generations.

It is also widely recognized that new technologies, particularly ICTs, are having a major impact on economic and social relationships among individuals, communities and nations. High-speed telecommunications have been a major driving force of globalization in capital, labour and product markets. Mobile telephones have, for the first time, made immediate communications at a distance available to the majority of individuals worldwide.

The Internet has transformed the availability of information and disrupted traditional social and economic structures, from intellectual property and trade in goods and services to privacy, political debate and social mores.

**Defining Sustainable Development**

The World Commission on Environment and Development - the Brundtland Commission- defines sustainable development in its 1987 report as follows:

*Development that meets the needs of the present without compromising the ability of future generations to meet their own needs. It contains within it two key concepts: in the concept of ‘needs,’ in particular the essential needs of the world’s poor, to which overriding priority should be given; and in the idea of limitations imposed by the state of technology and social organization, on the environment’s ability to meet present and future needs. (WCED 1987, part 1, section 2, para. 1).*

Although the definition of sustainable development emerged from an international enquiry into the relationship between environment and development, it is not concerned primarily with the environment but with the sustainability of the overall developmental context. This usually comprises three main elements:

1. **Economic development** – reducing and seeking to eradicate income poverty, achieving higher levels of prosperity and enabling continued gains in economic welfare;
2. **Social development** – reducing and seeking to eradicate other dimensions of poverty, improving the quality of education, health, housing and other aspects of the welfare of individuals and communities, and enhancing the quality of social interaction, engagement and empowerment;
3. **Environmental protection** – reducing pollution and other negative impacts on the environment, mitigating the effects of industrialization and human activity, and seeking to
achieve sustainable use of resources in the interest of future generations (WSSD, 2002a, ch. 1, para. 2).

This relationship is sometimes illustrated either as pillars or through a Venn diagram as here: three pillars or circles of "economic development, social development and environmental protection" as three "interdependent and mutually reinforcing pillars" of sustainable development (United Nations General Assembly, 2005, para. 48).

Development, in this context, is not a matter merely for developing countries, as the term is sometimes used. It is about development at all levels, from the family, through local communities, regions and nations, to the planet as a whole. Sustainability needs to be a priority in all countries—post-industrial and industrial as well as developing countries—and in the international system that links them.

Some analysts of sustainability add one or two additional aspects of development to this tripartite framework. These are:

1. Cultural diversity – the continuance of diverse human cultures from past to future within a context of the globalization of communications, economy and society and the more intensive intercultural interactions that result; and

2. Governance – the institutional mechanisms, rules and norms that encompass decision making and behaviour by governments, businesses and citizens, the interactions among these stakeholders and among different policy domains.

The sustainability of development results not from any individual part of this framework—from economic growth, for example—but from the framework as a whole: from the cumulative impact of all three (or five) components, from the interactions among them and from the system-wide outcomes that result from these.

Sustainable development, in other words, looks at development holistically, rather than from one dimension of the development ecosystem. This is often misunderstood.
The Brundtland Commission (1987) recommended seven critical actions needed to ensure good quality of life for people around the world (WCED, 1987, ch. 2, para. 28):

i. Revive growth;
ii. Change the quality of growth;
iii. Meet essential needs and aspirations for jobs, food, energy, water and sanitation;
iv. Ensure a sustainable level of population;
v. Conserve and enhance the resource base;
vi. Reorient technology and manage risk; and
vii. Include and combine environment and economic considerations in decision making.

These factors place a demand on us to:

i. Produce differently by increasing efficiency and reducing material used in production. The goal is to quadruple resource productivity so that wealth is doubled, and resource use is halved.
ii. Consume differently by developing policies that promote consumption patterns that reduce the ecological footprint of development while meeting the needs of all people so they enjoy a good quality of life.
iii. Organize differently by engaging all stakeholders and improving public participation in all steps of planning, implementation and evaluation of policies and actions; reducing global subsidies and applying some of these to sustainable development.

Accordingly to the World Bank (see World Bank, 2004; 2003; 2003a), development in the 21st century is a multi-dimensional concept which combines five perspectives, all of which are key to making development sustainable:

- **Financial capital**: sound macroeconomic planning and prudent fiscal management.
- **Physical capital**: infrastructure assets, such as buildings, machines, roads, power, plants, and ports.
- **Human capital**: good health and education to maintain labour markets.
- **Social capital**: people’s skills and abilities as well as the institutions, relationships, and norms that shape the quality and quantity of a society’s social interactions.
- **Natural capital**: natural resources, both commercial and non-commercial, and ecological services which provide the basic requirements, including food, water, energy, fibers, waste assimilation, climate stabilisation, and other life-support services.

**Science Education**

Science is the study of nature and the way things in the world are made and act (Olubela, 2009 in Adesola, 2010). Science is the study of knowledge comprising facts and principles guiding the understanding of things around us. Science is based on the acquisition of knowledge that is based on examining, testing and proving of facts. Busari (2009, in Adesola, 2010) also stated that, science is used to connote the distinctive methods by means of which knowledge is acquired, refined and certified. He stated further that, it is a body of knowledge (though organized) resulting from these methods when put into operation. Hence, science is both a product and process of investigation and research.

The process of science as used above is concerned with the scientific activities or methods by means of which information is gathered, analyzed, synthesized and disseminated. These activities according to Busari and Sodipo (2000) include observation, classification, measurement, collection of data, interpretation of data and experimentation among others. Scientific product on the other hand refers to the library of knowledge in the form of facts, concepts, principles, theories and laws.
Education has also been defined in various ways by several authors. Taiwo (1987) in Oduolowu (1999) defined education as the training of the young with a view to helping their growing up and developing into adults who can fend for themselves, live in a society and be service to that society. Bamisaye (1987) in Oduolowo (1999) also observed that education is expected to affect the social behavior of either the educated person or the person being educated. Such social behavior ranges from avoidance of social crimes like stealing, rape, abusive language and unruly behavior of any form.

From the above definitions, aesthetic and ethical considerations are relevant to the concept of education. It also involves acquisition of knowledge, abilities and skills which would enable the individual to be more functional in his environment and society at large. To many parents and governments, education of the child means, the learning which takes place in the schools and animates in the acquisition of certificates.

What are the major Sustainable Development issues for Education?

From an education perspective, developing sustainable development can be viewed as (Ospina, 2000):

1. Placing a system of values and ethics at the centre of society's concerns;
2. Encouraging a meeting of disciplines, a linking of knowledge and of expertise, and to render our understanding more integrated and contextualized and so, in turn, to open up new horizons for justice and equality (equity);
3. Encouraging lifelong learning, starting at the beginning of life and grounded in life – one based on a passion for a radical transformation of society and a change in the moral character of society;
4. Advancing new conceptions rooted both in traditional scientific rationality and in popular beliefs and consciousness, drawing on these as a source of human understanding and a pointer to collective wisdom;
5. Encouraging the refinements of locally based processes of change and of integral community advancement, one not marked by a passive receptivity to or a mindless repetition of homogeneous development models;
6. Ensuring priority is given to fundamental critical questions, to the method as a means of approaching tangible realities, by promoting dialogue among the sectors of society and a real interdisciplinary approach;
7. Elevating the importance of social subjectivity and of the qualitative dimension of social life;
8. Encouraging new alliances between the State and civil society in promoting citizens' emancipation mediated by the practice of democratic principles while fully acknowledging the complexities inherent to every human reality.

For the above to be put into place, it is suggested that education needs to be viewed as a means to (Ospina, 2000):

i. Promote a culture of citizenship and give value to social actors (such as non-governmental organizations and other sub-groups);
ii. Mobilize society in a concerted effort so as to eliminate poverty and all forms of violence and injustice that jeopardize the future and the maintenance of a good quality of life;
iii. Valorize aesthetics, the creative use of the imagination, an openness to risk and flexibility and a willingness to explore new options;
iv. Assert the importance of local communities and their ties to the entire Earth and indeed with the universal; identify and pursue new human projects in the context of a planetary consciousness and a personal and communal awareness of global responsibility;

v. Engender new hopes and ways of channeling the valuable energies and resources of entire nations; seek understanding, to anticipate, to imagine and to contextualize;

vi. Reach a stage in which the possibility of change and the real desire for change are accompanied by a concerted, active participation in change, at the appropriate time, in favour of a sustainable future for all;

vii. Instill in the minds of all people a conviction of the values of peace in such a way as to promote the creation of new lifestyles and living patterns;

viii. Develop to the maximum, the potential of all, throughout their lives, so that they can achieve self-fulfillment and full self-expression with the collective achievement of a viable future; effect change in value systems, behavior patterns and lifestyles necessary to achieve sustainable development, and ultimately democracy, security and peace;

ix. Disseminate the knowledge and skills necessary to foster sustainable production and consumption patterns and to improve the management of natural resources, agriculture, energy and industrial production;

x. Ensure an informed populace, prepared to support changes in other sectors conducive to sustainability.

How Science and Technology Education relate to Sustainable Development?

Science, over the last 100 years, has slowly been given a place in the curriculum. Yet its original purpose (to prepare students for science studies at University (Fensham, 2008) has tended to remain the predominant determinant of the content and hence the focus of teaching and learning.

The content for learning still carries the strong conceptual tone that characterized the scientific preparation of an elite group, as if they were the sole concern and purpose of school science. Getting the balance right between the purposes of enthusing enough students to go on to scientific and technological careers and giving all students an interest in, and enough knowledge of science and technology so as to appreciate the importance of science and technology in society, is perhaps the major science education issue facing all countries today. This suggests that the aims for school science curricula need to be examined, especially with respect to social relevance and hence sustainable development. Equipping young persons to participate in the big socio-scientific issues of today (for example, food scarcity, poverty alleviation, HIV/AIDS/ peace building, global warming, cloning, embryonic stem cell use, toxic waste disposal, sustainable development, etc.) makes good sense in the compulsory years of education.

Scientific Literacy

A common expression in many curricula today indicates that the purpose of science education in schools is to enhance scientific literacy. The precise meaning of scientific literacy is unclear and there is much controversy over whether it refers to learning science content, as the intended focus of science education. The ICASE definition of scientific and technological literacy clearly relates to the issues of sustainable development above and beyond specific content. This definition put forward in 1997 (Holbrook and Rannikmae) states: “developing the ability to creatively utilise sound science knowledge in everyday life, or in a career, to solve problems, make decisions and hence improve the quality of life.” This view of scientific literacy is still very valid today.

~ 16 ~
A comparison of similarities and differences in philosophical emphases between ‘Science through Education’ and the alternative ‘Education through Science’ (Holbrook & Rannikmae, 2007)

<table>
<thead>
<tr>
<th>Science through Education</th>
<th>Education through Science</th>
</tr>
</thead>
<tbody>
<tr>
<td>1 Learn fundamental science knowledge, concepts, theories and laws.</td>
<td>Learn the science knowledge and concepts important for understanding and handling socio-scientific issues within society.</td>
</tr>
<tr>
<td>2 Undertake the processes of science through inquiry learning as part of the development of learning to be a scientist.</td>
<td>Undertake investigatory scientific problem solving to better understand the science background related to socio-scientific issues within society.</td>
</tr>
<tr>
<td>3 Gain an appreciation of the nature of science from a scientist’s point of view.</td>
<td>Gain an appreciation of the nature of science from a societal point of view.</td>
</tr>
<tr>
<td>4 Undertake practical work and appreciate the work of scientists.</td>
<td>Develop personal skills related to creativity, initiative, safe working, etc.</td>
</tr>
<tr>
<td>5 Develop positive attitudes towards science and scientists.</td>
<td>Develop positive attitudes towards science as a major factor in the development of society and scientific endeavours.</td>
</tr>
<tr>
<td>6 Acquire communicative skills related to oral, written and symbolic/tabular/graphical formats as part of systematic science learning.</td>
<td>Acquire communicative skills related to oral, written and symbolic/tabular/graphical formats to better express scientific ideas in a social context.</td>
</tr>
<tr>
<td>7 Undertake decision making in tackling scientific issues.</td>
<td>Undertake socio-scientific decision making related to issues arising from the society.</td>
</tr>
<tr>
<td>8 Apply the uses of science to society and appreciate ethical issues faced by scientists.</td>
<td>Develop social values related to becoming a responsible citizen and undertaking science-related careers.</td>
</tr>
</tbody>
</table>

Conclusion

The acquisition of “big” ideas in science is relegated to building a concept of the nature of science and/or the promoting of personal intellectual thinking needed to promote sustainable development. This does not mean knowledge is excluded from the teaching of science, but it is recognition that useful basic knowledge is tentative, liable to regional variations and best included on a need-to-know basis. The key driving force for EtS is the need for students to acquire social skills, supported by personal skills, thus enabling students (and later as adults – Roth and Lee, 2004) to draw on their scientific literacy to play a responsible role within society. Ensuring students are able to function within the world of work at a skill or responsibility level, commiserate with the students’ aptitude and ability; Possessing a conceptual background, or skills of learning so as to learn to cope with a need to - have, relevant public understanding of science and technology in a changing society.
Recommendations

After careful analysis of the review work in sustainable development and science education, it is therefore recommended that science literacy should trend thus towards:

(a) Inclusion of issue-based or context-based teaching as a major thrust to ‘set up’ the scientific problem to be investigated.

(b) There is the need to go beyond scientific problem solving to also encompass socio-scientific decision making (related to responsible citizenry).

(c) Recognition that scientific literacy relates primarily to enabling citizens to effectively participate in the real world and is thus a social rather than solely an individual consideration.

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Application of Information and Communication Technology in Teaching and Learning in State Owned Colleges of Education of the South-East of Nigeria

Ikechukwu Akude
Department of Curriculum Studies and Educational Technology, Imo State University, Owerri-Nigeria

Ajuzie Ndubuisi Ebeniza
Centre for Educational Technology, Alvan Ikoku Federal College of Education, Owerri-Nigeria

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Abstract
Application of ICTs in teaching and learning in state owned Colleges of education of the South-East of Nigeria. The study is a descriptive survey. To guide in the achievement of the purpose of the study, four research questions were raised. The target population of the study was three hundred and twenty one (321) lecturers. Data were collected using a questionnaire of a four point modified likert type scale and experts in and outside the department of educational technology validated the instrument. The reliability of the instrument was ascertained by using ten teachers from another College of education to carry out a test – retest exercise, and a reliability coefficient of 0.71 was established using Pearson product moment correlation coefficient statistics. The researchers administered the instrument while data were analyzed using the mean and standard deviation statistical tool. Generally, the study revealed that many lecturers lack basic ICT skills; many ICT facilities are not available in these institutions. Based on these findings, the researchers recommended as follows; Lecturers at all level should try to improve on their capacity and on ICT competencies through trainings and full participation in workshops. Also, sufficient ICT facilities made available for lecturers use in teaching and learning.

Keywords : Communication Technology, Teaching and Learning, South-East Nigeria

Introduction
Teaching and learning before the coming of information and communication technology has been described as traditional method of teaching which was characterized by the old chalk and talk method. It also involves the face- to- face approach to teaching and learning where the teacher sees himself as the centre point of teaching (Akude, 2004). The teacher does all or most of the talking in the classroom; the students are passive, have little or no control over the flow of information and are reduced to playing the role of a stenographer. Learning in this approach is by mere listening. This is a very poor approach to learning. Supporting this view, Kpeke and Osho (1998) asserted that learners retain only 20% of what they hear while Onyejemezi (1991) among others upheld the fact that students remember 90% of what they say as they do it. The later statement lays emphasizes on participatory and problem-solving in teaching and learning which information and communication technology (ICT) seems to advocate and involves critical thinking.

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and exchange of ideas by different scholars, hence the introduction of computer in teaching and learning process (Alalibo, 2006). However, before explaining further, efforts must be made to explain the basic concepts in this study, i.e. application, information and communication technology.

According to Oxford advanced learner’s Dictionary (1994); application means the act of putting a theory, discovery, etc to practical use. According to Technofuture (2006), the “l” in ICT stands for Information. Information here refers to the processing, management and storage of data. “C” then stands for communication, and communication refers to the transmission of information between persons and equipment. Also, “T” in ICT stands for Technology, and technology is the application of science to accomplish desired objectives. In the case of ICT, the definition of technology is narrowed to include only computer-related purposes. Specifically, the use of hardware and software to process, manage, store or transmit data. To be computer literate means to have the knowledge and skills or ability to operate a computer so as to yield any desired result. ICT can be defined as a diverse set of electronic technologies and technological tools and resources used to communicate, create, disseminate, store, and manage information (Tinio, 2003; Adomi & Kpangban, 2010). These technologies may include computers, the Internet, broadcasting technologies and telephony. However, Joseph, Olarionye & Emmanuel, (2006) sees ICT as the combination of computers and telecommunications technologies to improve the quality of teaching and learning through processing, editing, storage, retrieval and dissemination of information with sound, motion pictures and diagrams. It is possible for any one in Nigeria who is in ICT environment to relate with any other person in any part of the world that is ICT friendly; Iwu (2001) opined that ICT has rendered international boundaries irrelevant since many modern activities cut across international frontiers. That is why we live in a boundless world that is becoming a smaller place, due to the recent development in technology.

ICT is a critical tool in preparing and educating students with the required skills for the global workplace. ICT makes it easier for students to access knowledge. ICT is regarded as an engine for growth and tool for empowerment, with profound implications for education, change and socio-economic development. Teachers, parents as well as education policy makers are central forces in tapping the learning opportunities created by the introduction of ICTs. They hold the key to what and how teaching and learning take place at schools and in the communities (Mankilik & Agbo, 2006). Generally, ICT holds out the opportunity to revolutionize teaching methods, expand access to quality education and improve the management of education system (World Bank, 2002). The main purposes of ICT consist not just in the development of human mental resources that allows people to both successfully apply the existing knowledge but to produce new knowledge (Shavinina, 2007).

The Problem

In recent years there has been a groundswell of interest in how computers can best be harnessed to improve the efficiency and effectiveness of education at all levels. However, it is unfortunate to observe that many students in our colleges of education today resort in quoting old authors in their project work, others copy exactly what has been written by others while some photocopy old works and tear out the front page and put in theirs. Moreso, these students after graduation stay idle, unemployed as reports from radio and television prove that unemployment rate in Nigeria is ever increasing yearly (National Bureau of Statistics, 2009). In the light of the above, one of the most commonly cited reasons for using ICTs in the classroom has been to better prepare the present generation of students for a workplace where ICTs, particularly computers, Internet and related
technologies, are becoming more and more ubiquitous (Matsepe-Casaburri, 2003). Hence the researcher deemed it fit to investigate into the application of ICT in teaching and learning in state owned Colleges of Education in the South-East of Nigeria.

**Purpose of the Study**

The major purpose of the study was to examine the level of application of ICT in teaching and learning in state owned Colleges of Education in the South-East of Nigeria. Specifically, the study intends to:

i. Identify the level of acquisition of relevant ICT teaching skills by the lecturers in the area under study.

ii. Find out how available the ICT facilities are in these institutions.

iii. Determine how accessible the ICT facilities are to the lecturers.

iv. Determine the regularity of use of ICT facilities by the lecturers in teaching.

**Research Questions**

In order to effectively cover all the issues raised in the purpose of this study, corresponding research questions were raised;

i. To what extent do the lecturers who teach in our colleges of education posses the relevant ICT teaching skills?

ii. What are the available ICT facilities in our institutions?

iii. To what extent do lecturers have access to ICT facilities in the institutions?

iv. How regularly are the ICT facilities put into use by lecturers in the institutions?

**Method and Procedures**

The research design adopted for this study is the descriptive survey. The researcher employed the use of questionnaire to gather information from the sampled population. The reliability index of the questionnaire was calculated using the Pearson Product Moment Correlation Coefficient and it gave 0.71. There are four (4) state owned Colleges of Education in the South East of Nigeria having a total of and six hundred and forty one (641) lecturers.

**Table 1: Showing names of State owned Colleges of Education and corresponding number of lecturers.**

<table>
<thead>
<tr>
<th>S/N</th>
<th>State owned Colleges of Education in the South-East</th>
<th>No. of lecturers</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>Abia State College of Education Technical, Arochukwu</td>
<td>85</td>
</tr>
<tr>
<td>2</td>
<td>Ebonyi State College of Education, Ikwo</td>
<td>189</td>
</tr>
<tr>
<td>3</td>
<td>Enugu State College of Education Technical, Enugu</td>
<td>96</td>
</tr>
<tr>
<td>4</td>
<td>Nwafor Orizu College of Education, Nsugbe</td>
<td>271</td>
</tr>
<tr>
<td></td>
<td><strong>Total</strong></td>
<td><strong>641</strong></td>
</tr>
</tbody>
</table>

**Source:** Field survey from each of the colleges listed in the table, 2012.

However, the researcher decided to study all the four colleges in the South-East, but purposively sampled 50% of the lecturers. Thus, a sample of 321 lecturers was got and used.
Table 2: Showing Stated owned colleges of education in the South-East and selected lecturers accordingly.

<table>
<thead>
<tr>
<th>S/N</th>
<th>State owned Colleges of Education in South-East</th>
<th>Pop. of lecturers</th>
<th>50% pop.</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>Abia State College of Education Technical, Arochukwu</td>
<td>85</td>
<td>43</td>
</tr>
<tr>
<td>2</td>
<td>Ebonyi State College of Education, Ikwo</td>
<td>189</td>
<td>95</td>
</tr>
<tr>
<td>3</td>
<td>Enugu State College of Education Technical, Enugu</td>
<td>96</td>
<td>48</td>
</tr>
<tr>
<td>4</td>
<td>Nwafor Orizu College of Education, Nsugbe</td>
<td>271</td>
<td>135</td>
</tr>
<tr>
<td></td>
<td><strong>Total</strong></td>
<td><strong>641</strong></td>
<td><strong>321</strong></td>
</tr>
</tbody>
</table>

Results

Research Question one: To what extent do lecturers who teach in the colleges of education possess the relevant ICT teaching skills?

Table 3: Lecturers responses on possession of ICT teaching skills

<table>
<thead>
<tr>
<th>S/N</th>
<th>ITEMS (SELECTED ICT OPERATIONS)</th>
<th>POSITIVE NO.</th>
<th>%</th>
<th>NEGATIVE NO.</th>
<th>%</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>Typing with key boards</td>
<td>200</td>
<td>62.3</td>
<td>121</td>
<td>37.7</td>
</tr>
<tr>
<td>2</td>
<td>Formatting</td>
<td>68</td>
<td>21.2</td>
<td>253</td>
<td>78.8</td>
</tr>
<tr>
<td>3</td>
<td>Changing the case of a text</td>
<td>170</td>
<td>53.0</td>
<td>151</td>
<td>47.0</td>
</tr>
<tr>
<td>4</td>
<td>Copying a text from one page to another</td>
<td>306</td>
<td>95.3</td>
<td>15</td>
<td>4.7</td>
</tr>
<tr>
<td>5</td>
<td>Underline a text</td>
<td>307</td>
<td>95.6</td>
<td>14</td>
<td>4.4</td>
</tr>
<tr>
<td>6</td>
<td>Effect font size of a word</td>
<td>210</td>
<td>65.4</td>
<td>111</td>
<td>34.6</td>
</tr>
<tr>
<td>7</td>
<td>e-mail</td>
<td>298</td>
<td>92.8</td>
<td>23</td>
<td>7.2</td>
</tr>
<tr>
<td>8</td>
<td>Saving a file in removable disk</td>
<td>140</td>
<td>43.6</td>
<td>181</td>
<td>56.4</td>
</tr>
<tr>
<td>9</td>
<td>Painting a program</td>
<td>8</td>
<td>2.5</td>
<td>313</td>
<td>97.5</td>
</tr>
<tr>
<td>10</td>
<td>Permanently deleting an icon</td>
<td>142</td>
<td>44.2</td>
<td>179</td>
<td>55.8</td>
</tr>
<tr>
<td>11</td>
<td>Changing of desktop background</td>
<td>96</td>
<td>29.9</td>
<td>225</td>
<td>70.1</td>
</tr>
<tr>
<td>12</td>
<td>Internet browsing</td>
<td>196</td>
<td>61.1</td>
<td>129</td>
<td>38.9</td>
</tr>
<tr>
<td>13</td>
<td>Using fax machine to send letter</td>
<td>30</td>
<td>9.3</td>
<td>291</td>
<td>90.7</td>
</tr>
<tr>
<td>14</td>
<td>Drawing charts, graph etc with computer</td>
<td>25</td>
<td>7.8</td>
<td>296</td>
<td>92.2</td>
</tr>
<tr>
<td>15</td>
<td>To warm boot a computer system</td>
<td>48</td>
<td>15.0</td>
<td>273</td>
<td>85.0</td>
</tr>
</tbody>
</table>

Table 3 indicates that out of 15 selected ICT skills identified for this study, the lecturers in these colleges possess only 8 skills. Such ICT skills which they possess includes among others, typing with the key board, changing the case of a text etc while such skills as formatting, painting a program etc are lacking. This is premised on the grounds that the researcher assumed that all skills above 50% are considered to have been possessed.

Research Question two: What are the available ICT facilities in these institutions?

Table 4: Lecturer’s responses on the availability of ICT facilities.

<table>
<thead>
<tr>
<th>S/N</th>
<th>Selected ICT facilities</th>
<th>Available</th>
<th>%</th>
<th>Not Available</th>
<th>%</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>Interactive board</td>
<td>25</td>
<td>7.8</td>
<td>296</td>
<td>92.2</td>
</tr>
<tr>
<td>2</td>
<td>Electronic bulletin board</td>
<td>4</td>
<td>1.2</td>
<td>317</td>
<td>98.8</td>
</tr>
<tr>
<td>3</td>
<td>Desktop computer</td>
<td>68</td>
<td>21.2</td>
<td>253</td>
<td>78.8</td>
</tr>
<tr>
<td>4</td>
<td>Scanner</td>
<td>45</td>
<td>14.0</td>
<td>276</td>
<td>86.0</td>
</tr>
</tbody>
</table>
Table 4: For purposes of generalization, the researcher considers all items that possessed percentages from 50 and above as being available, while those below 50 percentages are considered not available. In the light of this consideration, such item as Handset (100%) is available, while others are not available.

Research Question three: To what extent do lecturers have access to ICT facilities in these institutions?

Table 5: Lecturer’s responses on the extent of accessibility of ICT facilities.

<table>
<thead>
<tr>
<th>S/N</th>
<th>Selected ICT facilities</th>
<th>Accessible</th>
<th>%</th>
<th>Not Accessible</th>
<th>%</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>Interactive board</td>
<td>25</td>
<td>7.8</td>
<td>296</td>
<td>92.2</td>
</tr>
<tr>
<td>2</td>
<td>Electronic bulletin board</td>
<td>32</td>
<td>10.0</td>
<td>289</td>
<td>90.0</td>
</tr>
<tr>
<td>3</td>
<td>Desktop computer</td>
<td>200</td>
<td>62.3</td>
<td>121</td>
<td>37.7</td>
</tr>
<tr>
<td>4</td>
<td>Scanner</td>
<td>52</td>
<td>16.2</td>
<td>269</td>
<td>83.8</td>
</tr>
<tr>
<td>5</td>
<td>Handset</td>
<td>321</td>
<td>100</td>
<td>-</td>
<td>-</td>
</tr>
<tr>
<td>6</td>
<td>Lap top computers</td>
<td>128</td>
<td>39.9</td>
<td>193</td>
<td>60.1</td>
</tr>
<tr>
<td>7</td>
<td>Internet services</td>
<td>67</td>
<td>20.9</td>
<td>254</td>
<td>79.1</td>
</tr>
<tr>
<td>8</td>
<td>Digital versatile disk recorder</td>
<td>92</td>
<td>28.7</td>
<td>229</td>
<td>71.3</td>
</tr>
<tr>
<td>9</td>
<td>Digital versatile disk player</td>
<td>91</td>
<td>28.3</td>
<td>230</td>
<td>71.7</td>
</tr>
<tr>
<td>10</td>
<td>Television</td>
<td>153</td>
<td>47.7</td>
<td>168</td>
<td>52.3</td>
</tr>
<tr>
<td>11</td>
<td>Overhead projector</td>
<td>90</td>
<td>28.0</td>
<td>231</td>
<td>72.0</td>
</tr>
<tr>
<td>12</td>
<td>Closed circuit television Cameras</td>
<td>25</td>
<td>7.8</td>
<td>296</td>
<td>92.2</td>
</tr>
<tr>
<td>13</td>
<td>Film and film projector</td>
<td>40</td>
<td>12.5</td>
<td>281</td>
<td>87.5</td>
</tr>
<tr>
<td>14</td>
<td>Intranet</td>
<td>15</td>
<td>4.7</td>
<td>306</td>
<td>95.3</td>
</tr>
<tr>
<td>15</td>
<td>Very small aperture satellite terminal (VSAT)</td>
<td>65</td>
<td>20.2</td>
<td>256</td>
<td>79.8</td>
</tr>
</tbody>
</table>

N= 321

Table 5 shows that only the ICT facilities that are available are then accessible to lecturers for teaching and learning. Such facilities are Desktop computers and handsets with a percentage of above fifty respectively, while a whole lot of others are not accessible to the lecturers.

Research Question four: To what extent do lecturers utilize ICT facilities in class room teaching?
Table 6: Lecturer’s responses on the extent of utilization of ICT facilities in teaching.

<table>
<thead>
<tr>
<th>S/N</th>
<th>Items</th>
<th>SA</th>
<th>A</th>
<th>D</th>
<th>SD</th>
<th>Mean</th>
<th>SD</th>
<th>Rmks</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>Most needed ICT materials for class room instruction are lacking.</td>
<td>200</td>
<td>121</td>
<td>-</td>
<td>-</td>
<td>3.6</td>
<td>1.08</td>
<td>SA</td>
</tr>
<tr>
<td>2</td>
<td>The few available ICT materials are not regularly used due to lack of electricity power supply.</td>
<td>156</td>
<td>120</td>
<td>40</td>
<td>5</td>
<td>3.3</td>
<td>1.07</td>
<td>A</td>
</tr>
<tr>
<td>3</td>
<td>Most lecturers do not know how to operate some of the available ICT facilities.</td>
<td>120</td>
<td>80</td>
<td>87</td>
<td>34</td>
<td>2.9</td>
<td>1.03</td>
<td>A</td>
</tr>
<tr>
<td>4</td>
<td>Lack of support staff to assist lecturers use ICT facilities for class room instruction is a problem.</td>
<td>164</td>
<td>98</td>
<td>50</td>
<td>9</td>
<td>3.3</td>
<td>1.07</td>
<td>A</td>
</tr>
<tr>
<td>5</td>
<td>Lecturers need further trainings and workshops to keep them abreast with these ICT facilities.</td>
<td>240</td>
<td>50</td>
<td>31</td>
<td>-</td>
<td>3.7</td>
<td>1.09</td>
<td>SA</td>
</tr>
</tbody>
</table>

Table 6 revealed that lecturers in these colleges do not regularly utilize these ICT facilities due to factors like, lack of the facilities, lack of electricity supply, lack of skills of operation of these facilities.

Discussion of Findings

The study upheld that a good number of lecturers lack some basic skills as to employ ICT facilities in classroom teaching and learning in our higher institutions. It invariably shows that ICT application in our institutions is at low ebb. This agrees with the opinion of Akude (2004, P. 103) who suggested that computer literacy should be introduced in all our tertiary institutions.

The result shows that out of the 15 selected ICT facilities listed, only 5 could be said to be readily available while others are not in the institutions. Contributing, Manjulika & Reddy (2002) asserts that the major problem we have in our school system is dearth of learning resources or ICT tools. They further explained that lack of learning resources will place serious limitations on what the teacher can achieve.

The result upheld that lecturers have access to the few ICT facilities that are available in these institutions; however, the problem is that they do not have sufficient ICT facilities. It follows that only few ICT facilities are accessible to the lecturers for class room instruction. Lamenting on this issue, Carlson and Firpo (2001) upheld that teachers need effective tools and facilities, that can help them develop computer based projects and activities especially those that are geared to raising the level of teaching in our institutions.

The research revealed that the extent of lecturers’ utilization of the ICT facilities is very low. This is sequel to lack of electricity power supply, lack of basic computer operational skills etc. Also, Yusuf (1997), Okebukola (1990) & Egunjobi (2003) agreed that incessant power failure is a serious impediment to ICT implementation.

Recommendations

In consideration of the findings of this research and their attendant implications, the following recommendations are made:

i. Lecturers at all level should try to improve on their capacity and ICT competencies, through trainings and workshops participation.
ii. It is also advisable for the government and college authorities to provide our colleges with sufficient ICT facilities to enable lecturers use them in teaching and learning.

**Conclusion**

Several measures are necessary to increase the level of ICT application in teaching and learning in the colleges of education in the South-East of Nigeria. Such measures are; creating ICT awareness, campaign and also effective training of lecturers, making available necessary ICT facilities needed for effective teaching and learning, and providing necessary infrastructures in the colleges of Education. There is also an urgent need for continuous in service training, workshops, seminars and professional development for all lecturers in other to make room for efficiency and effectiveness in our teaching and learning process in colleges of education.

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Youths and Community Development in Nigeria

Ayuba A. Aminu

Department of Business Management
University of Maiduguri-Nigeria

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Abstract

The paper addresses the issue of youths and community development in Nigeria. It states that Nigerian rural sector is characterised by abject poverty, neglect, poor coordination and supervision of rural development programmes. It also submits that Youths are engaged in continuous efforts in mobilizing rural youth for community development and self-help projects. The paper finally identifies problems associated with youths community development programmes and concludes that success can only be achieved if the whole community is committed.

Keywords: Youth, Community, Development, Nigeria

Introduction

Youths have a great role to play in community development in Nigeria as they are being considered to be the active working group. But the structural characteristics of our economy that have marginalised the majority of the youths have also widened the gap between the rural youth and those in the urban centres. With the abundant human and natural resources available in Nigeria, if fully utilized can reduce the level of poverty and improve sustainable human development.

One eminent problem Nigeria is facing today is how to tackle income disparity between urban and rural centres especially in youth situations. Youths have a solution to the problem, if they will mobilize their fellow youths to embark on community development and self-help projects that will make them compete among themselves. Already some communities in Nigeria have formed their Youth’s Community Development Associations (YCDA) long ago for the improvement of their living conditions. The various governments in Nigeria have in the past introduced various community development programmes for the benefit of all citizens irrespective of sex. Programmes includes: Directorate of Food, Road and Rural Infrastructure (DFRRI), National Agricultural and Land Development Authority (NALDA), Small and Medium Enterprises (SME) etc. However, these programmes seem to have achieved little.

Women in government in Nigeria especially, the former Nigerian First ladies Messrs. Maryam Babangida and Maryam Abacha introduced “Better Life for Rural Women” and “Family Support Programme” respectively. These two programmes were meant to improve the life of rural women and supported the improvement of female youths living conditions in the society through appropriate community development activities. These two programmes really helped the rural female youths to understand and embrace self-help projects to educate their fellow youths in the rural areas.

Community Development

Community development is the process whereby the some citizens mobilize their members so as to
map out a strategy of improving their community through collective efforts. Collective efforts mean the ability to have full participation of members to be able to make use of their local resources in order to improve their living condition and standard. But the United Nations (1963) defined community development “as the process by which efforts of the people themselves are united with those of the government authorities to improve the economic, social and cultural conditions of the communities to integrate them into the life of the nation and to enable them to contribute fully to national progress”. Therefore, the United Nations definition of community development implies the participation of both the community and the government.

Hillman (1960) has however defined community development as the method of helping local communities to become aware of their resources in such a way as to satisfy some of their needs and in so doing, acquire the attitudes, experiences, and cooperative skills for repeating this process using their own initiatives.

Position of Youths in Community and Rural Development Programmes in Nigeria

‘Youths are great assets in the society’. This statement is true because youths have played a great role and are still playing an important role in community and rural development. Many Nigerian youths lives in the rural areas and have being trying their best to improve their status through the community development programmes. The issue is that youths need to participate actively in community development as they will one day become self sufficient.

Most of the youth’s community development programmes are meant to achieve the following objectives.

1. to make youth to be self-reliant through self-help projects
2. to ensure that youths are fully integrated into the nation building through community development.
3. to encourage youth communities to co-operate with government and non-governmental organizations for the upliftment of their fellow youths.
4. to educate and stimulate youths groups to accept change for the improvement of their living standard.
5. to mobilize youths to be aware of the importance of the formation of Youth cooperative groups.

In the case of rural development, youths have a role to play because most youths live in the rural areas and the aim of the formation of youth's community development programmes is to improve rural development. Kumar (1981:162) stated that rural development is “a movement designed to promote better living conditions for the whole community through active participation of the people themselves”. This signifies that rural development can only succeed when it is duly accepted by the people. Decree No. 4 of 1986 establishing (DFRRI) has defined rural development as a process through which rural needs are identified, human and mental resources mobilized and exploited to meet rural needs such as food, raw materials, roads, water, electricity, schools, health facilities etc and economic social participation and economic self-reliance in the community.

However, the disparity in the rural and urban development in Nigeria can be said to be attributable to the apparent neglect by government for not discouraging the rural-urban drift. Ballara (1981) and Oyaide (1989) agreed that one of the factors responsible for the rural-urban migration is the absence of basic social facilities in the rural areas. It has also been equally argued that most problems of large cities are caused by rural-urban migration (Ani 1999:66).
The Role of Youths in Community Based Organisations

In most rural areas in Nigeria, various types of community based organisations exist. But the thriving organisations now are the ones formed by youths. In the southern part of Nigeria, youth community based organisations have been in existence. It has also emerged in Northern Nigeria especially among the Christian based communities. Efforts are being made to encourage the Youth Muslim Ummah to integrate into the formation of youths community organizations. But the essence of the formation of the Youths community based organisation is to supplement government efforts in community development projects. These organisations are the closest to the people at the grassroots level, because the organisations are formed by the members of the community themselves.

Like any other community based organisations, youths community based organisations enhance community development through:

- Development, promotion and implementation of development projects sustainable for the benefit of their communities.
- Mobilising members of the community for national development.
- Strengthening community resources management.
- Improving the general skills of youths to be productive.
- Promoting a sustainable human development
- Encouraging the participation of the marginalised communities in the promotion of rural development that affects them.
- To ensure proper accountability of the community resources.

Youths and Self-Help Projects in Nigeria

In an effort to accelerate rural development through youths participation cannot be over emphasized as youths are deeply involved in self-help projects in various local governments in Nigeria especially projects that involve Trade, Commerce, Home Economics, small and medium term enterprises and agriculture. These self-help projects can be classified into two: Government Aided Projects (GAP) and Non-Government Aided Projects (NGAP). Government aid projects are those executed with the assistance of the government in either finance or material resources while non-government aid projects are those executed solely with collective effort of community members.

In recent time, youths have realised the importance of self-help projects in improving the way of life and living standards of their communities. Such self-help is collective efforts of the community to ensure that their efforts are based on their initiatives to achieve maximum benefit with or without the assistance of government.

Some of the contributions of youths in community development projects include:

1. educating the rural community on the use of improved seeds or farming techniques through the Young Farmers Club.
2. clearing and draining of drainages/culverts
3. sinking of ordinary dug-out wells
4. renovation of clinics, health centres/dispensaries in the rural areas
5. construction of rural feeder roads
6. Assistance to the less privileged in the society and
7. other community programmes include; Youths clubs enlighting fellow youth and women on HIV/AIDS, Women and Children trafficking, child labour and VVS.
One is now convinced that the youths have contributed much to community development in Nigeria. But the belief still is that, Nigerian rural sector is characterised by abject poverty, neglect, poor coordination and supervision of rural development programmes. These factors have resulted in the inability of both the government and Youth’s organisations to achieve meaningful rural development through community development. There exist a number of problems militating against the advancement of co-ordinated community development programmes in Nigeria.

**Problems Associated with Youths Community Development Activities in Nigeria**

Problems associated with community development activities in Nigeria are the same as the problems faced by youth’s development projects. These problems are:-

1. Lack of adequate funding
2. Lack of basic equipment
3. Execution of sub-standard projects
4. Fraud, dishonesty, and corruption among members/leaders
5. Politics, rivalries and envy and
6. Inability to accept change in traditional and cultural practices

**Conclusion**

Youths have a great role to play in community development in order to accelerate rural development. Government should also encourage the formation of Youth’s Community Development Programmes (YCDP). Bwala and Aminu (1996:133) further stated that the objectives of community development are the establishment of organised systems of social services in order to make people self-reliant and to participate actively in national development.

Youths formation of community based organisations and self-help projects does not necessarily mean it will lead to the achievement of the goals of rural and community development unless the community is very much interested in development. This is supported by Olatunbosun (1977) who opines that ... a development program will not be of help if it is designed by those who have no knowledge of their problem and operated by those who have no interest in their future.

**References**


Students’ Uptake of Corrective Feedback

Ataisi Emiya Gladday

Department of Linguistics and Communication Studies, University of Port Harcourt, Nigeria

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Abstract

In second language acquisition, errors by learners are seen as an indicator of progress in language. However, errors must be properly treated. The treatment of error is possible through corrective feedback. In view of the fact that present day language teaching is geared towards communicative competence, this paper aims to show how students respond to corrective feedback. A writing task is administered to a class of forty seven students. A pretest is given after an instructional lesson. Two weeks later, a post test is given based on the language items provided in corrective feedback. The post test shows the response of the students to corrective feedback. Consequently, the paper discusses factors that might have caused poor response of the students after corrective feedback. The paper recommends a three prong approach in error treatment: provision of good atmosphere for learning by the government, adoption of good learning strategy by the students and the use of interactive feedback by teachers for the communicative enhancement of learners.

Keywords: Uptake, second language acquisition, error treatment, noticing, corrective feedback

Introduction

Second language teaching is aimed towards second language acquisition. Second language acquisition is similar to the process children acquire their first language. For competence in the second language it is required that the learners interact in the target language naturally (Krashen, 2002, p.1).

Learners in second language setting are exposed to two types of input: positive evidence and negative evidence (Kim, 2005, p.1). Positive evidence refers to authentic native speaker discourse in a simplified and elaborate format to facilitate learner’s comprehension. On the other hand, negative evidence which provides information as to what is unacceptable in a language. The provision of negative evidence is reaction to the production of error by second language learners.

Second language learners have certain aims to achieve. Criper and Widdowson (1975, pp.180-182) explain that language permeates society and helps to define and maintain social institutions and social values. Based on this, second language teachings have certain aims in perspective. These aims are explained subsequently.

Second language teaching aims at developing in second language learners certain forms of linguistic behaviour which targets on native speakers abilities. Proficiency in the target language would provide access to scientific and technical knowledge which is unavailable to learners through the medium of their first language.

Second language teaching is directed towards an institutional purpose: economic, political and educational. In view of the importance of language for economic, political and educational development, language can be used as a tool for participation or exclusion (Bamgbose, 2003, p.71).
Since second language learning aims at participation, it means that proficiency in the target language is of utmost importance. Unfortunately, errors creep up during second language learning. These errors are to be properly treated. A proper treatment reflects in uptake.

This paper aims to provide answers to the following questions.

1. What instructional setting would enhance positive uptake of corrective feedback?
2. What learning strategies would enhance positive uptake of corrective feedback?
3. What instructional strategy would enhance positive uptake of corrective feedback?

This paper aims to examine the instructional setting, learning strategies and teaching strategies that would enhance corrective feedback.

For a thorough examination of uptake of corrective feedback, this paper is divided into five parts. Part one is for introduction; part two has the background as well as review of relevant literature. Part three explains the research methodology. Part four contains presentation and analysis of data. Part five anchors the paper with summary and recommendation.

Background

Three theories of language acquisition have over the year affected second language teaching. The three main theories are based on the behaviourist perspective, the innate/linguist perspective and the interactional/developmental perspective (Lightbown and Spada, 2006, pp.10-17). These theoretical perspectives have bearings on corrective feedback.

The behavioural approach views learning a language as a process of habit formation resulting from input and reinforcement of correct habits and negative reinforcement of mistakes. Learners had a blank canvass and had input for language acquisition through imitation of a set of habits. (Woozley, n.d. p.3). All learning, verbal or non verbal takes place through the establishment of habits which were development based on input from the environment (Xiangui, 2005, p.121). Based on this theory, errors in second language were seen as interference from habits acquired in the first language (Woozley n.d. p.2). Behaviourism sees error as a symptom of ineffective teaching or as evidence of failure (Maicusi et al., 2000, p.2).

The innate perspective is based on Chomsky’s views on language acquisition. Using rational logic, reason extrapolation and inference, Chomsky sees language acquisition as the gradual, creative build up of knowledge systems, resulting in implored general competence, rather than performance of habits in isolated instances (Woozley, n.d. p.4). In other words, the innate creativity in language learners is based on the internal cognitive learning. The innate perspective is based on cognitivism which is related to the idea that language is rule formation not habit formation (Odo, 2007, p.219). By innatist approach, error is needed for progress. Based on Chomsky’s idea, that a child generates language through innate universal structures, errors are conceived as a progressive step which shows learners experiment by trial and error. The learner forms a hypothesis of the language as the rule system. The over simplified form results in errors which occur less as the learners modify and improve their knowledge of the target language (Woozley, n.d., p.5).

The third theory is language acquisition based on the social interactionalist approach. By this approach, the social and interactive nature of language affects language acquisition. Language acquisition is achieved through the operation of the social context which relates to the negotiation of meaning not just the one-way process of comprehensible input. The social interactionist approach view errors as a social norm as well as a cognitive process. (Maicusi et al., 2000, p.2). Maicusi quotes George who notes that different definitions are given for errors by different persons. Errors by children are seen as transitional forms. Errors by native speakers are seen as slips of the tongue and as unwanted forms if made by second language learners. Because errors by second
language learners are seen as unwanted forms, Lennon (in Maicusi et al., 2000, p.1) explains that errors are linguistic forms which are unlikely to be produced by the native speakers of a language. Woozley (n.d., p.5) list the following as types of errors.

1. Overgeneralization- This occurs when learners make predictions which are wrong. For example, add 's' to every noun for plural. The application of this rule to 'ox' or 'men' would produce 'oxs' or mens' which is wrong.

2. Transfer- This occurs when learners use knowledge of their native language to make predictions above the target language. For example, using affirmative for negative intent to a simple negative question.

3. Omission/ Redundancy Reduction- This occurs when learners omit certain parts of speech which are not necessary to the overall goal of communication.

4. Learners are forced to use telegraphic speech to communicate in any ad hoc manner when there are no items available for them to express themselves fluently.

5. Performance errors- Errors cause by nervousness which results to lapses.

6. Bad teaching- Learners become confuse by faulty teaching or generalization of certain rules without observing the exceptions to such rules.

7. Fossilization- Errors which never disappear due to many possible reasons.

Error Treatment

Second language teaching aims at the learners' proficiency in the target language. Errors by language learners in second language learning are inevitable. Until 1967, errors by learners were seen as a sign of failure.

Corder in 1967 established the field of Error Analysis (EA). EA is a linguistic study that focuses on the errors learners make through an analysis of the errors made in the target language. The linguistic study of errors serves two purposes: diagnostic and prognostic. By the diagnostic function of EA, the learners' grasp of a language during the learning process is shown. By the prognostic function of EA, learning materials are modified to meet the learners identified linguistic problems.

Allwright (1988, p.199) explains that errors by language learners can be seen as an indicator of 'crisis points'. He explains that error is typically seen as evidence of failure of some sort rather than evidence of deliberate hypothesis-testing, a kind of evidence of teacher failure or learner failure. This failure indicates that the learner needs a remedial action and for the teacher, the provision of satisfactory treatment of the error.

In view of this, Weireesh (1991) considers learners' errors as a device the learners use to gain from a reliable feedback. Error analysis as a design for remedial teaching identifies and explains the difficulties of the learner.

The designed remedial teaching which is based on error analysis serves the following purposes. First, it indicates the level of the learners' proficiency in the target language. Second, it provides information about the difficulties the learners have in language learning. Third, it shows that second language learners' errors are potentially important for the understanding of the processes of second language acquisition (Candling, 2001, p.69).

In view of the foregoing learners errors should be viewed positively as it is part of the natural process of language learning and provides a picture of the hypothesis testing of the language learner and so, it is part of cognition.
Corrective Feedback

The acquisition of a language is subject to input. Carroll (2006, p.1) detects two approaches to input in the broad range of current SLA research. One, input to language acquisition based on universal grammar in the form of mental representation which ‘may just have been computed de novo at the instant of acquisition or may have been activated from long term memory to be internally altered in some way’. Two, input refers to ‘purely environmentally available stimuli-sounds in the speech stream, marks on a page, or pixels on a computer screen etc’.

The input to language acquisition is termed either positive or negative evidence. Positive evidence provides what is acceptable in the target language while negative evidence does not.

Corrective feedback is kind of negative evidence, provides information. Kim (2005, p.1) quotes Long and Robinson who note that negative evidence can serve two purposes- preemptive strategy and reactive strategy. Negative evidence as a preemptive strategy provides information through rule presentation before incorrect use of language occurs. As a reactive strategy, negative evidence indicates and/or correct non-target like forms in learners output.

A piece of corrective feedback is a response from an addressee likely a teacher to learners where the teachers. Intention is to correct the learners’ erroneous utterance (Basiron, 2008, p.192). Here lies error treatment which refers to ‘any teacher behaviour following an error that minimally attempts to inform the learner of the fact of error (Chandron, 1988, p.150).

Corrective feedback could be in the form of implicit or explicit feedback occurring in both natural conversational and instructional setting (Sheen, 2004, p.264). Basiron (2008, p.192) quotes Ellis and Elam who note that corrective feedback is a response to a learner’s error by;

1. indicating where the error has occurred,
2. providing the correct structure of the erroneous utterance or
3. providing metalinguistic information describing the nature of the error, or any combination of these.

Corrective feedback in explicit form provides an overt error correction while the implicit form does not. The following are types of corrective feedback identified in literature.

a) Explicit Correction: Teacher overtly corrects a learner by providing the feedback. For example;
   Student: She do go to school.
   Teacher: She does not go to school.

b) Metalinguistic Feedback: Teacher corrects learner’s error by providing explanation of the error without providing the correct answer. For example:
   Student: Yesterday, she walk to school.
   Teacher: Add ‘ed’ to the verb to mark past tense for an action that was done before the time of discourse.

c) Elicitation: Teacher asks questions to obtain the correct form of an erroneous utterance.
   Student: Yesterday, she walk to school.
   Teacher: What do you do to the form of the verb when it refers to an action that was done before the time of discourse?

Implicit Feedback

d) Recast: teacher reformulates a learner’s erroneous utterance in the correct form either wholly or partly.

e) Clarification Request: Teacher asks the learner to rephrase the erroneous utterance.

f) Repetition: Teacher raises her voice to highlight an error by repeating a learner’s erroneous utterance.
Translation: Teacher translates a learner’s native utterance into the target language to correct the erroneous utterance.

Paralinguistic Sign: Teacher uses facial expressions, gesture cues or a high voice intonation to provide a non verbal corrective feedback.

Uptake

The essence of corrective feedback is the elimination of errors from learners' interlanguage. This is possible if learners are able to comprehend the input, notice the mismatch between the input and their interlanguage system. The response of the learner to the input of the teacher refers to uptake. The corrective feedback provided by the teacher results in uptake which manifest in an utterance that does not require repair or an utterance that require repair.

The successful treatment of error shows that the learner has noticed the corrective feedback provided by the teacher. According to Schmidt Noticing Hypothesis, 'input does not become intake for language learning unless it is noticed. That is, consciously registered’ (Schmidt, 2010, p.1). He further explains that ‘people learn about the things that they attend to and do not learn much about the things they do not attend to’. Corder (1967, p.23) explains that intake is the part of input that is integrated into the learner's knowledge and becomes part of his interlanguage. In precise terms, uptake shows what and how students use feedback (Tedick and Gortari, 1998, p.3).

The noticing hypothesis implies that learners have to adopt an effective learning strategy in order to learn the target language. This is in line with Chaudron (1988, p.134) views that learners must use the information available in feedback to confirm, disconfirm and modify the hypothetical rules of their target language. Ellis (1991) shares this view by stating that the acquisition of a language includes the steps of ‘noticing, comparing and integrating’.

Based on the noticing hypothesis, input only becomes intake in second language learning when noticing occurs. Corrective feedback sets learners to notice gaps between their interlanguage and the target norms. This ‘noticing’ subsequently leads to restructuring. Cross (2002, p.3) lists the following as factors that influences noticing in the input:

1. Instruction – Instruction provides structured, differentiated input that assists noticing by focusing attention on and enhancing awareness of language features.
2. Frequency – A language feature may become frequent due to repeated instruction or by way of teacher talk.
3. Perceptual Salience- The more prominent a language, the greater the chance it will be noticed.
4. Skill level – Skill level includes how well individuals are able to routinize previously met structures. The processing ability in turn determines how ready learners are to notice new forms in the input.
5. Task Demands- Refers to the way in which an instructional task causes learners to notice particular features that are necessary in order to carry out the task.
6. Comparing- Noticing alone is not enough for input to become intake. Rather it requires learners to make a comparison between their observed input and typical output based on their existing interlanguage system.

Corrective feedback could be ineffective if there is a mismatch between the teacher's intention and the learners' interpretation. Kim (2005, p.14) explains that there could be a mismatch if the teacher’s feedback on learners’ nontargetlike form is misconstrued; it apparently leads to no congruence between the teacher’s intended pedagogical focus and students’ actual attentional focus. According to Kim (2005, p.16), a mismatch could be any of the following;
i. A mismatch between the teacher’s correction and the real nature of the learning problem.
ii. Mismatch between the teacher’s intent and the student’s perception.
iii. A mismatch between the teacher’s understanding of the problem and its real nature.

Methodology

This study is a classroom centred research. According to Salami-Nodoushan (2006, p.1), research on ‘classroom language learning is basically done by either observation or introspection, or even combination of both’.

The data presented in this study is got from the record of students activities in the classroom. Quantitative and qualitative approaches are used for the analysis of the data got from the classroom. The data is a record of students performance in two tests; pretest and post tests. A pretest was given before corrective feedback and a posttest after corrective feedback.

A class (mixed ability) of forty seven students is used for this study. A pretest is given after an instructional lesson. One week later, teacher negotiates with the students to provide corrective feedback. Two weeks later, a post test is given based on the correction made after the pretest.

Data Presentation

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Data Analysis

The test scores presented above shows the students’ uptake of the teacher’s corrective feedback. The first test shows that the students are 5.94 away from the target of 10. The post test shows 57% increment with the students 3.64 away from the target of 10. The increase in scores shows that 8 students out of the 26 students below the fair line of score 5 are yet to optimally benefit from the feedback provided in the class. This is in congruence with the fact that feedback informs, regulates, strengthens, sustains and eliminates error in language learning (Han, 2000, p.6).

The test scores are in line with Askland (2010, pp.85-86) conviction that competent students are more likely to benefit from instruction and feedback because they will take notice of salient features of language items presented to them. This means that language teachers should
encourage less competent students to focus on the salient features of language forms. This would greatly enhance communicative competence.

The test scores corroborate Schmidt Noticing Hypothesis. According to Schmidt (1990, p.131) input and noticing result to intake. The whole of this is related to his position that consciousness plays a significant role in second language learning. The fact that some students are yet to notice or take in the correction provided by the teacher explains the possible failure of the students to notice the correction provided by the teacher.

The test scores show the different response of the students to corrective feedback. Jin (2011, p.134) explains that ‘attention and awareness can be connected to the study of individual differences and consideration of formal instruction in language learning’.

If possible teachers should adopt the communicative language teaching method. This method is accepted as the dominant paradigm in language teaching (Alcon, 2004, p.175). Communicative language teaching is based on integrative learning activities which are intrinsically motivating for learners (Norbert, 2007, p.18).

Tatawy (2006, p.14) notes that there are conditions that determine the efficacy of corrective feedback. These conditions are listed below:

a. Fine tuning of corrective feedback to be at congruence with the level of students understanding and ability.

b. Provision of individualized attention to the learners.

c. Consistent focus upon one type of error at a time over a period of time.

Apart from the teacher’s style, the instructional setting also can affect the efficacy of corrective feedback. Time constraints and overpopulated classrooms make it difficult for language teachers to provide effective corrective feedback that would lead to positive uptake on the part of the learners. It is difficult for a teacher to fine tune corrective feedback, consistently focus on a type of error or provide individualized attention to forty seven students within limited time.

**Pedagogical Implications**

The aim of corrective feedback is to increase the proficiency of a learner in a target language. Unless a learner’s interlanguage has fossilized, a learner is supposed to respond to corrective feedback. The improvement that comes with corrective feedback is learning (Reigel, 2005, p.14). The response of learners to corrective feedback is uptake. Uptake is possible when students are actively involved in the learning process. For instance, the noticing hypothesis is based on the response of the learner to input which may be corrective feedback. Where the students are not actively involved in language learning, they may not notice the gap between their interlanguage and the target language.

Language teachers need to enhance their knowledge of the target language. Corrective feedback demands that a teacher treats error by being preemptive and diagnostic. This is not possible if the competence of the language teacher in the target language is in doubt.

It is severally noted in literature that some mismatches occur between teachers’ corrective feedback and students’ interpretations of corrective feedback. Sometimes, teachers are inconsistent in their treatment of error and this leads to potential confusion which may manifest as errors in the students interlanguage (Allwright, 1988, pp. 200-201). Mismatches can be reduced by the application of joint attention cue. This refers to a condition where a teacher makes conscious effort to ensure that the students understand the intended feedback (Dominey and Dodane, 2004, p.136). This would reduce indeterminacy or referential ambiguity which is responsible for mismatches.
Tatawy (2006, p.15) notes that certain conditions would bring about positive uptake after corrective feedback. These conditions are listed below:

(i) Teachers need to be systematic and consistent in their provision of feedback.
(ii) Corrective feedback when provided should be clear enough to be perceived as such.
(iii) The techniques employed for feedback should allow for time and opportunity for self- and paired-repair and modified output.
(iv) The feedback given should be fine-tuned in the sense that there should be close a match as possible between the teacher’s intent, the targeted error and learners’ perception of the given feedback.
(v) The learners’ developmental readiness to process the feedback provided should be taken into consideration.

Recommendation

Based on the importance of the use of language in the society, a three prong approach is recommended thus:

1. Government should create a conducive environment for teaching and learning. The adoption of communicative language teaching in public schools in Nigeria would only be possible by the instructional setting of schools which is dictated by government provisions in schools.
2. Teachers should adopt practices that showcase professionalism by keeping themselves abreast of current teaching methods.
3. Students should pay attention to the input provided language teachers if they must gain competence in a target lang

References


E-Learning of Business and Entrepreneurship Education for Drop-Out for Sustainable Development

Falilat Ajoke Idowu

Faculty of Education, Ahmadu Bello University, Zaria-Nigeria

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Abstract

Being a dropout from school should not be a barrier in acquiring a knowledge or skill. Learning in traditional classroom can never be replaced with learning via internet as the case may be. This paper borders on how dropout can benefit from learning via internet through various skills, practices and principles provided by Business Education and Entrepreneurship Education for sustainable development. Different authors give their meanings of Business Education and Entrepreneurship Education in the paper, the meaning of dropout, e-learning will also be given in the course of writing this paper. Some reasons why students drop out from school will be highlighted in the paper, reasons like, financial incapability of their parents, lack of interest in classroom learning. The writer of this paper give some recommendations like provision of constant power supply since e-learning is electronic learning, government should try to curb the rate of students dropping out of school by improving the standard of education, and also providing employment opportunities to teeming graduates among other recommendations and conclusion will also be reached.

Keywords: E-learning, dropout, business education, entrepreneurship education

Introduction

Being professionally trained or acquiring a vocational skill or knowledge in or out of a formal or informal school or being is a necessity for every individual in the society be it a man or a woman.

The mission of business education and entrepreneurship education in Nigeria is to prepare all individuals to live and work as productive citizen in a changing global society by providing essential business and entrepreneurship experiences, education and training. Entrepreneurship is about an individual’s ability to turn ideas into action, to be innovative, take the initiative, take risks, plan and manage projects with a view to achieving objectives (Akinola 2011). Business education is a course of study that teaches how to become self-reliance in the business oriented skills.

Drop-outs from school due to one problem to the other also need to get to learn one or two things to make themselves productive members of the society. With this in view, the process of getting the drop out to acquire business education and entrepreneurship knowledge becomes necessary. E-learning for sustainable development is an electronic means of learning by following instructions through internet without physical presence of the teacher or instructor. (www.googlesearch)

Concept of E-learning

E-learning includes all forms of electronically supported learning and teaching and more recently, e-tech. The information and communication system, whether networked learning or not serve as specific media to implement the learning process. The term will most likely to utilized to reference
out-of-classroom and in-classroom educational experiences via technology, even as advances continue in regard to devices and curriculum. E-learning is the computer and network enabled transfer of skills and knowledge. Its applications and processes include web-based, computer based learning, virtual education, opportunities and digital collaboration. Content is delivered via the internet, intranet/extranet, audio or video tape, satellite, television and CD-ROM, it can be self-paced or instructor and include media in the form of image, animation, streaming video and audio.

In no way traditional education (four wall classroom learning) can be replaced, but in the era of technological advance and minimization of distance through the use of internet, everyone must be equipped with basic knowledge in technology as well as use of it as a medium to reach a particular goal.

Concept of Drop-out

A drop out is a student who quits school before graduation. It is also a person who withdrawn from a given social group or environment. A dropout is a student who fails to complete a school or college course.

Implication of Dropout

When students drop out of school, the course of their life may be totally reset. Dropouts earn less than their peers with more education and they are more like than high school graduates to end up in prison (according to US Census Bureau).

Research shows that two factors are responsible for this trend;

i. Associated with institutional characteristics of their families, school and communities

ii. Associated with individual characteristics of the students themselves

Family – students living with both parents have lower dropout rates and higher graduation rates compared to students living with single parent. The employability of both parents and their parents’ income play roles as to parenting practices. These include monitoring children progress in school communicating with school and knowing the parents of their children/wards’ friends. Students also are more likely to drop out if they have siblings with drop out of school (Rumberger and Lim 2008).

Characteristics of schools including resources, structural features, composition of students body, and policies and practices also play a role in whether students drop out or not. Living in a high poverty neighborhood is not necessarily detrimental to completing school in an affluent neighborhood can be beneficial to school success.

Other reasons why students drop out include;

• Their classes were not interesting
• They were not motivated or inspired to work-hard
• They had missed too many days and could not catch up with school work
• They had repeated a class
• They had to work (include schooling)
• They become a parent
• They had to care for a family member who is invalid
• They were doubtful they would not meet their school graduation requirement even if they had put in the necessary effort (Bridgeland, Diluio and Morrison 2006)
Concept of Entrepreneurship

Nwafor (2007) defines entrepreneurship as the willingness and ability of an individual to seek out investment opportunities in an environment and can be able to establish and run as enterprise successfully. Entrepreneurship is the act of being an entrepreneur or one who undertakes innovations, finance and business acumen in an effort to transform innovations into economic goods. This ability should be ‘acquired’ and not be taken for granted. Entrepreneurship is also the process of using available capital in any form for business endeavors in an open and free market economy for sole purpose of making goods (Idowu in Odusina 2012).

Entrepreneurship Education

Entrepreneurship Education is an aspect of education is geared towards developing students in skills, ideas and managerial abilities necessary for personal reliance (Nwaokolo 1997). It is also the type of education given to a set of people to be able to instill in them the principles, skills and practices required to see and evaluate business opportunities, to gather necessary resources and the desire to take advantage of them as well as initiating action to ensure success in any chosen profession or occupation.

Business Education

Although Business Education is often described as education for, and about business (Nwosu, 2003), its primary purpose is to prepare individuals for gainful employment in business occupation. The value of any business education program could be determined by its ability to adequately prepare and equip appropriate individuals in such a manner that they could fit into specific jobs or establish their own business upon graduation. Business Education represents a broad and diverse discipline that is included in all types of educational delivery systems elementary, secondary and tertiary institutions. Business Education includes education for office occupations, distribution and marketing occupations, accounting, business teaching, business administration are economic understanding the foregoing points out that business education cover wide spectrum of economic activities in any society and also refer to pedagogical and desirable business competence necessary for a sustainable development (Eni, 1987).

Need for E-learning by Drop-out for Sustainable Development

Students drop-out of schools due to one reason or the other, in this light, the need for the drop-out to be self-reliant becomes pertinent in the society so that they will now become nuisance in the near future.

Business education as a course of study can be learned in and outside the traditional school setting. Thus the issue of e-learning comes in. Various types of learning under this method of acquiring knowledge and skill are inexhaustible. Among which include

- **Slide presentation** – This is using texts and graphics to tell their stories. They may also incorporate sound, animation, video. Some include interactive media like virtual reality models or small simulations. Though slide shows may allow some optional topics, the primary pathway is linear. This structure tells the designer control the order of learning experiences. The learner can control the pace of the story and can some questions, but the designer remain the storyteller.
• **Software demo** - This means software demonstration and it contains a narrated and animated demonstration, a simulation, a self-test and a real world activity to teach learners how to confidently define a system data source name. This can be done on a hand.

• **Augmented presentation** - An especially effective presentation can serve as the core of a topic or lesson. To turn a presentation into a more comprehensive learning experience, consider augmenting it with navigation controls to allow learners to move back and forth in the presentation.

• **Stories** - Good instructors often tell stories and effective learners frequently remember the stories better than any other part of the course. Such stories are an indispensable part of much soft-skills training. If the words are tone of voice in the instructor are essential ingredients in classroom learning – well then, you had better find a way to include them in your on-line training. Probably the most important use of audio is tell stories.

• **Active examples** - One of the most valuable forms of online resources is a library of examples that learners can actually manipulate and use. A learner can then copy the HTML to an authoring program where embedded comments guide them in modifying the example to suit their purposes.

• **Guided tours** – It is a simple form of guided tour that can be displayed in a Web page or played on a mobile device. This tour introduces learners to the geology of the rocky mountain region. It recounts can automobile trips to place of interests. ([www.googlesearch](http://www.googlesearch))

**Impact of E-learning of Business and Entrepreneurship Education for Dropout for Sustainable Development**

Electronic means of learning, teaching and doing business activities among other things has come to stay in Nigeria and Africa as a whole. The joy of every country in the world is to see that every citizen in the country educated, not only that but to be self-reliant irrespective of formal or informal education or training. Business Education and Entrepreneurship Education are means by which individual can equip himself in the society. The two courses have a variety of subjects that individual can choose from to learn to equip himself economically.

Due to one reason or the other, individuals who cannot complete their formal or informal education can have the opportunity to do so through learning by themselves via internet. By this means, every able and sound individual in the society can be said to be economically sound to take care of himself and his family which in turn will make a good impact in sustaining economic development of the country.

**Conclusion**

Going by this paper, dropout in the society can also acquire one or two skills if they take the opportunities of various electronic means of studies, doing business etc. Business Education and Entrepreneurship Education make it possible for individual to be self-reliant in whatever skill, knowledge of business they want to do irrespective of their financial stand.

**Recommendations**

1. Provision of constant power supply can help a lot to make electronic means of learning possible.

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2. Various tools and equipment needed to make learning electronically possible should be affordable.
3. Government should try to curb the rate of dropout from schools by improving the economy of the country.
4. Graduates roaming the streets should be given employment opportunities to encourage others to want to go to school.
5. Standard of education should be improved significantly

References

Odunsina,B. (1975): Some Thoughts in the Curriculum Development for Successful Entrepreneurship in Nigeria Lagos Centre for Management Development
Survey of Accessibility and Usage of Information and Communication Technology Among Students of Technical Education in Tertiary Institutions in Niger State, Nigeria

Adamu Muhammed Jebba

School of Technical Education, College of Education, Minna Niger State, Nigeria

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Abstract

This research investigates the availability, accessibility and usage of information and communication technology (ICT) among students of technical education in Niger State tertiary institutions. The study adopted survey research design with a structured questionnaire consisting of 40 items developed by the researcher for data collection. The population of the study comprised of all the 1161 students of technical education department from the two tertiary institutions offering technical education programmes in Niger State. Four research questions were formulated to guide the study. The findings of the study revealed among others that ICT facilities are not available for students use at the department and as such they don’t have access to it. In terms of usage, the students mostly use commercial cybercafés for the purpose of schools registration and thus there is poor usage of ICT for academic learning. Some recommendations were made in line with the findings which among others include the urgent need for the department to make ICT available and easily assessable for the students and also the need to mandate students to create email address and also present assignments/course projects through power point projector.

Keywords: ICT, ICT facilities, Technical Education, Tertiary institutions, Students

Introduction

One of the monumental transformations the human race is currently experiencing is the evolution of information and communication technology simply tagged as ICT. Perhaps, it is in support of this assertion that Nwezeh (2010) highlighted that the information and communication technology revolution is sweeping through the world and the gale has even caught up with developing countries like Nigeria. To corroborate this view further, Adomi and Kpangan (2010) opined that the rapid rate at which ICT have evolved since the mid 20th century, the convergence and pervasiveness of ICT, give them a strong role in development and globalization. Indeed, ICT have a significant impact on all spheres of human activity ranging from health to agriculture, housing to transportation, education to power generation, communication to military hardware, commerce to geography, weather forecast to banking, culture to politics, economy to sports to mention but few.

In the field of education for which this research focuses on, Kumar and Kaur (2005) reported that the current information revolution and increasing impact of information and communication technologies have modernized the processes of learning, teaching and research in education. ICT seemingly infinite information offers access to up-to-date research reports and global knowledge (Nwokedi, 2007) so it has become an important component of electronic services in academic institutions.

Information and communication technologies have therefore introduced new methods of teaching, conducting research and brought into education, facilities for online learning, teaching
and research collaborations. To sum up the impact of ICT in the field of education, Davis and Tearle, 1999 cited by Yusuf, (2005) reported that ICTs have the potential to accelerate, enrich, and deepen skills, to motivate and engage students, to help relate school experience to work practices, create economic viability for tomorrow’s workers, as well as strengthening teaching and helping schools to change from the traditional chalk and talk method to a renew innovations using the numerous access of modern technology. It has therefore, become an invaluable tool for learning, teaching and research (including collaborative research) in Nigeria. As important as ICT is in the field of education, the impact can only be exerted if and only if the target beneficiaries (students) have access and use the ICT facilities for the purpose for which it is meant.

Statement of the problem

Information and Communication Technology (ICT) in education has been continuously linked to higher efficiency, higher productivity, and higher educational outcomes, including quality of cognitive, creative and innovative thinking (Adeosun, 2010). The field of education has therefore been affected by ICTs, which have undoubtedly affected teaching, learning and research (Orie, Godspower & Legg-Jack, 2011). A great deal of research has proven the benefits to the quality of education (Ademola, 2011). In response to the global imperative of Education for All by the year 2015 and not willing to be left at lower side of ‘digital divide’ Nigeria developed and launched an ICT policy in 2001. One of the objectives of the policy focused on integrating ICT into the mainstream of education and training for students in all fields of learning.

In the field of technical education which the federal government of Nigeria has acknowledged as skill oriented programme which leads to the acquisition of practical and applied skills as well as basic scientific knowledge (National Policy on Education, 2004) it is imperative that the technical trainees (students) be kept abreast of emerging knowledge inherent in the emerging technologies in order to have first hand information affecting their field of practice and be well armed with adequate, relevant, up-to-date knowledge and skill. This can easily be facilitated if the students or trainees have access to ICT and subsequently maximize the numerous potentials of ICT through its usage. Perhaps, it is in this regard that the Economic Commission for Africa indicated that the ability of students to access and use information is no longer a luxury, but a necessity for development. It is against this background that this research investigates the availability, accessibility and usage of ICT among students of technical education in Niger State tertiary institutions.

Purpose of the study

The purpose of the study was to investigate the extent of availability, level of accessibility and use of ICT by students of technical education in Niger State tertiary institutions. Specifically, the study sought to:

1. Determine the availability of ICT facilities within the institution
2. Find out if the students have access to ICT facilities in the institution
3. Determine how often the students use ICT facilities
4. Find out the purposes for which the ICT facilities are used

Research Questions

The following research questions were formulated to guide the study:

1. Are ICT facilities available within the institutions?
2. Do students have access to the ICT facilities in the institutions?
3. How often do the students use ICT facilities?
4. What are the purposes for which the ICT facilities are use?

Methodology

The study adopted Survey Research design. The method was considered appropriate because it involves gathering information that relates to the opinions, attitudes and beliefs of the subjects of the study. According to Kassin (2007) surveys involve asking people a series of questions about their behaviors, thoughts, or opinions. This also agrees with the views of Osuala (1982) and Uzoagulu (1998) that surveys are oriented towards the determination of status of a given phenomenon; they focus on people and their beliefs, opinions, attitudes and behaviour.

Area of the Study

The study was carried out in tertiary institutions that offers technical education courses/programme in Niger state. The tertiary institutions are two, namely: the Federal University of Technology, Minna and Niger State College of Education.

Population/sample of the study

The target population for this study consisted of the 479 undergraduate students from the department of industrial and technology education of the Federal University of Technology, Minna and the 682 students of technical education from Niger State College of Education making a total of 1161. From this population, Yaro Yamane’s sampling formula was used to sample 297 students from the two institutions while purposive sampling technique was adopted to select students that have spent at least one year in the institutions under study. Thus, only students from part two and above were selected for the study. The selection was based on the fact that these groups of students are expected to be very much conversant with facilities within the departments in particular and the institution in general.

Instrument for Data Collection

In this study, a structured questionnaire developed by the researcher was employed as the instrument for data collection. The questionnaire titled: Accessibility and use of Information and Communication Technology Questionnaire (AUICT) have 40 items generated to address the research questions. The questionnaire was structured with a four point scale of Strongly Disagree=1 point, Disagree=2 points, Agree=3 points, Strongly Agree=4 points. A total of 260 usable questionnaires were returned by the students.

Validation of the Instrument

The instrument was subjected to face and content validation by three experts from the Department of Industrial and Technology Education, Federal University of Technology, Minna and three principal lecturers from College of Education, Minna. Suggestions and criticisms from these experts formed the basis for the final draft of the questionnaire.
Method of Data Analyses

The data for the study was analysed using mean and standard deviation to answer the research questions. The weighting of the responses from the questionnaire items was assigned points 1, 2, 3, and 4 using the four points scale.

Decision Rule

To determine the level of acceptance, a mean score of 2.50 was chosen as the decision point. Consequently, any item with a mean score of 2.50 and above was considered acceptable (Agree) while responses with a mean score of 2.49 and below were regarded as not acceptable (Disagree).

Results and Discussion

<table>
<thead>
<tr>
<th>S/N</th>
<th>ITEMS</th>
<th>SA</th>
<th>A</th>
<th>D</th>
<th>SD</th>
<th>X</th>
<th>Remark</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>Computers are available for students use in my department</td>
<td>16</td>
<td>33</td>
<td>69</td>
<td>142</td>
<td>1.70</td>
<td>Disagree</td>
</tr>
<tr>
<td>2</td>
<td>Power point projectors are available for students use in my department</td>
<td>10</td>
<td>30</td>
<td>66</td>
<td>154</td>
<td>1.60</td>
<td>Disagree</td>
</tr>
<tr>
<td>3</td>
<td>Photocopiers are available for students use in my department</td>
<td>15</td>
<td>22</td>
<td>73</td>
<td>150</td>
<td>1.62</td>
<td>Disagree</td>
</tr>
<tr>
<td>4</td>
<td>Scanners are available for students use in my department</td>
<td>9</td>
<td>24</td>
<td>67</td>
<td>160</td>
<td>1.55</td>
<td>Disagree</td>
</tr>
<tr>
<td>5</td>
<td>Internet service is available for students use in my Department</td>
<td>22</td>
<td>30</td>
<td>50</td>
<td>158</td>
<td>1.68</td>
<td>Disagree</td>
</tr>
<tr>
<td>6</td>
<td>Printers are available for students use in the department</td>
<td>16</td>
<td>24</td>
<td>61</td>
<td>159</td>
<td>1.60</td>
<td>Disagree</td>
</tr>
<tr>
<td>7</td>
<td>The schools’ library have computers for students learning and research</td>
<td>10</td>
<td>26</td>
<td>53</td>
<td>171</td>
<td>1.52</td>
<td>Disagree</td>
</tr>
<tr>
<td>8</td>
<td>The library have internet facility available for students academic work</td>
<td>16</td>
<td>33</td>
<td>69</td>
<td>142</td>
<td>1.70</td>
<td>Disagree</td>
</tr>
<tr>
<td>9</td>
<td>The library have printers available for students academic work</td>
<td>22</td>
<td>30</td>
<td>50</td>
<td>158</td>
<td>1.68</td>
<td>Disagree</td>
</tr>
<tr>
<td>10</td>
<td>The library have scanners available for students academic work</td>
<td>10</td>
<td>30</td>
<td>66</td>
<td>154</td>
<td>1.60</td>
<td>Disagree</td>
</tr>
<tr>
<td>11</td>
<td>Photocopiers are available for students in the library</td>
<td>16</td>
<td>24</td>
<td>61</td>
<td>159</td>
<td>1.60</td>
<td>Disagree</td>
</tr>
<tr>
<td>12</td>
<td>Video conferencing facility is available in the library</td>
<td>9</td>
<td>24</td>
<td>67</td>
<td>160</td>
<td>1.55</td>
<td>Disagree</td>
</tr>
<tr>
<td>13</td>
<td>Power point projectors are available in the library</td>
<td>16</td>
<td>20</td>
<td>54</td>
<td>170</td>
<td>1.55</td>
<td>Disagree</td>
</tr>
<tr>
<td>14</td>
<td>Commercial cybercafés are available in the school</td>
<td>120</td>
<td>50</td>
<td>40</td>
<td>50</td>
<td>2.92</td>
<td>Agree</td>
</tr>
</tbody>
</table>

N=260
The results presented in Table 1 revealed that the mean responses of items 1 to 13 are below the decision point of 2.50. In line with the decision rule, the interpretation is that the respondents disagreed that ICT facilities are available for students use in the institutions. On the other, item 14 have a mean score of 2.92 which is above the decision point, implying that commercial cybercafés are available in the schools under study.

**Table 2: Mean response on students’ accessibility to ICT facilities in the institutions**

<table>
<thead>
<tr>
<th>S/N</th>
<th>ITEMS</th>
<th>SA</th>
<th>A</th>
<th>D</th>
<th>SD</th>
<th>$\bar{X}$</th>
<th>Remarks</th>
</tr>
</thead>
<tbody>
<tr>
<td>15</td>
<td>Students have access to computers in the department</td>
<td>10</td>
<td>21</td>
<td>70</td>
<td>159</td>
<td>1.55</td>
<td>Disagree</td>
</tr>
<tr>
<td>16</td>
<td>Students have access to scanners in the department</td>
<td>15</td>
<td>35</td>
<td>62</td>
<td>148</td>
<td>1.68</td>
<td>Disagree</td>
</tr>
<tr>
<td>17</td>
<td>Students have access to photocopiers in the department</td>
<td>15</td>
<td>16</td>
<td>64</td>
<td>165</td>
<td>1.54</td>
<td>Disagree</td>
</tr>
<tr>
<td>18</td>
<td>Students have access to printers in the department</td>
<td>13</td>
<td>14</td>
<td>57</td>
<td>176</td>
<td>1.48</td>
<td>Disagree</td>
</tr>
<tr>
<td>19</td>
<td>Students have access to internet in the department</td>
<td>15</td>
<td>20</td>
<td>55</td>
<td>170</td>
<td>1.54</td>
<td>Disagree</td>
</tr>
<tr>
<td>20</td>
<td>The institutions’ library allows students to access computers</td>
<td>8</td>
<td>23</td>
<td>50</td>
<td>179</td>
<td>1.35</td>
<td>Disagree</td>
</tr>
<tr>
<td>21</td>
<td>The institutions’ library allows students to access scanners</td>
<td>15</td>
<td>35</td>
<td>62</td>
<td>148</td>
<td>1.75</td>
<td>Disagree</td>
</tr>
<tr>
<td>22</td>
<td>The library allows students to access printers</td>
<td>13</td>
<td>14</td>
<td>57</td>
<td>176</td>
<td>1.48</td>
<td>Disagree</td>
</tr>
<tr>
<td>23</td>
<td>The library allows students to access photocopiers</td>
<td>10</td>
<td>21</td>
<td>70</td>
<td>176</td>
<td>1.55</td>
<td>Disagree</td>
</tr>
<tr>
<td>24</td>
<td>The library allows students to access internet facilities</td>
<td>16</td>
<td>15</td>
<td>64</td>
<td>165</td>
<td>1.55</td>
<td>Disagree</td>
</tr>
</tbody>
</table>

The results presented in Table 2 revealed that the mean responses of all the items fall below the decision point of 2.50. In line with the decision rule, the interpretation is that the respondents disagree that students have access to ICT facilities within the institutions.

**Table 3: Mean response on the frequency of usage of ICT facilities**

<table>
<thead>
<tr>
<th>S/N</th>
<th>ITEMS</th>
<th>SA</th>
<th>A</th>
<th>D</th>
<th>SD</th>
<th>$\bar{X}$</th>
<th>Remark</th>
</tr>
</thead>
<tbody>
<tr>
<td>25</td>
<td>Students use ICT facilities for academic work on daily basis</td>
<td>10</td>
<td>40</td>
<td>51</td>
<td>159</td>
<td>1.62</td>
<td>Disagree</td>
</tr>
<tr>
<td>26</td>
<td>Students use ICT facilities for academic work at least once in a week</td>
<td>16</td>
<td>15</td>
<td>64</td>
<td>165</td>
<td>1.55</td>
<td>Disagree</td>
</tr>
<tr>
<td>27</td>
<td>Students use ICT facilities for academic work once in a month</td>
<td>15</td>
<td>35</td>
<td>62</td>
<td>148</td>
<td>1.68</td>
<td>Disagree</td>
</tr>
<tr>
<td>28</td>
<td>Students use ICT facilities for academic work once in a semester</td>
<td>146</td>
<td>53</td>
<td>39</td>
<td>22</td>
<td>3.24</td>
<td>Agree</td>
</tr>
<tr>
<td>29</td>
<td>Students use ICT facilities for academic work once in a session</td>
<td>8</td>
<td>23</td>
<td>50</td>
<td>179</td>
<td>1.46</td>
<td>Disagree</td>
</tr>
<tr>
<td>30</td>
<td>Students don’t use ICT facilities through out the sessions in the school</td>
<td>10</td>
<td>21</td>
<td>70</td>
<td>159</td>
<td>1.55</td>
<td>Disagree</td>
</tr>
</tbody>
</table>
In table 3 above, the mean score of five items (25, 26, 28, 29 & 30) falls below the cut off point of 2.50, which implies that the respondents disagreed with those items on the frequency of usage of ICT facilities. However, only item 27 has a mean score of 3.24 (which is above the cut off point) which therefore implies that the respondents agreed with that statement.

### Table 4: Mean response on the purposes for which ICT facilities are used

<table>
<thead>
<tr>
<th>S/N</th>
<th>ITEMS</th>
<th>SA</th>
<th>A</th>
<th>D</th>
<th>SD</th>
<th>(X)</th>
<th>Remark</th>
</tr>
</thead>
<tbody>
<tr>
<td>31</td>
<td>Students use ICT facilities for assignment</td>
<td>176</td>
<td>57</td>
<td>14</td>
<td>13</td>
<td>3.52</td>
<td>Agree</td>
</tr>
<tr>
<td>32</td>
<td>Students use ICT facilities for project work</td>
<td>159</td>
<td>51</td>
<td>40</td>
<td>10</td>
<td>3.38</td>
<td>Agree</td>
</tr>
<tr>
<td>33</td>
<td>Students use ICT facilities for academic discussions</td>
<td>15</td>
<td>16</td>
<td>64</td>
<td>165</td>
<td>1.54</td>
<td>Disagree</td>
</tr>
<tr>
<td>34</td>
<td>Students use ICT facilities to chart on face book/ to-go</td>
<td>15</td>
<td>20</td>
<td>55</td>
<td>170</td>
<td>1.54</td>
<td>Disagree</td>
</tr>
<tr>
<td>35</td>
<td>Students use ICT facilities to play games</td>
<td>15</td>
<td>36</td>
<td>44</td>
<td>165</td>
<td>1.62</td>
<td>Disagree</td>
</tr>
<tr>
<td>36</td>
<td>Students use ICT facilities for e-mail</td>
<td>30</td>
<td>40</td>
<td>50</td>
<td>140</td>
<td>1.85</td>
<td>Disagree</td>
</tr>
<tr>
<td>37</td>
<td>Students use ICT facilities for schools’ registration (café work)</td>
<td>146</td>
<td>53</td>
<td>32</td>
<td>29</td>
<td>3.22</td>
<td>Agree</td>
</tr>
<tr>
<td>38</td>
<td>Students use ICT facilities to download music</td>
<td>10</td>
<td>40</td>
<td>51</td>
<td>159</td>
<td>1.62</td>
<td>Disagree</td>
</tr>
<tr>
<td>39</td>
<td>Students use ICT facilities to watch films</td>
<td>32</td>
<td>29</td>
<td>53</td>
<td>146</td>
<td>1.80</td>
<td>Disagree</td>
</tr>
<tr>
<td>40</td>
<td>Students use ICT facilities to fax</td>
<td>16</td>
<td>15</td>
<td>64</td>
<td>165</td>
<td>1.55</td>
<td>Disagree</td>
</tr>
</tbody>
</table>

From table 4, items 31, 32, & 37 have mean scores above the cut off point of 2.50 which indicates that the respondents agreed with the purposes for which ICT facilities are used. On the other hand, items 33, 34, 35, 36, 38, 39 & 40 have mean scores below the cut off point which is an indication that the respondents disagreed with the purposes raised in the statements.

**Discussion**

The first research question sought to determine the availability of ICT facilities like computers, power point projectors, scanners, printers, photocopiers, video conferencing facilities and cybercafés. The findings revealed that all the facilities except the cybercafés are not available for students use at both the department and the library. Unfortunately, even the cybercafés are being operated by private individuals on commercial basis. This finding is in consonant with the investigation conducted by Adeosun (2010) when he highlighted that although efforts have been made to ensure that ICTs are available and used in Nigerian schools, the level of uptake is still low. This also agrees with Ani (2010) in his findings on Internet access and use by undergraduate students in Nigerian universities. The implication of this finding according to Okwudishu in Adomi and Kpangan (2010) is that the non-availability of ICT components in schools hampers students’ use of ICT. To sum up on the first research question with respect to the absence of ICT facilities and the common availability of commercial cybercafés as discovered from this research, Adomi, Okiy and Ruteyan, (2003) concurred that the absence of ICT equipment in most Nigerian schools leads students to resort to cybercafés, thus most cybercafé clients in Nigeria are students. To buttress this point further, Adomi et. al. reported that 77.8% of the customers/users of cafes were students. The
discovery of the findings for the first research question equally addresses the second research question on students’ accessibility of ICT facilities. The findings revealed that students don’t have access to ICT facilities which becomes quite obvious against the background that the ICT facilities are, sadly enough, not available in the first instance as discovered from the study. This finding was corroborated by the result of the 2011 Annual Socio-Economic Report on Access to ICT. According to the report, a survey was conducted between February and March 2011 and completed in July 2011 on access to ICT facilities in Nigeria. The report shows that the most widely used devices are radios and mobile phones, while internet usage and PC access remained considerably low. 82.9% of Nigerians had total access (those who owned and those who had access only) to radio, and 63.9% had access to mobile phones. While less than half of the population (44.7%) had access to TV, more than 95% of the population does not have access to either the PC or the internet (Annual Socio-Economic Report on Access to ICT, 2011).

With respect to the third research question which sought to determine the frequency of usage of ICT facilities by the students, the findings revealed very poor usage of the ICT facilities because the average period of usage is once in a semester. Thus, it is an indication that the students don’t frequently use the facilities which might of course not be unconnected with the mere fact that the facilities are grossly unavailable in the first instance. This finding was equally supported by Ani (2010) and Adeosun (2010). On the purposes for which the ICT facilities are commonly used by students, the findings revealed that the students used the ICT facilities for their project work and online registration popularly tagged as café work. This finding is also in line with the fact that institutional registration is this days mandatory online while project work also demands for the use of ICT facilities in terms of searching for related literature materials, computational/ statistical analyses etc.

**Conclusion**

Despite the undisputable fact that ICT is regarded the world over as an influential instrument for the development of quality teaching, learning and research in educational systems around the world, the students of technical education from Niger state tertiary institutions are still conspicuously not carried along with this monumental transformation. This is as a result of the non availability and subsequent accessibility as well as inadequate usage of ICT facilities within the institutions under study. The revelation of this study is therefore a pointer to the fact that the students from these tertiary institutions do not benefit from the monumental transformation derivable from the use of ICT and as such the impact cannot be exerted on the anticipated learning experience of the students. This is against the background that the impact and benefits can only be exerted if and only if the target beneficiaries (students) have access to and subsequently maximize the numerous potentials of ICT through its usage.

**Recommendation**

The following recommendations are proffered on the basis of the findings from this study:

- There is the urgent need for the technical education departments in particular and the institutions in general to make ICT facilities available for students use in both the departmental library as well as the main institutions library.
- The students should be given assignments, course projects, group work which will involve sourcing for information from the internet as this will not only expose the students to the
use of ICT, but it will also encourage them to be conversant with it in order to tap and maximize its potentials.

- Lecturers should encourage students to organize mini seminars for presentation of assignments through the use of power point projector as this will acquaint them to tap the potentials derivable from this ICT facility.
- The department should encourage students to conduct departmental registration through the use of departmental ICT facilities (when available) in order to maximize its usage.
- The department should mandate all students to create email address and post articles/information for students use through their email.
- The institution should post students related information on its web site and students should be encouraged to log on to the institutions porter for information.

References


The Impact of Colonialism on Nigerian Education and the Need for E-Learning Technique for Sustainable Development

Safiya J. Garba

Kaduna State College of Education, Gidan Waya-Nigeria

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Abstract

Education is crucial in any type of society for the preservation of lives of its members and the maintenance of the social structure. It grows out of the environment and the method of teaching being directly related to the pattern of work in the society. The greater portion of Nigerian education before the colonial era was informal, and functional, but with the colonization of Nigeria by Britain, the system of education was changed from progressive education to essentialist education to enable the colonialists achieve their aim of colonization. The purpose of this write up is not only to reveal the pros and coin of colonial education, but to explore the impact of colonialism in Nigerian educational system and to proffer solutions that will lead to better education that will be progressive in nature for sustainable development. This paper highlighted on the pre-colonial education in Nigeria, the impact of colonization in Nigeria educational system, problems such as the failure of the 6-3-3-4 system of education in Nigeria, emphasis on examination results and paper qualification as inherited from the colonial masters among others were identified. Recommendations such as, the need for the re-implementation of the 6-3-3-4 System of education, and the use of E-learning among others to enhance functional education in Nigeria were given.

Keywords: Colonialism, Nigerian education, E-Learning

Introduction

Education is an indispensable factor in the all round development of any nation. The genesis of Nigerian education labeled traditional education was progressive in nature, because of its emphasis on functionalism. Enoch (1996) stated that “traditional African education is not --- admired for the mere fact of its being indigenous to Africa, rather a mere permanent, justification thought”. With the advent of Christian missionaries and subsequent colonization of Nigeria by the British colonial masters, essentialism was imposed on Nigerian educational system. The colonial brand of education viewed education as a “central body of essential knowledge that must be transmitted to all who came to school” (Wango 1978). With this type of education, Nigerian teacher was expected to be strict and well behaved to the extent that he was a model of emulation. In imparting, knowledge to the learner, he could use lecture, play way or Socratic teaching strategy, while the learner was expected to learn what the teacher taught him by memorization and reproduction of the same on the examination day.

The colonization of Nigeria by Britain which lasted about a century has come and gone, but its impacts on Nigeria linger up to date. While some of these impacts are good and desirable some are in conflict with some African culture. To the Europeans the aim of introducing western education in Nigeria was to fit the ordinary individual to fill a useful part in his environment and to ensure that the exceptional individual shall use his abilities for advancement of the community and not to its detriment, or to the subversion of constituted authority. To this effect the colonial education in Nigeria was in principle a policy for separate development of the Muslim areas and the non-Muslim
Colonial education aimed at spiritual purification of the learner only and that was irrelevant to the needs & interests of Nigerian learner and the society. This called for reform in Nigeria educational system with the launching of the national policy on education in 1977 to enable the nation to return to its progressive system of education and this then calls for the need of the use of E-learning method of teaching to facilitate learning for the total development of the learner for sustainable national development.

**Conceptual Clarifications**

**Colonialism**

Colonialism means when a powerful country takes over the political, economic, social and cultural control of a less powerful country and rules that nation as a subordinate nation. Daniel (1980) stated that the phenomena associated with colonialism include monopolistic, seizure of territory, enslavement of the indigenous population, racism and militarism. Advocates of colonialism were of the opinion that it was meant to promote the welfare of the colonized nations for example (Ronald 1971) stated that

*In many of the new states we performed the tasks of an imperialist power without enjoying the economic or territorial advantages of empire we--- instructed the new nations in the proper principles of foreign policy. We did things with good intentions because we really did believe in self determination for everybody as a guiding moral principle, and because we thought it was our obligation to help the less fortunate “modernize” their societies by making them more like ours.*

In spite the claim of the colonialists it was observed that the colonizing nations generally dominated the resources, labour & market, of the colonies and may imposed socio-cultural, religious and linguistic structure on the indigenous population, common example in Africa was the period of the scramble for and partition of Africa by the super powers who divided Africa into regions that they could colonize. That is why (Lenin 1971) opined that it was the highest stage of capitalism.

Colonialism in Nigeria is considered to begin in 1807, when Great Britain abolished the slave trade. Generally, historians trace Britain’s increasing involvement through later signing of treaties and arrangement with Nigerian rulers. In 1865 Britain took a more active role in Nigeria and eventually occupied the Niger area. In 1885 Britain administered Nigeria in separated British protectorates until 1914 when she unified the country, while maintaining considerable regional autonomy among the three major regions. British colonialism created Nigeria. Joining diverse people, and regions in an artificial entity along the Niger River.

**Education**

The term education is quite elusive and very difficult to pin down to a single definition. This is so because numerous authorities in different fields have described education as its appeals to them. Education has to do with systematic development and the cultivation of the mind and other natural powers (Chukwusa 2011) while Oji (1982) sees education as a process by which we acquire knowledge, skills, habit, values or attitude to be able to become useful and justify related member of the society to acquire as well as the results of the process that involves teaching and learning. Okere (1990) defines education as “a process of developing the individual morally, socially, emotionally, physically, aesthetically and for his welfare as well as the welfare of the society”
Education helps members of the society to acquire suitable appreciation of their cultural heritage and to live a fully more satisfying life. This includes the acquisition of desirable skills, knowledge habits and value for people living in the society. It equips the members of the society with the capabilities of personal survival in and contributing to other group's survival in the wider world (Akule 2006). It is a treasure in which every human kind should heavily invest to purely pursue to its indefinite end. It is central to development; because it is an instrument for acquisition of appropriate skills, ability and competence both mental and physical as equipment for individuals to live in and contribute to the development of the society. Education should seek to fill a useful part in his environment and to ensure that exceptional individual shall use their capabilities for the development of the community.

Pre-Colonial Nigerian Education

Pre – colonial education represents the type of education offered in the preliterate era, within the community by community members who possessed specialized skills or abilities in various fields of human endeavor. In most communities in Nigeria, prior to the introduction of formal education boys were brought up to take to whatever occupation their fathers engaged in, in some cases, they were sent to other masters as apprentices to learn various vocations. Mkpa, (2012) noted that the traditional education offered by the community was comprehensive such that it provided training in physical, character intellectual, social and vocational development. Joseph (2007) observed that Nigerian pre-colonial education was progressive because of its emphasis on functionalism, and its relevance to Nigerians.

Although occupations varied according to the geographical areas, the major ones were farming, trading, craft, fishing, cattle rearing, traditional medicine and blacksmithing. The boys also engaged in other training activities such as archery, tree climbing and wrestling. Intellectual training consisted of them sitting quietly beside their fathers at meetings and listening attentively to learn the process of such tasks and skills such as proverbs and the use of wise sayings, oratory among others. All these stimulated their sense of rationality. The girls were expected to stay back at home to learn domestic and other chores such as cooking, sweeping, hair weaving, decorations of the body, dye production, weeding of farmland among other things from their mothers. Therefore the pre-colonial education in most parts of Nigeria trained individuals to fit usefully into their society by learning and producing economic skills for self sustenance, adapting to the role expectations and contribution to the development of the society. The problem of unemployment was minimal. The limitation of this type of education was the absence of writing and learners depended on their memories to facilitate retention and the transmission of all learned ideas to the next generation.

Islamic education started in Nigeria before the introduction of western education. Fafunwa (1974) noted that Islam was first accepted by a kanem ruler named umme Jilmi (1085 – 1097) and later Dunama I and Dunama II in the 13th c. in the early 14th century, Islam came to Hausa land by the traders and scholars from Wangarawa. Islam brought with it Arabic education and was therefore perceived as having great spiritual value. Mkpa (2012) observed that as a result of the political and social influence which islam and Quaranic learning conferred on those who possess it, many rulers employed Islamic scholars as administrators.

The jihad of Usman Danfodio in 1804 helped to revive, spread and consolidate Islamic studies and extended access to education also to women. Support for Islamic education came from some leaders for example Abdullahi Bayero (emir of kano) who built an Islamic school which continued to grow and expanded in scope and eventually became Bayero college kano and later the present day Bayero university kano. Many institutions have sprung up over the years in many parts of the
country for the purpose of Islamic education and practices. However the limitation of this education is the focus on Arabic which in many part of Nigeria is not the language of literature and communication.

The Nature of Colonial Education in Nigeria

The first form of western education came to Nigeria with the Christian missionaries in the mid nineteenth century. The church missionary society (CMS) and the Methodist mission society were the first British Christian organizations to set up schools in Nigeria (Nnamdi 2002) Most of their works were conducted in the southern part of Nigeria, where it was deemed safer. The colonial education aimed at creating a small class of skilled technical and administration functional and agricultural raw materials plantation farmers, possibly perpetuating the continued domination of the society by the offspring of members of the overthrown ruling autocracy. The emphasis of the western education was on the 4rs (Reading, Writing, Arithmetic and Religion) this new education prepared the recipient for the job opportunities as teacher church evangelists, clerks and interpreters.

The colonial brand of education was essentialist by orientation (Joseph 2007) they viewed education as a central body of essential knowledge that must be transmitted to all who came to school for this reason they established a proper code of conduct for the localities. Most of the schools set up by these missions were boarding schools because they believed that if children were to be developed along civilized lines their daily life must be supervised controlled and directed along proper lines. Education was meant to purify the mind of the learner. This is because of their belief that man was born evil in an unsuitable and sinful world.

The colonialists expected Nigerian teacher to be a strict disciplinarian and well behaved to the extent that he was to be a model worthy of emulation. In imparting knowledge to the learners, the teacher was expected to use lecture method, play way and Socratic teaching strategy. The Nigerian learner was expected to keep mute by sitting and looking up. He memorized all that emanate from the teacher’s mouth with the hope of reproducing same on examination day.

Turaki (1993) observed that the colonial educational policy in Nigeria was a policy of separate development of the Muslim areas and the non-Muslim areas. The fundamental basis of this administrative policy was religious and political. Lord Lugard promised the northern rulers of religious non interference and the policy of the exclusion of Christian missions from the Muslim areas. The Muslim areas were to be protected and preserved, while the non Muslim areas were to be opened to western education. Colonial administration in Nigeria therefore, developed two types of educational programs, thus; one for the Muslim areas and another for the non Muslim areas.

In the 1950s, because of the spread of mission schools, the southern parties were committed to policies that would benefit the south, while in the north, the emirs intended to maintain firm control to policies on economic and political change. Any activity in the north that might include participation by the Federal government or southern civil servants was regarded as a challenge to the privacy of the emirates (Wikipedia 2012). Broaden, educational opportunities and other social services were seen as threats to the status quo. Lugard’s goal was secular education free from any religious propaganda, but due to lack of manpower he was forced to rely upon Christian missionaries for the development of educational programs.

Lord Lugard established a government schools for the sons of chiefs and mallams in 1904. He wanted these mallams to be taught English, reading and writing of Hausa in Roman characters, without prejudice to their religion. Turaki (1993) noted that the colonial policy permitted a joint educational program between the government and the native administration, but did not destroy
the Quranic schools, but allowed them to exist side by side with the new schools. This scheme was not well received by the Muslim teachers, religious prejudices came up to the present, prevented considerable expansion of their scheme. The policy of ‘protective or conservative’ of the northern Nigeria helps to explain the educational backwardness of the north in general and account for the gap in the level of educational development between the north and the south (Martins 2005).

In the non Muslim areas the first government school was established in 1929 and the second was established in 1932. These schools were established for the purpose of producing elementary school teachers who after the training would establish elementary schools in their areas. Thus (Turaki 1993) observed that by the early 1930s, there were no elementary schools comparable to those in the Muslim areas. The colonial administration by policy abandoned the non-Muslim areas to Christian mission who were concerned with the training of pastors, evangelists, teachers and communicants. The focus of education was thus theological and not secular. The aim was not for any advance education but just enough to enable converts to read and write so that they could effectively use the scriptures for evangelistic purpose and not for any social change. Mkpa (2012), observed that from 1882, the government began to make bold intervention by promulgating codes and regulations, guidelines and policies on organization of schools. Government also began to appoint inspectors and to give grants to schools to ensure quality in various parts of the nation. These served as the basis for the modern day educational policies in Nigeria (Martins 2005). But after the attainment of independence, it was discovered that colonial system of education could not meet the needs and aspirations of the nation, this calls for the need to return to the progressive educational system to enable the sustainable national development.

The Effects of Colonialism on Nigerian Education

The colonial brand of education was essentialist by orientation which viewed with reference, an aim of education that sought the spiritual purification of the learner. This essentialist aim of education is upheld in Nigerian education, thus it is clearly stated in the national policy on education (2004) that Nigerian education is meant to develop the child spiritually.

The colonial education system focused strongly on examinations. Most points given to a school’s performance went to the numbers and rankings of its examination results. This emphasis on examination is still in use today to judge educational results, performance and to obtain qualification for jobs in government and private sectors perhaps this might explain why many of Nigerian students are involved in examination malpractices which make it possible for undeserving candidates to obtain high grades and certificates that they cannot defend.

Colonial education also affected Nigerian indigenous system of education. This was because the missionaries were after formal training of the mind, for this reason they encouraged boarding accommodation so as to supervise, control and direct the learner along proper lines (Nnamdi 2002). This deprived the Nigerian child from learning moral and other forms of education he was used to. Fajana (1978) in (Nnamdi 2002) observed the difference between colonialist and traditional education and stated that while the traditional system of education made it possible for children to learn both moral and other forms of education at the same time, the colonialist system which involved boarding accommodation deprived them of such opportunities because the colonial education was material oriented, the children missed other forms of training available outside the school. These Nigerian children could not offer their parents services which were often needed and accepted as a necessary part of their preparation for future life. This particular weakness together with other considerations such as; political, ideological and economic interests inculcated into educational program are the genesis of the legacy inherited from the colonial education.
Again in its efforts to lay basic foundation, for hard work and material gain the colonial authorities introduced various means which in their view were the only way to survival. Omotosho (1998) observed that among the vestiges of the colonial education are materialism and individualism. Both constitute the main roots from which many ideas were originated. While Nduka (1975), observed that the greatest legacy from the colonial past is western materialism. According to him, the most striking difference, as it appeared to the indigenous Nigeria, between the indigenous culture and dominant western culture was the wealth and power associated with the latter as compared with the material poverty and weakness of the former.

On the contrary, western education created a dichotomy in the status of the people. The difference between the rich and the poor became clear. The colonial system as observed by Omotosho (1998) was designed in such a way that the educated person will not have any priorities but to work hard and acquire all these because much importance has been attached to their acquisition as they are recognized as a status, symbol and the only means of enjoying life.

Rodney (1972) stated that ‘the colonizers introduced a new set of formal education institution which partly supplemented and partly replaced those which were there before’. The colonial system also stimulated values and practices which amounted to new informal education. According to Rodney, it was not an educational system that grew out of the African environment or the one that was designed to promote the most rational use of material and social resources for development, nor an educational system designed to give young people confidence and pride as members of the society, but the one that sought to instill the sense of difference in the society.

Furthermore, the British used education as a tool to cultivate religion and cultural hegemony in Nigeria. Nnamdi (2002) observed that “the colonialists oppressed the inhabitants by subjecting them to … foreign values.” Such subjugation led to the domination of people.

Further still, the aim of colonial education made the colonialists to use various means to control and retard the educational aspirations and development of the colonies. This affected the quality of education provided, the number of the recipients and the social class and family background of these recipients, this resulted in the poor educational attainment of the people.

On the other hand, colonialists left behind desirable impact on Nigeria. For example, the colonialists enacted educational ordinances in 1882, 1887, 1916, 1926, and 1946 which were used as guidelines to administer education. These served as the basis for the modern day educational policies, education laws and techniques of educational administration in Nigeria today (Martins 2005). However, most of the policies had the shortcomings of not taken into consideration or account local peculiarities.

Even though progress in education was slow, but it was steady throughout the colonial era, and on the eve of independence, Nigeria had gone through a decade of exceptional educational growth leading to a movement for universal primary education in the Western Region and in the north, primary school enrolments went from 66,000 in 1947 to 206,000 in the West from 240,000 to 983,000 in the same period. Secondary level enrolment also went up.

**E-Learning Components**

Above was the educational situation of Nigeria at independence up to 1977, and with the birth of the National Policy on Education in 1977, Nigerian education returned to its previous progressive position to enhance functionalism. This then calls for the need of the use of e-learning technique to facilitate learning and to move away from the colonial method of memorization of facts.

Jessica (2006) pointed out that E-Learning provides a way to bridge the gap between the changing generations and the increased need for higher education. The use of E-learning is
necessary today because learners are weary of the traditional method of teaching. Many instructors have found that slowly integrating technology in teaching all subjects works best for them. She identified three main categories for teaching using Web-based tools which include;

- Traditional lecturer with a web site containing additional materials, which could include, examination reviews, syllabi copies, lecturer outlines, primary source links, copies of articles, use of textbooks, web-sites, ... online submission of research papers for checking, links to helpful on – campus resources, and professional organizations,

- Blended instruction which is appropriately half lecturer and half online interaction. This could include: the ones listed above and required discussion forums, online reading response posts and research directives.

- Total online interaction. This includes printed lectures instead of verbal class, digitally taped and broadcasted lectures- either audio or video, and the one listed above.

The advantages of using this E-learning components in the classroom are numerous because instructors are only to limited their imagination and access to technical support and ability. The advantages include the increased interaction by the students with the material outside the class, increased access to materials provided to the students which are of primary sources, increased discussion among students and between students and instructor, increased efficiency for the instructor in time management, increased creative outlet for the instructor and increased freedom for him/her if allowed to travel around and above all it makes learning interesting and easy for the learners.

E-learning places the learner at the centre of all learning activities. This implies that the learners’ education is to be based on their needs and interests. The role of the teacher is reduced to that of a guide or stage-setter, thus the work becomes easier but the end result would be progressive education. It also enables the teacher to use constructivist model of learning that creates roles for other mentors and experts. Teachers and students become producers and not just users of information, thus becoming functional. Students take more responsibility for their own learning, work at their own pace and correct many of their own errors.

Problems

The point of emphasis in Nigeria education today is progressive education, which implies that the learners’ education is to be based on their needs and interest to be able to fit in well in the society. The policy that would have helped in the achievement of this lofty idea is the 6-3-3-4 system of education, but the policy has accommodated massive failure.

- In spite of the lofty objectives of education in the National Policy of Education, Nigeria’s education has failed to produce appropriate and commensurate values and development. It has also failed to produce learners a combination of skills and value system that could make him self reliant and fit him into the society.

- Due to emphasis on examination results and paper qualification as inherited from the colonial masters, the problem of examination malpractice is on the increase every year.

- The Policy on Education (2004) stipulates that teaching shall be practical, exploratory and experimental. The use of E-learning will help to achieve that, but the equipment and trained personnel are limited in Nigerian schools. Much of the methods obtainable today is lecture method.
Conclusion

This paper discussed the impact of colonialism on Nigerian educational system. The research work shows that the colonial education in Nigeria was essentialist in nature and they succeeded in changing the progressive education they found in Nigeria. This colonial education was grossly irrelevant to the needs of Nigerian learners and the society at large. Resulting from the irrelevance of colonial education, its products could not fit correctly into the Nigerian society. However, it laid the basic foundation of Nigeria’s formal education. The nation returned to her progressive education in 1977, with the birth of the national policy on education in order to make education functional to meet the needs of the learner and enable him fit well in the society. This then calls for the need of E-learning in teaching and learning in the educational system to facilitate learning for functional education.

Recommendations

Based on the problems identified in this paper, the following recommendations were proposed;

- Government should ensure the implementation of the 6-3-3-4 system of education. This will be possible if the government increases her commitment to education.
- To make the work of the teacher easier in inculcating values and skills, and to facilitate learning, effective software and on-line learning resources should be an integral part of every school curriculum in Nigeria.
- Teachers and students should be equipped with modern multi-media computers in the classrooms when proper learning takes place the issue of examination malpractice will significantly reduced.
- Emphasis should not just be on paper qualification but also be based on experience and ability to exhibit the acquired skills.
- Nigerian government should solely aim at functionalism and expunge essentialist metaphysical positions the educational system.
- The National Policy on Education should be reviewed to rid the educational system of colonial influences.

References


Nigerian Indigenous Knowledge Application in ICT Development

Anele Nwokoma

School of Information Technology and Communications, American University of Nigeria, Yola, Adamawa State, Nigeria

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Abstract

Indigenous knowledge (IK) systems application in Nigeria ICT for sustainable economic development has been overlooked by both corporate and government decision makers partly because of a lack of a formal methodology to collect, assess, and use such knowledge. This problem can be solved through IK-based training programs aimed at empowering Nigerian youths. Corporate and government development strategists should integrate Nigerian indigenous knowledge and communication systems in various ICT and development program. IK can be the basis for an alternative development model. IK systems integrate multiple disciplines as such the resultant synergism may demonstrate higher levels of efficiency, effectiveness, adaptability, and sustainability than do many of the conventional system.

Keywords: ICT, Indigenous Knowledge, Sustainable Economic Development, Government, Corporations, Communities, and Culture

Introduction

According to World Commission on Environment and Development (1997), sustainable development is development that meets the needs of the present without compromising the ability of future generations to meet their own needs. The term indigenous knowledge (IK) is used synonymously with ‘traditional’ and ‘local knowledge’ to differentiate the knowledge developed by a given community from the international knowledge system. IK refers to the knowledge of indigenous peoples as well as any other defined community.

In addition, indigenous or local knowledge is knowledge that is unique to a given culture or society. It is in contrast with the knowledge generated within the Western/international system of universities, research institutes and private firms. Indigenous knowledge is used at the local level by communities in developing countries as the basis for decision-making pertaining to culture, food security, human and animal health, education, natural resource management, social and skill development, and other vital activities.

Therefore, the awareness and application of the value of indigenous knowledge (IK) will be a potential contribution to ICT and sustainable economic development for poverty alleviation. This potential could spawn youth empowerment and community development growth in Nigeria at a time when such knowledge is being neglected in policy, program, and project issues relative to sustainable development. While there could be links between the application of IK and a communities’ sustainable development, important question remain. How could policy and corporate stakeholders apply IK for youth empowerment and community development in Nigeria? The following sections will discuss Different forms of knowledge, Importance of Indigenous knowledge, and IK Application in Nigeria.
Different forms of Knowledge

In Dei (1993a), formal knowledge refers to knowledge systems developed within predominantly Western-based education systems. It is formal because it tends to be supported by written documents, rules and regulations, and technological infrastructure. However prominent it may be in industrialized societies, Western-based formal knowledge remains just one knowledge system among many. In many countries, Western-based formal knowledge exists alongside non-formal indigenous (local, traditional or ecological) knowledge systems, Dei (1993b).

In contrast, the concept of indigenous or local knowledge (IK) refers to the complete bodies of knowledge, know-how, practices and representations that are maintained and developed by people with long histories of close interaction with the natural environment, Sachs (1992). These sets of understandings, interpretations and meanings are part of a cultural complex that encompasses language, naming and classification systems, ways of using resources, rituals, spirituality and a world view.

Such knowledge provides the basis for local decision-making about many fundamental aspects of day-to-day life in these societies, such as hunting and gathering, fishing, agriculture and animal husbandry, food production, water, health, adaptation to the environment, skill development, education, and social change. Furthermore, non-formal knowledge — in contrast to formal knowledge — is transferred orally from generation to generation and is seldom, if ever, documented, Matowanyika (2002). Non-formal knowledge systems should not be lost simply because Western attitudes tend to dominate most thinking about development policy. Nor should Western thinking exclude local communities from participation in the development process. 'Development' in government and corporate policy makers is defined only in terms of unfamiliar, sometimes not even appropriate, Western concepts. Believe it or not this the case of current government and corporate development programs in Nigeria.

Analysis of governmental attempts to tackle poverty reduction tells us that development interventions have often failed. Even worse, they may sometimes have a detrimental effect on peoples’ livelihoods. Western solutions have been used in situations where IK could have provided a better response but, for one reason or another was not even considered to be an option. Although IK has proven its value in many cases such as Ghana, South Africa, India, and Thailand, it cannot, and should not, be promoted without first being critically assessed, O’Manique and Dotse (2003). Not all IK offers sustainable solutions to today's pressing problems. Furthermore, most local solutions are very context-specific.

Ironically, an awareness of the value of indigenous knowledge, particularly its potential contribution to sustainable development and poverty alleviation, is growing precisely at a time when such knowledge has never been under greater threat. It is in danger of disappearing not only under influence of global processes of rapid change, but also because the capacity and facilities needed to document, evaluate, validate, protect and disseminate such knowledge are lacking in African countries, especially in Nigeria. This situation must change. But it will need instruments, facilities, research, and financial resources. It will also require moral support, as local knowledge is usually given a lower status in both development and scientific circles than Western-based science and technology. More research needs to be done on IK systems, and methods need to be developed for dealing with it. Such research must of course be done together with the people who possess the IK, and with the local communities involved.
Importance of Indigenous Knowledge

Indigenous knowledge has made, and can still make, significant contributions to resolve local problems. In recent years there has been a growing flow of information from developing countries about the role that IK is playing in a range of sectors: agriculture (intercropping techniques, animal production, pest control, crop diversity, animal healthcare, seed varieties), biology (botany, fish breeding techniques), human healthcare (through traditional medicine), the use and management of natural resources (soil conservation, irrigation and other forms of water management), education (oral traditions, local languages), and poverty alleviation in general, Warren, et al. (2005).

Moreover, Mudimbe (1998) posits that scientists are often adapting IK and re-applying it in projects of development cooperation and other contemporary contexts. Thailand, Vietnam, India and Indonesia are all developing innovative new curricula and new approaches to the transfer of knowledge that take local knowledge systems into account. Consequently, academics, policymakers, and ICT development practitioners should show increasing interest in IK. Over the last two decades researchers have established links between IK and science, and acknowledged the relevance of IK to education systems and development issues, Ahmad (2005).

These growing research interests in IK are reflected in statements made by governments and non-governmental organizations in many countries. They, as well as international organizations such as the World Bank, International Labor Office, United Nations Education, Science and Culture Organization (Unesco) and the Food and Agriculture Organization, are explicitly acknowledging the contribution that local knowledge can make to sustainable economic and ICT development. As a result and for example, the policies and programs of several national governments — Uganda, South Africa and the Philippines, to mention a few, are reflecting a growing interest in IK, (CASID), 2005.

IK Application in Nigeria

On the basis of all of the above it seems safe to conclude that there is growing appreciation for IK. However, one of the major prerequisites for the entire process of collecting, applying and disseminating IK is the full participation of the local people involved. Full participation can be achieved only when the local communities are able to participate on an equal level of policy-decision input. Local input must be from the grassroots and should tap the diverse views, opinions, resources and interests manifested in the cultural values and norms of Nigerian culture.

For sustainable economic development to have any credibility at all, it must seek and speak to the social, cultural, economic, political, spiritual and cosmological aspects of Nigeria peoples’ lives, as well as to their specific needs and aspirations. Capacity building is therefore a key issue, and vital if traditional knowledge systems are to receive the active support to sustain Nigerians in context and content. Government and Corporate capacity building must include training to better equip Nigerian youths and indigenous people, in general. This can be achieved through collaborations among Federal and State Governments, Corporations, and local Communities by placing IK on the agenda for sustainable ICT development in general.

Real and effective Nigerian ICT sustainable development is possible only if the development agenda seeks to center indigenous knowledge systems in the search for solutions to Nigerian problems. This means articulating an alternative conception and praxis of development, one which does not reproduce the existing total local dependency on external (expert) advice, knowledge and resource.
Conclusion

Development of ICT in Nigeria ought to focus on knowledge appropriate to Nigerian Communities. The processes and principles that Nigerian Communities have for years utilized to interpret, explain, and understand their social and natural worlds is valuable for effective economic development. Within Nigerian Communities contexts, there is a paradox and contradiction in the development process: on the one hand is the continuing transnational/corporate appropriation of local knowledge without adequate local communities` input.

As it stands now, conventional approaches to development have not helped Nigeria. Consequently, there are examples of so-called development projects that continually undermined Nigerian peoples' abilities to control their own lives. These programs have made local peoples objects of exploitative economic systems. IK, therefore, is an important tool for the participation of local people in sustainable economic development. Participatory approaches allow people to define their needs from their perspective.

Nigeria ICT sustainable development should start with and build on what people know. Only then will development result in self-reliance rather than dependency and be sustainable. We must involve various Nigerian communities in all stages of the conception, planning, implementation and evaluation of development activities. Nigerian indigenous knowledge systems contain invaluable explications of the workings of ecosystems and the sustainability of ecologically sound economic production strategies.

References


Improving the Internet Service Using Grid Technology  
(A Case Study of Adeniran Ogunsanya College of Education, Otto Ijanikin Lagos)

Adewopo, Adeniyi

School Of Science, Adeniran Ogunsanya College of Education, Lagos-Nigeria

Saromi  J. A

Lagos State Polytechnic, Ikorodu, Lagos-Nigeria

Akinjobi, J, A

Crawford University, Igbesa,Ogun State-Nigeria

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Abstract

Data Grids are an emerging new technology for managing large amounts of distributed data. This technology is highly-anticipated by scientific communities, such as in the area of astronomy, protein simulation and high energy physics. In this paper, we present our work on Adeniran Ogunsanya College of Education Internet servers. While few of the servers are trying to cope with the user requests from the five schools of the college, other servers are always idle. Lack of grid support is making it really challenging to process user requests efficiently. A grid-Coordinator was included in the star topology of the college network which route jobs to servers that idle.

Keywords: Internet service, Grid technology, Nigeria

Introduction

What do data grid and the Internet have in common? They are both technologies that provide services to users. Some of these technologies perform tasks more efficiently than the other but all of them serve the same purpose. They provide services requested-for by users. Maybe with the growth of users’ requests individual servers will not be able to function efficiently. Because of the importance of grid computing, its ability to distribute tasks among job servers, make use of replication algorithms and schedule jobs from busy to idle servers grid computing is more efficient technology.

Presently the five servers at the five schools of Adeniran Ogunsanya College of Education (AOCOED) are operating within a conventional environment. Some of the servers are operating within a conventional environment. The servers are trying to cope with the user request while other servers are idle. Lack of grid support is making it really challenging to process user requests efficiently.

AOCOED faces computing challenges of unprecedented scale in terms accessing the Internet. Access and data storage is expected to grow leading to data collection of several gigabytes. Her
network architecture comprises of five servers each located at the five schools of the college and users from the schools can access the server from anywhere on the college campus.

Grid computing harnesses a diverse array of machines and other resources to rapidly process and solve problems beyond an organization’s available capacity. Academic and government researchers have use it for several years to solve large scale problems and the private sector is increasingly adopting the technology to create innovative products and services, reduce time to market and enhance business processes (Kalman et al, 2003).

The rest of this paper is organized as follows. Section 2, present an overview of distributed processes, data replication and scheduling in the grid. Our model is presented in section 3. Finally in section 4, we end the paper with concluding remark.

Related Work

Grid computing in general comes from high performance computing, super computing and later clusters computing where several processors or work stations are connected via a high-speed interconnection order to compute a mutual program. Originally, the cluster was meant to span a local area network but then it was also extended to the wide area. A Grid itself is supposed to connect computing resources over the wide area network. (Heinz Stockinger: Distributed Database Management Systems and the Data Grid

The Globus project provides tools for Grid computing like job scheduling, resource discovery, security, etc. Recently, Globus is also working on a Data Grid effort that enables fast and efficient file transfer, a replica catalogue for managing files and some more replica management functionality based on files. Replica update synchronisation is not addressed. In the Grid community there is a general tendency to deal with replication at the file level, i.e. a single file is the lowest granularity of replication. This has the advantage that the structure of the file does not need to be known by the replication manager that is responsible for replicating files from one site to another sites over the WAN. This is also a valid simplification for most of the HEP replication use cases and, thus, is also the main focus of this paper. Related work in the HEP community can be found in the two Data Grid projects PPDG and GriPhyN. There is still the possibility to deal with replication at the object level which requires more sophisticated techniques than file level replication. Object handling is addressed in Holtman et al, 2003. However, as soon as data items in a replicated file are changed, these changes have to be propagated to all other replicas.

Data Grids are Grids that provide a scalable storage and access to data sets in different locations (Chervenak, et al, 2001). The data sets must eventually be evaluated and analyzed by scientists and other collaborators from different research groups, who may be located around the globe. Hence, efficient, reliable and secure access to the data sets and their replication across several sites are primary concerns in Data Grids. Different scenarios need to be evaluated to ensure the effectiveness of access and replication strategies. Given the inherent heterogeneity of a Grid environment, it is difficult to produce performance evaluation in a repeatable and controlled manner. In addition, Grid testbeds are limited and creating an adequately sized testbed is expensive and time consuming. Therefore, it is easier to use simulation as a means of studying complex scenarios.

There are some tools available, apart from GridSim, for application scheduling simulation in Grid computing environments, such as OptorSim , Monarc (CiprianMihai and Corina, 2004). Simulation tools are evaluated based on three criteria: (1) the ability to handle basic Data Grid functionalities; (2) the ability to schedule compute- and/or dataintensive jobs; and (3) the underlying network infrastructure. MicroGrid are mainly targeted as a general-purpose grid
simulator for Computational Grids. Hence, they lack features that are core to Data Grids, such as data replication and query for the location of a replica. OptorSim has been developed as part of the EU DataGrid project. It aims to study the effectiveness of data replication strategies. In addition, it incorporates some auction protocols and economic models for replica optimization. In OptorSim, only data transfers are currently being simulated, whereas GridSim is able to run both compute- and data-intensive jobs. Monarc and ChicSim are grid simulators designed specifically to study different scheduling, replication and performance issues in Data Grid environment. Hence, they provide a general and extensible framework, to implement and evaluate these issues. However, they lack one important feature, i.e. the ability to generate background network traffic. This feature is important because in real-life, networks are shared among users and resources. Hence, congested networks can greatly affect the overall replication and performance issue.

**Model and Algorithm for Improvement**

Our contribution in this article is the inclusion of a grid coordinator as a central node to the servers in a star topology of AOCOED five servers. This model is the simplest solution, as the coordinator keep information about the servers on the network.

**Algorithm**

1. Job are sent by client to server
2. The receiver server sent message to coordinator
3. Coordinator compare load on servers and route job to the least idle server

**Conclusion**

The Internet servers of AOCOED are operating under conventional environment where a server is overloaded while others are idle. Grid computing deals with the issue of distribution of processing and load amongst processing resources.

In the future, we are planning to incorporate a computational model that will optimize server utilization in our star topology.

**References**


Assessing the Level of Environmental Awareness of Non-Science Students of Colleges of Education in Rivers State

Madumere Akuego Jane

Federal College of Education (Technical), Omoku, River State, Nigeria

Doi:10.5901/jesr.2012.v3n7p69

Abstract

Environmental awareness is the first step towards the achievement of environmental literacy. The pivot of any educational system is the teacher. Teachers are the most crucial factors in any educational system and one of the goals of the teacher education is to provide teachers with the intellectual and professional background adequate for their assignments to changing situation. These teachers are products of teacher education institutions. The non science students outnumber the science students in colleges of education and they graduate to take up teaching opportunities and form greater part of the teaching work force at the primary and junior secondary schools. These non science students at graduation teach the primary science subjects therefore there is a need to know their environmental content readiness to handle primary science subject. Three research questions were postulated and analysed using percentages. The implication of the finding was that non science students’ environmental awareness is low. It was recommended among others that a planned environmental education curriculum be made compulsory as general studies in colleges of education.

Keywords: Environment, Non-Science students, Rivers State

Goals of environmental education

Environmental education programmes often aim to:

1. Help students develop knowledge about the natural environment, particularly with regard to how ecosystems work and human impacts on the natural environment.
2. Foster more positive perceptions about the value of the natural world.
3. Develop eco-friendly habits, such as getting people to recycle and to produce less waste.
4. Engage students in environmental projects and action.
5. To develop students psychological and spiritual relationship with nature.

The above goals were better defined by 5 objectives which were outlined in UNESCO-UNEP (1996)

1. Awareness: to help social groups and individual acquire awareness and sensitivity towards “the environment as a whole and issue, questions and problems related to environment and development.
2. Knowledge: to help individuals, groups and societies gain a variety of experiences in, and acquire a basic understanding of what is required to create and maintain a sustainable environment.
3. Attitudes: to help individuals, groups and societies acquire “a set of values and feelings of concern for the environment” and the motivation to actively participate in prevention of environmental problems.
4. Skill: help individuals, groups and societies acquire the skills for identifying, anticipating, preventing and solving environmental problems.
5. Participation: to provide individual groups and societies with an opportunity and the motivation to be actively involved at all levels in creating a sustainable environment.

Development of environmentally mindful attitudes

Newhouse, 1990, advised that in order for environmental education to be effective, it needs to help shift attitudes and behaviors to be more environmentally mindful. Sheehan and Wonder (1998) stated that many educators believe that a small child possesses inherent attitudes of care and compassion for fellow creatures, both human and non-human. But the quality of our children’s environmental awareness and their sense of wonder in the natural world must be supported, channeled and encouraged. Attitude formation in environmental education has been extensively studied (Lozzi, 1989, Chawla 1998, Palmberg and Kuru, 2008). While there is significant controversy in both the psychological and practical implications of attitude formation in the literature, researchers agree that both cognitive and effective components are necessary for effective environmental education (Milton, Clerland and Bennett-Gate, 1995). Attitude, knowledge, focus of control and sense of responsibility leads to environmental discipline. Affective and cognitive components, combined with a behavior tendency, should be directed towards the environment (Mittelotaedt, 1999)

Environmental Education in Nigeria

Agbola (1993) in reviewing the situation in Nigeria, points out that even in the absence of a coherent environmental education policy or strategies to realize such a policy, children in primary and secondary schools are exposed to an appreciable measure of environmental knowledge and discussion or issues. At the university level however, specialization is, as expected and now whereas students in the faculties of technology, science, agriculture and forestry and social has discussion on environmental issues. This would not necessarily be true of most students in the arts education and other course of the preparation of teachers for the primary system in the teachers colleges. Agbola opines that not only are learners interested in exploring the environment and in coping with the changing environment stimulated but students are trained in the “principles and practical of communication with the children they will teach (Agbola 1993).

At the secondary level however, provisions are not so persuasive. In the colleges of education student teachers exposures to environmental education would vary depending on their subject combination. students in the sciences or social sciences are likely to have a significant infusion of environmental education while their counterparts arts and business education would not. Agbola points to the undesirability of this situation since teachers sometimes have to assume responsibilities outside of their areas of specialization. Efforts at primary and secondary level have not been effective in making the difference to the attitude of the students who have passed through, nor enough to make an impact on practice. To satisfy the above need is the problem of the study.

Research design

This study utilizes the descriptive survey design.
Study population

The population of this study comprises of final year, non-science students of colleges of education, river state.

Instrument for data collection

The instrument for data collection for this study was the questionnaire; there are a total of twenty (20) questions in the questionnaire. A total of one hundred and fifty questionnaires were administered and yes or no format were used in section C and D while in section B is objective questions.

Validation of Instrument

The research instrument was validated by some lecturers in school of science education (SSE).

Method of data analysis

Data was analyzed using percentage. A level of acceptability was as follows:
80 – 100% very high level
65 – 75% high level
80 – 64% moderate level
35 – 49% low level
0 – 34% very low level

Research Question (1)

What is the level of non-science students knowledge of the environment? Research question one which sought to know what the students of non-science department of the school know about the environment in which they live in research questions comprises of 6 options A, B, C, D, E.

<table>
<thead>
<tr>
<th>S/N</th>
<th>Items</th>
<th>A</th>
<th>B</th>
<th>C</th>
<th>D</th>
<th>E</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>The physical, chemical and biological surroundings of an organism is</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>-------</td>
<td>%</td>
<td>%</td>
<td>%</td>
<td>%</td>
<td>%</td>
</tr>
<tr>
<td>2</td>
<td>Environmental degradation is as a result of lack of environmental ------</td>
<td>46.66</td>
<td>6.66</td>
<td>9.33</td>
<td>13.33</td>
<td>24</td>
</tr>
<tr>
<td>4</td>
<td>Flaring of gases can cause – to the environment.</td>
<td>69.33</td>
<td>61.33</td>
<td>6.66</td>
<td>16</td>
<td>10.66</td>
</tr>
<tr>
<td>5</td>
<td>---- can affect the health of living things in the environment</td>
<td>66.66</td>
<td>2.66</td>
<td>5.33</td>
<td>24</td>
<td>1.33</td>
</tr>
<tr>
<td>6</td>
<td>An ecosystem consist of the following except</td>
<td>21.33</td>
<td>12.66</td>
<td>24</td>
<td>42</td>
<td>-</td>
</tr>
</tbody>
</table>
The environment consist of the following except 

<table>
<thead>
<tr>
<th></th>
<th>The environment consist of the following except</th>
<th>5.33</th>
<th>2.66</th>
<th>12.66</th>
<th>42</th>
<th>37.33</th>
</tr>
</thead>
<tbody>
<tr>
<td>7</td>
<td>Water pollution can be caused by all except</td>
<td>42.66</td>
<td>12</td>
<td>10</td>
<td>14.66</td>
<td>20.66</td>
</tr>
<tr>
<td>8</td>
<td>Can cause ozone layer depletion</td>
<td>14.</td>
<td>28.66</td>
<td>24</td>
<td>19.33</td>
<td>14</td>
</tr>
<tr>
<td>9</td>
<td>All these are type of environmental pollutions except</td>
<td>-</td>
<td>1.33</td>
<td>8</td>
<td>36</td>
<td>54.66</td>
</tr>
</tbody>
</table>

From the table 1 above based on set out levels of decisions, it shows that 64% of the students of non-science department have moderate level of awareness of the environment in which they live in while 46.66% is aware of the causes of environment degradation, 61% has a moderate level of how the environment correlate with our health. 69.33% agrees that flaring of gas can cause sickness therefore having a high level of what can cause sickness. 66.66% agrees that pollution can affect the health of living things in the environment; 42% believes that an ecosystem consists of aquatic and terrestrial which is a low level of awareness about ecosystem; 42% also do know that the component of the environment which is a low level of the knowledge about the environment; 42.66% agrees that water pollution can be caused by all expect oil spillage which is a low level of the knowledge about oil spillage which is a low level of the knowledge about spillage; 28.66% agrees that sun can cause ozone layer duplication which is a very low level of cause of ozone layer duplication; 54.66% agrees that all of these are type of pollution expect biological pollution which is a moderate level of knowledge about pollution.

**Research question (2)**

Are there environmental related courses assigned to non-science students in their departments? Research question (2) was to solicit information on environmental courses allocated to students of the school basically those of no-science department.

The research question comprises of five (5) items in yes or no options.

<table>
<thead>
<tr>
<th>Items</th>
<th>Yes</th>
<th>Percentage</th>
<th>No</th>
<th>Percentage</th>
</tr>
</thead>
<tbody>
<tr>
<td>1.</td>
<td>126</td>
<td>84%</td>
<td>24</td>
<td>16%</td>
</tr>
<tr>
<td>2.</td>
<td>42</td>
<td>28%</td>
<td>108</td>
<td>72%</td>
</tr>
<tr>
<td>3.</td>
<td>102</td>
<td>68%</td>
<td>48</td>
<td>32%</td>
</tr>
<tr>
<td>4.</td>
<td>55</td>
<td>37%</td>
<td>995</td>
<td>63%</td>
</tr>
<tr>
<td>5.</td>
<td>42</td>
<td>28%</td>
<td>108</td>
<td>72%</td>
</tr>
</tbody>
</table>

From the table above, 84% of the respondents who are non science students agree that environmental science is important to the students showing a very high level based on the decision level of the research. 72% agree that environmental science is not in their course allocation, 22% agree to the fact that students in any level should offer environment related courses; 63% responded that they have not gone for any environmental awareness course outside the school, 72% indicated that environmental studies is not in their course of study.
Research question (3)

Are non-science students sensitized to the environmental issues and problems? Research question 3: Which purports to know awareness and sensitization level of the students on environmental issues is the items on the questionnaire.

<table>
<thead>
<tr>
<th>Items</th>
<th>Yes</th>
<th>Percentage</th>
<th>No</th>
<th>Percentage</th>
</tr>
</thead>
<tbody>
<tr>
<td>1.</td>
<td>50</td>
<td>33.33%</td>
<td>100</td>
<td>66.66%</td>
</tr>
<tr>
<td>2.</td>
<td>90</td>
<td>40%</td>
<td>90</td>
<td>60%</td>
</tr>
<tr>
<td>3.</td>
<td>60</td>
<td>40%</td>
<td>90</td>
<td>60%</td>
</tr>
<tr>
<td>4.</td>
<td>38</td>
<td>25.3%</td>
<td>112</td>
<td>74.66%</td>
</tr>
<tr>
<td>5.</td>
<td>120</td>
<td>80%</td>
<td>30</td>
<td>20%</td>
</tr>
</tbody>
</table>

From the table above 66.66% is of the opinion that the federal college of education has not held seminars on environmental awareness or environmental issues; 60% believe that oil companies are not interested on environmental issues. 60% opined that there are environmental problems. 74% of the students believe that the school radio station has not done any programme on environmental issues. While 80% of the students believe that media houses and town criers help in environmental sensitization.

Summary and Conclusion

This study was carried out to assess the level of environmental awareness of non-science students in Colleges of education in Rivers State. A questionnaire was used as the research instrument for collecting relevant data. Data was analyzed using percentages and from the analysis the following findings were made:

- That the Non-science students have knowledge about the environment; but the level of knowledge is low
- That there are environmental related courses allocated to non-science students in their year 1 and 2
- That the non-science students are not sensitized to environmental issues.

Recommendation

1. Federal Ministry of Education should come up with environmental education curriculum that can take form of a spiral arrangement so that the higher one climbs academic ladder, the more he is exposed to higher aspect of environmental knowledge.
2. Environmental education should be taught as a compulsory subjects with developed contents in our basic education schools just as family life education is now been taught as a subject in the primary schools.
3. Environmental protection club should be formed in federal colleges of education in the country
4. The world environmental day of 5th June should be celebrated in all the schools of federal colleges of education in the country.

~ 73 ~
5. Environmental awareness campaign should be done in the school every month.
6. Environmental courses should form part of the elective courses in higher institutions especially colleges of education in the country.

References

Inclusion and Solidarity as Education Methodology

Ivan Siqueira

School of Arts and Communication (ECA), University of São Paulo (USP), São Paulo – Brasil

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Abstract

Education and Citizenship for Afro-descendants and Poor People (Educafro) is a Non Government Organization (NGO) supported by Solidarity Franciscan Service (SEFRAS), a branch of Catholic Church in Brazil. The NGO has strongly dedicated to promote a well fare state especially for Afro-descendants and Poor people in Brazil. Its methodology is based on the UNESCO's philosophy for the 21st century education and has reached excellent outcome. The culture of peace, mutual understanding and critical think has changed the life of thousand of Afro-descendants since its creation around 1993. This paper discusses some aspects of its methodology, as citizenship classes, and shows the results of its engaged actions in the national education scenario in the last few years.

Keywords: Education in Brazil, Educafro. Afro-descendants, Communitarian pre-vestibular, Inclusion

Introduction

Education and Citizenship for Afro-descendants and Poor People (Educafro) is a Non Government Organization (NGO) supported by Solidarity Franciscan Service (SEFRAS), a branch of Catholic Church in Brazil. Notwithstanding its uncountable actions in order to increase public policies and its powerful Leadership Formation Program, based on principles of Solidarity, Non-violence, Tolerance, Equity and Citizenship, maybe its most important action is in the field of education. Since its creation, in 1993, more than 30,000 students who are disadvantaged due to their low socio-economic background were educated in its programs of education and citizenship. In Brazil, the vast majority of these students are Afro-descendants. The more specific program, in which many young people have attended, is the students’ preparation for university admission tests. In this country, after the conclusion of primary and secondary school, before go to university, one must be approved in a specific exam called “vestibular”. Educafro has more than 200 groups spread in the States of São Paulo and Rio de Janeiro to help low-income students in this process of university admission. Unfortunately, by 2008, only 5% of all university students in Brazil came from 40% of the poorest households, and they were particularly studying in private schools, which, with exceptions, are not the best. On the other hand, 90% of all public university students came from 40% of the richest households – three-quarters of them belonged to 20% richest segment of the population (OECD, 2011, p. 17).

It’s well known that Brazil has one of the largest black populations in the world. The last census released in November 2010 established a population around 190 million. Whites are 47.7%; Afro-descendants are 50.7% (blacks and browns). The city of São Paulo has the biggest Afro-descendants population – 4 million; Rio de Janeiro is the second – 3 million; and Salvador is the third – 2 million (IBGE 2012). The list of largest percentages of blacks in the Brazilian States is shown in table 1 – São Paulo (SP), Minas Gerais (MG), Rio de Janeiro (RJ) and Bahia (BA):
Table 1 – States with the largest populations of blacks in Brazil

<table>
<thead>
<tr>
<th></th>
<th>SP</th>
<th>MG</th>
<th>RJ</th>
<th>BA</th>
</tr>
</thead>
<tbody>
<tr>
<td>Whites</td>
<td>63.9</td>
<td>45.4</td>
<td>47.4</td>
<td>22.2</td>
</tr>
<tr>
<td>Blacks</td>
<td>34.6</td>
<td>53.5</td>
<td>51.7</td>
<td>76.3</td>
</tr>
</tbody>
</table>

Source: IBGE (Census 2010)

Historically, few students come to university in this country. Only around 2000 the enrollment rates in higher education exceeded 10% of population between 18 and 24 years old. But the statistic for the Afro-descendants is like a tragedy. In 2001, only 1.8% of Afro-descendants were at university compared with 14.1% of whites. In 2006, the situation was 6.3% for blacks and 19.2% for whites (IPEA, 2012). In carriers with the highest social and economic value as medicine and law is almost impossible to find a single black student. An example of this extreme difficulty – in the last four years, a program of quotas for black students at Federal University of Rio Grande do Sul (UFRGS) offered 84 places for medical school but only 03 black students were enrolled (Educafro, 2012).

On the other hand, index of violence, adolescence vulnerability, bad jobs and payment are sadly closed to black people. Race, class, gender, urban space and age are the components of a “geography of death”, especially for male youth Afro-descendants (Vargas & Amparo-Alves, 2009). In Salvador (State of Bahia), in the decade of 1990, 96% of all murders practice by Police was among black population. In São Paulo State, between 1996 and 2006, there was an increase of approximately 160% in the number of prisons. There is not any ethnic census for this population by we know that 75% of them had between 18 and 34 years old; 7% had concluded the secondary school and only 2% had a graduation degree (FUNAP, 2012). The Afro-descendants that live in big cities without quality-education have the greatest probability of being hit by violence and consequently appearing in statistics of premature deaths. The Map of Violence in 2012 shows that violence and murder are strongly related with age between 15 and 29 years old (Index of Vulnerability for Youth). The numbers of deaths and homicides caused by firearms in Brazil are unthinkable even when compared with war and armed conflicts, as shows table 2:

Table 2 – Armed Violence & Death Statistics

<table>
<thead>
<tr>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Brazil</strong></td>
<td>1,091,125</td>
<td>550,000</td>
<td>125,000</td>
<td>45,000</td>
</tr>
<tr>
<td><strong>Angola Civil-war</strong></td>
<td></td>
<td></td>
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<td></td>
</tr>
<tr>
<td><strong>Israel-Palestine Conflict</strong></td>
<td></td>
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<td></td>
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<tr>
<td><strong>Colombia Civil-War</strong></td>
<td></td>
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</tr>
</tbody>
</table>

Source: Map of Violence – Brazil 2012

Educafro has emerged to struggle against these circumstances, as a dream that came true in Rio de Janeiro, a city in which 50% of slums are black but in city’s richer districts blacks are only 7%. Firstly, it convinced private universities as Pontifical Catholic University of Rio de Janeiro (PUC-RJ) to support black students and offer discounts for their education. Since then, the number of partnership between Educafro and higher educational institutions has significantly increased. Further than that, Educafro has promote ethnic diversity in the job market, as it did with the largest private bank institution in Brazil, Itaú, with whom agreements have been made in order to promote inclusion of Afro-descendants among bank employees. With the Department Store and Hosiery Colombo an agreement was signed whereby a minimum of 20% of Afro-descendants would be hired to work in all levels of new jobs. These two last occurrences began around 2004.
Educafro has also worked hard and has given a strong contribution for a new use of a nation exam (ENEM) by which students of all country can choose their graduation course in a large group of Federal Universities with only one exam. Before that, one must did an exclusively exam for each university, which produced very expensive situations. Discussions with Police and a plan of requalification and African cultural for policies are in action in São Paulo. Educafro also did a decisive participation on a nation law about Africa History and Afro-descendants in Brazil. The most polemical situation in which this NGO has engage was the Quote’s law – University for all (PROUNI), a national program based in 1960’s American experience of affirmative action. Between 2005 and 2010, the program has already included about 47.9% of Afro-descendants of 1.383 million available enrollments at private universities financed by Federal Government.

Certainly, Educafro was not the only responsible for that enormous historic victory for the Afro-descendants but it has a massive participation especially in the last few years. A great part of its proceedings has been based on the pedagogical philosophy placed by UNESCO for the 21\textsuperscript{st} century education:

1. Learning to know
2. Learning to do
3. Learning to live together
4. Learning to be

From such a perspective of value-based education, Educafro methodology has deal a constellation of attitudes in which students have found sense of dignity, creative thinking, problem-solving skill, informed decision-making and cooperation among others. More than teach contents and to promote a free pass to university, Educafro curricula are firmly related to the values of great contemporary relevance. Its epistemological parameters are linked with the main objectives of current day education values: socio-economic progress, material prosperity, ethical development of citizens, social critic consciousness and mutual understanding. I will explain in the next lines the methodology and the circumstances that put Educafro in advance when compared with the results of official education and others issues related to Afro-descendants education in the 21\textsuperscript{st} century in Brazil.

**Methodology of Education of Educafro**

The philosophical principles of Educafro education are similar of National Association of Black Supplementary School in United Kingdom, based on the evidences that cognitive development of black students is underestimated by the traditional school and by the fact that black students are not motivated to develop their full potential or to give the best of themselves in the studies; mostly because the Brazilian School has had little social meaning for Afro-descendants and traditionally treats them with values that do not share their history, African heritage or social conditions (Kabengele & Gomes, 2006). Blacks still struggle against social stereotypes and negative references that the school often plays about culture and physic appearances of Afro-descendants. It’s very difficult to be educated in an environment without positive self-references. Not long ago in Brazil, we rarely see black people in a prominent position on the television, magazines or other Medias, excepting soccer players or some singers of samba.

This situation is the historical consequence of prejudice against black people and the legacy of injustice and inequality of more than 350 years of slavery. Moreover, the lateness of country’s abolition in 1888 and the fact that only in recent times something has been done to turn African-descendants into real citizens – compared with the conditions given to the European and Asian immigrants – have impeded the majority of population to fully develop.
Educafro did its activities majority with volunteers in week-ends. The classes often occur on Saturdays (09 am to 17 pm) and occasionally on Monday to Friday (19 to 22 pm). It also provides textbooks and other instructional materials for teachers and students at low prices. This material covers content of all disciplines: Math, Portuguese Language, Geography etc. The classes usually take place in churches or in public school in alternative schedules. Among the textbooks, there is the book of citizenship. Every year, a collection of themes are written from a range of issues related to the Afro-Brazilian perspective in labor marked, *modus operandi* of Brazilian discrimination and prejudice against blacks among others. In the last two year the more relevant topics are “The challenges brought by the entrance of black and poor students in Brazilian Universities: what policy we should require the authorities?” and “The urgency of a process of deconstruction of institutional racism towards true racial democracy in Brazil”. The papers are often written by members of Educafro, generally in a collaborative way.

Educafro’s methodology of teaching and learning works together. It’s not rarely a content be selected after a previous discussion among teacher and students concerning about the approach, the relevance and the sequence of the topic. The students also work in groups, helping one another and exchanging information and learning process: “I’ve learned in this way” is a statement commonly heard.

Some researchers said the 20th century showed an inward looking, a self-oriented perspective and an egocentric vision of the world (UNESCO – African Regional Conference on Values Education, 2001). Since its beginning in 1993, Educafro has never discriminated against poor white students, as one might suppose, however it always stressed its priority by blacks, aware that education should not be a factor of exclusion but to promote equal chances to all in a learning society. The curricula and epistemological aspects of its approach reflect a particularity often denied in Brazil – that blacks are not suffering because they are poor, but that their suffering come from the fact that before anything they are blacks.

Thus, Educafro teaches that 21st century requires among several learning objects particularly actions fully conscious of responsibilities, something like a new humanism, a ethical behavior in a new world, in which we must not avoid contact with the other but living daily meeting of the differences, especially in the urban societies. So, instead being agent of exclusion being part of a collaborative way. In fact, this is the principle of collective existence (civility) by which the idea of modern society was built by French Enlightenment: *liberté, égalité, fraternité*. This does not mean that Educafro ignores the world globalised requires economic competition, but that it is interested in a way of thought that mutual understanding, the elimination of discrimination and high level of education for all Brazilian segments of population will make a better society for everyone. An example of the concern of students of Educafro with others low-income students of Brazil is a web tool they created to make possible to check information about all university program of quotas in the country:
New Ways to Measure Student’s Performance

Evaluations carried out by Educafro are not only related to content but also to the attitude of students. Therefore, students must participate in citizenship activities such as going to Brasília (The Federal Capital of the Country) to discuss with parliamentarians about quota or education funding. A group of student will go to Brasília on March 25th this year to press the debate in the Supreme Federal Court about a law that reserve 50% of all places in public universities for public school students and blacks. Students also must put into practice what they learn, so they are motivated to find cooperative solutions for currently problem like little money to pay public transport to go to classes. Some solutions are to sell snacks, trinkets or t-shirts with African themes at monthly meeting that Educafro regularly promotes. These meetings are also part of the evaluation of a global assessment for each student.

The complete structure of this assessment includes citizenship activities, for example, travel to Brasilia, evaluations of subjects, monthly contribution (about US$ 15), participation in activities to solve collective or individual problem and commitment to participate in the examination in public universities. When a student gets a scholarship in private university he will automatically become a volunteer or teacher.

The great difference of Educafro approach is that education process is not exclusively formed by students and teachers. In many situations, students and teachers share the process of learning with coordinators, militants, college students, professionals of several labor activities and volunteers. This education is very close to the student’s reality. They frequently see people like themselves, who won the social barriers and racial discrimination through education and hard work.

Educafro also developed tools and strategies looking for a holistic development of the whole person by encouraging students to live a simple life with respect for others and nature in a way that the idea of common is more important than the idea of individual. Accordingly, although Educafro is part of Catholic Church, it promotes among the students the respect for Afro-Brazilian Religions like *Umbanda* and *Candomblé*. Unfortunately, in Brazilian Public Schools, students rarely have this
rich and diverse approach, no matter if they are blacks or whites. It’s almost unthinkable a public school in which students learn not only subjects of math, sciences and languages but also citizenship, respect for others, their history approach – in case of blacks, opportunity to face everyday problems and help to find solution – in short, real life. The case of Educafro and its successful results in education shows that public institutions of secondary education in Brazil have a lot to change and to rethink about education in the 21st Century, especially about Afro-descendants – half of the population. If we compare the budget of public education, its structure and locations with the little funds donated voluntary to Educafro, it stay clear that education is more than a matter of financial investments.

The Achievements and the New Picture

In 2003, a decade after the birth of Educafro, the Rio de Janeiro State University (UERJ) was the first higher education institution in Brazil to promote a program of affirmative action for black students – more than a century after the abolition of slavery proclaimed in the same city in 1888. This required a strong participation of members of civil society including Educafro participants. The affirmative action of UERJ was the beginning of a new age for Afro-descendants in terms of education possibility in this country. At the same year, a law (Lei nº 10.639) forced the inclusion of History of Africa and Culture of Afro-descendants in primary and secondary schools – private or publics – something that in the 1960’s the black movement had already strongly stressed: “in Brazil, there’s no teaching of History of Africa or History of African outside the continent” (Nascimento, 1978, p. 154). In 2005, began the program University for all (PROUNI), in which Educafro participated with the first draft. Educafro leaders say they had presented this draft to the previous Federal Government Fernando Henrique Cardoso (1995-2003) but it only was accepted by Lula Government in 2004. In fact, the macroeconomic stabilization in early 21st Century was favored by the consolidation of “Plano Real” in 1990s – an economic program led by President Cardoso who finally controlled inflation of prices since 1980s. The economic stabilization also allowed a better picture for Afro-descendants in the country.

Since then, Educafro has played a central role in discussions about affirmative action in Brazil. The entity has often discussed these issues in a national scale. The more frequent argument is that Afro-descendants still have the worst education and that it’s impossible to the country to be a really developed and sustainable nation while half of its population is living in bad education conditions, bad security and bad working. On the other hand, Educafro always discussed with important newspaper, like “Folha de São Paulo” and “O Estado de São Paulo” that the huge part of the black population has been criminalized or excluded, having its future denied by a silent action that still persist between some important segments of society.

Despite bad statistics of premature deaths and bad public education, it seems that paradoxically Afro-descendants in Brazil have never seen a period of hope and great expectations. The economy is under control, the growth rates of the country are sufficient to maintain the jobs and salaries like a long time ago people did not see. Statistics show that about 30 million have abandoned poverty in the Lula Government (2003-2010) and migrated to a new social class, the called “Classe C” – a lot of them are Afro-descendants. In 2011, the economic class C was about 54% of the population, their income was about US$ 850 per month. Even the poorest classes D and E had an income near of US$ 700 per month. Around 44% of all Brazilians had access to internet, although 86% of classes D and E had not yet (O Observador, 2012).

The new steps of Educafro are to create new possibilities to amplify hope and better education to Afro-descendants and poor white students through web tools. The entity has already formed a
franchising to enlarge the index of inclusion of Afro-descendants in marked labor. The most important is that their understanding of education includes contents, ethic behavior, and respect for others, living with the difference, good job and hope – not by chance the coordinators of Educafro are Franciscans.

Conclusion

This paper analyzed the new circumstances of education in Brazil for the Afro-descendants after the appearance of affirmative actions in the beginning of 21st Century and showed the leading role of Educafro in this state of affairs. The methodology of Educafro has innovated by join contents, citizenship, humanism values, technology and hope as tool to include the poorest segments of population in higher education. The philosophy of Educafro has similarities with other NGO worried with the destiny of new generations of African-descents out of Africa, like National Association of Black Supplementary School in United Kingdom or other in Brazil – Geledés: Institute of Black Woman, Uneafro Brazil and others. It’s undeniable that blacks still suffer the worst living conditions in Brazil. Besides that, the long battle of Afro-descendants throughout the history of this country starts to show more concrete outcomes in large scale. Educafro is part of the struggle that toppled in combat countless others Afros.

References

Information and Communication Technology (ICT) Availability and Utilization in Management of Secondary Schools in Kaduna State, Nigeria

Oluwadare Adegbemile

Department of Educational Foundations, Federal College of Education, Zaria, Kaduna State, Nigeria

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Abstract

The study investigated the availability and utilization of ICT facilities in the management of secondary schools in Kaduna State. The study adopted the descriptive design survey type. A 20 item questionnaire titled Information and Communication Technology Facilities Availability and Utilization Questionnaire (ICTFAUQ) was designed for data collection. 46 respondents out of the 50 principals of the sampled schools completed the questionnaire properly. This amount to 92% return rate. Tables, frequency counts, mean scores and standard deviation were computed to answer the research questions. The independent t – test was used to test the two null hypotheses at 0.05 level of significance. The study revealed that the available ICT facilities in the State were not adequate in schools and their utilization was a matter of concern. The study further revealed that the views of both the Male and Female Principals on ICT facilities availability and utilization in the management of secondary schools did not differ. It was recommended that Government should as matter of urgency sponsor the training of principals on the utilization of ICT facilities in Educational Management and The Federal and State Ministries of Education should ensure the provision of electricity in every school.

Keywords:- Information and Communication Technology (ICT), Availability, Utilization, Management, Secondary Schools, Kaduna State and Nigeria

Introduction

The emergence of information and communication technology (ICT) has totally revolutionized the way we access, process, store, retrieve and disseminate information within organizations or across the globe. According to Miller and Akume (2009). Information and communication technology refers to the process of gathering accessing and dissemination of data for an enhanced learning Information and communication technology is daily giving rise to new concepts, new ideas and making impact not only in the industries/businesses but also in the education sector. I.C.T. has simplified education through the application of electronics media, internet etc. According to Ndukwe (2006), emphasized that the production and introduction of calculators and computers in the education system worldwide has helped in simplifying teaching and learning in schools, thereby promoting national stability and economic survival. Today, organizations such as educational/research institutions as well as individuals turn to the internet for accurate and up-to-date information, sharing of information, working or trading with various people at different places through the internet, is becoming common practice. The use of computer is continually gaining grounds in many aspects of human endeavors. Educational administrators need to have basic information on student and teacher flows, probably also of school supplies, and how much the system is spending on various inputs, in order to make the most basic resource allocation decisions.
Undoubtedly, ICT has played an important role in improving data collection in educational systems. It has also made these data more widely available to school personnel, parents, and the public at large through central administration Web sites, and in some countries through direct access to central databases by school personnel for effective planning and management of schools.

Education management and development according to Naidu and Jasen (2002) is an intricate process that requires reliable, timely, user-friendly and Campbell and Sellbum (2002) pointed that ICTs can be valuable for storing and analyzing data on education indicators; students’ assessments; educational human and material resources; and cost and finance. They use of computer related technology is particularly helpful in this educational management. Further stressed that school administrators and policy makers can construct different policy options to determine needs and analyze potential consequences. Each scenario can be analyzed and evaluated systematically, not only in terms of educational desirability, but also in terms of financial affordability, feasibility and sustainability over a sufficient period of time to show results, perhaps that was why Ibukun (2003) cautioned that there is no amount of capital injection into Educational System without a change of altitude, better skill acquisition and overt commitment on the part of the teaching force that can produce the much-desired change in school performance. It is not an exaggeration that ICTs have significant contributions to changes in teaching practices, school change and innovations, and community services. Thus, policy makers and school administrators should think in terms of input factors that can work together to observe the right influence of ICT in education. Kozma (2005) opined that matching the introduction of computers with national policies and programs related to changes in curriculum, pedagogy, assessment, and teacher training is more likely to result in greater learning of students and other outcomes. Ohakwe and Okwuanaso (2006) contented that the knowledge of computer application software’s such as spreadsheet, excel, computer – aided design, and database are important skills in schools management. The complexity of secondary school education requires more demand from school administrators in processing of relevant data in an attempt to provide information for the State Teachers Board and other educational agencies for decision making towards quality assurance and transformational development.

**Statement of the problem**

Information and communication technologies are already a vital factor in successful development of education. Recently the Federal Government contended that computer knowledge would be a requirement for some employments, interviews and in some cases promotions. It seems as if ICT facilities might not have been effectively used in the management of schools as it appears some vital areas of application still not attended to in secondary schools in Kaduna State. It is on these bases that the study tends to empirically investigate the availability and utilization of ICT facilities in the management of secondary schools in Kaduna State.

**Research Questions**

For the purpose of carrying this study, two research questions were formulated to guide the study.

1) What is the state of ICT facilities availability for the management of secondary schools in Kaduna State, Nigeria?

2) What is the level of ICT facilities utilization in the management of secondary schools in Kaduna State, Nigeria?
Research Hypotheses

The following hypotheses were formulated to guide the study.

**Ho1:** There is no significant difference in the mean responses of male and female principals on ICT facilities availability in the management of secondary schools in Kaduna State.

**Ho2:** There is no significant difference in the mean responses of male and female principals on ICT facilities utilization in the management secondary schools in Kaduna State.

Purpose of the Study

The purpose of this study was to investigate into ICT availability and utilization in the management of secondary schools in Kaduna State. Specifically, the study sought to:

- Establish ICT facilities availability to principals in secondary schools in Kaduna State.
- Establish whether ICT facilities are utilized in the management of secondary schools in Kaduna State.

Significance of the Study

The study is significant in many ways. The study would provide empirical information on the level of ICT facilities availability to principals in secondary schools in Kaduna State and provide information on the level of usage of ICT facilities by principals in the management of secondary schools in the State. The study would have implications for teacher educators in Colleges of Education and Universities in incorporating ICT assisted courses in Teacher Education Programme.

Research Design

The study adopted the descriptive survey design.

Population

The population of this study comprises of all secondary schools in Kaduna State.

Sample and Sampling Procedure

50 secondary schools were selected by stratified random sampling from all the 118 Senior Secondary Schools located in the state. The principals in the 50 schools were the sample used for this study.

Instrument for Data Collection

A 20 item questionnaire titled Information and Communication Technology Facilities Availability and Utilization Questionnaire (ICTFUAQ) was designed for data collection for the study. Respondents were asked to rate each of the items on 4 point likert scale as follows: Strongly Agree (SA – 4 points), Agree (A – 3 points), Disagree (D – 2 points), and Strongly Disagree (SD – 1 point) were used.
Validity of Instrument

The instruments were given to two specialists in Educational Management for validation with regard to terminology that was used to measure the intent of the study. Their corrections were used in the reconstruction of the instrument.

Reliability of the Instrument

To ensure the reliability of the instrument, a test-re-test technique was employed. A pilot study was carried out by administering the ICTFUAQ instrument at intervals of two weeks on 10 non-participating Secondary School Principals in Sabon – Gari Local Government Area of the State. The reliability index was calculated using the person product moment correlation. A correlation coefficient index of 0.98 was obtained.

Data Collection

After selecting a school for participation in the study, a letter was sent to the principals through their respective Zonal Education Officers with explanation on the nature and importance of the research. The ICTFUAQ was included in a packet that was mailed to the schools. The completed questionnaires were collected personally while others were collected through their respective Zonal Educational Officers. 46 respondents comprising out the 50 principals of the sampled schools completed the questionnaire properly. This amount to 92% return rate. 35 of the respondents were males while 21 were females.

Data Analysis

The statistical techniques for the data collected varied in accordance with the nature of research questions and hypotheses. Tables, frequency counts, mean scores and standard deviation were computed to answer the research questions 1 and 2. The mean of 2.5 was regarded as “Reject” while a mean response on or above 2.5 were regarded as “Accept”. By using The Statistical Package for the Social Sciences (SPSS). The independent t-test was used to test hypothesis 1 and 2. The two null hypotheses were tested at 0.05 level of significance.

Results

Research Question 1

What is the state of ICT facilities availability to principals for the management of secondary schools in Kaduna State?

The result generated from the study is presented in table 1.
Table 1: Means and Standard Deviation Scores of views of Principals on ICT Facilities Availability in Management of Secondary Schools in Kaduna State.

<table>
<thead>
<tr>
<th>S/N</th>
<th>ICT Facilities</th>
<th>Mean</th>
<th>SD</th>
<th>Decision</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>Internet</td>
<td>1.34</td>
<td>0.439</td>
<td>Rejected</td>
</tr>
<tr>
<td>2</td>
<td>Multimedia Projector</td>
<td>1.86</td>
<td>0.431</td>
<td>Rejected</td>
</tr>
<tr>
<td>3</td>
<td>e-mail</td>
<td>1.22</td>
<td>0.342</td>
<td>Rejected</td>
</tr>
<tr>
<td>4</td>
<td>Interactive Radio</td>
<td>1.22</td>
<td>0.342</td>
<td>Rejected</td>
</tr>
<tr>
<td>5</td>
<td>Teleconferencing</td>
<td>1.35</td>
<td>0.448</td>
<td>Rejected</td>
</tr>
<tr>
<td>6</td>
<td>Audio Tapes</td>
<td>1.87</td>
<td>0.432</td>
<td>Rejected</td>
</tr>
<tr>
<td>7</td>
<td>Computers</td>
<td>1.22</td>
<td>0.342</td>
<td>Rejected</td>
</tr>
<tr>
<td>8</td>
<td>Photocopiers</td>
<td>1.15</td>
<td>0.230</td>
<td>Rejected</td>
</tr>
<tr>
<td>9</td>
<td>Handset</td>
<td>1.85</td>
<td>0.849</td>
<td>Rejected</td>
</tr>
<tr>
<td>10</td>
<td>Printer</td>
<td>1.89</td>
<td>0.431</td>
<td>Rejected</td>
</tr>
</tbody>
</table>

Table 1, shows that all the respondents disagreed on the ICT facilities availability in the management of secondary schools Kaduna State. All the 10 items had mean scores below the cut-off point of 2.5. Point on a four-point likert scale.

Research Question 2

What is the level of ICT facilities utilization in the management Secondary schools in Kaduna State? The result generated from the study is presented in table 2

Table 2: Means and Standard Deviation Scores of views of Principals on ICT Facilities Utilization in Management of Secondary Schools in Kaduna State.

<table>
<thead>
<tr>
<th>S/N</th>
<th>ICT Facilities</th>
<th>Mean</th>
<th>SD</th>
<th>Remarks</th>
</tr>
</thead>
<tbody>
<tr>
<td>11</td>
<td>Internet</td>
<td>1.34</td>
<td>0.439</td>
<td>Rejected</td>
</tr>
<tr>
<td>12</td>
<td>Multimedia Projector</td>
<td>1.86</td>
<td>0.431</td>
<td>Rejected</td>
</tr>
<tr>
<td>13</td>
<td>e-mail</td>
<td>1.22</td>
<td>0.342</td>
<td>Rejected</td>
</tr>
<tr>
<td>14</td>
<td>Interactive Radio</td>
<td>1.22</td>
<td>0.342</td>
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</tr>
<tr>
<td>15</td>
<td>Teleconferencing</td>
<td>1.35</td>
<td>0.448</td>
<td>Rejected</td>
</tr>
<tr>
<td>16</td>
<td>Audio Tapes</td>
<td>1.87</td>
<td>0.432</td>
<td>Rejected</td>
</tr>
<tr>
<td>17</td>
<td>Computers</td>
<td>1.22</td>
<td>0.342</td>
<td>Rejected</td>
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<td>18</td>
<td>Photocopiers</td>
<td>1.15</td>
<td>0.230</td>
<td>Rejected</td>
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<tr>
<td>19</td>
<td>Handset</td>
<td>1.85</td>
<td>0.849</td>
<td>Rejected</td>
</tr>
<tr>
<td>20</td>
<td>Printer</td>
<td>1.89</td>
<td>0.431</td>
<td>Rejected</td>
</tr>
</tbody>
</table>

Table 2 shows that all the respondents disagreed on the ICT facilities utilization in the management of secondary schools Kaduna State. All the 10 items had mean scores below the cut-off point of 2.5. Point on a four-point likert scale
Hypotheses Testing

**Ho1:** There is no significant difference in the mean responses of male and female principals on ICT facilities availability in the management of secondary schools in Kaduna State.

The hypothesis was tested using t – test. The result is shown in table 3.

**Table 3:** t – test of Difference in the Mean Responses of Male and Female Principals on ICT Facilities Availability in the Management of Secondary Schools in Kaduna State.

<table>
<thead>
<tr>
<th>ICT Facilities Availability</th>
<th>Principals</th>
<th>N</th>
<th>Mean</th>
<th>S.D</th>
<th>S.E</th>
<th>DF</th>
<th>t Calculated</th>
<th>t Critical</th>
<th>Decision</th>
</tr>
</thead>
<tbody>
<tr>
<td>Male</td>
<td></td>
<td>35</td>
<td>3.10</td>
<td>0.76</td>
<td>0.220</td>
<td>44</td>
<td>1.091</td>
<td>2.021</td>
<td>NS</td>
</tr>
<tr>
<td>Female</td>
<td></td>
<td>21</td>
<td>2.86</td>
<td>0.82</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

P < 0.05

Table 3 shows that the calculated t-test value of 1.091 is less than the criterion value of 2.021 at 0.05 level of significance to accept the null hypothesis of significant difference. This implies that the views of both the male and female principals on ICT facilities availability in the management of secondary schools Kaduna State did not differ.

**Ho2:** There is no significant difference in the mean responses of male and female principals on ICT facilities utilization in the management of secondary schools in Kaduna State.

The hypothesis was tested using t – test. The result is shown in table 4.

**Table 4:** t – test of Difference in the Mean Responses of Male and Female Principals on ICT Facilities Utilization in the Management of Secondary Schools in Kaduna State.

<table>
<thead>
<tr>
<th>ICT Facilities Utilization</th>
<th>Principals</th>
<th>N</th>
<th>Mean</th>
<th>S.D</th>
<th>S.E</th>
<th>DF</th>
<th>t Calculated</th>
<th>t Critical</th>
<th>Decision</th>
</tr>
</thead>
<tbody>
<tr>
<td>Male</td>
<td></td>
<td>35</td>
<td>3.11</td>
<td>0.78</td>
<td>0.219</td>
<td>44</td>
<td>1.918</td>
<td>2.021</td>
<td>NS</td>
</tr>
<tr>
<td>Female</td>
<td></td>
<td>21</td>
<td>2.69</td>
<td>0.80</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

P < 0.05

Table 4 also shows that the calculated value of 1.918 is less than the criterion value of 2.021 at 0.05 level of significance to accept the null hypothesis of no significant difference. This is, the views of both male and female principals on ICT facilities utilization in the management of secondary schools in Kaduna State not differ.

**Discussion**

The analysis of research question one (Table 1) indicated that all the respondents disagreed on the ICT facilities availability in the management of secondary schools Kaduna State. All the 10 items had mean scores below the cut-off point of 2.5. Point on a four-point likert scale. Table 2 further revealed that all the respondents disagreed on the ICT facilities utilization in the management of secondary schools Kaduna State. All the 10 items had mean scores below the cut-off point of 2.5. Point on a four-point likert scale. The findings are not surprising because there could not be
utilization without availability. It is therefore, obvious that lack of these core ICT facilities would make principals ineffective in achieving the laudable goals secondary education in Kaduna State.

The findings of this study revealed that the views of both the male and female principals on ICT facilities availability and Utilization in the management of secondary schools Kaduna State did not differ. Table 3 shows that the calculated t-test value of 1.091 is less than the criterion figure of 0.021 at 0.05 level of significance to accept the null hypothesis of significant difference in the t – test of difference in the Mean Responses of Male and Female Principals on ICT Facilities Availability in the Management of Secondary Schools in Kaduna State. and Table 4 also shows that the calculated value of 1.918 is less than the criterion figure of 2.021 at 0.05 level of significance to accept the null hypothesis of no significant difference in the the t – test of difference in the Mean Responses of Male and Female Principals on ICT Facilities Availability in the Management of Secondary Schools in the State. These findings agreed with Ibukun (2003) who affirmed that there is no amount of capital injection into Educational System without a change of altitude, better skill acquisition and overt commitment on the part of the teaching force that can produce the much-desired change in school performance and no wonder Ohakwe and Okwuanaso (2006) contented that the knowledge of computer application software’s such as spreadsheet, excel, computer – aided design, and database are important skills in schools management.

Conclusion

The study revealed that the available ICT facilities in the State were not adequate in schools and their utilization was a matter of concern. The study further revealed that the views of both the Male and Female Principals on ICT facilities availability and Utilization in the management of secondary schools did not differ. Based on the aforementioned findings, it is therefore imperative to conclude that the provision of ICT facilities and proper utilization of information and communication technology in the management of secondary schools would bring teachers and educational administrators into the information age with computer training and with more teacher-oriented, easily accessible data bases that help teachers in their teaching.

Recommendations

Based on the results and findings of the study, the following recommendations would go along way to solve the problems of ICT availability and utilization in the management of secondary schools in the state.

1. Government should also sponsor the re-training of principals on the utilization of ICT in Educational Management.
2. Serving teachers should be given the opportunity within a specific period to become ICT in education literate through in service education.
3. Government should ensure the provision of basic ICT facilities in all schools.
4. School principals should involve the parent-teacher associations in the provision of ICT facilities in schools.
5. The Federal and State Ministries of Education should ensure the provision of electricity in every school.
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Kozma, R.B, (2005). National policies that connect ICT-based education reform to economic and social development. An interdisciplinary journal of humans in ICT environment 1(2) 117-


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Measures for Improving the Acquisition of Entrepreneurial Skills in Technology Education by the Polytechnic Students in the South-South States in Nigeria

A.D. Usoro

Department of Vocational Education, University of Uyo, Nigeria

T.C. Ogbuanya

Department of Vocational Education, University of Nigeria, Nsukka, Nigeria

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Abstract

The study sought to identify measures for improving the acquisition of entrepreneurship skills in technology education by the polytechnic students in the south-south states. Structured questionnaire was the instrument used to collect data from the respondents. The population for the study comprised 35 teachers of technology; the sampling technique was of “convenience type”. Data were analyzed through the use of mean and standard deviation while Analysis of variance (ANOVA) was used to test the hypotheses at 0.05 level of significance. The findings of the study revealed that entrepreneurship skills, creative, business techniques were needed in technology education. It was therefore recommended that graduates of technology education should be dedicated to creating a society as their future and fortune would be determined by their abilities and dedication to entrepreneurship skills.

Keywords: Entrepreneurship, Technology education, South-South States, Nigeria

Introduction

Today’s increasingly competitive business environment, shortened product life cycle, global competition, increased market segmentation and re-structured industry creates a unique educational opportunity for students to get a targeted skills for self employment. The Federal Government of Nigeria being aware of the need for technology based environment among the Nigerian citizenry designed Polytechnic to train people who can apply scientific knowledge to solve environmental problems for the convenience of man. Hence they produce mainly middle-level technical workforce for various sector of the economy (Okerie, 2000). In consonance with the objectives of Polytechnic programme in Nigeria, there is need for quality of instruction at all level of education especially to be oriented towards the training and impartation of the necessary skills to individual who shall be self-reliance economically. This implies that the training environment should provide a total transformation of students from a relatively less sophisticated, less mature to a more experience and less dependent student. According to Olowe (2008) teachers of technology at Polytechnic level over the years trained graduates for employment in particular occupation or clusters of occupation. This makes Polytechnic education a unique level of education which equipped students with marketable skills needed for entry into the world of work as employees or as self-employed. Bar-yam, Rhoades, and Sweeny (2000) asserted that the key insight from a
complex demanding environment is to improve methodology in Polytechnic education through
transmitting knowledge with entrepreneurship goal which emphasizes the development of the
individual student for self employment.

However, United Nation Educational Scientific and Cultural Organization (UNESCO) with the
International Labour Organization (ILO) in (2006) agreed that the immense scientific, technological
and socio-economic development as envisaged within the present era should be given
globalization and entrepreneurship education such that Polytechnic education will continue to gear
toward life-long education. Globalization according to Thakur (2006) is a mark of paradigm shift in
both economic/educational thinking. One often hears “The world is a global village” thanks to
narrowing down the geographical distances and barrier in thinking pattern between developed and
developing countries. Globalization from the technological perspective is the fast and significant
technological process in the field of communication, which has permitted entrepreneur to have
access and exchange of information at anytime and from any place in the world

Entrepreneurship could be said to be the process of producing something new, with value by
devoting the necessary time, effort with social risk and resulting reward of monetary and personnel
satisfaction and independence. Obeta (2006) ascertained that entrepreneurship education is the art
of organizing a business opportunity, mobilizing resources and persisting to exploiting that
opportunity. As ascertained by Baldwin (2002) entrepreneurship training is rapidly expanding and
drives job creation with economic growth through accelerating innovation and promoting the full
use of human, financial and other resources. The ability to run a business has been identified as
important in checking graduate unemployment and self-reliance. For this reason all technology
curricular should include entrepreneurship education. The objectives of entrepreneurship education
according to Paul (2005) in Obeta (2006) are to:-

- Provide meaningful education for the youth to be self-reliance and encourage then to
derive profit and be self employed.
- Provide graduates with enough skills that will make them to be creative and innovative in
identifying new business opportunities.
- Provide graduate with enough training in risk management to make uncertainty bearing
more possible and easy.
- Give young graduate training to establish a career in small and medium sized business.
- Provide graduate with training in skills that will enable them meet the manpower need of
the society.
- Stimulate industrial and economic growth of rural and less developed areas.

In addition to these objectives, Baldwin (2002) asserted that there is an array of
entrepreneurial skills for students to be self-reliance. These are:-

Marketing skills: - This involves thinking how to reach the targeted audience for product and
services. This entails understanding what people wants, listening to the people's need and
interacting well with other people.

Financial Resource skills: - This is the ability to handle money well. This includes knowing how
to stretch the limited start-up capital that you have, spending only when needed, identifying the
best pricing structure for your business in order to get the best return for your products and
services.

Self-Motivation skills: - This involves the ability to be self confident with extra drive and
commitment to make sure that you are taking the necessary steps to make your dreams of a
successful business a reality. An entrepreneur must be able to focus energy and hard work toward
each and every step that will make an enterprise a success.
Time Management Skills: - This involves the ability to plan and manage time with a clear idea of the things to be done in a day. The entrepreneur should have the ability to multi-task and prioritize the day’s task.

Administrative Skills: - This involves skills in filling, billing, printing, invoices, collecting, payment, and managing receivables. The entrepreneur contributes his initiative, skills and ingenuity in planning, organizing, and administrating the enterprise.

Innovative Skills: - This is the act of introducing something new. This involves the integration and accumulation of new knowledge; casting a wider net for the discovery of potential opportunities.

Professional Skills: - These are necessary for success in a business. This is obtained in a cooperate arrangement between the school and the industries. This involves code of conduct, customer’s care technique and opportunity recognition.

Practical Skills: - These skills involve the use of tools and equipment to transform materials into product and services. The practical skills provide the students with occupational abilities to ensure self-employment.

Entrepreneurship helps to prepare students to enter the business world with the knowledge and application of balance sheet, income statement, discount cash flow, capital budgeting, opportunity recognition, market segmentation, target market, sales, business planning, public speaking, team work and leadership (Hisrich, Peters, Shepherd, 2008). The starting point of any successful new venture is the basic idea that can be generated internally or externally through various techniques such as creative and business techniques. Creative technique according to Hisrich et-al (2008) is a method of obtaining new ideas, focusing on certain parameter. This is all about trying some techniques with a few colleagues. By practicing creative technique and attitudes, students will gain confidence and skills to build a company. Other creative techniques that allow generation of ideas and stimulation of creativity are:-Brainstorming, problem solving, check list of related questions, free association, free notebooks, and the big dream approach.

Meanwhile, business technique is a written document prepared by the entrepreneur that describes all relevant external and internal elements involved in starting a new venture. It is often an integration of functional plans such as marketing, finance, manufacturing and human resources. According to Krueger (2008) business technique addresses both short term and long term decision such as; where am I now? Where am I going? How will I get there? Does the idea make sense? Will it work? Who is my customer? Does it satisfy customer’s need? What kind of protection can I get against imitation by competitors? Can I manage such business? This implies that business technique provides guideline and structure to management in a rapidly changing market environment. Technology education is a vital pivot in the preparation of an individual to positively fit into the ever increasing complexity of life as self employed but Ogbuanya (1998) and Usoro (2002) at separate findings noted that the story has not really changed partly due to the fact that:-

- The teaching/learning environment has not really supported the practical-based curriculum.
- Intensification of Industrial Training is poor.
- The training tools and equipment are obsolete.
- The training institution are still disseminating skills of the 19th century
- Students are half baked with skills that would have provided them with occupational abilities for self employment.
- Affective domain has not been given a fair place in technology education.

The above limitation is an indicator that there is less emphasis on entrepreneurship education which resulted in lack of self-employment skills as graduate of Polytechnic education are still
roaming the street for white collar jobs, sometimes join kidnapping and militancy business. If there won’t be enough co-operate arrangement between the schools, industries for intensification of entrepreneurship education there is likelihood that the concept of self-reliance as enshrined in National Policy on Education (1998) would not be achieved.

Studies, such as Olewe (2008) and Obeta (2006) have been conducted on the need for proper training in technology education for skill acquisition. Polytechnic education which supposed to equipped students with marketable skills still continues to produce graduates with lack of self-reliance skills. Thus, this study is therefore designed to establish measures for improving the acquisition of entrepreneurial skills among polytechnic graduates in the south-south zone of Nigeria.

Purpose of the study

The purpose of the study is to establish measures for improving the acquisition of entrepreneurial skills in Technology Education by the Polytechnic Students in the South–South States in Nigeria. Specifically, the study sought to:

1. Identify the entrepreneurial skills that would be needed to improve self-reliance among Polytechnic Students.
2. Identify the Creative Techniques that would be needed to improve the acquisition of Entrepreneurial skills among Polytechnic Students.
3. Identify the Business Techniques that would be needed to improve the acquisition of Entrepreneurial Skills among Polytechnic Students.

Research Questions.

The study sought to answer the following research questions:

1) What are the Entrepreneurial Skills that would be needed to improve self-reliance among Polytechnic Students?
2) What are the Creative Techniques that would be needed to improve the acquisition of Entrepreneurial Skills among Polytechnic Students?
3) What are the Business Techniques that would be needed to improve the acquisition of Entrepreneurial Skills among Polytechnic Students?

Hypotheses.

The following hypotheses were tested at 0.05 level of significance:

1. There is no significance difference in the mean rating of Teachers of Technology on the Entrepreneurial Skills that would be needed to improve self-reliance among Polytechnic Students.
2. There is no significance difference in the mean rating of Teachers of Technology on the Creative Techniques that would be needed to improve the acquisition of Entrepreneurial Skills among Polytechnic Students.
3. There is no significance difference in the mean rating of Teachers of Technology on the Business Techniques that would be needed to improve the acquisition of Entrepreneurial Skills among Polytechnic Students.
Methodology

The study made use of survey research design. The design was considered suitable for the study because survey design solicited information from Teachers of Technology on the Entrepreneurial Skill needed for self-reliance among Polytechnic Students.

The study area was south-south geo political zone. The study was conducted at Akwa Ibom State Polytechnic, Ikot Osura and Rivers State Polytechnic, Bori. The choice of these institutions was informed by the fact that these institutions operate National Board for Technical Education Curriculum, with large population of teachers and resource materials needed to carry out the research study.

The population for this study was teachers of technology classified under two groups: group A-comprised of 23 lecturers and group B comprised of 12 instructors. Entire population was used for collection of data for the study, as the population size was rather small.

Sample and Sampling Technique

The population was made up of all teachers of Technology in the two states polytechnic (Akwa Ibom State and Rivers State) of the south-south geo- political zone. Simple Random Sampling Technique was used to select the two poly techniques within the zone. Since the population was small the sampling technique was of the “convenience type.”

Instrument for Data Collection

Structured questionnaire was used to collect the data for the study. The questionnaire items generated contained information gathered from the review of literature. The response scales for the skills needed were as follows: very highly needed=5, highly needed=4, averagely needed=3, moderately needed=2, not needed at all=1, mean=3.00

The instrument that was validated by three experts, two from the department of Vocational Education University of Uyo and one from Vocational Teacher Education University of Nigeria Nsukka. It was trial tested on 20 vocational education teachers who were not part of the main study. The analysis of the data obtained from the testing using Cronbach Alpha formula for internal consistency of non-dichotomous response modes yielded a reliability index .75 for the instrument.

Method of Data Collection

Copies of the questionnaire were administered to the respondents with the help of two research assistants. The completed questionnaires were collect from the respondents by hand after two weeks. A total number of 34 copies of the instrument were correctly filled and returned. It was this number that was analyzed to generate data used for answering the research questions and testing the null-hypotheses.

Method of Data Analysis

The data collected from the respondents were analyzed using mean, standard deviation. The mean of the responses on 5-point scale was 3.00. The lower limit of the scale was 3.50. Thus, any skill item with a mean of 3.50 and above was regarded as needed by technology teachers for use in entrepreneurship training. Any skill item with a mean less than 3.50 was regarded as skills not needed for self-reliance among Polytechnic Students.

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needed for use in entrepreneurship training. The standard deviation was to determine the closeness or otherwise of the opinion of the respondents from the group mean. The one way analysis of variance (ANOVA) was used to test the null hypotheses at probability level of .05 level of significance. Any hypothesis whose calculated t-value was greater than table t-value stands rejected and otherwise accepted with relevant degree of freedom.

Research Question 1

What are the entrepreneurial skills that would be needed to improve self-reliance among polytechnic students?

Table 1: Mean rating of teachers of technology on the entrepreneurial skills needed by polytechnic students for self-reliance.

<table>
<thead>
<tr>
<th>s/no</th>
<th>Entrepreneurial skills for self-reliance</th>
<th>X</th>
<th>SD</th>
<th>RMK</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>Marketing skills</td>
<td>4.10</td>
<td>0.64</td>
<td>Agree</td>
</tr>
<tr>
<td>2</td>
<td>Financial resources skills</td>
<td>4.33</td>
<td>0.63</td>
<td>Agree</td>
</tr>
<tr>
<td>3</td>
<td>Self-motivational skills</td>
<td>4.48</td>
<td>0.76</td>
<td>Agree</td>
</tr>
<tr>
<td>4</td>
<td>Time management skills</td>
<td>3.88</td>
<td>0.79</td>
<td>Agree</td>
</tr>
<tr>
<td>5</td>
<td>Administrative skills</td>
<td>3.98</td>
<td>0.90</td>
<td>Agree</td>
</tr>
<tr>
<td>6</td>
<td>Innovative skills</td>
<td>4.00</td>
<td>0.70</td>
<td>Agree</td>
</tr>
<tr>
<td>7</td>
<td>Creative skills</td>
<td>3.53</td>
<td>0.68</td>
<td>Agree</td>
</tr>
<tr>
<td>8</td>
<td>Professional skills</td>
<td>3.55</td>
<td>0.66</td>
<td>Agree</td>
</tr>
<tr>
<td>9</td>
<td>Practical skills</td>
<td>3.54</td>
<td>0.71</td>
<td>Agree</td>
</tr>
</tbody>
</table>

The data presented on Table 1 above revealed that the nine entrepreneurial skills had a mean range of 3.53 to 4.48 with standard deviation 0.63 to 0.90. This revealed that the entrepreneurial skills were needed by teachers of technology and should be used to improve skills acquisition in technology education.

Research Question 2

What are the creative techniques that would be needed to improve entrepreneurship skills among polytechnic students?

Table 2: Mean rating of teachers of technology on the creative techniques needed to improve entrepreneurship skills among polytechnic students.

<table>
<thead>
<tr>
<th>s/no</th>
<th>Creativity Techniques</th>
<th>X</th>
<th>SD</th>
<th>RMK</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>Provide advice to students about becoming creative</td>
<td>3.88</td>
<td>0.69</td>
<td>Agree</td>
</tr>
<tr>
<td>2</td>
<td>Begin by trying to be creative.</td>
<td>4.33</td>
<td>0.72</td>
<td>Agree</td>
</tr>
<tr>
<td>3</td>
<td>Decide on issue that need fresh thinking.</td>
<td>4.55</td>
<td>0.83</td>
<td>Agree</td>
</tr>
<tr>
<td>4</td>
<td>Experiment with what is best for you.</td>
<td>4.48</td>
<td>0.76</td>
<td>Agree</td>
</tr>
<tr>
<td>5</td>
<td>You don’t have to be related to the problem you trying to solve.</td>
<td>4.45</td>
<td>0.65</td>
<td>Agree</td>
</tr>
<tr>
<td>6</td>
<td>Share your thought with your association</td>
<td>4.10</td>
<td>0.80</td>
<td>Agree</td>
</tr>
<tr>
<td>7</td>
<td>Encourage students as they improve.</td>
<td>4.00</td>
<td>0.74</td>
<td>Agree</td>
</tr>
</tbody>
</table>
Table 2 showed that all the respondents rated all the creative techniques item listed as being relevant to teachers of technology for improving entrepreneurship skills among graduates of technology education. The mean rating for these items ranged from 3.88 to 4.55 with standard deviation of 0.40 to 0.90. This revealed that the creative techniques were appropriate for teachers of technology for improvement of entrepreneurship skills acquisition in technology education.

Research Question 3
What are the business techniques that would be used to improve entrepreneurship skills among polytechnic students?

Table 3: Mean rating of teachers of technology on the business techniques needed to improve entrepreneurship skills among polytechnic students.

<table>
<thead>
<tr>
<th>s/no</th>
<th>Business Technique</th>
<th>X</th>
<th>SD</th>
<th>RMK</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>Define the goals and objectives of the venture</td>
<td>3.58</td>
<td>0.69</td>
<td>Agree</td>
</tr>
<tr>
<td>2</td>
<td>Encourage the students that business technique is essential to launching a new venture</td>
<td>3.51</td>
<td>0.59</td>
<td>Agree</td>
</tr>
<tr>
<td>3</td>
<td>Students should carry out feasibility study to see any barrier to success</td>
<td>3.56</td>
<td>0.65</td>
<td>Agree</td>
</tr>
<tr>
<td>4</td>
<td>Develop attitude in recognizing business opportunity.</td>
<td>3.57</td>
<td>0.85</td>
<td>Agree</td>
</tr>
<tr>
<td>5</td>
<td>If you have any one to review your business plan, let non-disclosure agreement be sign.</td>
<td>4.45</td>
<td>0.65</td>
<td>Agree</td>
</tr>
<tr>
<td>6</td>
<td>Students should specify performance criteria that would be monitored and controlled.</td>
<td>4.20</td>
<td>0.83</td>
<td>Agree</td>
</tr>
<tr>
<td>7</td>
<td>Students should be encouraged to accept risk and failure.</td>
<td>4.09</td>
<td>0.75</td>
<td>Agree</td>
</tr>
<tr>
<td>8</td>
<td>Students should tolerate ambiguity and uncertainty</td>
<td>3.55</td>
<td>0.67</td>
<td>Agree</td>
</tr>
<tr>
<td>9</td>
<td>Students should be encourage to be self regulating and dynamic</td>
<td>4.12</td>
<td>0.49</td>
<td>Agree</td>
</tr>
</tbody>
</table>

Table 3 showed that all the respondents rated all the business techniques item listed as being relevant to teachers of technology for improving entrepreneurship skills among graduate of technology education. The mean rating for these items ranged from 3.51 to 4.45 with standard deviation of 0.49 to 0.85. This revealed that the business techniques were appropriate for teachers of technology for improvement of entrepreneurship skills in technology education.

Hypotheses 1

There is no significance difference in the mean rating of entrepreneurial skills that would be needed to improve self-reliance among poly technique students.
Table 4: summary of ANOVA Calculation for testing null hypothesis 1

<table>
<thead>
<tr>
<th>Source of variance</th>
<th>Sum of squares</th>
<th>df</th>
<th>Mean sum of squares</th>
<th>Calculated F-value</th>
<th>tabulated critical F</th>
</tr>
</thead>
<tbody>
<tr>
<td>Between group</td>
<td>3155.45</td>
<td>2</td>
<td>295.92</td>
<td>23.10</td>
<td>1.90</td>
</tr>
<tr>
<td>Within group</td>
<td>2402.35</td>
<td>33</td>
<td>15.85</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Total</td>
<td>5557.80</td>
<td>35</td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

Table 4 showed that calculated f-value of 23.10 was greater than the critical f-ratio of 1.90 for 33 df at 0.05 level of significance. The null hypothesis of no significant difference was rejected. Thus there is a significance difference in the mean rating of teacher of technology on measures to improve the acquisition of entrepreneurship skills in technology education.

Hypotheses 2
There is no significance difference in the mean rating of teachers of technology on the creative techniques that would be needed to improve the acquisition of entrepreneurial skills among polytechnic students.

Table 5: summary of ANOVA Calculation for testing null hypothesis 2

<table>
<thead>
<tr>
<th>Source of variance</th>
<th>Sum of squares</th>
<th>df</th>
<th>Mean sum of squares</th>
<th>Calculated F-value</th>
<th>tabulated critical F</th>
</tr>
</thead>
<tbody>
<tr>
<td>Between group</td>
<td>1654.02</td>
<td>2</td>
<td>192.65</td>
<td>15.73</td>
<td>1.90</td>
</tr>
<tr>
<td>Within group</td>
<td>1218.85</td>
<td>32</td>
<td>14.11</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Total</td>
<td>2872.87</td>
<td>34</td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

Table 5 revealed that the calculated f-value of 15.73 was greater than the tabulated critical f-ratio of 1.90 for 32 df at 0.05 level of significance. Thus the null hypothesis of no significance was therefore rejected. This indicated that there was a significant difference in the mean rating of the two main groups of respondents on the creative techniques needed to improve the acquisition of entrepreneurship skills in technology education.

Hypothesis 3
There is no significance difference in the mean rating of teachers of technology on the business techniques that would be needed to improve the acquisition of entrepreneurial skills among polytechnic students.
Table 6: summary of ANOVA Calculation for testing null hypothesis 3

<table>
<thead>
<tr>
<th>Source of variance</th>
<th>Sum of squares</th>
<th>df</th>
<th>Mean sum of squares</th>
<th>Calculated f-value</th>
<th>tabulated critical F</th>
</tr>
</thead>
<tbody>
<tr>
<td>Between group</td>
<td>3190.32</td>
<td>2</td>
<td>398.17</td>
<td>45.65</td>
<td>1.90</td>
</tr>
<tr>
<td>Within group</td>
<td>977.29</td>
<td>33</td>
<td>9.54</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Total</td>
<td>4167.61</td>
<td>35</td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

Table 6 revealed that the calculated f-value of 45.65 was greater than the tabulated critical f-ratio of 1.90 for 33 df at 0.05 level of significance. Thus the null hypothesis of no significance was therefore rejected. This indicated that there was a significant difference in the mean rating of the two main groups of respondents on the business techniques needed to improve the acquisition of entrepreneurship skills in technology education.

Findings/Discussion of the study

The following findings emerged from the study based on the research questions and hypotheses tested:

1. The respondents agreed that the skills found in entrepreneurship were needed by teachers of technology to improve self-reliance among polytechnic students.
2. The respondents agreed that the creative techniques were needed by teachers of technology to improve entrepreneurship skills among polytechnic students.
3. The respondents agreed that the business techniques were needed by teachers of technology to improve entrepreneurship skills among polytechnic students.
4. There was significance difference in the mean rating of teachers of technology on the skills found in entrepreneurship which were needed by teachers of technology to improve self-reliance among polytechnic students.
5. There was significance difference in the mean rating of teachers of technology on the creative techniques needed to improve entrepreneurship skills among polytechnic students.
6. There was a significance difference in the mean rating of teachers of technology on business techniques needed to improve entrepreneurship skills among polytechnic students.

Entrepreneurship Skills for Self-Reliance

The findings of the study as presented on Tables 1 and 4 revealed that all the entrepreneurship skills identified by of teachers of technology were needed to improve self-reliance among graduates of technology education. This finding is in consonance with the work of McGrath (1999) that the observed skills will enhance the acquisition of entrepreneurship, hence entrepreneurship education should be pursued vigorously in all tertiary institution offering engineering and technical subjects.
Creative techniques for improvement of entrepreneurship skills

The findings of this study as presented on tables 2 and 5 revealed that creative techniques as identified by teachers of technology were needed to improve entrepreneurship skills among graduates of technology education. This finding is in parripassu with the work of Kruegen (2000) that the creativity techniques with regular innovation in understanding all forces at work within the environment would usher in an improvement of entrepreneurship skills in technology education.

Business Techniques for improvement of entrepreneurship skills

The findings of this study as presented on tables 3 and 6 revealed that business techniques as identified by teachers of technology were needed to improve entrepreneurship skills among graduates of technology education. This finding is in line with the work of Hmieleski, and Corbet (2006) that the business techniques is an important strategy needed to translate window opportunity into a viable business venture. This show that business techniques identify individual morality and behavioural habits that is related and essential of existence in business.

Educational implication of the study

The findings of the study have implication for teachers of technology and official of the state ministry of education as follows:

• The entrepreneurship skills identified in the study would provide a skill oriented activities that will stimulate student’s interest in self-employment venture.
• The graduate of technology education would be self-regulated, self-aware, and self-confident to undertake a business venture.
• Teachers of technology would develop positive attitude and customers’ care plans among the students.

Recommendations

On the strength of the above findings the following recommendations were made:

• Tertiary institution should continue to inculcate and develop proper value for survival of the individual in the society.
• Students should not be afraid to take entrepreneurship risk.
• Students should be encouraged to be creative and innovative.
• Teachers of technology should be re-trained to acquire effective skills in entrepreneurship education.

Conclusion

The outcome of the study was closely related with the major purposes of the study. The study of entrepreneurship has relevance today not only because it helps technology students to better their personal needs but because of the economic contribution of the self employment it offers. Therefore, the skills and techniques identified would equip the students with job and work place skills after graduation thereby helping the students to be self-reliant.
References


Process-Based Teachers’ Refresher Courses and Students’ Acquisition of Science Process Skills in Process-Oriented Physics Lessons

Okon Akpakpan Udoh

Directorate of Continuing Education, Akwa Ibom State College of Education, Afaha Nsit, Nigeria

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Abstract

The study investigated the efficacy of process-based refresher courses on students’ acquisition of science process skills in process-oriented physics lessons, in Abak Educational Zone of Akwa Ibom State. Four hundred (400) SS2 students in eight (8) intact classes were randomly selected and used for the study. The research instrument employed for the study were Refresher Course Instructional Package (RCIP) and a Test of Science Process Skills (TOSPS). The data obtained were analyzed using t-test statistics. Results of data analysis showed that: physics students who were taught process-oriented physics lesson in “mechanics and properties of matters” by physics teachers who were exposed to process-based refresher course acquired observational, manipulative, computational and communicative science process skills significantly higher than their counterparts who received the lesson from teachers who were not so exposed; physics students who were taught process-oriented physics lessons in “mechanics and properties of matter” by physics teachers who were exposed to process-based refresher course, acquired the cognitive science process skills marginally higher than their counterparts who received the lessons from teachers who were not so exposed. It was therefore recommended that teachers at all levels of educational structure should be trained and retrained accordingly.

Keywords: Physics lessons, Science process, Refresher courses

Introduction

Science process skills are the various mental and motor processes, which the scientists use to arrive at new knowledge (Nwana, 2000). These processes are so vital to scientific effort that no knowledge will result if they are not employed. These skills, according to Nwosu (1994) are: (i) Observing (ii) Measuring (iii) Classifying (iv) Communicating (v) Predicting (vi) Inferring (vii) Using space time relationship (ix) Questioning (x) Controlling variables (xi) Hypothesizing (xii) Defining operationally (xiii) Formulating models (xiv) Designing experiment/experimenting (xv) Interpreting data.

Science process skills can be summarized into cognitive, observational, manipulative, computational and communicative. According to Onwioduokit (2002).

Cognitive skills contains variable such as logical reasoning, reflective thinking, synthesizing, applying knowledge and creative thinking …. Observational skill has to do with using sense organs appropriately, observing changes in phenomenal effect as independent, recording of data, detecting inconsistencies or contradictions and detecting common features or characteristics among objects or events .... The sub-skills of manipulative skills include handling of objects, setting up apparatus, modeling eye-hand coordination, experimenting (manipulating variables) and finger dexterity ... Computational skills has to do with abilities
required in quantifying empirical concepts, calculation based on data obtained, graph plotting, making quantitative deductions and being accurate in measurements. The sub-skills of communicative skills involved here include reporting, questioning, answering questions, using appropriate language and drawing conclusion.

Several science educators have advanced the rationale for teaching, learning and assessing science processes. Furley and Harlen (1984) described the process skills as the foundation for both scientific inquiries and development of intellectual skills needed to learn concepts. Bybee et al (1989) identified these skills as having the enduring quality of enabling the individual acquire and process information and solve problems even when the information base changes.

Awodi, (1984) enunciated that science cannot be taught effectively without employing the processes of science, and neither can science be learnt effectively without the use of the processes of science. "The processes of science encourage the active involvement of pupils in the learning process. Rather than being a passive receiver of the knowledge generated by others, he is finding out things, validating knowledge and making discoveries" (Otuka, 1990, p. 191).

The Federal Republic of Nigeria (2004) stated that "science education shall emphasize the teaching and learning of science processes". This policy statement represents a paradigm shift from the traditional, teacher-centred approach to teaching (with it inherent emphasis on rote-absorption of products of science) to the children-centred, interactive learning (with emphasis on effective use of science process skills); and this new trend begs for capacity building through the instrumentality of in-service training of teachers, in the form of refresher courses for teachers.

Inservice training is either a short-term or long-term up-dating course, usually in the form of seminars, workshops and conferences or further studies and meant for teachers in active service (Owolabi and Danusi, 2005). Refresher course is a course designed to keep professionals informed of recent development in their field of knowledge or expertise (Geddes & Grosset, 2005). Zeitler (1981) showed that the training of inservice teachers in process-based learning promotes efficiency in implementing process-based curriculum which (Mohammed, 2007) lays emphasis on guiding students to develop process skills through hands on activities.

Incidentally, in Nigeria, unlike other countries, the retraining of teachers has not received the desired attention from Local, State and Federal Governments. There has not been any systematic attention to update regularly the knowledge and skills of teachers in the light of curriculum changes and wide society (Mohammed, 2007). Considering the cost (in terms of money and time) of retraining, it is necessary to explore the efficiency of a cheaper and faster alternative full-fledged retraining. One of such alternatives is the refresher course, designed and mounted by a process-oriented, specialist teachers on "process-based teaching/learning and students' acquisition of science process skills."

Research Hypothesis

To guide the researcher in conducting the research study, the following null hypothesis was formulated: there is no significant difference in acquisition of science process skills (cognitive, observational, manipulative, computational and communicative science process skills) between physics students taught by teachers who are exposed to refresher course and their counterparts taught by teachers who are not so exposed.
Research Method

Experimental research design was adopted for the study. The population of the study comprised all the senior secondary II (SS2) physics students in Abak Educational Zone (comprising Abak and Etim Ekpo Local Government Areas of Akwa Ibom State). Eight (8) schools were randomly selected, four (4) each from Abak and Etim Ekpo L.G.As. from among school that had SS2 enrolment of at least one hundred and fifty (150) students. Fifty (50) students in intact class were drawn from each of these schools to give a sample size of four hundred (400) students.

Procedure

The four intact classes were, by random process and in equal proportion, assigned experimental and control groups. The two intact classes in the former group were taught by teachers exposed to refresher courses, while the remaining two intact classes in the latter group were taught by teachers who were not so exposed. All four groups of students were taught by their respective physics teachers (here called professional/research assistants) in their respective schools.

To update the professional skills of teachers (research assistant) for the experimental group, in the light of changing emphasis in curriculum, which favour process-based teaching and utilization of science process skills, these teachers were exposed to a packaged refresher course. Designed by the researcher, the refresher course instructional package (RCIP) consisted of three discussion/demonstration sessions, of two hours per session and bordered on: (i) the inquiry nature of physics (ii) the active and inquisitive nature of students (iii) the rationale for teaching/learning science process skills (iv) evaluating science process skills (v) the performance/specific objectives of senior secondary physics curriculum (vi) process-based teaching method, as recommended by the Federal Republic of Nigeria (2004), in the National Policy Education (vii) science process skills and experimental physics (viii) process-oriented lesson notes. (ix) valid (video-taped) process-based lesson delivery. Each participating teacher was earlier given a typed hand-out to this effect.

The four intact classes were taught topics under the unit, "Mechanics and properties of matter". All the students (in groups 1 – 4) were post-tested.

Measuring Instrument

The measuring instrument employed for the study was a Test of Science Process Skills (TOSPS). It consisted of two questions in practical physics (in mechanics and properties of matter). Each question was composed of five (5) parts, each part containing two each of cognitive, observational, manipulative, computational and communicative sub-tasks, to give a total of 20 sub-tasks for the three questions. The question designed were representative of the activities for the process skills concerned.

The reliability of the TOSPS (using coefficient alpha method) was found to be 0.82. The face-validation of the TOSPS was done by a panel of three experienced physics education university lecturers.

Assisted by the research assistants, the TOSPS was administered by the researcher on the 400 SS2 physics students (the four intact classes) in their respective schools as both pretest and post-test. On-the-spot assessment was made. Each question was marked on a total of 100, then a mean across the two questions found for each test.
Results

The results of data analysis are presented in the tables below.

**Table 1:** Pre-test, t-test Analysis of Difference in Acquisition of Science Process Skill between Experimental and Control Groups of Physics Students.

<table>
<thead>
<tr>
<th>Science Process Skill</th>
<th>Group</th>
<th>N</th>
<th>X (%)</th>
<th>SD</th>
<th>Df</th>
<th>t</th>
<th>Decision at P &lt; 0.05</th>
</tr>
</thead>
<tbody>
<tr>
<td>Cognitive</td>
<td>Experimental</td>
<td>200</td>
<td>11.00</td>
<td>3.1</td>
<td>380</td>
<td>1.70 (1.96)</td>
<td>NS</td>
</tr>
<tr>
<td></td>
<td>Control</td>
<td>200</td>
<td>10.50</td>
<td>2.8</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Observational</td>
<td>Experimental</td>
<td>200</td>
<td>13.00</td>
<td>2.5</td>
<td>380</td>
<td>1.77 (1.96)</td>
<td>NS</td>
</tr>
<tr>
<td></td>
<td>Control</td>
<td>200</td>
<td>12.60</td>
<td>2.0</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Manipulation</td>
<td>Experimental</td>
<td>200</td>
<td>14.60</td>
<td>2.6</td>
<td>380</td>
<td>1.90 (1.96)</td>
<td>NS</td>
</tr>
<tr>
<td></td>
<td>Control</td>
<td>200</td>
<td>15.06</td>
<td>2.1</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Computational</td>
<td>Experimental</td>
<td>200</td>
<td>14.47</td>
<td>3.0</td>
<td>380</td>
<td>1.94 (1.96)</td>
<td>NS</td>
</tr>
<tr>
<td></td>
<td>Control</td>
<td>200</td>
<td>14.00</td>
<td>2.7</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Communicative</td>
<td>Experimental</td>
<td>200</td>
<td>15.70</td>
<td>1.8</td>
<td>380</td>
<td>1.58 (1.96)</td>
<td>NS</td>
</tr>
<tr>
<td></td>
<td>Control</td>
<td>200</td>
<td>16.00</td>
<td>2.0</td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

T-value in bracket is critical value; NS = not significant at p < 0.05

**Table 2:** Post-test, Analysis of Difference in Acquisition of Science Process Skills between Experimental and Control Groups of Physics Students.

<table>
<thead>
<tr>
<th>Science Process Skill</th>
<th>Group</th>
<th>N</th>
<th>X (%)</th>
<th>SD</th>
<th>Df</th>
<th>t</th>
<th>Decision at P &lt; 0.05</th>
</tr>
</thead>
<tbody>
<tr>
<td>Cognitive</td>
<td>Experimental</td>
<td>200</td>
<td>54.7</td>
<td>4.1</td>
<td>380</td>
<td>1.77 (1.96)</td>
<td>NS</td>
</tr>
<tr>
<td></td>
<td>Control</td>
<td>200</td>
<td>54.0</td>
<td>3.8</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Observational</td>
<td>Experimental</td>
<td>200</td>
<td>58.0</td>
<td>2.7</td>
<td>380</td>
<td>24.27 (1.96)</td>
<td>S</td>
</tr>
<tr>
<td></td>
<td>Control</td>
<td>200</td>
<td>50.0</td>
<td>3.8</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Manipulation</td>
<td>Experimental</td>
<td>200</td>
<td>60.0</td>
<td>1.9</td>
<td>380</td>
<td>27.73 (1.96)</td>
<td>S</td>
</tr>
<tr>
<td></td>
<td>Control</td>
<td>200</td>
<td>54.0</td>
<td>2.4</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Computational</td>
<td>Experimental</td>
<td>200</td>
<td>62.0</td>
<td>3.1</td>
<td>380</td>
<td>16.93 (1.96)</td>
<td>S</td>
</tr>
<tr>
<td></td>
<td>Control</td>
<td>200</td>
<td>57.0</td>
<td>2.8</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Communicative</td>
<td>Experimental</td>
<td>200</td>
<td>55.0</td>
<td>2.0</td>
<td>380</td>
<td>17.25 (1.96)</td>
<td>S</td>
</tr>
<tr>
<td></td>
<td>Control</td>
<td>200</td>
<td>51.0</td>
<td>2.6</td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

T-value in bracket is critical value; NS = not significant at p < 0.05; S = Significant at p < 0.05

**Discussion of Findings**

The analysis in Table 1 shows that in the pretest, the critical t-value, 1.96 is greater than the calculated t-values 1.70, 1.77, 1.90, 1.94 and 1.59 for cognitive, observational, manipulative,
computational and communicative skills, respectively. This shows that there was no significant difference in the performance of the two groups of physics students. In other words, the experimental and control groups were at the same level of acquisition of the science process skills during the pretest.

The analysis in Table 2 shows that in the post test, at 0.05 level of significance, the critical t-value, 1.96, is less than the calculated t-values: 24.27, 27.73, 16.93 and 17.25 for observational, manipulative, computational and communicative skills respectively. This shows a significant difference in acquisition of the respective science process skills in favour of the experimental group with higher mean percentage values. This implies that physics students taught by teachers exposed to process-based refresher course acquire the respective science process skills significantly higher than their counterparts taught by teachers who are not so exposed. This show-cases the efficacy of refresher courses in raising the capability of teachers to impact science process skills to students. This findings is consistent with that of Zeitler (1981) and Strawitz and Harlen (1987) which showed that the training of pre-service and inservice teachers in process based learning engender increased level of teacher effectiveness in implementing process-based learning.

Further, Table 2 reveals no significant difference in acquisition of cognitive science process skills between experimental and control groups of students, as the calculated t-value (1.77) is less than the critical t-value (1.96) at 0.05 level of significance. The slight higher mean percentage value for the experimental group implies that physics students taught by teachers exposed to process-based refresher course acquire cognitive science process skills marginally higher than their counterparts taught by teachers who are not so exposed. The marginal difference in acquisition of cognitive science process skill between the experimental and control groups of students implies a strong need for a more focused attention on the capacity-building of physics teachers, through inservice training and retraining programmes, in the area of cognitive science process skill. The level of acquisition of skills by students is limited to the teachers’ professional training and competence. Lending credence to this fact, Olorukoba (2007) asserted that,

“Our science teachers should be given opportunity for inservice training to improve upon their professional expertise…. Even the so called trained science teachers need to refresh themselves in order to be current of new and better methods of teaching different topics in their subject areas (p.5).

Conclusion

Based on the findings of the study, the following conclusions are drawn:

1. Physics students who are taught process-oriented physics lesson by physics teachers who are exposed to process-based refresher courses acquire observational, manipulative, computational and communicative science process skills, significantly higher than their counterparts who received the lesson from teachers who are not so exposed.

2. Physics students who are taught process-oriented physics lesson by physics teachers who are exposed to process-based refresher courses acquire cognitive science process skills marginally higher than their counterparts who received the lessons from teachers who are not so exposed.
Educational Implications and Recommendations

The superiority in the acquisition of science process skills (cognitive, observational, manipulative, computational and communicative skills) by students taught by process-trained teachers over those taught by non-process-trained teachers highlights an important issue: the teaching of processes of science in schools should be emphasized. This task is demanding. First, it calls for patience, experience and expertise from the teacher. Secondly, it demands a cultivation of scientific attitudes, some of which are: curiosity, open-mindedness, empiricism, skepticism and parsimony. These qualities do not come by chance. They come by constantly training and retraining of teachers. Teachers do not impact to students what they themselves are deficient in. Teachers at all levels of educational structure should, therefore, be trained and retrained accordingly.

References


Impact of Shipping on Nigerian Economy: Implications for Sustainable Development

Ekpo Imoh Ekpo

School of Maritime Studies, Maritime Academy of Nigeria, Oron, Akwa Ibom State, Nigeria.

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Abstract
It is imperative to explore avenues that exert impact on the citizenry of Nigeria Vis-à-vis an improvement material per capita income, hence, improved material income and standard of living. Shipping as a capital and/or Inland water trade has tremendous impact on the nation’s economy of which the study is aimed at exploring through cargo reservation, transportation and haulage of wet and dry cargo within and outside the Nigerian waterways. The study will invariably invoke, recreate and set in motion the impact and economic opportunities of the Nigerian shipping sector for possible investment by public or private sector, or a combination. The investment climate in Nigerian Shipping Industry is guided by the current National economic development policy which is aimed at promoting strong private sector driven industry with government as the enabler. Nigeria looses a lot of revenue due largely to lack of cargo carrying capacity of Nigerian fleet. Example, the liquefied natural gas (LNG), liquefied petroleum gas (LPG), iron ore, and other bulk cargo is mostly carried by foreign ships. Nigeria cannot afford to toy with the maritime sector due to the linkages between shipping activities and economic development as it is a primary logistic provider. There are opportunities for investment in dry bulk, tankers, liner/container, coastal cruise services, and offshore services if properly harnessed. With Nigeria as a flag state, proper funding and good management will attract foreign ships for registration. Nigerian oil and gas is useless and valueless without shipping. Oil and gas are like Siamese twins. Shipping facilitates movement of oil and gas from point of production to point of need locally and internationally.

Keywords: Shipping, Nigerian economy, Educational system

Introduction
The maritime industry includes all enterprises engaged in the business of designing, constructing, manufacturing, acquiring, operating, supplying, repairing and/or maintaining vessels, or component parts thereof: of managing and/or operating shipping lines, stevedoring and customs brokerage services, shipyards, dry docks, marine railways, marine repair shops, shipping and freight forwarding services and similar enterprises. This paper is primarily concerned with managing and operating shipping lines. Shipping in maritime can be a physical process of transporting commodities and merchandise goods and cargo, by land, air, and sea. It also can describe the movement of cargo by ship from point A to point B, or from port A to port B, or from one country to another.

The maritime industry occupies a very prominent position in the economy of nations all over the world. The industry in its strict sense embraces all the maritime related business activities which take place within the country’s maritime environment. These include offshore economic activities such as fishing, salvage, towage, underwater resources and on-shore economic activities such as port activities, maritime transport (shipping), ship construction, repairs and maintenance activities. Of all these activities, shipping stands out as the greatest boost to a nation’s economic growth and development. This is so because all other maritime activities revolve around shipping.
Due to close linkage between shipping activities and economic development, most nations cannot afford to treat it with levity, hence a conscious intervention needed to ensure that the national interest is protected. (Obed, 2006:44). Shipping as a primary logistics provider is critical in the process of Nigeria's international trade and economic development. As a mode of transport, shipping provides the cheapest and most efficient means of moving large volumes of import and export round the world thereby creating jobs and adding value to the economy. (Ma, 2010:13).

The seminal role played by shipping notwithstanding, Nigeria’s national shipping industry is in crises. This is caused by investment difficulties, management inefficiency and organizational problems among others. The formulation of national shipping policy and the establishment of the defunct Nigerian Maritime Authority (NMA) to implement shipping policies have not been able to fully arrest this deterioration in the productivity of the national carriers in the cargo sharing formula. The Nigerian shipping companies pass this to foreign carriers due to lack of vessels of their own. When a similar trend of decline of the UK fleet was observed in the 80’s, the British government raised an alarm not only on the absolute decline but also the speed of the decline. This has not been the situation in Nigeria, a third world nation.

The situation in Nigeria today is not encouraging because no national carrier has a seaworthy ocean going vessel. The Nigerian shipping industry faces a threat of gradual extinction as the industry tends towards the pre - 1959 period when the shipping business in Nigeria was dominated and monopolized by foreign carriers (NMA, 2006:12).

**World maritime industry.**

The process of navigating or engaging in commerce through various types of navigable waters introduces the related concept of shipping. (Garner, 2009.314) defines shipping as relating to ships, as shipping interests, shipping affairs, shipping business, shipping concerns. Rolins (1980) viewed shipping vessel, as receiving on board a ship for transportation, to have transported by a carrier, to take or draw into a boat, to engage, to serve on a ship. (webster, 2008:587). Shipping involves the art of transporting goods, often termed cargo, from one point to another on any stretch of water. Shipping could therefore be on land also. Shipping business can be said to be one of the oldest businesses in the world. Historically, it constitutes a major source of political power and territorial influence for “he who rules the sea, rules the world” (Mukherjee, 2010:19), a fact underscored by the various conquests of the Egyptians, Turkish, Roman, and Spanish, Greek, Portuguese and British empires.

The story of the shipping industry since the Second World War has been one of ingenuity, professionalism, fabulous profits and some miscalculations. (Ma, 2011:14). Adam Smith, the father of modern economics, viewed shipping as one of the principal stepping stones to economic development. In chapter three of the “Wealth of Nations”, he argued that the central force in a capitalist society is the division of labour and the extent to which it can be practiced depends largely and crucially upon the size of the market. He saw shipping as a source of cheap transport which can open up wider markets to specialization, offering prices way below every other means of transportation (Mshelia, 2002:12).

Historical evidence indicates that, maritime pioneers, explorers, navigators, merchants and sea masters were non-Africans. They discovered sea routes, developed navigational aids and exploited mercantile trade and territories to their advantage. The world maritime industry is operated largely by private business individuals and organized groups. The role of national governments in the industry is limited to creating territorial water limits, developing regulations, enforcement of law and creation of basic infra- and superstructure in some cases. Today maritime industry is
characterized by high and increasing technological innovations in the form of large capacity vessels, high speed inbuilt cargo handling equipment, multicargo compartments, transshipment transfer, highly trained and skilled personnel, trade groups, regional trade zones, cartel links, mergers, harsh competitions and aggressive marketing (Prasad, 2011:7) The state of maritime industry in Nigeria deserves attention.

The Nigerian Shipping Industry- An Overview

Shipping in Nigeria basically started during the second half of the last century via efforts of the foreign shipping lines. Woreman line started as a trading house in Hamburg and developed into a visible shipping company in 1894. Their first ship “Theresa Henrietter” left Hamburg for West Africa on 24th march, 1849. Elder Dempster commenced services in Nigeria in 1892 with their first ship “Fore runner”. This was followed by another British line “Palm line” which came into being after the Second World War. In 1960, Nigerian shipping line joined the trade as a junior. This period marked the formation of the Nigerian National Shipping Line (NNSL) in 1958. This marked the beginning of our national carrier’s participation in sea borne trade from humble beginnings of three second hand vessels, it grew to 12 owned vessels in 1970. By 1977, NNSL contracted to build 12 new vessels which were successfully delivered, making a total of 24 vessels (Iniodu and Ukpong, 2004:39). Today, the ships have all been grounded and some put to scrap due to poor management of the national fleet. However, there has been a renewed interest in the venture due to lack of alternatives to maritime transport.

Factors that Influence the development of Nigerian Shipping Industry

There are three major factors that influence the development of shipping industry in Nigeria; they are lack of capital, poor incentives for investors, poor integrated transport system.

Lack of Capital

Shipping is a highly capital intensive venture whether vessel acquisition is based on ordering or second vessel. Nigeria, with a very low capital formation, makes it difficult if not impossible to mobilize the needed capital for investment in shipping. More so, investment in shipping does not yield quick returns especially as Nigerian investors do not have access to foreign guaranteed loans due to lack of suitable collateral. This makes it difficult for indigenous shipping companies to acquire ships through loan finance from the ship yards.

Poor Incentives for Investors

Modern shipping is highly sophisticated and capital intensive. To this extent, shipping has very high commercial risk. That is why the traditional maritime countries accord shipping very favorable and attractive investment incentives (Fmort 1995:90). In Nigeria, shipping is not accorded similar concessionary fiscal and monetary incentives like countries in developed maritime nations. For example the tax rate applicable to shipping in Nigeria is the same as other businesses. Shipping is not accorded any concessions and it is neither classified as a “pioneer” industry nor does it fall within “agro” industries that enjoy tax free holidays. Under these harsh conditions, investors would prefer less risky businesses. In Greece for instance, (apart from other concessionary measures,) ship owners do not pay tax on income from operation of ocean going vessels of 500 gross tonnage and
above in addition to other concessionary measures. There are also no taxes on dividends (Field studies, Thernamaries shipping company, Athens, Greece).

**Poor Integrated Transport System**

Integrated transport is the transportation of goods under a single contract, but performed with at least two or three different means of transport. The carrier is liable for the entire carriage, though performed by several modes of transport (rail, sea, air, and road). The carrier does not need to possess all the means of transport (Muller, 2011). It is also known as combined transport. Integrated transport is an organ through which logistics supply chain management can function effectively. The legal infrastructure needs to be developed for intermodal transport to be meaningful. There are series of international legislation that affects intermodal transport, but full Implementation has always been a problem in Nigeria.

The physical infrastructure need be developed. Development of railway system, air port and sea port structures/facilities, construction and repair of road network and their interconnectivity will to a large extent improve intermodal transport in Nigeria. The state of infrastructure in the Nigerian transport sector calls for serious attention both from the government and the private sector. The transport sector is a viable area for investment and the Federal government should consider developing a new national transport policy to create a world class transportation system which will in turn improve shipping practice in Nigeria.

**Changes in World Shipping and Impact on Nigerian Maritime Industry**

There are some important developments and changes in shipping which impact on the Nigerian shipping industry, these developments and changes in shipping venture are as follows,

1. **Technological innovations.**

   In the last three decades, there have been accelerated technological innovations in shipping in the area of design and cargo utilization (Ma, 2011:9). This is to make for efficient and cheap transportation of goods in the world trade. Innovations have been recorded in bigger seize of vessels, cellular container vessels, the roll on/ roll off (RORO) and IT which increase the cost of ships to the disadvantage of less developed economies.

2. **Institutional changes in shipping.**

   Latest changes in legislation, code modification, labour conventions in the last two decades make it rather too difficult for compliance for less developed countries and developed countries alike

3. **Impact of liberalization.**

   Certain global policies make it difficult for implementation at the national level. One such is the liberalization by the United Nations Committee on Trade and Development (UNCTAD). Developing economies are ill equipped to embark on it. Some of the policies contain ambiguities at the implementation stage and impact seriously on the national regimes.

4. **Inadequate shipping management skills and experience.**

   As has already been mentioned, the shipping business has become very complex. New shipping arrangements and organizational structure are formed to respond to the emerging trends in shipping. The multimodal transport and short sea transport has placed more responsibility on the shoulders of operators having been given the duty to transport goods through all modes, from origin to destination, and the liability for damage or loss done to goods in the course of carriage (Donor, 2011:11).
Economic Opportunities in the Nigerian Shipping Industry

The investment climate in the Nigerian shipping industry is guided by the current national economic development policy which has the objective of promoting a strong private driven industry with the government as the enabler. Some of the key and specific investment opportunities in the Nigerian maritime sector are;

1. **Dry Bulk Shipping**
   The trade is strong in Nigeria. Domestic demand for grains, fertilizers, sugar, cement salt etc. is supported by importation. This is expected to continue for a considerable period, particularly in the grain market where some agronomic factors do not lend themselves to domestic production.

2. **Tanker Shipping**
   Nigeria being a major oil and gas producing and trading nation, investors in the tanker trade are assured of the full employment of their vessel on a sustainable basis, especially on the affreightment of national cargos. These investments will create robust trade for gas carrier operators. Also, industrial chemicals constitute a major import component of Nigeria’s freight trade. Generally, investment in Very Large Crude Carriers (VLCC), largest ship to transit suez canal (SUEZMAX), Liquefied natural gas/liquefied petroleum gas (LNG/LPG), ultra large crude carriers (ULCC) etc. tankers remains commercially viable for Nigerian crude trade (Elem, 2006:38).

3. **Liner/Container Shipping**
   Nigeria as the oldest trading posts south of Sahara attracts high import trade from major trading nations of the world. The shipping traffic to Nigerian ports carries mainly high valued finished and semi finished containerized goods. It is not only sustainable, but also expanding considerably as a direct outcome of the economic reforms. Similarly, export trade in agriculture, industrial raw materials and semi finished goods are experiencing significant growth as a result of a well structured fiscal regime on export trade.

4. **Coastal Passenger/Cruise Services**
   Passenger service is marginally utilized despite its potentials as a viable alternative to the road mode, especially for coastal taxi of the Niger delta region. Intra sub regional trade and the mobility of citizens in the west African sub region is growing rapidly and is expected to peak with the full implementation of some regional and sub regional economic integration (Elem, 2008:6).

5. **Offshore and Coastal Services**
   Nigeria has huge hydrocarbon resources and is a major player in the world oil and gas. Although economic activities in that area falls within the confines of cabotage trade, which is restricted by law to Nigerians, the cabotage law also provides for partnerships between Nigerians and foreign players where possible to meet the demand.

6. **Ship Finance and Maritime Insurance**
   Vessel financing is still evolving in the Nigerian financial market, largely on account of its peculiar nature. Most operators rely on equity financing, which is hardly sufficient. The operators need well structured and developed ship finance services capable of providing composite funding options to meet the growing demand for financial solutions in the sector.

7. **Port Development**
   The major reforms which are taking place in Nigerian maritime and shipping sector is the deregulation and liberalization of port services to private sector participation. In development, this has subsequently led to the concessioning of the major port terminals in the country to private operators. The country still needs modern and efficiently run port terminals to meet the growing demands of efficient port services. Development in deep sea ports to accommodate the ever increasing draft of modern ships deployed in international haul is another priority investment area.
Nigeria presently has no deep sea port, and the growth envisaged in the economy in the medium to long term would require such a port facility to accommodate the size of ship and volume of traffic.

8. Ship Yards

Investment in the provision of ship yard services is intended to meet the rapidly growing demand for local dry docking facilities in response to the dictates of the cabotage law. Shipyards are necessary to meet the demands of the offshore and coastal shipping services. Investment in this area will lead to expansion in shipping technology. The combined shipyard capacity in the country today is not only limited, but grossly inadequate.

9. Ship Breaking and Recycling

There are no ship breaking and recycling activities in the whole of the African continent despite the high number of scrapped ships and the relics that adorn the inland waterways of African countries. This constitutes navigational hazards as well as threats to safer shipping and cleaner waters. This development makes it compelling those vessels for scrapping anywhere in Africa are towed all the way to Asia. This constitutes a serious economic dislocation from any perspective it is considered. In Nigeria, ship wrecks and scraps are high in numbers and constitute reasonable base feed stock for a scrapping and recycling industry.

10. Reefer Trade

Reefer trade is high and growing in Nigeria. In addition to a high volume of trade in frozen fish and associated sea food, trade in dairy products, fruits, vegetables, and refrigerated foods is significant throughout the year.

11. Pollution Control

As a major oil producer, it is imperative that Nigeria ensures that appropriate surveys are conducted and that areas are mapped out for spill and pollution control. There is also need for reception facilities at ports and terminals to receive oily waters and bilge waters from ships (Prassad, 2010:14). Private investment in the area of technical surveys, provision of reception facilities and general delineation of the nation’s water ways for pollution control and rapid response systems are avenues for possible investment.

12. Search and Rescue

The federal government of Nigeria has articulated a new policy of search and rescue which requires provision of facilities and training to meet the needs. This is aimed at containing distress at sea. This is another area in which the public private partnership is most desired.

13. Cabotage Trade

The cabotage regime came into force on May 1st, 2004. The regime was introduced to strengthen the participation of Nigerians in the economic opportunities created by shipping and maritime activities. Investment in this area accommodates foreign and domestic trade through joint ventures. A broad list of the investment corridors with the domestic shipping market includes:

1. Dry docking
2. Ship repairs
3. Coastal shipping services
4. Trawlers
5. Terminal/jetty infrastructure
6. Offshore construction and fabrication
7. Supply boats to offshore oil fields
8. Crew boats
9. Tug Boats/Anchor handling
10. Diving support vessels
11. Cables/pipe laying vessels
12. Barges/House Boats
13. Dredgers
14. Passengers/ferry services
15. Tourism services

(Element, 2008:24).
Impact of Shipping on the Nigerian Economy

The impact of shipping can be positive or negative, but the positive impact far outweighs the negative impact. On the positive side, shipping provides a host of economic benefits like job provision, aiding export promotion, helping in diversifying the economy, expanding market opportunities for foreign trade by providing competitive services, increasing foreign exchange earnings, opening doors to foreign competition. Trade and the ability to compete in overseas markets are dependent on an efficient, secure and reliable maritime structure. United Nations Committee on Trade and Development (UNCTAD, 2008:1).

Usoro (2005) insisted that shipping should be regarded as the first global industry accounting for about 90% of World Sea borne trade. In spite of the enormous positive impact created, negative impacts also suffice. The environmental issues are still giving the world enough headache. The major environmental impacts are reflected in air quality, dredging, endangered and threatened life species, oil pollution and solid waste explained as follows:

Air Quality

Vessels emit harmful pollutants to the air such as hydrocarbons, nitrogen oxides, (Nox,Sox). Other sources of air pollution from shipping include the release of oxylene, toluene, xylene and other toxins from fuel vapour during loading and unloading of marine tank vessels (Prasad, 2010:14). According to the United States Environmental Protection Agency (EPA), impacts of these pollutants may include adverse health effects such as respiratory and cardiovascular diseases, lung damage, learning impairment and even death. Depletion of the ozone layer, damage to agricultural resources and increase in acid rain are other negative consequences (Donovan, 2006:10).

Dredging:

To maintain safe navigation depths, many harbor channels must be periodically dredged. The sediments contain contaminants which when released pose serious threats to the ecosystem, particularly through bio accumulation in the food chain (Bellefontaine, 2010:16).

Oil Pollution:

Oil released into the ecosystem is a major environmental problem associated with the shipping industry. Large spills occur during transportation through tanker accidents and spills during loading and off loading. Waste water from tank washing, discharge from bilges and engine maintenance are common causes of smaller spills. These are hazardous to human beings and the environment through bioaccumulation of toxins through the food chain. In addition, oil pollution degrades coastal habitats, smothering tidal pools and killing marsh grass (Bellefontaine, 2010:19).

Solid Waste:

All ships produce solid wastes during voyages. Most of these wastes can be legally disposed at sea, as long as they are released at a distance from the shore. Plastics must be properly incinerated on land. Solid waste from shipping enters the environment when cargo is lost at sea or accidentally released during loading and unloading.
Growing the Nigerian Economy through Shipping

The simple measure of any economy is the gross domestic product (GDP) which is defined as the value of goods and services produced in a given year, of which shipping is one (Ojinaka, 2005:50). The operation of a sector such as shipping / maritime has some impact on the economy. Each sectors financial need is covered in the national budget and the contribution of all sectors in a given year makes up the national budget. The maritime sector, if properly harnessed should have an overwhelming positive impact on the GDP and should influence the growth and development of the of the economy through market expansion, opportunities for foreign trade, competition, foreign exchange earnings, and serving strategic national interest (UNCTAD, 2008:15)

Importance of Shipping to the Nigerian Economy

The Nigerian economy is driven by oil and gas exploration, production and sales. Other major contributors are international cargo trade, customs duties, direct taxes and others. In the Nigerian maritime sector, shipping is an indispensable component of the important drivers of the economy (Ugwu, 2006:40).The Nigerian economy is import- oriented but also the biggest oil exporter in Africa. High percentage of Nigeria’s international cargo trade is facilitated by sea carriage.

Nigeria trades about 180 million tons of sea borne cargo per annum. Annual freight paid is about $6.8 billion (#1,088bn). More than 80% of this is earned by foreign firms.

Oil and Gas Production and Exploration

Oil remains the mainstay of the Nigerian economy, contributing about 55% to the GDP, 95% of export earnings and about 70% of governmental revenue.

Since a preponderant proportion of Nigeria’s oil is produced in shallow or deep waters, accessing and maintaining a presence in these areas is facilitated by marine craft such as supply boats, tug boats and barges. These craft are leased on a continuous basis by the oil and gas industry. The total value of freight paid on oil exports amounts to more than $84 million annually, none of which come to Nigeria, as Nigerians do not own any VLCC carrying Nigerian crude oil. The nearest claims of Nigerians are only as commission agents.

Crude Oil Terminals and Grades Produced

There are eight oil terminals in Nigeria from where ten grades of crude oil and condensate are exported. The terminals are in two categories, on-shore and off shore / floating storage vessels. The on-shore terminals are Bonny, Brass, Qua Ibo, Forcados and Escravos. The off-shore/floating terminals are FSO Domy, MV Oloibiri and Antan. The oil terminals, the operators and the various crude oil grades are presented in table 1.

<table>
<thead>
<tr>
<th>Terminals</th>
<th>Crude grades</th>
<th>Location</th>
<th>Terminal operators</th>
</tr>
</thead>
<tbody>
<tr>
<td>1.Bonny</td>
<td>Bonny light and Bonny medium</td>
<td>Eastern zone</td>
<td>Shell</td>
</tr>
<tr>
<td>2.Qua Ibo</td>
<td>Qua Ibo light Oso condensate</td>
<td>Eastern zone</td>
<td>Mobil</td>
</tr>
<tr>
<td>3.Brass</td>
<td>Brass blend</td>
<td>Eastern zone</td>
<td>Nigerian Agip</td>
</tr>
<tr>
<td>4.Antan</td>
<td>Antan blend</td>
<td>Eastern zone</td>
<td>Addax petroleum</td>
</tr>
</tbody>
</table>

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### Classes of Vessels used in Petroleum Export Lifting

There are two main categories of tankers, clean and dirty. The clean tankers are smaller and are used mainly for product trading, while dirty tankers are used in trading crude oil and are larger. There are also smaller dirty tankers used in product trading like LPFO and HPFO.

Crude oil tankers are classified according to their summer Deadweight (SDW). The classes of vessels used in crude oil lifting range from general purpose vessels to ultra large crude oil carriers. The various classes are as follows:

<table>
<thead>
<tr>
<th>VESSELS</th>
<th>SIZE (metric tons)</th>
</tr>
</thead>
<tbody>
<tr>
<td>General purpose (GP)</td>
<td>16,500-24,999</td>
</tr>
<tr>
<td>Medium range (MR)</td>
<td>25,000-44999</td>
</tr>
<tr>
<td>Long Range 1(LR1)</td>
<td>45,000-79,999</td>
</tr>
<tr>
<td>Long Range 2(LR2)</td>
<td>80,000-159,000</td>
</tr>
<tr>
<td>Very Large Crude Carrier (VLCC)</td>
<td>160,000-319,000</td>
</tr>
<tr>
<td>Ultra Large Crude Carrier(ULCC)</td>
<td>320,000-549,999</td>
</tr>
</tbody>
</table>

*Source: Guis Obaseki (1999:5)*

Flag states and shipping companies prefer large ships (12teu, 14teu and lately 18teu) TEU (twenty equal unit) for shipment due to economy of scale

### The Future of Nigerian Shipping

It is unfortunate that many developing countries of the world, particularly in the West African sub region, have not been very successful, active and prominent in the theater of world shipping. There is need for a deliberate attempt to seek for the future of world shipping and the integration of Nigeria in the serious global shipping initiative. It is glaring that the economy is externally dominated. About 85% of the nation’s external trade, import and export, passes through the nation’s seaport. Since 1990’s, not less than 2,500 vessels are recorded in the Nigerian seaports annually (Badejo, 2001:40).

An examination of the existing shipping structure in Nigeria reveals the need for implementation of drastic measures that will help to re direct shipping fortunes in the future. The following factors are major issues that could re-shape the country’s shipping future;

1. The need to reform the shipping policy to be responsive and dynamic to the future of shipping in the 21st century,
2. The need for intermodal transport coordination and integration within the context of the total transport concept (TTC) and supply chain management (SCM),
3. Port specialization leading to the adoption of the load centre strategy or the husband spoke approach to shipping,
4. Merger formation and cooperation of shipping companies versus competition,

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(5) Specialized vessels to be introduced, particularly tanker vessels and others,
(6) Use of Incoterm and IT facilities should be improved upon,
(7) Improvement in the training of manpower in the maritime training institutions. For example, the maritime academy of Nigeria Oron should be upgraded to a degree awarding status with improved and modern simulators and equipments for the training of seafarers in keeping with standard training certification and watch keeping (STCW 78/95) and a consistent supply of labour to the Nigeria and other flag states.

Conclusion

Shipping is of great importance to the Nigerian economy. One of the major challenges facing Nigeria at present is that it has no meaningful participation in the Shipping Industry on which Nigeria depends, both for Exports and Imports. Practically all Nigerian Exports are shipped “Free on Board” (FOB), while its Imports are shipped ‘Cost Insurance and Freight’ (CIF). The Oil rigs in Nigerian waters and the vessel which service them are owned and controlled by foreigners. Even the vessels involved in Coastal trade and Inland Waterways covered by the Cabotage Act are mostly controlled by foreign Ship owners.

Statistics show that Nigeria pays over $2 billion in freight each year to foreign ship owners either to export oil or to import finished goods. Presently Nigeria derives no benefit from the freights incurred. A substantial amount of foreign exchange is being lost to foreign shipping operators and owners. From available records the value of vessels engaged in the three areas of Nigeria’s shipping business namely: Offshore rigs and support vessels, coastal Cabotage trade and import and export trade, amount to well over $20 billion. The consensus is that if Nigeria can gain a foothold in its Shipping Industry, the potential would be enormous. If shipping activities are properly harnessed, given the few suggestions made in this paper, shipping will be ranked next to oil in foreign exchange earnings if not overtake it. Oil is a wasting asset, but shipping is eternally relevant. Shipping is indispensable in economic growth and development of Nigeria with its attendant positive multiplier.

Port facilities should be upgraded and modernized for quick discharge of consignments as a ship owner is more interested in timely turnaround of his ship for next engagement and avoid lay time and lay days.

Recommendations

Sequel to the write-up on Nigeria shipping industry, the following recommendation are to be proffered

(1) The maritime sector is capital intensive. A maritime bank should be established to provide the needed finance with government guarantee,
(2) A combined monetary and fiscal incentive scheme should be formulated,
(3) A deliberate policy should be put in place to encourage indigenous participation,
(4) The Cabotage regime should be faithfully implemented to make for more involvement of local operators within the flag state,
(5) Maritime policy makers should understudy developed economies with a view to duplicating some features and toe their own path of growth,
(6) Increased investment in shipping infrastructure and maintenance by indigenous operators to continually meet an acceptable international standards,
Investors should be encouraged to go into shipping with incentives like tax free holidays, government guaranteed loans and protection against foreign dominance.

Government should and must do all it can to curtail foreign dominance and the repatriation of profit for a more sustainable economy.

Government should encourage production of exportable goods for maximum deployment of ships as most ships coming into Nigerian waters sail back on ballast.

Unnecessary delays, sharp practices and scam should be drastically reduced at the ports for shipment to move freely thereby making just in time (JIT) supply chain management to be effective in Nigeria.

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Instructional Television Utilization for the Enhancement of Cognitive Learning Skills: Implication for the Challenges in Science Education

Ofili, Glory Osaretin

Dept of Educational Technology and Library Science
Faculty of Education, University of Uyo.
Akwa Ibom State, Nigeria.

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Abstract

This paper focused on Instructional television utilization for the enhancement of cognitive learning skills. The study adopted a quasi experimental design with two intact classes comprising of forty students each randomly selected for the study. Two hypotheses were postulated to guide the study. Physics achievement test was developed and validated with a reliability coefficient of 0.71. Data were analysed using t-test statistics and result revealed there was a significant difference in the use of instructional television on the performance students while there was no significant difference in the performance of male and female students in the experimental group. Recommendations were made that instructional television should be used in teaching Physics due it abstract nature.

Introduction

Science is the bedrock of technological development of a nation. To this end the Federal Government of Nigeria has continuously placed emphasis on the study of science and technology. In spite of the importance of science in national development, students’ performance in science subjects is not encouraging as has been observed. One of the challenges in science education is poor performance. West African Examination Council (WAEC, 2010) revealed that achievement of students in Biology, Chemistry and Physics in the May/June examinations has been on the decline. Of the total number of students who sat for the examination in the year under review, the total percentage of candidates who attained credit level (grade 1-6) and above in Biology, Chemistry and Physics averaged 26%, 34.92% and 22.61% while 53.13%, 43.79% and 45.49% respectively failed out rightly. The poor performance of students in science subjects has been attributed to poor teaching methods in the form of excessive talking, copying of notes and rote learning of text book materials adopted by teachers. The challenge of not having well equipped laboratory for practical experience has also contributed to poor performance in Physics (Ibe, 2006)

The students are exposed to expository rather than inquiry methods of science instruction which does not predispose students to experimentation (Anulobi, 2009). However, the National Policy on Education (NPE, 2004), stated that the aim of education is to inculcate in the child, the spirit of inquiry and creativity through the exploration of nature. That education should equip students with skills with which to live effectively in our modern age of science and technology. In line with above objective, the aim of science is to develop in students the ability to think critically in order to make reasonable decisions in issues that concern them, and the society at large. Research findings in education tend to indicate that the instructional materials adopted by teachers do
influence the cognitive, psychomotor and affective outcomes of the students. Instructional materials perform specific functions in learning such functions ranges from simplifying teaching to making teaching effective. One of such instructional materials is the use of instructional television. This is the production of television programmes directed towards helping students achieve specific instructional objectives with a specific target population. This is referred to the transmission of educational programs through the television which can be stored in Video, CD and DVD. They are used to teach students repeatedly till they gain mastery on what is being taught. They could be employed in topics where teacher find it difficult to carry out practical. The main basic tasks of teaching are to release, instigate, and increase such motivational processes and forces like interest and the need, desire and wish to learn. Instructional television could be used to achieve this aim.

Cognitive skills are mental and reasoning skills that are used in the process of acquiring knowledge (Ekanem, 2006). They include skills such as perception, reasoning, memory and concentration. The stronger these skills the easier it is for learners to learn. It is generally accepted that individuals acquire cognitive skills more rapidly from visual images. Instructional television could help learners to think in alternative ways, to question, to discover, to be motivated and enthusiastic. Instructional television does not only state a fact, by oral speech, it also shows that fact, illustrates it and within a few moments puts it in a larger context of knowledge related to the fact. These various kinds of elaboration via sound tracts and pictures increase the memorial of the basic statement or information. It has been found that the duplication of sensory channels and the richness of elaborated information are features that contribute to the ease of learning and also to the strength of retention of verbal information. According to Adeosun (1998) educational instruction television is used to achieve objective which are supposed to reflect in the attitude of the learners. Okworo (2008) and Ofili (2003) found out that television and video tape influence learners they help to stimulate learning and enrich the class with material not likely to be available in real classroom setting. According to these scholars they make learning more permanent and offer experiences, which promote self-activity on the part of the students. Perception is very important in learning. In perception we use our sense to comprehend objects and events. The eyes, ears and nerve endings are some of the means through which perception takes place. Instructional television is a useful tool that helps to stimulate our perception it increases our hearing and seeing simultaneously and hence our cognitive skills. Also nothing absolutely new is ever learned effectively with one exposure. Repetition helps to reinforce and extend learning and to make the learned information more enduring. Instructional television allows repetitive viewing the learner can view well until the concept being taught is well understood Rubin (1979). The need for participation and practice was one of the facts emphasized for enhancing learning. According to him a widespread of criticism of audiovisual materials and methods is lack of participation and overt practice. Instructional television could be used to increase the participatory role of a learner and facilitate thinking and problem solving as well as stimulate other learning activities. Practicing a response in an instructional television setting increases retention Singer (1979). The greater the association the more likely the material or concept being presented will be retained. They make the teacher’s role more that of a guide, the organizer and stimulator and less that of a dispenser of information.

Gender issues and academic achievement has become a very important issue among researchers. Some studies are in view that boys perform better than girls and vice versa. Females and males could do well in science if exposed to similar conditions Nsofor (2001). According to this view, sex difference has little or no effect on performance in sciences. Essentially achievement by learners depend more on personal effort. This implies that high achievement could be traced to the individual’s efforts.

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Statement of the problem

Studies have shown that the prevalent conventional method presently being used in schools by Physics teachers is not effective enough and as such, have not helped students in understanding and retention of Physics contents Eshiette (2009). Considering the abstract nature of the subject, the inability of teachers to carry out practical in some aspect of the subject and the need to improve on the achievement of students it becomes necessary to explore other method that could be used for effective delivery of this subject. This study therefore, investigates the effect of instructional television on the academic performance of Physics students.

The purpose of study

The purpose of study was to determine the effect of instructional television on:
- The academic performance of senior secondary school Physics students
- To determine if Instructional television has any gender effect on Physics students

Research questions

How does the use of instructional television influence the performance of physics students?
Is there any gender influence on the performance of students taught with instructional television?

Hypotheses

The following hypotheses guided the study at 0.05 level of significance:
- There is no significant difference in the mean achievement scores of students exposed to instructional television and those exposed to the Conventional method.
- There is no significant difference in the mean achievement scores of male and female students exposed to Instructional television.

Research method

The study adopted a quasi experimental posttest, treatment-control design with two schools randomly selected. From each school, two intact science classes of forty students each were used for the experimental and control group making a total of eighty students. A video containing electromagnetic waves content was used for the experimental group while the control group was taught using the lecture (chalk and textbook) strategy. One researcher made instrument Physics Achievement Test (PAT) was used to collect data which was a 20-item multiple choice questions. This was validated with a test-retest reliability of 0.72. Mean scores and t-test were used for analysis of data collected.

Findings

Research Question One

How does the use of instructional television influence the performance of physics students?
Table 1: Mean and standard deviation of students’ scores from pre-test and post-test

<table>
<thead>
<tr>
<th>Group</th>
<th>N</th>
<th>Mean Pretest</th>
<th>Mean Posttest</th>
<th>Mean Gain</th>
<th>SD</th>
</tr>
</thead>
<tbody>
<tr>
<td>Control</td>
<td>50</td>
<td>27.21</td>
<td>47.14</td>
<td>19.93</td>
<td>7.04</td>
</tr>
<tr>
<td>Experimental</td>
<td>50</td>
<td>28.28</td>
<td>62.28</td>
<td>24.00</td>
<td>5.83</td>
</tr>
</tbody>
</table>

Table 1 shows that the mean of the experimental group 62.28 with standard deviation of 5.83 is greater than that of the control which is 47.14. This shows that the experimental group who were exposed to instructional television performed better than the control group.

Research question two

Is there any gender influence on the performance of students taught with instructional television?

Table 2: Mean and standard deviation of male and female students’ scores from post-test

<table>
<thead>
<tr>
<th>Group</th>
<th>N</th>
<th>Mean Pretest</th>
<th>Mean Posttest</th>
<th>Mean Gain</th>
<th>SD</th>
</tr>
</thead>
<tbody>
<tr>
<td>Male</td>
<td>57</td>
<td>27.21</td>
<td>62.53</td>
<td>7.09</td>
<td>8.27</td>
</tr>
<tr>
<td>Female</td>
<td>43</td>
<td>26.45</td>
<td>61.95</td>
<td>7.06</td>
<td>8.59</td>
</tr>
</tbody>
</table>

Table 2 shows that the mean scores of males and females students exposed to Instructional television are 62.53 and 61.95 respectively which is basically the same. This shows that Instructional television enhanced the performance of male and female students alike.

Hypotheses 1
- There is no significant difference in the mean achievement scores of students exposed to instructional television and those exposed to the Conventional method.

Table 3: Comparison of the Post-test Scores of the Experimental and Control Groups.

<table>
<thead>
<tr>
<th>Group</th>
<th>N</th>
<th>X</th>
<th>SD</th>
<th>df</th>
<th>t</th>
<th>Sig.</th>
</tr>
</thead>
<tbody>
<tr>
<td>Control</td>
<td>50</td>
<td>47.14</td>
<td>8.8</td>
<td>49</td>
<td>12.16</td>
<td>.143</td>
</tr>
<tr>
<td>Experimental</td>
<td>50</td>
<td>62.28</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

The result of the analysis in table 3 shows a significant effect of the use of Instructional television on the academic achievement of Physics students (t =12.16, df =49, with .143 level of significance) this means t-cal was statistically significant at P< 0.05. This shows that the experimental group performed better than the control group. Based on this, the null hypothesis was rejected meaning there is a significant effect of use of Instructional television on the academic performance of the experimental group. This difference can be attributed to the use of Instructional television in the teaching since all other conditions were the same for both groups.

Hypotheses 2

There is no significant difference between the academic achievement of males and females in the experimental group.
Table 4: Comparison of the Post-test Achievement Scores of Males and Females in the Experimental group.

<table>
<thead>
<tr>
<th>Group</th>
<th>N</th>
<th>X</th>
<th>SD</th>
<th>df</th>
<th>t</th>
<th>Sig.</th>
</tr>
</thead>
<tbody>
<tr>
<td>Male</td>
<td>57</td>
<td>62.53</td>
<td>2.55</td>
<td>49</td>
<td>1.49</td>
<td>0.00</td>
</tr>
<tr>
<td>Female</td>
<td>43</td>
<td>61.95</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

The result of the analysis as shown in table 4 reveal there is no significant difference in the performance of male and female students with t value of 1.49 and df of 49 at .000 level of significance. Therefore the null hypothesis was upheld meaning that there is no significant effect of use of Instructional television on academic performance of male and female Physics students in the experimental group. This study showed that gender has no effect on the use of Instructional television in the learning process.

Discussion

The result of the study revealed that there is a significant difference in academic achievement of students taught with Instructional television and those taught without it. This study support the finding of (Anulobi 2009; Eshiet 2009; Okworo 2008; Enemugha 2008). They discovered that the use of instructional television in teaching science subjects enhance students academic achievements. They affirmed that they are effective in teaching owing to their ability to captivate and hold attention as well as provide for direct interaction of students with what is learnt. The use of Instructional television is effective and result in more learning in less time and better retention of what is learnt, especially when the material being learned was repeated to the learners. They provide experiences not easily obtained through other media and contribute to the efficiency, debt and variety of learning. The study also shows that the use of Instructional television is not gender dependent this is in agreement with studies of Okworo (2008) and Eshiette (2009) but negate the study of Enemugha (2008) who discovered male performed better than females when taught Biology with Instructional television.

Conclusion and recommendations

The use of Instructional television improved the academic achievement of students in the teaching and learning of Physics. There was no gender effect in the use of Instructional television. The following recommendations are made

- Instructional television should be used in the teaching of physics to enhance learning
- Government and non-governmental organizations should equip our schools with Instructional television media facilities for effective teaching
- Curriculum developers should expand the curriculum to include the use of Instructional television especially in topics where practical cannot be carried out for effective teaching
- There should be provision for regular supply of electricity in schools at all times

References


West African Examination Council (2010). May/ June Chief Examiner’s Report
Perception of Teachers Towards the Utilization of Information and Communication Technology (ICT) in Teaching Introductory Technology in Secondary School in Delta State in Nigeria

Umunadi, E. Kennedy

Department of Technical and Business Education
Delta State University, Abraka-Nigeria

Doi:10.5901/jesr.2012.v2n7p124

Abstract
The advent of information and communication technology (ICT) worldwide in this new millennium has posed some challenges to different spheres of education and other human endeavour. It is therefore imperative to look at the adequacy and utilization of ICT equipment for teaching introductory technology subject in Delta State. Furthermore, the study was conducted to ascertain the adequacy and utilization of ICT equipment in urban and rural secondary school in Delta State of Nigeria. Two major research questions and two hypotheses guided the study. The target population for the study consisted of all the principals and introductory technology teachers teaching the introductory technology subject in Delta state secondary schools. 86 respondents completed the questionnaires used for data collection and analysis. The mean, standard deviation and the Z-test were the statistical tools used for data analysis. The hypotheses tested at 0.05 level of significance. The findings revealed that: (1) There is inadequate information and communication technology equipment in terms of number required for teaching introductory technology subject in the urban and rural secondary schools in Delta State.(2) The available ICT equipment for teaching the introductory technology subject are not utilized in the urban and rural secondary schools in Delta state. In these areas of the introductory technology subject: (a) Technical Drawing (b) Metal work (c) Woodwork (d) Electricity /Electronics (e) General Workshop ICT equipment were not used. The study also showed the significance difference in the mean responses of adequacy and use of ICT equipment in urban and rural secondary school students in Delta state. The researcher gave these recommendations and suggestions based on the findings of the study as follows: The government should provide infrastructure and training for the integration of information and communication technology in advancing knowledge and skills in introductory technology subject. This suggestion is to actualize the National Policy on Education (FRN, 2004). The computers and other equipment for the use of ICT for teaching introductory technology should be supplied by the government and so on.

Keywords: Teachers, information, Communication, Technology, Nigeria

Introduction

The present application of information and communication Technology (ICT) to all the activities of the world confirmed the fact that the use of ICT is becoming an indispensable tool for modern advancement in knowledge and skills. With the present day computerizations of activities in education, the focus is now on introduction of ICT in schools at all levels (Folayan and Ibrahim, 2000). The inclusion of ICT in our education and the National Policy on Education is highly necessary as we launch into the new millennium and targeting the millennium development goals. World Bank (2000) defined information technology as the integration of computer technology mainly in the form of internet and information management system. Cox (1999) pointed out that information and communication technology as well as all that is involved in gathering and
processing information using modern communication technologies such as computers and other related equipment so that the services generated can reach all that desired reasonable cost and in good time to the overall benefit of mankind.

The training of youth in the schools aimed at equipping them with useful skills and at improving the knowledge in their desired areas of study at the end of training. To facilitate effective training of the youth to acquire knowledge and skills, it is the desire of the government to integrate ICT in our education systems. FRN (2004) government stated that necessary infrastructure and training for the integration of ICT in advancing knowledge and skills in Nigeria should commence immediately in our institutions. The federal Government has set up a body known as National Information Technology Development Agency (NITDA) and the purpose according to (Enweremadu, 2001) of establishing this agency is to integrate internet into educational process, produce 500,000 professionals in the information technology network and employ the merging technology of satellite communication to provide access to the internet.

World Bank (2002) stated that when computer is properly integrated into a broader educational program would help to improve the academic training for science and technology education and holds out the opportunity to revolutionize pedagogical methods and expand access to quality of education. There is need to brace up to the new challenges and systems of education through the development and use of ICT in junior secondary school which is at the level of acquisition of knowledge and skills in education (Okoli, 2005). Introductory technology is one of the pre-vocational subjects in the junior secondary school curriculum in Nigeria that can provide the youth with such training.

Information And Communication Technology

The following issues represent challenges to improving information and communication services:

- High cost of private provision of power.
- Lack of local manufacture or maintenance of information and telecommunication equipment and the lack of local software development capacity.
- Absence of effective and efficient postal communication.
- Inadequate human capacity and indigenous technical know how.

Policy thrust: Under NEEDS the government is committed to the following policy thrusts;

- Develop and sustain a modern information and communication technology to support private sector-driven growth and economic development and to improve the quality of life and reduce the level of poverty significantly.
- Improve access to internet connectivity, and raise the level of computer usage and literacy.
- Facilitate the development of a national multimedia super corridor, including provision of appropriate incentives for private sector involvement.
- Aggressively promote information and communications technology as an instrument of mass education, growth, and development.

Targets and strategies. NEEDS sets the following targets:

- Increase telephone density to one telephone per 25 people.
- Make telecommunication accessible to a wider range of Nigerians, regardless of where they live.
- Develop a national communications and telecommunication backbone, including a national multimedia super corridor.

NEEDS adopts the following strategies:

- Use a combination of fiscal and financial incentives to encourage private sector investment in service provision in the industry.
Enforce intellectual property rights, and promote entrepreneurship, training, and partnerships.

Pursue a local content policy in the manufacture of electrical and electronic equipment and communications and telecommunications equipment, including handsets, accessories, and components.

Facilitate access to special financial support through NEXIM, the Bank of industry, SMEIES, and other institutions, for private sector-driven wireless telephone and internet connectivity development in rural areas.

Foster an enabling environment for developing software capacity.

Provide incentives to develop industrial parks in information communications technology.

Introductory Technology Subject in Junior Secondary School

The subject normally starts in the first year of the junior secondary courses. The introductory technology subject, which comprises of areas like woodwork, metalwork, technical drawing, electricity/electronics and Auto-mechanics, is taught in the urban and rural secondary schools in Delta State. The federal ministry of education prepared the curriculum which a solely for the teaching of the subject. While the award of certificates at the junior secondary school level in Delta State is usually carried out by the Delta State Ministry of Education. The examination is usually taken at the end of the first three years of secondary education. For effective implementation of introductory technology government shall provide necessary infrastructure and training for the integration of ICT in the school system in recognition of the role of ICT in advancing knowledge and skills in the modern world (FRN, 2004).

Statement of the Problem

The introductory technology is practical and activity oriented subject. It is because of the practical oriented activities that the subject requires integration of ICT in the teaching of the subject. The introductory technology core curriculum introduced in 1985, is implemented in secondary schools across the country disregarding the use of ICT. Okebukola (1995) pointed out that computer studies and computer-based education are now planned to be key elements in the implementation of the National Policy on Education, which started in the year 1988. It was noticed that computer based ICT education were not be integrated into the implementation program of the secondary school in Nigeria. The success of the implementation of this curriculum will largely depend on different factors like the adequacy of equipment and effective utilization of ICT in the urban and rural secondary schools. Now there is no evidence relating to the adequacy ICT equipment and how effectively they are utilized in urban and rural secondary schools in Delta State for the successful implementation of the curriculum in this area of study.

White (1987) stated that in the past educational institutions, including secondary schools used computers only for administrative purpose such as pay roll, inventories, order forms, attendance records for the most part teachers and students were not involved. This was because computers were very largely and far too costly to be placed in schools but now microcomputers are becoming common in the classrooms. Hence, the need arises to look at teacher perception and views towards the utilization of ICT in teaching introductory technology in secondary school.

Hypotheses

H03: There is no significant difference in the mean of urban and rural junior secondary school students with adequate information and communication technology equipment for teaching introductory subjects.
Ho$_2$: There is no significant difference in the utilization of urban and rural junior secondary information and communication technology equipment for teaching introductory subjects.

**Research Questions**

1. How adequate are the ICT equipment and facilities for teaching introductory technology subject in urban and rural secondary schools in Delta State.
2. How effective is ICT equipment utilized in teaching the introductory technology subject in urban and rural secondary schools in Delta State.

**Purpose of the Study**

The purpose of this study was to assess the adequacy and utilization of ICT equipment for teaching introductory technology in urban and rural secondary school in Delta state. Specifically, the study is to:
- Verify the adequacy in terms of number of available ICT equipment in urban and rural secondary school in Delta State.
- Ascertain whether the available ICT equipment are properly utilized in teaching the introductory technology subject in the urban and rural secondary schools in Delta State.

**Population**

The target population for this study consists of 120 introductory technology teachers and 115 school principals in Delta State who are currently teaching and working respectively in the secondary school. There are 115 secondary schools in Delta State that are currently offering introductory technology subject, according to ministry of education, examination and standard branch, Asaba Delta State.

**Sample**

The researcher seeks to obtain a proportional sample that represented the schools and the staff of the chosen school. The sample of the study was selected using the stratified random sample design for the school. The proportional procedure was carried out by dividing the schools into strata of urban and rural schools then random sampling was carried out on each urban and rural stratum to select the sample size of the schools.

In this way 30 schools, 15 representing the urban and 15 representing the rural schools, was drawn proportionally from the population. In a like manner 60 introductory technology teachers 2 teachers from each of the 30 schools and 30 principals, one principal in each of the 30 schools was randomly selected. In all the researcher have 30 secondary schools and 90 staff were involved in the study.

**Validation of the Instrument**

The researcher subjected items of the instrument to face validity by giving the initial pool of the instrument to research professionals and five experts in the field of industrial technical education from the department of vocational teacher education, university of Nigeria, Nsukka and three experts from the department of Technical and Business Education, Delta State University, Abraka.
Method of Data Collection

Questionnaire was the major instrument of the study. The researcher personally administered the questionnaire to the respondents and also employed the assistance of experts in the field of industrial technical education especially introductory technology teachers to help administer the questionnaire in distance locations. Such teachers on behalf of the researcher distributed, collected and returned the completed questionnaire copies to the researcher. The reliability of instrument was established using a test retest reliability procedure. The Pearson’s product-moment correlation coefficient was employed to correlate the scores. A coefficient of internal consistency (r=55) was computed and result confirmed the questionnaire items appropriate for the study.

Method of Data Analysis

The raw scores obtained from the responses in each questionnaire items was computed and tabulated into frequency table. In analyzing the data collected the researcher used the mean, standard deviation and Z-test statistic. The mean and standard deviation was used assess the adequacy and use of ICT equipment for teaching introductory technology in schools raised in the research questions. While the Z-test statistics was used to test the hypotheses formulated for the study.

Results

Research Question 1

How adequate are the ICT equipment and facilities for teaching introductory technology subject in urban and rural secondary schools in Delta State?.

Table 1. Mean responses of adequacy of ICT Equipment for teaching Introductory Technology subject in Urban and Rural Secondary Schools.

<table>
<thead>
<tr>
<th>Ranking of items</th>
<th>Area of Introductory Technology</th>
<th>Urban Schools N=42</th>
<th>Rural Schools N=44</th>
<th>Grand Mean</th>
<th>Remarks</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td>XU</td>
<td>SDU</td>
<td>XR</td>
<td>SDR</td>
</tr>
<tr>
<td>1</td>
<td>Woodwork</td>
<td>2.70</td>
<td>0.42</td>
<td>2.16</td>
<td>0.33</td>
</tr>
<tr>
<td>2</td>
<td>Technical Drawing</td>
<td>2.24</td>
<td>0.26</td>
<td>2.32</td>
<td>0.28</td>
</tr>
<tr>
<td>3</td>
<td>Metal Work</td>
<td>2.18</td>
<td>0.31</td>
<td>2.02</td>
<td>0.28</td>
</tr>
<tr>
<td>4</td>
<td>Electricity/Electronics</td>
<td>1.98</td>
<td>0.12</td>
<td>1.81</td>
<td>0.22</td>
</tr>
<tr>
<td>5</td>
<td>General Workshop</td>
<td>1.88</td>
<td>0.08</td>
<td>1.61</td>
<td>0.17</td>
</tr>
</tbody>
</table>

Data presented in Table 1 shows that Woodwork received the mean score of 2.70 (urban ) and 2.16 (rural). Technical Drawing received the mean of 2.24 (urban) and 2.32(rural). Metal Work received the mean (X=2.18) Urban and mean (X=2.02) Rural. Electricity/Electronics received the mean of (1.96) Urban and (1.81) rural. Then the general Workshop received the mean ( X=1.88) urban and rural (1.61) rural. The ranking column showed the woodwork items as having the highest grand mean rating of (X=2.43) followed closely by Technical Drawing items with rating of (X=2.28) then followed by the metal workshop equipment with rating of (X=2.10) while Electricity Electronics

~ 128 ~
received the rating of (X= 1.89) and General workshop equipment received the lowest grand mean rating of (X=1.75), as shown on the Table 1, none of the items has upto a grand mean rating of X=3.50 adequacy. The remarks above are based on ranking of grand mean and cut-off point of 3.50 on a five-point scale.

**Research Question 2**

How effective are the available ICT equipment utilized in teaching the introductory technology subject in the urban and rural secondary schools in Delta State?

**Table 2.** Mean responses of Extent of utilization of ICT Equipment for teaching Introductory Technology subject in Urban and Rural Secondary Schools.

<table>
<thead>
<tr>
<th>Ranking of items</th>
<th>Area of Introductory Technology</th>
<th>Urban Schools N=42</th>
<th>Rural Schools N=44</th>
<th>Grand Mean</th>
<th>Remarks</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td>XU</td>
<td>SDU</td>
<td>XR</td>
<td>SDR</td>
</tr>
<tr>
<td>1</td>
<td>Technical Drawing</td>
<td>2.65</td>
<td>0.25</td>
<td>2.57</td>
<td>0.31</td>
</tr>
<tr>
<td>2</td>
<td>Woodwork</td>
<td>2.76</td>
<td>0.43</td>
<td>2.06</td>
<td>0.28</td>
</tr>
<tr>
<td>3</td>
<td>Electricity/Electronics</td>
<td>2.25</td>
<td>0.21</td>
<td>1.94</td>
<td>0.71</td>
</tr>
<tr>
<td>4</td>
<td>Metal Work</td>
<td>2.35</td>
<td>0.36</td>
<td>1.82</td>
<td>0.16</td>
</tr>
<tr>
<td>5</td>
<td>General Workshop</td>
<td>2.25</td>
<td>0.32</td>
<td>1.66</td>
<td>0.14</td>
</tr>
</tbody>
</table>

The data presented in table 2 shows that Technical Drawing attracted the mean of 2.65 (urban) and 2.57 (Rural). Woodwork equipment received the mean score of 2.76 (urban) and 2.06 (rural). Electricity/Electronics received (X=2.25) urban and (Xr= 1.94) rural. Metalwork equipment received 2.35 and 1.82 mean of urban and rural respectively. General workshop equipment received the mean of (Xu=2.25) in urban and the (Xr =1.66) in rural.

The ranking column showed that the Technical Drawing equipment items as having the highest grand mean rating of (X=2.61) followed closely by woodwork equipment items with rating of (X=2.41) then followed by the Electricity/Electronics equipment items with rating of (X=2.10) while metal work equipment items received the rating of (X=2.09), as clearly shown on the Table 2, none of the equipment items has upto a grand mean rating of X=3.50 on the rating scale. The remarks above are based on ranking of grand mean and cut-off point of 3.50 on a five-point scale.

**Table 3** Summary of Z-test Analysis on Adequacy of ICT equipment for teaching Introductory Technology Subject

<table>
<thead>
<tr>
<th>Location</th>
<th>Mean X</th>
<th>SD</th>
<th>df</th>
<th>Z-test</th>
<th>Z-critical</th>
<th>Remarks</th>
</tr>
</thead>
<tbody>
<tr>
<td>Urban</td>
<td>2.19</td>
<td>0.32</td>
<td>84</td>
<td>3.24</td>
<td>1.98</td>
<td>Reject Ho1</td>
</tr>
<tr>
<td>Rural</td>
<td>1.98</td>
<td>0.28</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

Table 3, the figures represent mean and standard deviation of the mean responses of teachers obtained from the junior secondary schools. The calculated values fall in the rejection region.
Formulated hypothesis, which states that there is no significant difference in the mean responses on the information and communication technology equipment for teaching urban and rural students in Delta State was rejected, because the calculated value falls on the rejected region. \( Z_{\text{calculated}} = 3.24 \) which is greater than \( Z_{\text{critical}} = 1.96 \) at 0.05 level of significance with the degree of freedom \( df=84 \). The statement implies that there is a significant difference in the mean responses of the urban and rural teachers on the adequacy of information and communication technology. The null hypothesis rejected and its alternative was accepted.

Table 4 Summary of Z-test Analysis on the Utilization of ICT equipment for teaching Introductory Technology Subject

<table>
<thead>
<tr>
<th>Location</th>
<th>Mean X</th>
<th>SD</th>
<th>df</th>
<th>Z-test</th>
<th>Z-critical</th>
<th>Remarks</th>
</tr>
</thead>
<tbody>
<tr>
<td>Urban</td>
<td>2.45</td>
<td>0.24</td>
<td>84</td>
<td>6.82</td>
<td>1.98</td>
<td>Reject Ho2.</td>
</tr>
<tr>
<td>Rural</td>
<td>2.01</td>
<td>0.35</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

Table 4 represents the figures showing the mean and standard deviation of the mean responses on the utilization of information and communication technology by teachers of junior secondary schools. The calculated values fall in the rejection region. The null hypothesis is therefore rejected on the bases of the \( Z_{\text{calculated}} = 6.82 \) which is greater than \( Z_{\text{critical}} = 1.98 \) at 0.05 level of significance with the degree of freedom of 84. The alternative hypothesis was then accepted which states that there is a significant difference in the responses of urban and rural teachers on the utilization of information and communication technology (ICT) for teaching introductory technology in junior secondary school in Delta State.

Discussion of the Findings

The findings of this study were discussed in line with research questions and hypotheses formulated. The findings of the first question revealed that there is inadequate ICT equipment in terms of number required for teaching the subjects in the urban and rural secondary school in Delta State. In an effort to answer in details the research question one, the principals and introductory technology teachers were asked questions on the issues of adequacy of the ICT equipment and their responses tended more to uniformity. The teachers accepted that their schools were not supplied computers by the government.

Achuonye (2002) emphasized that ICT should be part and parcel of the teacher training programme so that the graduating teachers will in turn integrate them in their daily teaching process. It can be seen therefore that research question one which seek to ascertain whether ICT equipment in terms of number required for teaching the introductory technology subject in urban and rural secondary school has a negative responses against the adequate ICT equipment.

The findings of the research question two on how effective are the available ICT equipment for introductory technology subject are utilized in teaching the subject in urban and rural secondary schools in Delta state. The respondents pointed out that electricity light from the Power Holding Company (PHCN) of Nigeria is not always available or supplied to the urban and rural areas where it is needed for the teaching of introductory technology subject. The perception of teachers towards the utilization of ICT in teaching introductory technology subject was not encouraging, and the results shows that the teachers disagreed, most of the items were not utilized because they agreed...
that ICT is too cumbersome and the situation lead to the student graduates acquisition of theoretical knowledge in different areas of introductory technology subject.

Elliot (1998) stated that other part of information and communication technology is telecommunications. The technology used to bring about the communication of voice and data signals over some geographic distance. The term information technology (IT) assumes not only the presence of computing technology but also the organization of information systems into networks, through the application of telecommunication technology. Abindube (1999) pointed out that the use of computer requires acquisition of practical skills, which must be properly communicated to learners, and most of the teachers lack these skills and this leads to their low interest in computer utilization.

The hypothesis tested revealed that there is a significant difference in the mean responses of the urban and rural introductory technology teachers on the adequacy of information and communication technology equipment for teaching the subject. To actually make the picture clear and to address the issues, one may want to side and support the idea stated in the work that the urban schools with cyber café facilities in town has inadequate equipment than the rural schools counterpart with inadequate ICT equipment.

As rightly pointed out by the introductory technology teachers showed that effective implementation of introductory technology subject can also be made or achieved by urban and rural students taught with adequate ICT equipment when made available. In addition, the government on the other hand is putting up workshops and installing the (ICT) equipment in various part of the country and institutions for the purpose of adequately equipping them with necessary equipment and introductory technology materials and facilities (Olorunselu, 1999).

The second hypothesis findings revealed that there is a significant difference in the mean responses on the utilization of information and communication technology equipment for the teaching of introductory technology subjects in urban and rural area in Delta state. There is a significant difference in the mean responses of urban and rural teachers on the use of ICT equipment for teaching introductory technology subject in JSS in Delta State. Ezekwe (1990) made his contribution towards the promotion of science (ICT) equipment utilization and technology management of materials in Nigeria. He stated that it is through the utilization of ICT and science materials that meaningful achievement can be attained in introductory technology subject. Agunbiade (2000) stated that practical aspect of technical skills forming has been generally ascribed to the global shortage of competent technologist in different areas. The failure of the strategies of (ICT) adopted in Nigeria to alleviate the problem is blamed on lack of equipment, computer facilities and time constraint.

Another possible reason of the discrepancy in the responses of the urban and rural introductory technology teachers is that the urban students are exposed to private cyber café existing in towns. The respondents agreed that the (ICT) equipment were used by students in urban and they are exposed to the use of computers in the cyber café in town than their rural school counterpart. This might account for the discrepancy between the responses of the urban and rural teachers on the utilization of ICT equipment. In this way the hypothesis (H02) testing and seeking to know whether there is a significant difference in the mean responses of urban and rural school teachers on the utilization for teaching introductory technology subject yielded alternative results to the stated hypothesis. In this regard, the findings revealed that there is a significant difference in the utilization of ICT equipment in urban and rural areas secondary school for teaching introductory technology subject.
Conclusion

It was the purpose of this study to find out whether there is adequate ICT equipment for teaching introductory technology and to ascertain how effective the ICT equipment utilized in teaching the introductory technology subject in the urban and rural secondary schools in Delta State. It was as well as the purpose of this study that the findings of the research shall be used to suggest the possible solution to the Delta State government where the (ICT) equipment are not available, inadequate and where available they are not properly and effectively utilized in teaching introductory technology in Delta State. The government from review of literature on the use of ICT for teaching introductory technology subject places high premium on this issues of the use of ICT on teaching introductory technology subject.

Among the major short falls observed from the investigation of the schools. It was discovered that there are schools where the ICT equipment are not existing at all and the teachers are not even literate in the field of ICT as a result the ICT equipment are not utilized in teaching the students the subject in such schools. It is therefore hoped that other researchers, the government in the state as well as educational body and planners in their efforts to find out the necessary implementation problems of ICT equipment utilization for the teaching of introductory technology programme as well as to resolve such problems. The government should show enough interest and ways of providing a lasting solution to the inadequate, lack of ICT equipment for teaching introductory technology subject enumerated as the findings and utilize the findings on ICT for the growth, progress of ICT and utilization for teaching introductory technology subject.

Recommendation and Suggestions

(1) The industries, non-governmental agencies and private enterprises should provide ICT, equipment, workshops, generators, steady power supply of Electricity light for effective teaching and learning in secondary school in Nigeria.

(2) Companies, government and other international organization should provide fund and take the responsibility of the provision of the ICT equipment and computer system programme to improve the poor state of instruction in secondary school.

(3) The government should post minimum of three trained ICT experts and technical teachers to the secondary schools to enable them make effective use of the available ICT equipment and seek the advice from qualified teachers for effective implementation of the subjects.

(4) Supervisors and inspectors from ministry of education should be sent to the JSS to ascertain the degree of utilization of the ICT equipment and ICT programs and ICT provided by the government and other private organization.

(5) Computers, equipment, tools gadgets provided by the government should be installed in different JSS to enable the teachers use ICT for teaching during the practical class. The rehabilitation of the Secondary schools buildings and provision of ICT, equipment and facilities should be carried out to improve the learning standard.

References


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Evaluation of Wood Fuel Exploitation and its Relative Consumption Pattern in Kaduna Metropolis

Ojo, O.S., Okonkwo, M.C., Oladele, O.N., Jayeoba, W.A., Suleiman, R.A. and Yakubu, M.

Department of Forestry Technology, Federal College of Forestry Mechanization, Afaka, Kaduna State, Nigeria
Department of Vocational Studies, Federal College of Forestry Mechanization, Afaka, Kaduna State, Nigeria
Trial Afforestation Project, Kaduna State Secretariat, Nigeria
Ministry of Environment, Kaduna State Secretariat, Nigeria

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Abstract

It was discovered through an on-count method that a total of 1908 vehicles transport fuelwood where 964 were Lorries, 636 Trucks and 308 cars were recorded for 3hrs per day and in 12 weeks. Also, 100 respondents each agreed that a lorry or truck is utilized per week and 40 respondents, cars. Therefore, a linear correlation using Pearson’s product-moment correlation coefficient analysis shows there is no significant relationship between fuelwood exploitation and its relative consumption in Kaduna metropolis (Ho: P₁ = P₂ (or P₁ - P₂ =0). Where the t value showed 6.314 at df = 1 and α = 0.05 and the calculated value shows 1.136 has no correlation between exploitation and consumption pattern of the sample data. Therefore, from this study it was found that fuelwood exploitation has a technique that is basic for sustainable utilization and it ensures a safe environmental standard unlike fossil fuel components in the environment.

Keywords: Fuelwood, transportation, Utilization, Consumption, Environment and Safe.

Introduction

The burning of wood is currently the largest use of energy derived from a solid fuel biomass. Fuelwood can be used for cooking and heating, and occasionally for fueling steam engines and steam turbines that generate electricity. Fuelwood may be available as firewood, charcoal, chips, sheets, pellets, and sawdust. The most important sources of fuel, which are the necessities for mankind, are fuel wood (charcoal and firewood), petroleum and peat. Of these, wood makes an outstanding fuel as it is 99% flammable if completely dry (Hill, 1952; Kochhar, 1998). The particular form used depends upon factors such as source, quantity, quality and application. Sawmill waste and construction industry by-products also include various forms of lumber tailings. Some consider fuelwood bad for the environment; however this is not the case if proper techniques are used. One might increase carbon emissions using gas powered saws and splitters in the production of firewood, but when wood heat replaces carbon-producing fuels such as propane, heating oil or electricity from a coal-burning plant, then wood burning has a positive impact on the carbon footprint.

One of the major and most renewable natural resources available to the earth and man at large is forest and its products. It was the earliest utilizable natural resources until now that other resources have sufficed human needs. There is more to wood consumption than just its local utilization and it initiated the basis of industrialization. Demand for firewood, including from
woodland species, can be reduced by increasing the efficiency of firewood use, as well as by increasing the use of alternative fuel sources, such as plantation timbers and manufactured fuels. In Kaduna metropolis, there are a number of Bakeries and large canteens, which are the major target as far as fuelwood is concerned. Many consumers depend on locally baked bread which is cheaper and affordable to the common masses. Also, fast local food restaurants meet the instant need for food available in areas of the metropolis. The aforementioned depend mainly on fuelwood consumption on daily and large basis.

Increase in the efficiency of firewood use is likely to reduce the emission of greenhouse gasses. While there are significant uncertainties about greenhouse gas emissions from fossil burning. In our various homes under various operating conditions, in general the more efficient use of firewood will have greenhouse benefits. Overtime, there is evidence to prove that there will be change in climate, the distribution of climax plants formation than occurred in historic period, and still continues. It was also discovered that there had been such changes in recent theological period. It was shown that there might have been climatic fluctuations in West Africa, but believed that there is no circular climatic trend and the evidence came from historical files. He pointed out that the distribution of Northern Nigeria vegetation in 1822 – 1824 by Denham and Clapaton indicated conditions like those of today. From this one will attribute any shift southwest from human activities.

The geological data that is, the fact remains; fossil, soil, geomorphologic development point to the existence in tropical Africa of web period when the evergreen forest extended from beyond its present limit.

Natural Phenomenon

The geo-distribution of national resources can be argued giving the indices of more fossils to the Southern regions because of the cloud formation. The dense nature of the atmosphere can curtail the emissions unlike the Northern region aridity would result to a faster deterioration of the climate. Therefore, wood burning can be adopted as soon as alternative firewood is promoted as one of several commercial products from landscape regeneration programs.

Climate change, attributed to human-induced emission of greenhouse gases into the atmosphere, is widely recognized as having potentially serious impacts on the global environment. Since the industrial revolution, atmospheric CO2 concentrations have increased from approximately 280 mmol mol\(^{-1}\) in 1750 to 365 mmol mol\(^{-1}\) at present, and will exceed 700 mmol mol\(^{-1}\) by the end of the present century if emissions continue to rise as predicted (IPCC 2001). In Europe, warming has been detected in the form of an increased mean annual air temperature of between 0.38°C and 0.68°C since 1900. Further increases of as much as 2.8°C above the 1990 levels have been redirected by 2100 using climate models (EEA 1998). There is now little doubt that climate is warming on a global scale, but change at a local level may be more variable and subtle and therefore more difficult to detect (IPCC 2001). One approach to assessing effects of climate change at a local level is through establishing the relationships between developmental processes in living organisms (phenology) and seasonal climatic conditions and using these relationships as indicators of ambient climate. Phenology is the study of the timing of periodic biological events in the animal and plant world as influenced by the environment (Schwartz 2003). Records of long-term phonological observations on trees, such as the dates of leaf unfolding, flowering, leaf discoloration and leaf fall, provide historical information to indicate how plants have responded to variations in climatic conditions. There has been interest for many years among natural historians in the recording of phenological events, particularly across Europe.
For example, the Royal Meteorological Society established a phenology network in 1875 (Sparks et al. 2000a) and Finnish phenological records go as far back as 1748 (van Vliet and de Groot 2001). Despite changes in recording methods since the initiation of these programmes, the importance of these historic records as indicators of environmental and climate change is now well established (Sparks et al. 2000a) and examination of long-term phenological data sets has provided measures of biological responses to climatic variation (Sparks and Carey 1995). However, interpretation of these data records, in terms of identifying the exact causal relationship between climate and development, and extrapolation to larger geographic regions presents a challenging problem for environmental modelers (Schwartz 1999).

The standard of living of man has been a major concern since forest became restricted to its optimum utilization and the exploration of fossil products. This has shown that a great repulse to the relationship between man and the forest that is, man is gradually losing understanding with the forest and his environment. Also, there are only few benefits from the national treasure as it takes superiority over other resources and sources of income, giving the need to revitalize the fuelwood systematics and the world from preventable disaster.

Wood Energy

Energy is a limiting commodity for many communities in the developing world, and the rural communities in Africa are highly dependent upon wood as their primary energy source (Arnold & Jongma, 1978). For example, in South Africa 12% of the total energy consumption of the country (i.e. domestic and industrial) is extracted from wood source, while in countries such as Burkina-Faso, Ethiopia, Mali, Tanzania and Zambia, this figure is in excess of 90% (Basson, 1987; Osei, 1993). The few states that have been done on that wood utilization have achieved issues concerning sustainable utilization (Lieigme, 1983; Shackleton, 1993; Osei, 1993), history of legalized protection of wood resources (Cooper & Swart, 1992), economics of fuelwood usage, and future energy demand (Basson, 1987; Osei, 1993). No study in Africa has examined the impact of fuelwood removal on components of biodiversity other than the wood resources itself, even though it has been recognized that this practice may have consequences for conservation (Cooper & Swart, 1992; Joshua & Jonsingh, 1994).

Effective conservation practice demands the maintenance of biological diversity and ecological processes within the constraints of sustained resources utilization. Few areas in indigenous forest in Southern Africa are free from exploitation, both commercial and subsistence, and extensive fragment of natural forests has occurred.

Roundwood used in energy production is comparable in quantity with industrial roundwood. Energy production using wood includes traditional heating and cooking with fuelwood and charcoal, heat and power production in the forest industry (usually using processing wastes such as black liquor from pulp production) for own use or sale to others, and heat and power generation in specifically designed power facilities. Statistics on energy production from wood are difficult to obtain because of this diversity of uses and the high share of informal production. Furthermore, the two main agencies that collect these statistics – FAO and the International Energy Agency (IEA) – present different figures because of different definitions and primary data sources. IEA presents biomass energy production figures that include other types of biomass besides wood (i.e. agricultural residues and dung). Its statistics also include heat and power generation in the forest industry and by commercial energy producers, which are not fully captured in FAO statistics. Trends and projections for biomass energy production estimated from a combination of these two data sources reveal an increase in global production from about 530 million tonnes oil equivalent
(MTOE) in 1970 to about 720 MTOE in 2005, projected to reach 1 075 MTOE in 2030. Interpolation suggests that wood used for bioenergy production increased from about 2 billion cubic metres in 1970 to 2.6 billion cubic metres in 2005. This suggests that up to 3.8 billion cubic metres of wood could be required by 2030. However, some of the future demand may be satisfied by biomass produced from agricultural residues and energy crops (including short-rotation coppice and grasses). Until 2005, global biomass energy production increased relatively slowly, at less than 1 percent per year. Most of the increase in production occurred in developing countries, where wood continues to be a major source of energy. The exception is Asia and the Pacific, where growth has declined considerably because of switching to other preferred types of energy as a result of increasing income. The projections reflect a future marked increase in the use of biomass for energy production in Europe and, to a lesser extent, North America as renewable energy policies and targets take effect. Europe's per capita biomass energy use is projected to triple by 2020 in response to renewable energy targets, although some production will also come from energy crops and agricultural residues. Most developed countries have set renewable energy targets for 2020; hence, rapid growth in production is expected until that time, followed by a slower rate of growth. Furthermore, future large-scale commercial production of cellulosic biofuel could increase the demand for wood drastically, beyond that shown in the projections. The projections for biomass energy production in developing countries also have interesting features. As a consequence, in the Guinea Savannah zone, the gap between demand and fuel wood supply is widening. In 2005, only about 23% of the fuel wood consumed in this zone originated from the area. This means that 77% of wood consumption in the area is unsustainable, i.e. is Non-Renewable Biomass. Kaduna State is situated in this zone. Therefore, Kaduna State, like other States in Northern Nigeria, is not self sufficient in terms of fuel wood supply. In the Sudan Savannah zone, the situation is even worse. In 2005, only 13.7% of the demand was covered by production in the area, according to the FAO.

Consumption of Fuelwood in Nigeria

"The consumption of fuel wood and charcoal remains based on the early data by FAO as reported by EMRD (1991). This is based on a per capita fuel wood and charcoal consumption of 0.5 t/cap/year and 0.2 t-charcoal/cap./year and projected for the national population as available from the 1991 population census at projected at 2.8% growth rate per year". However, due to rising prices for fossils fuels, a massive shift from “modern” fuels like Kerosene and LPG back to fuel wood and charcoal has been taking place.

To calculate the consumption of wood fuel, the amounts of wood used for charcoal making and fuel wood have to be summed up. If we apply a weight-related conversion factor of 4.5 for charcoal making (the volume-related FAO default value is 6:1), wood fuel consumption is about 1.4 kg/head/day; or the energy equivalent thereof in fossil fuels.

R.A. Cline-Cole & et. Al., (1987) reported a fuel wood consumption of 360 kg/person/year (excluding wood used for making charcoal) in neighbouring Kano State. There is an obvious competition between surface needs for agriculture and wood production. “Crop production in Nigeria is currently dominated by resource-poor farmers with little or no access to productive resources. More than 90 % of these are small holder farmers cultivating less than 2 ha farm holdings and because of this, they cultivate marginal and environmentally fragile land areas. This practice has led to land degradation and deforestation, erosion and lowland flooding, degradation of watershed protection and declining resilience in ecosystems.
The rate of deforestation of the woodlands average 3.5% in 1980-90. It has been projected that Nigeria’s remaining forest may likely disappear in 2020”. The effects on CO2-emissions are categorized under “emissions from land use change and forestry”.

**Emissions from Land Use Change and Forestry**

Additional information on the non-sustainability of wood fuel demand and production can be obtained from the comparison of carbon uptake and release in relation to land use changes. In some cases, these changes provide some uptake of CO2, mainly following re-growth of vegetation on abandoned land, but this effect is small compared to the conversion of forests for other uses. “Results indicate that energy and land use change sectors contribute highest to CO2 emissions, while CO2 contributes more than 70 % to gross equivalent emissions. Thus, the energy and land use change sector, and the reduction in national emissions for CO2 should be the first step towards sustainable management of future GHG emissions in Nigeria”. In the years 1988-2000 the percentage contribution of “Land Use Change and Forestry” to total emissions oscillated between 38.5 % and 47.8 %.

**The shift from fossil “modern” forms of energy like kerosene or LPG back to fuel wood**

“The unsustainable level of production of fuel wood in Nigeria is likely to continue for some time as long as the energy crisis facing the country remains unresolved. The country still witnesses erratic supply of petroleum products (Kerosene and Gas), and when available the prices are beyond the reach of ordinary people. The implication is not far-fetched, as more people will resort to fuel wood, which is already in short supply” (FAO 2003, Experience of National Forestry Programmes in Nigeria). The situation in 2007 is still the same, if not worse. This means that people are reverting from modern to traditional forms of energy (“reverse substitution with wood fuel”, according to the FAO).

**Need for Firewood Utilization**

In an area of cleared vegetation, regeneration enhances essential control of dry land salinity and restores landscape biodiversity. Regeneration could provide a useful carbon sink and the basis for sustainable regional firewood industries. Some time, old and dead trees often with hollows and fallen timber are preferred sources of firewood, as they tend to burn well and produce less smoke. However, these same trees also provide crucial habitat and food, nesting hollows, perching places and forage substrate for birds and arboreal mammals, including Nigeria’s most threatened ecological communities and wildlife. In Uganda, over nine-tenth of energy requirements is based on wood obtained from the forest (Anon, 1994)

Over nine-tenths of Uganda’s energy requirements is based on wood obtained from the forests (Anon., 1994). Fuelwood is a major source of domestic and industrial energy. It is used in the processing of agricultural products such as tea, tobacco and sugar; in the construction industry for baking bricks, tiles and lime; and in fish processing. However, the country’s dependence on biomass energy resources is a source of great concern because gazette and non-gazette forest resources from which most of the firewood is harvested are depleting rapidly due to population increase. It is estimated that deforestation in Uganda is occurring at the rate of 650 km2 annually (FAO, 1993). Lack of a mechanism to control harvesting of fuelwood in non-gazette forests encourages excessive depletion. There is a need for an organized management institution to oversee the utilization of
non-gazette forest resources to avoid a situation that Hardin (1968) described as "the tragedy of the commons." A significant question to ask at this stage is: How can common pool natural resources be managed and exploited in a way that avoids both excessive consumption and high administrative costs? It has become clear that neither state control, nor privatization of institutions has been uniformly successful in empowering individuals and communities to manage natural resources sustainably (McKean, 1998).

The increase in the bioenergy use is expected to come mainly from forest resources, and the remainder from agricultural and biological waste residues. The volume of standing forest in Slovenia has been steadily increasing for many years. The utilization of bio-energy for heating purposes depends on costs, both the cost of the bio-energy itself and the cost of alternative energy sources and fuel oil being the most common one. A significant increase of the actual energy produced from firewood in Slovenia could be achieved by promoting better fuel quality management, improving firewood production and supply chains and promoting the use of more efficient combustion appliances with less environmental impacts. This will in addition to increasing the quality of the use of firewood contribute to achieving Slovenia’s national bio-energy goals and our Kyoto Protocol obligations.

Materials and Methods

In Kaduna metropolis there are three major Local Government Areas which are North, South and Kaduna Central respectively. The study area is Located at 10° 35’ 0" N, 7° 29’ 54” E axis of the globe. It comprises of various tribes and cultures from all walks of life. Business activities cannot be overemphasized as the populace engage themselves in various trades including firewood business on a large scale.

Sampling Procedure

This work is targeted to provide information on the rate of firewood consumption. Well structured questionnaires were administered to major bakeries, canteens and retail consumers of notable usage of firewood. Also, "on count" method was adopted to obtain the number of truck or lorry load for 3 hours per day, three times a week and 12 weeks. Likewise, exploitation field of firewood production was visited for further information on suitable species of trees exploited solely for the purpose of firewood.

Sampling Technique

Five major bakeries, canteens and retailers were randomly selected respectively. Fifty well structured questionnaires were administered to each selected area in ratio 2:1:2 that is, 100 for the bakeries, 100 for the retailers and 50 for the canteens respectively, making a total of Two Hundred and Fifty Questionnaire. Also, every loaded truck, lorry or car was counted for at least three hours per day for 12 weeks. Likewise, pictures or images of a current status of the firewood production area will be provided.

Analytical Tool

From the results derived in the course of this research, data collected was subjected to Pearson’s product-moment correlation coefficient to measure the linear relationship between sampled data.
Test of Hypothesis

\[ H_0: \ P_1 = P_2 (\text{or} \ P_1 - P_2 = 0) \]
\[ H_A: \ P_1 \neq P_2 (\text{or} \ P_1 > P_2 \text{ or } P_1 < P_2) \]

In the hypothesis testing, shows there is no significant relationship between fuelwood exploitation and its relative consumption.

Results

The study was dependent on so many variables needed to obviously reveal the most consumed quantity of firewood and the rate pattern at which this is done. In this chapter, tables, charts and pictures are used to express data. Also, inference will be drawn to interpret the hypothesis.

Socio-economic Characteristics of the Respondents

<table>
<thead>
<tr>
<th>Table 1: Showing Gender Distribution of the Respondents</th>
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<td>Gender</td>
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<tr>
<td>Male</td>
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<tr>
<td>Female</td>
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<tr>
<td>Total</td>
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Source: Field work, 2012

The table above shows the gender distribution of the respondents as a vital factor to be considered in the socio-economic characteristics of the respondents. From the result, 52.08% of the respondents are male while 49.92 of them are female. This shows that there is a sort of gender equality in the distribution of the respondents though more men are involved in the firewood utilization than women.

It was also noticed that men are more in both the major bakeries and canteens as the respondents declared men are more versatile than women and more work is covered per unit time and area with men at work.

<table>
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<tr>
<th>Table 2: Showing Age Range of Respondents</th>
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<tr>
<td>Age Range</td>
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</tr>
<tr>
<td>20-30</td>
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<td>31-40</td>
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<td>41-50</td>
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<tr>
<td>51-60</td>
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<tr>
<td>Total</td>
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Source: Field work, 2012

In the table above, it is shown that the percentage relative frequency of the ages of the respondents cannot be under-estimated as the youth (20-30 years) shows their involvement in firewood utilization by taking the lead with a value of 39.60% while the rest of the age classes are 24.60%, 20.0% and 15.18% respectively. This is relatively true about the age class distribution because the youth are the more vulnerable in terms of lack of employment and would take up any in the absence of none. The respondents in the age class of 51-60 are some worth owners of the bakeries and canteens.
Besides the age differences, the hauling of materials and even the fuelwood require the hands of able workers are still relatively young and agile and the more reason for the employment of the youth to manage and fulfill the set goal and objective. Also, another reason is the management of risk that is most works are now exposing workers to risk especially in the aspect of time beating.

**Figure 1:** Showing the Education Status of Respondents

![Bar chart showing education status](source: field work, 2012)

From the chart above, it was realized that respondents with primary education earned a minimum of primary education and are found to be more among the casual with 80 respondents, followed by it is the bar with secondary education with a value of 40, tertiary education has the lowest with 20 points and respondents with no formal education has 25. This shows that the level of education has been quite a major factor especially in an economic unit where human hygiene matters. Education is the key to a healthy environment and a healthy living.

**Figure 1:** Showing a row view of the fuelwood hips

![Fuelwood hips](source: Field work, 2012)
This shows that between the volumes of 108m³ and 673.2m³ are hipped on the site. It was known further that there are 22 numbers of hips in the area. So, the total volume ranges between 2376m³ and 14810.4m³ on a hip site.

Conclusion

The exploitation of fuelwood has been known to be an inexhaustible source of energy for man from time immemorial and this is a fact that will never change. This research proved that forest trees especially those used for fuelwood exploitation are only depleted with use of sophisticated machine like the chainsaw or power saw machine that tend to disrupt the active cell for re-growth or coppice. It also reveals that this is an uncommon type of regeneration system which is practiced to ensure sustainability. In the results, more men are more involved in firewood utilization than women, showing that more of them are youth with a relatively low education status (primary education). This utilization was also shown from the result to have no correlation or relationship with exploitation that is, they both independent activities executed with time. Pictures also show the extent and species type of the exploited trees which related the volume of the entire fuelwood hipped for transportation.

Therefore, in Kaduna metropolis, fuelwood utilization is prospective for sustained yield management and industrial fuelwood practice. This will enhance improved technology of green fuel or wood burning using improved devices and increase the rate and support for fuelwood plantation having known the tree species most suitable and common in the fuelwood trade. It will also improve the climatic condition of the world at large if it is realized the great benefits fuelwood burning has over fossil fuel.

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Building a Bridge Between Gown and Town Through Infusion of Industrial Experience Into Students’ Final Year Project

Olawale O.E. Ajibola

Department of Systems Engineering
University of Lagos, Akoka, Lagos, Nigeria

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Abstract
Education, the imparting and acquiring of knowledge through teaching and learning has many parts; it is the knowledge or ability gained through training. Education may mean learning or informative experience gained through learning among others. Education may be formal or methodically structured on one hand, or informal in nature on the other. Formal education is acquired in stages and it is fashioned after perceived intelligence quotient expected of developmental stages of mankind usually from the Nursery School to a degree awarding Educational Institution. At the apex of education is the Students’ Industrial Work Experience Scheme (SIWES) designed to acquaint students with the industry while still undergoing academic training with the sole aim of preparing them for industrial challenges of the futurity. Moreover, every programme at the apex educational institution terminates with student project culminating in a dissertation. This paper considers the positions of SIWES and the students’ Final Project and proposes an infusion of the two important components of our educational curriculum with the ultimate aim of turning out well groomed professionals that are capable of successfully driving our economy through Vision 20:2020.

Keywords: industrial experience; students’ project; infusion; educational curriculum; vision20:2020.

Introduction
The growing concern among our industrialists that graduates of our institutions of higher learning lack adequate practical background studies preparatory for employment in industries, led to the formation of students Industrial Work Experience Scheme (SIWES) by ITF in 1993/1994 (Information and Guideline for SIWES, 2002). One of the key functions of ITF is to work as cooperative entity with industry and commerce where students in institutions of higher learning can undertake mid-career work experience attachment in industries which are compatible with student’s area of study (Okorie 2002, Asikadi 2003).

In the study carried out by Wodi and Dokubo (2009), it was reiterated that the problem of skill acquisition by graduates of Nigerian Technical/Vocational Education is a reason for the establishment of SIWES. The scheme was planned to serve as a bridge between educational institutions and industrial employers with the latter providing general and specific occupational skills and knowledge. Specifically, the objectives of the Students Industrial Work Experience Scheme (SIWES) are to:

- Provide an avenue for students in institutions of higher learning to acquire industrial skills and experience in their course of study, which are restricted to Engineering and Technology including Environmental studies and other courses that may be approved. Courses of NCE (Technical), NCE Agriculture, NCE (Business), NCE (Fine and Applied Arts) and NCE (Home Economics) in Colleges of Education are also included.
- Prepare students for the industrial work situation they are to meet after graduation;
- Expose students to work methods and techniques in handling equipment and machinery that may not be available in their institutions.
- Make the transition from school to the world of work easier, and enhance students contacts for later job placement;
- Provide students with an opportunity to apply their knowledge in real work situation thereby bridging the gap between theory and practice; and
- Enlist and strengthen employers, involvement in the entire educational process and prepare students for employment in Industry and Commerce.

According to Mafe (2010), for the participation of Nigerian students in trans-national exchange programme for industrial experience to enhance the attainment of the goals of the scheme, there is need for a clear understanding and appreciation of the distinction between "work-experience" and "work-integrated learning" or "cooperative education. In his own words; work-experience is observational and exploratory whereby students are exposed to the production process with limited monitoring of the students’ performance and assessment of the performance after completion of the programme. On the other hand, the focus of work-integrated learning is the development of the occupational competency of the student with the main purpose being learning. Already, SIWES has many aspects of cooperative education incorporated into its structure and operation (e.g. planning, placement, supervision and assessment) but is deficient in implementation. It is, therefore, important that concerted efforts be adopted by all SIWES stakeholders to ensure that SIWES meets its objectives.

On the other hand, the students' final year project provides the mechanism that enables the students' examiners to assess the suitability of the students undergoing training under their tutelage to face the challenges of the industry. The final year report is an important undertaking that represent the documentation of all the activities involved in successful implementation of the project and should use the structural guidelines outlined approved for that purpose. Examiners are very interested in the process that was used during the final year project. The mechanism for detailing the process is the final year project report.

**Objectives of the Study**

A way of achieving work-integrated learning that must necessarily be targeted at the meaningful development of truly employable professionals is to incorporate internship into their course curricula. However, SIWES as a programme has a fundamental setback; most industrial concerns are very reluctant to absorb students into the obligatory internship in their organizations due to the following reasons:

1. The period of internship is too short for the students to undergo a short training where the task to be performed requires specialized skills for the company to benefit from their investment on the intern, and
2. The interns may, in most cases, not add any value to their employers product(s) in terms of research and development.

The students’ final project, although a course in partial fulfillment of requirements for the award of a degree, is also a harmonization of all knowledge acquired by the students during the course of study which prepare the student for the task of managing any project from the conceptualizing stage to the close of the project. It exposes the future professional to the methodology that enables him/her to bring to bear all the skills acquired during the course of learning and the personal prowess developed overtime on his/her future endeavours culminating in
successful execution of any task to a profitable completion. The aim of this paper is therefore to find the meeting point between the two courses namely SIWES and the student final project and suggest a way of harmonizing the two schemes for the betterment of our educational products. The objectives of the study are therefore summarized as follows:

1. To promote a better understanding of the student final project and the students industrial work experience scheme (SIWES)
2. To seek to improve the quality of the products of Nigerian universities through proper implementation of students’ final project and SIWES.
3. To harmonize the aims and purpose of students’ final year project and SIWES for the purpose of preparing Nigerian graduates for post qualification challenges.

The Students’ Industrial Work Experience Scheme (SIWES)

The issues considered in this study shall be based on literature and personal experience as the departmental SIWES coordinator at the Department of Systems Engineering, University of Lagos in Nigeria and a university lecturer whose experience as a students’ final year project supervisor spanned a period of seventeen years. According to Oyeniyi (2011), students’ Industrial Work Experience Scheme (SIWES) is a programme designed to expose and prepare students of Institutions of Higher Learning for industrial work situation which they are likely to meet after graduation. It is a skill acquisition/training programme which affords students the opportunity of familiarizing and exposing themselves to the needed experience in handling industrial equipment and machinery that are not usually available in their institutions. The establishment of the scheme was to alleviate the fear of industrialists that products of institutions of higher learning in Nigeria are inadequately prepared for the world of work. Based on these facts, the scheme was established to achieve certain objectives such as to:

- provide an avenue for students in institutions of higher learning to acquire industrial skills and experience in their course of study, which are restricted to engineering and technology including environmental studies and other courses that may be approved;
- Expose students to basic methods and techniques in handling equipment and machinery that may not be available in their learning institutions;
- make the transition from school to the world of work easier, and enhance students contacts for late job placement; and
- strengthen employers, involvement in the entire educational process and prepare students for employment in industry and commerce (Industry Training Fund, 2002; 1-3).

The Students’ Final Year Project (SFYP)

In the contribution made by Letherland Caroline lead Curriculum Enhancement project, the Students’ Final Year Project (SFYP) is defined as research-based learning which includes preparing all students to undertake an autonomous piece of research work as the culmination of their degree programme. SFYP is seen by students as the pinnacle of their academic achievement, not only because of the academic rigour that is imposed on it by the University, but also because of the control they have to design, carry out and evaluate what they do. It is often seen to represent the point at which students become truly members of a disciplinary group. It is a universal norm that this piece of work must possess the following characteristics:

1. It must be compulsory
2. It must have significant number of credits allocated to it
3. It must be assessed in a way which relates to it being a research based activity.
4. It must be supervised within the school (although there may be occasions where co-supervision is the best way forward, where this can be negotiated).
5. It must result in an individual report responding to a question negotiated at the level of the individual student (which may fit together into a piece of work which a group could do).
6. It must be undertaken according to a research method defined by the student in their report.

And in relation to assessment, the importance of this piece of work in terms of credit weighting and therefore potential influence on the degree classification requires that it should be double blind marked. A model that is similar to our proposal in the Department of Systems Engineering, University of Lagos, Nigeria is the one practiced at the Department of Industrial and Systems Engineering, University of Pretoria, South Africa.

The Department of Industrial and Systems Engineering SFYP Experience

As part of the pre-requisites for the bachelor’s degree in Industrial Engineering, students in their final year of study are required to complete an engineering project in which fundamental industrial engineering knowledge and skills are applied. The project, executed over two semesters from February to October, forms an essential part of the training and industry exposure of Industrial Engineering students at the University of Pretoria (UP). The total project carries a total of 40 credits or 400 learning hours, equivalent to approximately 2.5 months of full-time work. The project consists of the following four sequential phases, namely:

**Phase I: Project planning**
- Background
- Problem Statement
- Project Aim & Key Deliverables
- Project Approach

**Phase II: Literature review & environmental analysis**
- Critical analysis of literature and environment
- Data information and data gathering
- Identification of design/problem solving concept and approach

**Phase III: Detailed design and/or problem solving**

**Phase IV: Completion and presentation of results and final report**

However, the students have the freedom to define their own project topic, but it is expected that most projects will originate from industry and be initiated by a definition of the project by an industry sponsor. Industry support is essential in order to identify suitable projects. Students have the responsibility to choose an appropriate environment where they are required to complete an engineering project in which fundamental industrial engineering knowledge and skills are applied. The outcomes of this project are assessed using an assessment sheet. In order to complete their project successfully they have to identify and solve an engineering problem. As part of their final year project students are required to:

- Analyse existing literature that can assist in design and/or problem solving.
- Identify available industrial engineering methods, tools and/or techniques that can be used in design and/or problem solving.
- Select the most appropriate method(s), tool(s) and/or technique(s) for design/problem solving.
- Develop supplementary methods, tools and or techniques that can assist them with a design/solution.
- Apply appropriate engineering methods, skills and tools in the problem solving approach.
- Test and validate all the results

Also, students are required to:
- Clearly define an existing design and/or problem
- Design a solution approach to solve the identified problem.

In addition to the aforementioned, they are to carry out investigations, experiments and data analysis.

As part of their final year project students are required to analyse a project environment and gather/document all information and data to be used in development of a design/solution to the identified problem.

The aim of the Project Definition is to briefly describe the background and rationale for the project, the high level project objectives and expected key deliverables and initial scoping of the project in terms of the field of study and boundaries of the investigation and solution. A project will typically involve the analysis, improvement, optimisation or design of a defined business process, operation, complex system or a component thereof. Important criteria for the evaluation of the suitability of a project are:

1. Clarity on the expected benefit or value add of the project
2. The application of industrial engineering principles, tools and techniques
3. Clear evidence of engineering analysis and design, that is an improved or new approach, model, process, facility or system needs to be developed or formulated. In exceptional cases the project might be purely investigative in nature, but the complexity and value add needs to be clear.

The Project Definition should provide sufficient details to allow a student to select the project based on his/her areas of interest (if defined by an industry sponsor) and to allow the course coordinator to make a judgement on the suitability of the project and to allocate a project leader with the necessary expertise. As a guideline, the following key aspects should ideally be covered in no more than a one page Project Definition:

1. Brief background on the company, environment and project
2. Rationale for the project in terms of expected benefit and building on previous work
3. Project scope, defining the area or department within which the project will be executed and solution developed
4. Key policies or constraints that might apply to the project solution development
5. Expected key deliverables of the project (if possible)
6. Tools and techniques that can be used (if possible)
7. A suggested high level outline of the approach that can be followed (if possible).

The project definition will provide the basis for the student to develop a project proposal, including background, problem statement or needs requirement, project aim and specific objectives, project approach, resources required, deliverables, and timelines. Students are expected to gain a full understanding of the problem and research and investigate alternative approaches to develop a solution in the project proposal. To facilitate easy implementation of the project, a project sponsor is required.

A project sponsor is the key contact within the company who should be able to provide the best guidance on the project and is most likely to gain from the success of the project. The project sponsor has the following important responsibilities:

1. Confirm his/her role as project sponsor, duly authorized by the company. Multiple sponsors can be appointed, but is not advised.
2. Review and approve the Project Proposal, ensuring that it clearly defines the problem to be investigated by the student and that the project aim, scope, deliverables and approach is acceptable.

3. Review and approve the Project Report, ensuring that information is accurate and the solution addresses the problems and/or design requirements of the defined project.

4. Ensure that sensitive of confidential information or intellectual property of the company is not disclosed in the document.

5. Acknowledges the intended publication of the document on UP Space. A Project Sponsor Form is available to obtain sign-off from their Project Sponsors.

6. Intellectual Property Ownership of Project Reports. The University of Pretoria has Intellectual Ownership of the project documents delivered by the student. Project reports from previous years have been published electronically on UP Space. It is the student’s responsibility to liaise with the industry sponsor to establish whether the final project report may be published. If not, the following is suggested to protect company sensitive or confidential information:
   • Make use of a fictitious name representing the Company, e.g. ABC, XYZ, etc.
   • Withhold, exclude or adjust important confidential or sensitive data, such as design drawings or financial information.

The Practice at the Department of Systems Engineering, University of Lagos, Nigeria

Established in year 2000, the pioneering Department of Systems Engineering in Nigeria has evolved into a dynamic and viable entity that champions radical changes both within the University of Lagos and in the larger Nigeria. Until two years ago, allocation of supervisors to students on both the SIWES and the SFYP has been done in the reactive manner adopted by any other department in the university. However, since two sessions ago, allocation of project supervisors to students is done after the first semester of the 400level of the 5 year degree programme to enable students academic supervisors interact with the students so that anytime opportunity arises in the industry to solve industry based problems the students may invite their project supervisors to interact with the industry based supervisor(s) with the aim of defining a researchable problem which the students could take up as their final project(s). Students in the department are involved with grouped projects in order that they may develop the spirit of team-work even while they are still in school. The model adopted by the department is closely related to that of the department of industrial and systems engineering in the South Africa in that asides the number of hours and the weight assigned to SFYP and the financial backing received from the industries, which eventually is the target of our model, the department work within the framework provided by the laws that established the University of Lagos to open up new research areas in the industries. The conception of the students’ final year project involves:

1. A brief of the students by each academic supervisors.

2. Establishment of communication network between the project group members and their supervisor for updates on the progress made so far in identifying an industry based problem that is worth the while.

3. The interns are instructed to be explicit about their quest to identify, clearly define and address an industry based problem that if not completely solved while serving in the company could transform into a final year project.
4. The academic supervisors, on a visit to the company, are required to specifically enquire from the industry based supervisors if there exist such practical problem peculiar to their companies that may challenge the candidates’ intellectual capabilities.

The direct implication of the aforementioned is that:
1. The students would stimulate intrinsic interest in the activities of the company where they work as intern.
2. The students build the kind of confidence they require to confront their future endeavours.
3. The environment to work is readily available since students could revert to the company as the situations demand especially when they need specialized equipment.
4. The financial resources required to bring the project to fruition is readily provided by the company.
5. The company also gains by way of tax reduction.
6. The industries also build symbiotic relationship between themselves and the department thereby creating opportunity for potential interns from the department and consequently good job opportunity for the products of the department.
7. The country benefits from the model both at the nonce and in the futurity.

To mention but a few.

Discussion

The essence of integrating the students’ final year project and the students’ industrial work experience scheme into the educational curriculum of the higher educational institutions in Nigeria is to ensure quality assurance (QA) in Nigeria’s higher education. The word quality refers to standard or grade of an entity while assurance is synonymous with certainty. To this end, quality assurance in higher education in Nigeria may be said to mean ensuring the certainty of the grade or standard of higher education with respect to Nigeria. And quality assurance in higher education clearly translates to high quality graduates. However, the concept of quality assurance is all involving. According to Okebukola (2010), quality assurance refers to an umbrella concept for a host of activities designed to improve the quality of input, process and output of the higher education system involving several components which he called elements of quality assurance.

Quality assurance is not synonymous to accreditation as it is erroneously conceived in some quarters but accreditation is one of the activities in quality assurance. In the assessment of Okebukola (2010), QA has components internal and external to the institution. He distinguished the two as follows:

- Internal quality assurance to include the internal examiner system and internal academic and management audit. An institution engages in these activities to assure itself that it is on course to fulfilling its vision and mission in terms of quality of input, process and output.
- External validation of institutional quality assurance is often necessary in the desire to norm that institution with others with the same vision and mission. Agents external to the university are players in the external quality assurance system. The key activities are accreditation, periodic monitoring and evaluation by NUC, visitation and external institutional audit. The quality assurance process examines the effectiveness and efficiency of the input, process and output elements of the teaching, learning, research and service activities of a higher education institution.

He professed that the quality of products can be measured by how well the graduates are being prepared to serve society and for meeting the challenges of the world of work. It can be
judged through ascertaining how efficient the teachers are, and the adequacy of the facilities and materials needed for effective teaching and learning. The utility value of quality assurance can be seen through the provision of information to the public and other interested parties about the worth of the higher education delivery system. It equally ensures accountability in respect of the investment of public funds (Okebukola, et al, 2007).

The paper by Ibidapo-Obe, Sofoluwe and Ajibola (2012) focused on the experiences and strategies for enhancing Quality of Learning in Higher Educational Institutions in Sub-Saharan Africa based on information and communication technology (ICT) and was targeted at applying an evolving but excellent management practices institution-wide and at all levels which are concerned with policies and processes related to teaching, learning and assessment in different national contexts considered key management issues to include acting on student feedback, engaging e-learning initiatives, linking research and teaching effectively, leading learning organizations, implementing innovations in education, developing outcomes based courses and applying peer review principles to teaching. The key management issue from the text that concerns this work is the linking of research and teaching effectively. Moreover, the term teaching here is considered within the general context of its paradigm with special emphasis on the concept of SIWES training while the term research means bringing to bear the industry based researchable problem on the students’ final project whereby a research problem is defined by the industry in conjunction with the academia. This will give birth to meaningful research efforts that will benefit the country as a developing nation unlike the present trend where the academia is engaged in research efforts that are not targeted towards solving a real-life problem.

In the fifty year assessment of Okebukola, the quality assurance process improved steadily. Improvement in quality of graduates from the Nigerian university system was however found to mismatch the quality assurance efforts. This calls for invigoration of the quality assurance activities at the federal and state levels, Okebukola (2010). The Students’ Industrial Work Experience Scheme (SIWES) popularly touted Industrial Training must have been designed to enable students put to use of some the theoretical prowess built into the candidates in order that they may become world-class professionals. The progenitors of SIWES must have designed the scheme to engender a mutual benefit between the industry and the academia for the overall promotion of Nigerian economy. The industry prepares a researchable problem which the students can solve as a team of researchers within the six months of the programme. The industrial experience of the students is thus expected to influence the students’ choices of area of research for their final year project. It is the gains of the scheme that is expected to arouse the commitment of the industry and create a bilateral relationship between the academia and the industry. The current practice where students see SIWES as a means to make quick money is a clear departure from the blueprint of the scheme as designed by its progenitors, Ajibola (2011).

In his work, Ajibola (2011) strongly suggested that SIWES should be redesigned in such a way as to accommodate the problems of the industry which the students must solve in stages and the inputs made by individual students should be the yardstick for scoring the students performance at end of the programme. This will enable the industry to make adequate budget for the students’ project since the industry expects benefits from the students’ effort. The students in turn benefit since it gives them the needed exposure to the procedural processes that solve real-life problems from conception to the close of the project. This must be pursued with vigour.

**Conclusion**

A systems approach to quality assurance demands that dimensions of input, process and output
should be the focus. The input segment includes students, teachers, curriculum and facilities. On the process side, emphasis is on teaching/learning interactions, internal efficiency, research, evaluation procedure and management practices. The output includes the quality of graduates as well as the system’s external efficiency, Okebukola (2010). This paper focuses on the last miles of the undergraduate degree programmes in Nigerian higher educational institutions with the aim of harmonizing all the knowledge acquired by students as input for SIWES but the later serving as input for the students’ final project. The process involves administering the by-products of SIWES, industrial exposure, as input variables for the students’ final project for good quality graduate that will fit into any industrial setting. Clearly, the output shall be: skilled and employable graduates, responsible citizens, economic and social development, and production of new knowledge.

References


Mathematics Education for Sustainable Development: Implications for Scientific and Technological Literacy

Daso, Peter Ojimba

Department of Technical Education Ignatius Ajuru University of Education, Port Harcourt, Rivers State, Nigeria

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Abstract

This paper seeks to investigate and thoroughly examine mathematics education for sustainable development using the ambit of scientific and technological literacy. The obvious importance of mathematics in facilitating scientific and technological development in the ‘developed’, ‘developing’ and ‘under-developed’ nations of the world are quite glaring. This paper therefore considered mathematics education in relation to the sustenance of scientific and technological development in Nigeria. Issues such as the political implications of mathematics education and the social implications of mathematics education were delved into. This paper also discussed the principles behind the actualization of scientific and technological literacy using mathematics education as a focal point. Hence, suggestions on how mathematics education could be improved by both the Federal government and other agencies were given. Recommendations on how attendant problems in mathematics education could be solved were proffered.

Keywords: Mathematics Education, Sustainable Development, Scientific, Technological Literacy.

Introduction

Jayeola-Omoyemi (1995) posited that scientific and technological breakthrough have a tremendous impact in revolutionizing many industrial and social activities of mankind. If this assertion is correct, one would equivocally admit that there will be no scientific and technological development without proper mathematics education. Moreso, development has more often than not been associated with scientific and technological breakthrough of various nations in question. Development may be attained by the so called ‘developing’ nations of Africa, but the main issue is the sustenance of that development.

Furthermore, the encouragement given to students to love mathematics; teachers to diversify their methods of teaching; as well as incentives by government to teachers are noteworthy in most African nations and Nigeria in particular. The question now comes – are these incentives sufficient to sustain the so far scientific and technological development attained especially in Nigeria? Since mathematics is the bedrock of science and technology, its level of understanding among the Nigerian population becomes a serious concern for scientific and technological literacy. This concern stems from the fact that if the level of mathematics among the Nigerian population remains so low, the sustenance of the scientific and technological development so far attained becomes a mirage. Harping from the views of Ogunniyi, Eniayeju and Emereole (1992), a scientifically and technologically illiterate person is considerably circumscribed in playing his/her full potential role in the socio-economic development of his/her community. This means that there is need for massive mathematics education among the Nigerian population. Corroborating their views, The Federal Ministry of Education, FME (1998) stated that the objectives of primary education...
include among others – the inculcation of permanent literacy and numeracy, and the laying of sound basis for scientific and reflective thinking. The implication here is that much more attention must be paid to mathematics education in the nation’s school system. The role played by mathematics in the scientific and technological development of America and the NATO nations cannot be overemphasized. For instance, the news of the launching of the first artificial satellite, the Sputnik by the USSR in 1957 shook America. This spurred America to make major revisions of science, technology and mathematics curriculum. Also, teacher preparation and welfare were greatly improved. More funds were equally made available at all levels of the educational system. These efforts yielded dividends in 1969 when two Americans successfully landed on the moon (Iji, 1999). This connotes that massive scientific and technological literacy would depend on massive mathematics education with respect to issues of curriculum, strategy and teacher education. In an attempt to discuss this issue, this paper seeks to take a parasonic view of the political and social implications for science and technology via effective and efficient mathematics education.

**Political Implication of Mathematics Education for Scientific and Technological Development**

Aghaduino (1999) observed that mathematics has been exceedingly successful, especially when applied to science. Invariably, mathematics has some unique characteristics which science share to some degree. This is why Bishop, Hart, Lerman and Nane (1993) said that “schools and individual learners exist within societies and in the concern to ensure the maximal effectiveness of school mathematics teaching, we often ignore the educational influence of other aspects of living within a particular society”. This therefore, creates more responsibility to mathematics educators ensuring that their mathematics teaching is relevant to the particular society in which they found themselves. This responsibility of mathematics teaching must not separate itself from the economic, cultural and political context of the society. The obvious implication here is that society influences mathematics teaching and learning through the formal and instructional structure, which it intentionally establishes for this purpose.

Societies therefore influence the intended mathematics curriculum in most countries through nationally or regionally structured organizations. Buttressing this point, Bishop et al (1993) posited that;

*For example in the United Kingdom, the present government has recently instituted a national curriculum, a development in which the highly political nature of national curricular decision-making has been rather obviously demonstrated. We have therefore seen the typical political pressure groups being very active – the back to basis groups led by traditionalists among the employers and government, the teachers and educators concerned about the erosion of their influence of the central government’s interference, the more progressive industrialists who want to ensure that school leavers compete with the best of the rest Europe.*

The above suggests that the scientific and technological attainment of the developed and industrialized nations was due to the political will of the government and other organizations. This resulted to massive mathematics curriculum reform and appropriate mathematics – the case of back to basis. This has far-reaching implication for all stakeholders in Nigeria’s scientific and technological development. The political groups, parents, civil servants and others with educational power should not claim ignorance of the need for massive scientific and technological literacy for
Nigeria, which its achievement could only be facilitated by an effective and efficient mathematics education.

Again, Nigeria and Nigerians should realize that the impetus to become ever more, industrialized and technologically developed as the so-called developed or developing nations has been underpinned by the belief in the importance of adopting the mathematics and science curricula of the more industrialized societies. Should mathematics then become more of a critical and politically informed subject serving the needs of a concerned society or should it become more of a vehicle for developing democratic values? It connotes that the mathematics curriculum is clearly too important an instrument to be determined by mathematicians alone. Politicians, economists and other stakeholders are equally needed.

**Social Implication of Mathematics Education for Scientific and Technological Development**

Keitel (1986) arguing for social needs for mathematics states that;

> By social needs demand I understand here the pressures urging school mathematics to comply with the needs for certain skills and abilities required in social practice. Mathematics education should qualify the students in mathematical skills and abilities so that they can apply mathematics appropriately and correctly in the concrete problem situations they may encounter in their lives and works. Conversely, social usefulness has been the strongest argument in favour of mathematics as a school discipline and the prerequisite to assigning mathematics a highly selective function in the school system.

This is a major challenge of scientific and technological literacy in Nigeria today – how to link scientific and technological knowledge of the citizenry to their everyday life. More important is to what extent their mathematics knowledge so far helped to sustain the scientific and technological knowledge acquired. The position taken by Keitel as indicated above showed that the social interaction between science and technological functions in the society is inseparable from mathematics education.

Furthermore, Ohuche (1995) said;

> The purpose of scientific activity is to build up knowledge, to give an explanation for something; to provide a time description of some event; to diagnose the nature of some condition. While the purpose behind technological activity is to facilitate human aspiration to solve some practical problems; to put knowledge to good use; to extend the boundaries of existing possibilities. Thus it is the purpose of science to explain why air that moves rapidly over a surface exerts least pressure upon the surface than does slowly moving air. But to demonstrate how this fact might be used to build a machine that will fly is a technological achievement.

This implied that if the activities of science and technology are to be promoted and sustained by Nigeria, her citizenry must need to be properly tutored in their social implications. This means that mathematics education must be made relevant in the Nigerian school systems i.e. primary, secondary and tertiary levels of education. The issue now is how do we actualize the scientific and technological literacy so advocated?
Actualizing Scientific and Technological Literacy via Mathematics education

According to Baptiste (2000) more than 90% of the scientists said that the general public’s current level of understanding of science, its methods and impacts is adequate. He further stated that only 32% of American parents surveyed felt they were science literate. The frightening situation is that only 36% of all teachers surveyed believed they were science literate. The Nigerian case is far much frightening than what we are seeing, he averred.

On this ground, it was observed that workers of this 21st century require not just a larger set of facts or a larger repertoire of specific skills, but the capacity to readily acquire new knowledge, to solve new problems and to employ creativity and critical thinking in the design of new approach to existing problems. Trotter in Bantiste (2000) stated that the evaluation of our goals for the enhancement of scientific literacy, technological effectiveness and mathematical skills in our educational system is not only unclear but until very recently lacked any public or political support. Okoro (2000) therefore felt that the training of skilled manpower in science and technology for the different aspects of national development should be considered a national priority area. This is because science and technology education provides a means whereby the individual can organize human concepts and attitudes, classify experience as well as communicate with others.

Since mathematics teachers are primarily the source of science, technology literacy (STL), their inadequacy both in qualitative and quantitative form becomes a concern (Hogan, 2000). Furthermore, Iji (2001) noted that for science and technology to be sustained, there is the need for mass production of mathematics teachers both quantitatively and qualitatively. This may be so because mathematics teachers stress scientific and technological literacy by demanding a rational and independent approach to science and technology and its impact on society. Functional, relevant and related mathematics, which enhances the scientific and technological literacy of the society can only be realized through the use of qualified mathematics educators.

Recommendations

The obvious nature of intimacy of science, technology and mathematics is seen in this paper. The fact that sustaining what one has already is better than going for a fresh new one which might be more expensive and possibly time consuming, recommends the following:

- The school systems should be enriched with qualitative mathematics educators by giving them specific training relevant to science and technology
- Political groups, parents, civil servants and other stakeholders in science and technology should be co-opted in the planning of mathematics curriculum and not leaving it out totally to mathematicians.
- Since scientific and technological development and its sustenance is to some extent hinged on the competency of the mathematics teacher, he/she should give his/her teaching a human face.

Conclusion

This paper critically examined the position of mathematics education on the development of science and technology. It pointed out the political will of the developed nations that had to go back to basis which saw them to their present technological position. Political and social implications of science and technology to the Nigerian society were discussed. It is expedient to
know that to disseminate the science and technology literacy among Nigerians, the teacher of mathematics in Nigeria educational system is considered indispensable.

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Empowering Vocational and Technical Education Teachers and Students Through Curriculum Implementation. Reforms for Attainment of Millenium Development Goals

Umunadi, E. Kennedy

Department of Technical and Business Education
Delta state University, Abraka-Nigeria

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Abstract

This paper was designed to look at the state of implementation of the curriculum in Nigeria educational system. The paper x-rayed the national policy on education and the same time looked at the present implementation programme on ground in different vocational and technical education institution in Nigeria. The paper was addressed under the following sub-headings : (1) History of vocational and technical education before the advent of British government in Nigeria. (2) Empowering vocational and technical education teachers (3) Empowering vocational and technical education students (4) Vocational and technical education curriculum and implementation instruction by teachers (5) Problems of teachers for vocational and technical education (6) Vocational and technical education curriculum reforms: the policy thrust for the attainment of millennium development goals (7) Vocational and education as the vital transformation tool and a formidable instrument for teachers and students empowerment (8) Tertiary education strategies for developing human resources for attainment of millennium development goals. Based on these points the following recommendations and conclusions were made for the attainment of the millennium development goals in Nigeria. Adequate attention should be given to the National Policy on education framework by teachers for empowering vocational and technical education teachers and students. The government of Nigeria should also give scholarship to students interested in vocational and technical education in institutions selected by the government for effective training of teachers to empower them for the attainment of millennium development goals. The government should recruit teachers and also give in service training to the teaching force to enable them improve on their knowledge and skills. Government should appoint vocational and technical supervisors and monitors from the federal, state and local government to look at the present implementation programme of the schools at different levels and so on.

Keywords: Vocational and Technical Education, Curriculum, Teachers

Introduction

Empowering vocational and technical education teachers and students through educational curriculum reforms is of great importance in Nigeria because vocational and technical education training of teachers had no philosophy that would provide unity and direction of their practice. The system of education was not geared to the needs, condition, and craft of the locality and aspiration of Nigerian. The success of any educational system in meeting its set target of philosophy, goals and objectives depends to large extent on satisfying the psychological human needs of the individual.

The constitution of Nigeria gives all citizens the right to education. But the delivery of education in Nigeria has suffered from year of neglect, compounded by inadequate attention to policy framework within the sector. Findings from an ongoing educational sector analysis confirm
the poor state of education in Nigeria. The national literacy rate is currently 57 percent. Some 49 percent of the teaching force is unqualified. There are acute shortage of infrastructure and facilities at all levels of education in Nigeria. Assess to basic education is inhibited by gender issues and socio-cultural belief and practices, among other factors. Disparities persist in educational standards and learning achievements. The system emphasizes theoretical knowledge at the expense of technical, vocational and entrepreneurial education. School curricula need urgent review to make the relevant and practice oriented. The National Economic Empowerment and Development Strategy (NEEDS, 2005) recognizes education as the vital transformational tool and a formidable instrument for socioeconomic empowerment in Nigeria. The education sector has responsibility for producing and supplying the personnel required to propel and sustain the NEEDS initiatives and the millennium developmental goals in Nigeria. The goals of wealth creation, employment generation, poverty reduction, and value reorientation can be effectively pursued, attained, and sustained only through an efficient, relevant and functional education system. Education is critical to meeting the millennium goals set by NEEDS. It is also a sector that the initiative seeks to reform for the attainment of the millennium development goals.

History of Vocational and Technical Education before the Advent of British Government in Nigeria.

Even before the advent of the British in Nigeria, many communities and cultures had developed their own system of informal, formal and vocational education systems. Vocational education was done through the system of apprenticeship, whereby young boys and men were attached to master craftsmen where they learnt various trades and skills such as carpentry, Masonry, Blacksmith, Foundry, Carving, Textile Design and Dying and so on. Such apprentice could spend from three to seven years depending on the trades they were specializing in, the master’s skills, competence and exposure, and the wards individual ability and performance. At the end of such training, the “graduate” apprentice was assisted by the family to acquire necessary tools, and local equipment to start his own trade. He would recruit other apprentices to work within his new set-up (Odugbesan,1995).

Independence in Nigeria attracted efforts aimed at achieving rapid national development, innovations, reforms in educational objectives because education in the country was marked with the dominant of literary education than vocational and technical education. The educational system remained largely literary in nature with vocational and technical education aspects of the entire components not made popular. Guga (1999) stated that despite the various attempts at the regional levels to initiate some new ideas and reforms by the Nigerian political leaders, the structure and aims remained largely literary and static.

After the national independence of Nigeria in 1960, the initial efforts aimed at achieving rapid national development were concentrated on the expansion of formal educational institutions at all levels. A large number of the first and second generation universities and polytechnics were established by decrees in quick succession to fulfill this national objective. Most of the programmes were however concentrated in arts and the humanities.

There was a radical reform in education aims, which was orchestrated in 1969 as a result of the national curriculum conference, earlier scheduled for 1966 was held. The report of the conference later grew into what is known as the National Policy on Education 1977, revised 1981, 1998 as the third edition and now 2004 as the fourth edition. The national policy on education and its various amendments addressed the problems of Nigeria from the technical education and the different needs of Nigerians at different levels. The national policy on science and technology (1986)
emphasized the introduction of gainful practical activities in the classroom at all levels. The policy encouraged the use of practical work in marking handicraft, gardening farming among others as strategies for implementation of vocational and technical education curriculum in Nigeria.

At present, technical and vocational education outside the universities is offered at:

(a) Local Apprentices with Master Crafts
(b) Prevocational School
(c) Vocational Schools
  *Craftsmen-National Technical Certificate (NTC)
(d) Technical Colleges
  *Master Advanced National
  *Craftsmen Technical Cert. (ANTC)
  *National Business and Technical Education Board Examination (NABTEB).
(e) Polytechnics and Monotechnics
  *Technicians – National Diploma (ND)
  *Higher Technicians/Technologists (HND)
(f) College of Education (Technical)
  *Technical Teachers (NCE-Tech.)

In addition to the formal institutions enumerated above, the Federal Government has of late created various programmes/agencies aimed at promoting self-employment and self-reliance through technical education. These include the National Directorate of Employment (NDE), small scale industries loans scheme, the people's Bank, with its drop outs and drug addicts' rehabilitation skill acquisition programme, and the National Open Apprentice Scheme.

**Empowering Vocational and Technical Education Teachers**

Empowering vocational and technical education teachers should be treated with all seriousness in order to achieve success and fulfill the national objectives. The purpose of teacher education and empowerment in this regard is to bridge the gap of educating students at different levels. Teacher education as stipulated in the National Policy on education emphasized that teachers should receive quality training to cope with the changes and innovation in education system. There is need to emphasize on teacher training to enable them acquire knowledge and skills during the training in Nigeria because no education system can rise above the quality of its teachers.

The National Policy on Education (2004) stipulated that since no education system may rise above the quality of its teachers, teacher education shall continue to be given major emphasis in all education planning and development. The policy also stipulate minimum qualification for entry into the teaching profession shall be the Nigeria certificate in Education (NCE).

All teachers in education programmes shall be structured to equip teachers for the effective performance of their duties.

The purpose of teacher education should be to:

1. Encourage further the spirit of enquiry and creativity in teachers.
2. Produce highly motivated, conscientious and efficient classroom teachers for all levels of our education system.
3. Help teachers fit into social life of the community and society at large and to enhance their commitment to national objectives.
Provide teachers with the intellectual and professional background adequate for their further assignment and to make them adaptable to any changing situation not only in the life of their country, but in the wider world.

Enhance teachers’ commitment to the teaching profession.

Empowering Vocational and Technical Education Students

The National Policy on Education highlighted vocational and technical education for developing national consciousness, acquisition of skills, intelligent understanding of the complexity and inculcating the right type of values in the individual students.

The aims of vocational and technical education as stipulated in the National Policy on Education (FRN, 2004) stated that technical education should be:

(i) To provide trained manpower in applied science, technology and commerce particularly at sub-professional grades.
(ii) To provide the technical knowledge and vocational skills necessary for agricultural, industrial, commercial and economic development.
(iii) To provide people who can apply scientific knowledge to the improvement and solution of environmental problems for the use and convenience of man.
(iv) To give an introduction to professional studies in engineering and other technologies.
(v) To give training and impart the necessary skills leading to the production of craftsmen, technicians and other skilled personnel who will be enterprising and self-reliant, and
(vi) To enable our young men and women to have an intelligent understanding of the increasing complexity of technology.

Vocational and technical education teachers and students should strictly adhere to aims and objective stated in the National Policy on education, the innovations and reforms in vocational and technical education should be addressed properly for the attainment of the millennium development goals.

Vocational and Technical Education Curriculum and Implementation Instruction by Teachers

Vocational and Technical education curriculum constitutes a broad range of students experiences in technical college setting, while instruction focuses on the delivery of vocational and technical experiences in the college. More specifically, instruction may be perceived as the planned instruction between the technical teachers and students during implementation that results in desirable learning. Some educators feel that all curricula include instruction, while others contend that sound instruction include a sound curriculum (Mbaiorge, 1992).

The vocational and technical education, most instruction is work-oriented. For this to be achieved, learners must be exposed to active teaching strategies or procedures. Active participation of learners in instruction in any vocational trade must be direct. Direct participation exists where the learner is physically involved in the academic and practical activities involved in that trade. The individual must be particularly affected and will exhibit positive perceptions and experience that indicate positive signals to the attainment of the desired goals (Nwachukwu, 2001).

Direct teaching strategies may be in the form of group or individual activities. Group activities are those that are experienced by two or more students participating in the same learning situation, each taking a part and contributing to the whole activity. Such participation comes in the form of field trips, discussions, committee work and role-playing. On the other hand, individual activities are
those in which each student interacts with some form of live communication in the classroom or work, alone on a project.

**Problems of Vocational and Technical Education in Nigeria.**

One of the greatest handicaps in the improvement and expansion of vocational and technical education is the acute shortage of qualified teachers and administrators. There is a noticeable lack of teacher preparation and in-service training programmes and also difficulty in recruiting well-educated individuals with competence in a relevant occupation. Other prevailing issues that are hindrance in implementation of vocational and technical education are inadequate policy framework, lack of educational standard, lack of active teaching strategies, lack of teacher participation in decision making, and learner interest in vocational and technical education.

The kind of teacher preparation programmes needed for many vocational and technical programmes has never been resolved. Competency in the skills being taught is an obvious necessity, but the present emphasis on this alone is inadequate in the light of changing occupational concepts involving the application of science, computer-related knowledge and general education (Nwachukwu, 2001).

For too long the educational community has misunderstood the nature of vocational and technical education and has refused to understand that there is much more to it than the acquisition of certain skills through the duplication of work activities. Ultimately, vocational and technical education will be as good as those who teach it. The preparation and continued updating of teachers for the task of functional teachers become the responsibility of the colleges and universities with experience in teacher education. The schools and departments in the relevant disciplines such teacher preparation programmes may involve some new relationships between the institution of higher education, business and industry during implementation activities for the attainment of millennium development goals.

The National Policy on Education and the implementation strategies were properly spelt out to achieve the said goals of preparing Nigerians at different levels of education for the attainment of millennium development goals in Nigeria but the Nigerian system of implementation is questionable at the different levels. At the moment, it appears that there are no clear indications of proper implementation of technical education programme at the different levels of education. Hence, the need arises to look critically at the present implementation problems on ground at the different levels of our educational system in Nigeria and to map out strategies to tackle the implementation problems in order to remove such hindrance that may likely block empowering vocational and technical education teachers and students through the curriculum reforms and implementation for attainment of millennium development goals.

Prossers (1949) stated in the theories of vocational and technical education that the school workshops laboratories and total environment where vocational and technical education is given must be adequately equipped to reflect the actual working environment. That is the technical school workshop, laboratories and the working environment should be well equipped. It is simply put that the school workshops should look like the industrial workshop where the students will work after training. It is only through this way that the students can acquire the skills and knowledge necessary to enable them function effectively in the world of work in the attainment of millennium development goals.
Vocational and Technical Education Curriculum Reforms: the Policy Thrust for the Attainment of millennium Development Goals

The overall policy thrust of NEEDS in education is to:

- Provide unhindered access to compulsory universal basic education to all citizens as a bridge to the future socioeconomic transformation of Nigeria society.
- Establish and maintain enhanced quality and standards through relevant, competency based curricula and effective quality control at all levels.
- Enhance the efficiency, resourcefulness, and competence of teachers and other educational personnel through training, capacity building and motivation.
- Strengthen Nigeria’s technological and scientific base by revamping technical, vocational, and entrepreneurial education and making optional use of information and communication technologies to meet the economy’s manpower needs.

Vocational and Education as the Vital Transformation Tool and a Formidable Instrument for Teachers and Student Empowerment.

There are six educational goals set by NEEDS. The six goals for education as a vital transformation tool and a formidable instrument for socioeconomic empowerment of Nigerian’s were highlighted and the third and fourth educational goals and key targets and strategies were pointed out as it affects vocational and technical education as follows:

The first is to ensure and sustain unfettered access to education for total development of the individual.

The second goal is to improve the quality of education at all levels.

The third goal is to use education as a tool for improving the quality of life through skill acquisition and job creation for poverty reduction.

The fourth goal is to ensure periodic review and effective implementation of the curriculum at secondary level to meet the requirements of higher education and the world of work.

The fifth goals is to mobilize and develop partnerships with the private sector and local communities to support and fund education.

The sixth goal is to promote information and communication technology capabilities at all levels.

The third goals are to use education as a tool for improving the quality of life through skill acquisition and job creation for poverty reduction. Targets and strategies for achieving the goal include the following:

(a) Ensure that Nigerians who have completed basic education acquire the literacy, numeracy, and basic life skills needed to live meaningful lives and contribute to national development.

(b) Ensure that 50 percent of secondary school students have access to good quality vocational and entrepreneurial education.

(c) Ensure that 50 percent of tertiary education graduates acquire sufficient technical skills, entrepreneurial skills and knowledge to be self-employed and wealth creators.

The fourth goal is to ensure periodic review and effective implementation of the curriculum at the secondary level to meet the requirement of higher education and the world of work. Targets and strategies for achieving the goal include the following:

(a) Complete the curricular revision exercise to reflect the dynamism of society and emerging global issues.

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Rehabilitate vocational basic technology and resource centres nationwide.

Establish new basic technology and resource centres nationwide.

Produce education materials that reflect the revised curricula.

Establish libraries and information resource centers for teachers and students to complement formal and life-long education and create awareness of their importance.

Involve local crafts people in the delivery of vocational education in schools.

**Tertiary Education Strategies for Developing Human Resources For Attainment Of Millennium Development Goals.**

Under NEEDS the government recognizes the critical importance of tertiary institutions for developing high-quality human resources, especially in an increasingly technology-driven world economy. The government also recognizes the challenges facing these institutions, challenges that include inadequate funding and facilities, curricula that are inadequate to meet the challenges of nation building, inadequate and inappropriate staffing (especially among the lecturers), cultism, and low moral and academic standards among students. Higher institutions in Nigeria currently depend almost exclusively on government subsidies. The bulk of federal government spending on education goes to tertiary institutions; state governments spend at least 20 percent of their budget on education, mostly primary and secondary education. Almost total dependence on the government for funding higher education is neither practical nor sustainable. There is therefore a need for fundamental reforms of the higher education system.

The strategies for reforms for attainment of the millennium development goal include the following:

(a) Strictly adhere to the provisions of the university autonomy Act.

(b) Diversify funding by attracting private sector funding and considering more appropriate pricing of facilities and services (including hostel accommodation).

(c) Update and restructure curricula to meet the demands of the national economy, mainstream science and technology, especially information and communication technology.

(d) Establish effective monitoring of public and private universities to ensure strict adherence to standards.

(e) Develop innovative approaches to ensure continuing retooling and capacity building of lecturers so that they operate at the cutting edge of their disciplines.

(f) Increasingly move towards a decentralized and competitive wage bargaining system, which promotes a performance based reward system.

**Recommendations**

(1) Adequate attention should be given to the National Policy on education framework by teachers for empowering vocational and technical education teachers and students through educational curriculum reforms for the attainment of millennium development goals in Nigeria.

(2) There should be a good vocational and technical education preparation programme to enable the vocational and technical education curriculum implementation to be well implemented by well qualified teachers. The government of Nigeria should also give scholarship to students interested in vocational and technical education in
institutions selected by the government for effective training of teachers to empower them for the attainment of millennium development goals.

(3) The government should recruit teachers and also give in service training to the teaching force to enable them improve in knowledge and skills and also update the teacher with current ideas, skills and knowledge in vocational and technical education to empower them for the attainment of millennium development goals.

(4) Government should appoint vocational and technical supervisors and monitors from the federal, state and local government to look at the present implementation programmes of the schools at different levels to ascertain the levels of compliance with the philosophy, educational standards in terms of equipment and facilities, policy framework and teaching strategies necessary for the attainment of millennium development goals in Nigeria educational system.

Conclusion

The paper was designed for re-appraising the vocational and technical education curriculum for vocational and technical schools in Nigeria for the attainment of millennium development goals. The researcher looked at vocational and technical education aims and objectives of the National Policy on Education (2004) and relating it to different technical school programmes and identified the different problems of disparity in curriculum, standard, inadequate attention, and misappropriation of philosophy and lack of teaching strategies in the implementation of the curriculum in vocational and technical institutions in Nigeria. The author went further to study the National economic empowerment and development strategy (NEEDS) and key target and strategies for achieving and attainment of millennium development goals in Nigeria. Prosser’s (1949) stated the school workshop should be well equipped to attain the standard of the industrial workshop and its environment where the trainers will work after training. In order to achieve the best results in the attainment of the millennium development goals. Ministry of education (vocational and technical unit) should orchestrate, monitor and rectify the following lapses in the implementation programmes: philosophy of administrators, adequate policy framework, educational standard, active teaching strategies, teacher preparation, qualified teaching force, recruitment of qualified teacher, learner participation and teacher participation in decision making during the implementation programme in vocational and technical education institution in Nigeria.

The nation must therefore look ahead to implementing and evolving the well stated national policy on education and NEEDS policy thrust and its different strategies to enable technical schools play the roles of empowering vocational and technical education teachers and students through curriculum reforms and implementation for attainment of millennium development goal in Nigeria.

References


Education: The Deserving Insulation from Territorial, Economic and Technological Disasters of the Vision 2020 Saga

Achilike, Adaku Ngozi

Akanu Ibiam Federal Polytechnic, Unwana, Ebonyi State, Nigeria

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Abstract

Education has been described by many experts and even novices as the sum total of the outcome of human exposure to experiences in different environments. The outcome usually manifests into change in behaviour. The paper sought to x-ray different opinions on outcomes that are capable of insulating countries from disasters inherent in their quest for the first 20 (twenty) best economies by the year 2020. The 20:2020 vision has been ascribed for that magic condition that would create territorial, economic, technological freedom, etc. The paper discussed the issue under the following headings: economic emancipation, technological freedom, educational disasters, the vision 20:2020 saga, the NPE (National Policy on Education) and educational systems changes and the way forward/deserving insulation. Conclusions were drawn and recommendations proffered for teacher education to be made free and rich, books to be captured in Internet, CDs and DVDs, student peer-review assessment for tests and class-work, certification for mid-way dropouts in order to reduce High Dropout (HDO) risk. These were seen as necessary ingredients for achievement of the vision 20:2020.

Keywords: emancipation, disaster, simulation, brainstorming, insulation demonstration and technology.

Introduction

Events trailing the 2020 global vision have thrown Nigeria into conscious efforts in order to key into the processes necessary for the race of being one of the world’s 20 largest economies in the magic year. Various approaches have been applied in the form of reformation and transformation agenda for various sectors of the economy, but the success rate seems to be too low for achievement of the goals. This paper has taken the bold step of looking at the role of education in the achievement of the vision bearing in mind Patrick Awuah’s (founder and president of Ashesi University, Ghana) belief that boldness has genius, power and magic in it. We can apply it in our quest for success in this gigantic vision. Education, the blended real-sense perspective, territorial integrity, economic emancipation, technological freedom, educational disasters, case points, vision 20:2020 saga, the National Policy on Education (NPE) and educational changes, the way forward/deserving insulation: have all taken the total discourse aimed at giving insight into a reliable advocacy approach towards achieving the vision 20:2020 goals. Practicable recommendations were proffered for high-powered policy-making.

Education – The blended real-sense perspective

The history of education is as old as the life of man on earth. From the education of the ancient Egypt, Hindu, Mesopotamia, Jewish (all of which were based on religions); to that of the Spartans, Athens, Rome and Greeks that are based on culture: none seem to digress seriously from the basic
elements involving humans with experiences aimed at giving positive effects on the society. Hence the notable philosophers of our times like Aristotle, Plato, Socrates, Jean Jacques Rousseau and John Locke, etc who theorized the philosophy of education into readable and consumable materials did not mince words in projecting the need for behavioral change. Only the changes can guarantee initiative, pragmatism, and innovation, among other traits in man that are aimed at better living for the reduction/eradication of disasters.

Education has been described by many present renowned authorities and scholars as the agglomeration of well organized experiences of teaching and learning that could lead to change in behaviour. The change must be measurable, testable, transferable and of benefit not only to the individual but also to the society as a whole. Uzoagulu (2004) expects university education to equip the individual to be valuable to self and society while the National Teachers Institute (NTI, 2008) portray ‘education’ as the experience that starts from birth, sum total of cultural and organized activities, and the development of knowledge and abilities in learners for personal and societal enhancement. Entrepreneurship education was viewed by the NBTE (2007) as depicting that blended education that prepares graduates to match knowledge with actions for the satisfaction of personal and societal needs.

As far back as 1993, Shaeffer’s study revealed that educational growth in developing world (countries) subsequently lead to deterioration in the quality of the system. Such growth often lead to increased enrollment, new (often sub-standard) textbooks published, new hands hired to teach and new structures without a commensurate increase in the effectiveness of teaching and values. The situation is sadly bleeding into lethargy for serious studies on the part of students, especially with the way and manner examinations misconducts are spreading like cancer. Bajah (1997) therefore solicited for planned educational activities in a stable setting to guarantee effective teaching/learning resulting to real-sense education.

Territorial Integrity

Territorial boundary connotes area of Power, control and/or authority. This boundary has long been very wide, as a result of which people have often muscled to protect what they consider their territory. Technology has recently broken these barriers, it is believed. Educationists believe that only education can truly guarantee the broken barriers. The space has now been broken by the US, Russia, China, etc and they could only have achieved this through their organized educational system.

Integrity, on the other hand, means the possession of high moral principles and professional standards. Without an organized system, society and standard (SSS), it will be difficult to achieve what America, Russia and others have boasted to the world on. Taking care of the greenhouse emissions, climate changes as well as space visitations, laboratories and researches; problems of population sizes and other similar but differing problems which the developed countries appear to be handling with all amount of seriousness; (though only just maximally succeeding) should be faced squarely by developing countries as well.

Their applications of innovations using residual knowledge and intrinsic values of education in the area of cheap solar technologies which are very relevant in energy conservation are quite applaudable. What are the possibilities that the developing countries (especially Africa) can cope with terrorism, the recent flooding, earthquake, tsunamis and other natural disasters which are no longer restricted to ‘big/advanced countries’? Academic dishonesty is the most brutal part of our current educational reality and calls for concerted initiative or we allow it to put the system in grave danger of battering our generation, as is being witnessed in some parts of the country/world today.

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Economic Emancipation

The economy of a nation or individual involves the financial affairs of production and consumption of goods and services taken as a whole. Emancipation, on the other hand, signifies the state of being free from restriction. Economic emancipation, therefore, relates to the situation whereby a nation or individual is considered to be able to take care of personal or national needs without being encumbered by others (individual or nation). In 2003, the Obasanjo Administration was able to secure debt relief (economic restriction by the Paris Club) from the group of nations that make up that club. This was enabled by the then and present Minister for Finance, Dr. Ngozi Okonjo-Iweala. Without her well grounded education in Finance/Economics, this would not have been possible. It is also noteworthy that her educational background gave rise to her occupying good position with the World Bank and this was an edge the government took advantage of to achieve the debt relief.

Emancipation simply put means the act of securing freedom from disenfranchisement (Wikipedia, the free dictionary, 2010). Nigeria being one of the third world countries does not have as much privileges as the developed countries. As such she has undergone lots of deprivation educationally, economically, technologically and so on. Education holds the key to her avoidance of charity from other nations and embracing of justice in the world body polity.

We can say categorically, that ethically, none can invalidate this knowledge with superb insight, else they will impede a genuine dissection of our educational sector. It is obvious that no particular system can be taken in abstraction without including the knowledge-based management entrenched in education.

Technological Freedom

Technology is nothing but the application of tools, methods and people through well articulated processes/systems in order to achieve greater performance and initiate new ideas leading to developmental strides. As long as the materials of application are borrowed, one cannot be said to be free. This triggers up the importance of education (i.e. real-sense education) which alone is capable of ensuring technological freedom. State of the art technology cannot be achieved through mediocrity but through dint of hard work at education.

Sometimes we allow difficulties to obscure our good sense of judgment. Our youths therefore, need to imbibe the fact that the difficulties encountered in some subjects or programmes are not really sufficient (should not be) to shackle the need for zeal and efforts at being empowered by education. Present realities may not appear to validate this truth but it is worth all the trial one can commit to it.

We have for once learnt to see the great events of world history from below, from the perspective of the outcast, the suspects, the maltreated, the powerless, the oppressed, the reviled – in short from the perspective of those who suffer. The important thing is that this ‘experience of incomparable value’ should be allowed to foster an enlarged generosity and humanity rather than enmity. We have to learn that personal suffering is a more effective key, a more rewarding principle for exploring the world in thought and action than personal good fortune. This perspective from below must not become the partisan possession of those who are eternally dissatisfied; rather, we must do justice to life in all its dimensions from a higher satisfaction, whose foundation is beyond any talk of ‘from below’ or ‘from above’.

(Clement, 1986)
Nigeria can do much better if she has the political will to tackle it. There should be no Sentimental Gap-Filing (SGF) – others must not suffer because we did but using our experiences, we can help the world better. More so, as educated men and women, let us resign ourselves to core facts (core values) knowing that no idea prevails in all its rightness but calls for consideration of others i.e. (positive compromise). Real-sense education is the only weapon with which to ensure that our country and indeed the future generation are equipped with innovative initiative that can transform the nation into a giant one like the Asian tigers have and who are enjoying the privilege of an enviable technological freedom.

**Educational Disasters**

Having described education, it can be deduced that a half-baked educational experience could only lead to disasters. According to Wikipedia (2010), “A disaster is a natural or man-made (or technological) hazard resulting in an event of substantial extent causing significant physical, psychological, biological, educational, economical damage or destruction, loss of any such values that can guarantee comfortable living. According to [www.fafunwafoundation.tripod.com/fafunwafoundation](http://www.fafunwafoundation.tripod.com/fafunwafoundation), Nigeria is one nation that is wonderful in developing policies but poor and deficient in implementation, especially with relation to educational matters and this culminates into a disaster, as implementation is the key to a useful policy.

Disaster is destructive end-results or events that could cause serious loss, hardship, unhappiness or death and therefore, is unsuccessful and unproductive to any individual or nation. According to Karns (2002), much has been said about the decline in the American public school system, more so the Nigerian educational system. As a result, requirements, once stringent, have been lowered over the years to allow the lazy, the unmotivated and the uncaring to pass through. Many students then receive certificates and diplomas but have never been adequately challenged academically – thus the message has been dumped down.

Our infrastructure for the present is underfunded and deteriorating and the quality of our educational curriculum and teaching is not adequately equipping students with the skills needed to compete in the global economy. Those who venture to update and upgrade teaching are seen by government, parents and students themselves as wicked because that entails the student working hard.

In Nigeria, it is evident that the decline in education has been appreciated by those in charge of the system, hence the myriad reviews, reforms and ideas advanced by the Minister (Prof. Ruqayyatu Ahmed Ruffa’i) and Prof. Godswill Obioma (Executive Secretary of NERC). In the face of technology, can these reforms work?

The quagmire we suddenly discover has come upon our educational system did not happen in one day but took a gradual downtrend (nose-dive). Can we then expect that they will disappear suddenly? Many of our teachers from primary to secondary and then tertiary institutions are half-baked. There are lots of malpractices in our system, from examination misconducts of different types to certificate racketeering, then money/employment laundering and appointments depicting mediocrity. Visionary dreaming breeds pride and pretentiousness, and is destructive. The visionary person demands that the community should conform, willy-nilly, to his ideal, which is doomed to failure. But a well blended idea demands that many peoples’ ideas are put together in taking decisions as to what should constitute the mandate of the people for a good vision. These vices have only dragged the nation to a pitiable one and we, certainly, cannot continue this way.
Case point

Ghana World Ranking 2007

<table>
<thead>
<tr>
<th>Organization</th>
<th>Survey</th>
<th>Ranking</th>
</tr>
</thead>
<tbody>
<tr>
<td>Heritage Foundation/Wall Street Journal</td>
<td>Index of Economic Freedom</td>
<td>91 out of 157</td>
</tr>
<tr>
<td>Reporters with borders</td>
<td>Worldwide Press Freedom Index</td>
<td>29 out of 168</td>
</tr>
<tr>
<td>Transparency International</td>
<td>Corruption Perception Index</td>
<td>69 out of 179</td>
</tr>
<tr>
<td>United Nations Development Programme</td>
<td>Human Development Index</td>
<td>135 out of 177</td>
</tr>
<tr>
<td>Vision of Humanity</td>
<td>Global Peace Index</td>
<td>40 out of 121</td>
</tr>
<tr>
<td>CIA – The World Fact-book</td>
<td>GDP (PPP) per capita</td>
<td>162 out of 164</td>
</tr>
<tr>
<td>CIA – The World Fact-book</td>
<td>Real GDP growth</td>
<td>78 out of 216</td>
</tr>
<tr>
<td>United Nations</td>
<td>Population growth</td>
<td>53 out of 230</td>
</tr>
</tbody>
</table>


The above case point shows Ghana ratings by different world bodies. This country happens to rank highest in the continent, followed by South Africa, Kenya, etc. Nigeria did not rank 4th or 5th. It can, thus, be inferred that we rank abysmally low in world rankings and it calls for soberness and a fervent determination to right all the wrongs of our systems.

Other World Rankings – 2007 Global Economy in Brief
Leading economies in World GDP of $48 Trillion

<table>
<thead>
<tr>
<th>Countries</th>
<th>US $Billion</th>
</tr>
</thead>
<tbody>
<tr>
<td>United States of America</td>
<td>$13.4 trillion</td>
</tr>
<tr>
<td>Japan</td>
<td>$04.2 trillion</td>
</tr>
<tr>
<td>Germany</td>
<td>$02.8 trillion</td>
</tr>
<tr>
<td>China</td>
<td>$02.6 trillion</td>
</tr>
<tr>
<td>United Kingdom</td>
<td>$02.3 trillion</td>
</tr>
</tbody>
</table>

In continuation, Africa has a total of $1.092 trillion; as follows;

<table>
<thead>
<tr>
<th>Countries</th>
<th>US $Billion</th>
</tr>
</thead>
<tbody>
<tr>
<td>South Africa</td>
<td>$255 billion</td>
</tr>
<tr>
<td>Nigeria</td>
<td>$191 billion</td>
</tr>
<tr>
<td>Egypt</td>
<td>$107 billion</td>
</tr>
</tbody>
</table>

These globally shrank in 2009 – Source:

It is noteworthy that Nigerian Human Development Index (HDI) is 154 out of 170 with a value of .499 out of .999 while her university ranking is 61 out of 62 in Africa.

Further rankings on Nigerian economy

<table>
<thead>
<tr>
<th>Macroeconomic environment</th>
<th>20th</th>
</tr>
</thead>
<tbody>
<tr>
<td>Benefits from large market</td>
<td>42nd</td>
</tr>
<tr>
<td>Functioning regional standards</td>
<td>62nd, 61st &amp; 57th</td>
</tr>
</tbody>
</table>
According to Sani (2010), Nigeria’s economic growth appears to be at the mercy of incessant volatile international market and unless she diversifies by insulating her markets from external disruptive effects, the transformational programmes being put in place would only end up in the archives. Again, real-sense education is the key insulator, where it is built to encourage high incidence of creativity without a bottom line. It is then pertinent to train our youths on change management and adaptation thus making thinking/learning environment very essential.

The present administration’s decision to send our 1st class brains for further studies abroad with the idea of using them to transfer learning/knowledge, when they return, is laudable. However, there is need to ensure that these brains are truly 1st class. Without appearing to be pessimistic, the level of academic dishonesty being witnessed in our institutions must be checked to ensure that we do not send our ‘best brains’ out to further reduce Nigeria’s world rankings.

Efforts being made by well meaning citizens to re-position the system should be improved upon and appreciated by all and sundry (parents, children, adults, leaders, etc.) for it to positively impact upon our lifestyles and develop the nation. It is obvious to an educationist that only a conscious, consistent and organized effort will yield the desired result.

**The Vision 20:2020 Saga**

Many nations of the world are clamoring to be included as first top twenty most developed nations. Nigeria is also struggling in the race. A saga however can be described as complicated series of events or personal experiences stretching over a considerable period of time. Thus we can regard the vision of a country aspiring to be part of the world development vision as a saga since it involves numerous but myriad events, several years and experiences requiring interlinks for better achievement.

As the country pursues her quest for a place in the global vision, care must be taken to note the following Development Key Indicators (DKI):
In the bid to face challenges headlong, the country has set up committees to map strategies for achieving the goal. Despite the human, material, natural endowments and coastal location available to the country as potentials for growth, very little has been realized. Previous and present administrations thus, seem to lack the political will to attain considerable/substantial growth rate. This is seen in their intention to pursue the vision amidst economic stagnation, declining welfare, social and economic instability without the desired vigor. It is obvious that action is demanded; not packaged portfolio and rhetoric.

Global warming, emergency response rate, global health record, economic growth, great technological innovations and entrepreneurial skills, among others, will all count in the global achievement assessment. The preparations, the actions, reactions and counteractions are all the desired penultimate aimed at achieving the ultimate – 20:2020. The superb insight demands that;

“For the sake of the ultimate, the penultimate must be preserved. Any arbitrary destruction of the penultimate will do serious injury to the ultimate.” Clement (1986:59)

The NPE (National Policy on Education and Educational System’s changes)

The Policy as is practiced today seems to have digressed from what was originally intended by educational developers and curriculum planners of old. On the premise of the decline, Prof. Obioma according to vanguardngr.com/category/education (2012), has been charged with a holistic review of the 2004 NPE which has been rendered obsolete by current educational realities both nationally and internationally. Its defects and deficiencies are very obvious and as such complicity in handling it will not suffice at this time.

Nigerian national goals derived from the philosophy of her educational system include: knowledge for national consciousness and unity; knowledge for right type of values and attitudes that are helpful for survival; knowledge aimed at imparting understanding of the world around; and knowledge for the acquisition of mental, physical and social abilities and competencies necessary for individual survival and for purposes of contributing to national growth. The philosophy therefore, demands that concepts and principles are important ingredients for knowledge impartation. This is the only way we can breed citizens who will not only know how to use a machine, but who will also know the overall workings of the machine in order to develop the initiative on how best to use, maintain and care for it as well as develop a better one in future.

Technology, which has somewhat simplified knowledge, demands that knowledge be properly managed in order to make it more useful. The idea of introducing too many examinable subjects
into the primary and secondary curricula at the whims and caprices of political office holders in order to pacify their professional ego would only lead to a disastrous educational system where students are churned out with little or no knowledge at all. This idea would run contrary to the current global educational realities where different people are trained in different areas to cover so much that will equip them to diversify and contribute to the system, something new as they progress.

The Way Forward/Deserving Insulation

Insulation can be viewed as a condition or situation that provides protection against something undesirable or unpleasant (Encarta, 2009). From the foregoing, therefore, it is obvious that for the country to be protected from undesirable unpleasantness of backwardness, underdevelopment, recession, there is the need for insulation through real-sense education. We must catch our children young in this plan and groom them through all triangular pinnacle of education in order for success to be beneficial. The President has started well by directing that all first class graduates of our universities be tipped for higher degrees overseas so as to equip them to lecture in our universities for at least five years. This is good news but there is need for a strategy to ensure that this selection is not marred by malpractice of ‘grade sale’ and that our institutions are well equipped for studies.

It is a distinctive thing in the life shape of an individual that elements and developments are triggered up during his educational career. This positive benefit should kick-start with parental home and progress, in order to make real sense that would create devotion for both parents and nation. This opinion was projected by Clement (1986) as he delved into the issue of patriotism. It would be more relevant today.

As opined by Ezichi, Kenebara, Anele and Achilike (2009:33) “Researches must be occasioned by the need to:
(a) Provide answers to the following operational questions – happenings in classrooms, offices and beyond
(b) Advance knowledge that would help current practices (c) improve creative thinking and simulations
(d) Better re-ordering of educational programmes planning and materials
(e) Build up a body of new knowledge that will reflect technological innovations, and
(f) Give a guide for future predictions that could use sound theoretical constructs and/or modules on educational processes.”

There is no doubt that weighing and assessing researches through the above bases by A Research Censor’s Board would go a long way in improving researches for Government decision-making that would increase or improve the dividends of democracy, via education, to the people. These assessments should be publicized in the Internet and other media.

Conclusion

It is concluded from the text that the need for a real-sense education that would prepare our generation for bracing up for the challenges sequel to the achievement of vision 20:2020 is a necessity that must be faced by the nation. This would demand a critical review of all the sectors allied to education in order to give education a holistic overhaul. Borrowing a leaf from philosophers of old and the immediate past, we can fashion a present and future that is better blended just as the developed nations (China, America, United Arab emirates, Britain, etc) have done in the area of technology. Our children can be groomed to develop interest from home and to
enjoy being useful in the scheme of things. Little incentives provided in yearly budgets to get to 26% would get the nation there albeit with little difficulties. This would ostensibly involve developing our early-child education, primary, secondary and tertiary education with uniform standard, bearing in mind Jean Jack Rousseau’s philosophy that every child (especially the healthy child of today – through a well developed health system) is born good and intelligent; only the right input would elicit the right outcome, thus ensuring the desired insulation from disasters and other difficulties associated with the move for a successful vision 20:2020.

Recommendation

The paper, drawing from the conclusion, recommended as follows;

- That pre-school education should be taken more seriously by all agencies concerned with it, to ensure a well grounded foundation for our children’s training.
- That the psyche of our children should be tailored with or to the fact that failure to pass an examination does not signify dullness but inability to cover sufficiently what needed to be known for a particular examination.
- That teachers should be well trained so that they can impart what they have, bearing in mind that a nation cannot grow above the level, knowledge and standard of her teachers.
- That teacher education in our colleges and universities of education should be sponsored by government in order to develop interest and skill in teaching.
- Since this generation has much interest in chats through network, lessons, manuals and books should now come in CDs and DVD plates as well as through internet websites in order to capture the interest of our youths for education.
- That prize be awarded for excellent performance in different subjects each term, semester, and year; as an incentive for encouragement.
- That simulations, brainstorming and demonstrations be emphasized during lessons. Case studies should also be generated to develop interest which will form basis for brainstorming group sessions. This will help develop critical thinking in our youths. These could form practical sessions for pupils and students.
- Students should be made to peer-assess their tests, coursework, course tests and practical work before grading is done by the teacher. That way, improvements will be done on pupils and students before exams.
- Knowledge and change management should be entrenched for enrichment purposes into sub-curricula.
- Rusticated students could be assessed and offered certificates (for programme participation) to go for lower jobs.
- Higher qualifications like Post Higher National Diploma (PHND), Master of Technology (M.Tech) and Doctor of Technology (Tech.D/TD) should be commenced in our Technological institutions, to prevent brain drain to the University sector.
- Government should provide seed funding for private universities, polytechnics, mono-technics and colleges of education.

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