Forward

I have the pleasure to furnish you herewith the Proceedings which herein contains a collection of the papers presented at Abuja International Conference on Education (AICE2013) organized by African Society for Scientific Research and African Association for Teaching and Learning in cooperation with several partners and collaborating journals in the international community. The conference was held August 18-21, 2013 at FCT Education Resource Center, Abuja-Nigeria.

The AICE series is an academic activity for interested scholars, educators, scientists, technologists, policy makers, corporate bodies and graduate students. The aim of the conference is to diffuse research findings and create a conductive environment for scholars to debate and exchange ideas that lead to development in social, political, technological and economic spheres of the global community.

Following the call for papers by the International Scientific Commission, papers we received more than 200 proposals from 25 different countries from all continents. As a commitment to the vision and mission of academic excellence and integrity, each paper was anonymously reviewed by two members of the editorial sub-committee of the Commission. This book of proceedings contains a selection of the papers presented at the conference.

We wish to express our sincere thanks to the FCT Education Resource Center, Abuja-Nigeria for providing the venue and facilities for the conference and for being committed to towards ensuring the success of the conference. We thank the management and staff of our institutional partners for their cooperation and support for the project. We express our profound gratitude to all and sundry especially our Special Guests, delegates, reviewers, the media, the Nigerian foreign missions and all the cooperating partners for their contributions in promoting this noble academic event.

Please read on!!!

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INTEGRATION OF ONLINE LEARNING INTO DISTANCE EDUCATION IN NIGERIA

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ABSTRACT
The paper examines the integration of online learning (e-learning) into distance education in Nigeria. The government of Nigeria accepts distance leaning as a process through which additional formal educational qualifications can be earned. The introduction of ICT usage, integration and diffusion has initiated a new age in educational methodologies, thus, it has radically changed traditional methods of teaching and learning patterns in the domain as well as offering contemporary learning experiences to both instructors and students. Change is common in the educational sector and information technologies are now beginning to find their way into the classroom instruction. Online leaning would be useful for resources provision, capacity to support a range of communication strategies and cost effectiveness. This paper examines the concept of distance education and online technology, requirements for developing and implementing course materials into online and the possibilities for online learning.

Key Words: Integration, Online Learning, ICT, Education and Nigeria

INTRODUCTION
Promoting the development of a knowledge society through open and distance education is one of the tactics increasingly adopted in recent times by governments around the world who want to encourage economic development at the local, state and national levels. Researchers (Howell, Williams & Lindsay, 2003) have shown that distance education programs in particular are growing in importance as centers for the development of knowledge society, and this has led several countries, notably those in the west to develop strategies to encourage this effort aimed at providing people who do not have the opportunities to attend conventional institutions of higher learning. However, advances in information and communication technologies (ICTs) have posed complex problem for colleges and universities in Sub-Saharan Africa (Ololube, 2006, pp. 101-118), especially in their distance education programs to reaching the goal of promoting the development of a knowledge society. Distance education, also called open or distance learning is a form of education in which there is normally a separation between teachers and learners. Thus, it includes one which others may refer to as a means of the printed and written word, the telephone, computer conferencing or teleconferencing used to bridge the physical gap between the instructor and the learner. Distance education equally involves the provision of whatever educational opportunities
that are needed by anyone, anywhere, at any time for those who otherwise would have been denied.

Improving the quality of education through the diversification of contents and methods and promoting experimentation, innovation, the diffusion and sharing of information and best practices as well as policy dialogue are UNESCO’s strategic objectives in Education (UNESCO, 2002, 2005). By itself, information and communication technologies (ICTs) literacy rate have become key tools that has a revolutionary impact of how we see the world and how we live in it. ICT literacy is the capability (knowledge, skills and aptitude) of a person to identify, search effectively and present specific information in order to build knowledge and develop critical and creative thinking pertinent to a field of study. This phenomenon has given birth to the contemporary and advances in our ways of life. ICTs are having a revolutionary impact on educational methodology both at conventional and distance education levels globally. However, this revolution is not widespread and needs to be strengthened to reach a large percentage of the population. In a complex society like Nigeria, many factors affect distance education. Therefore an interdisciplinary and integrated approach is very necessary to ensure the successful development of Nigeria’s economy and society (Mac-Ikemenjima, 2005).

The academic landscape in Nigeria includes the teaching and learning process, along with the educational programs and courses and the pedagogy or methodology of teaching; the research process, including dissemination and publication; libraries and information services; higher education administration and management, and distance education programs (Beebe, 2004). According to the national policy on education, Federal Republic of Nigeria (1989), higher education refers to postsecondary section of the national education system which is given in Universities, Polytechnics and Colleges of Technologies including such courses given by Colleges of Education, Correspondence Colleges and such institutions as may be allied to them. The terms of references for these institutions of higher education as indicated in the national policy on education are:

• The acquisition, development and inculcation of the proper value-orientation for the survival of the individual and society.
• The development of intellectual capacities of individuals to understand and appreciate their environments
• The acquisition of both physical and intellectual skills which will enable individuals to develop into useful members of the community
• The acquisition of an objective view of the local and external environments (p.22).

The Federal Republic of Nigeria (2004) through its national policy on education detailed that the goal of distance education should be to:

• Provide access to excellence education and equity in educational opportunities for those who otherwise would have been denied.
• Meet special needs of employers by mounting special certificate courses for their employees at their work place.
• Encourage internationalization especially of tertiary education curricula.
• Restructure the effect of internal and external brain drain in tertiary institutions by utilizing Nigerian experts as teachers regardless of their locations or places of work (p. 45).

Thus, the federal government is convinced that for higher education to make optimum contribution to national development, ICTs are essential ingredient to foster its
implementation. Though, the integration of Information and Communication Technologies (ICTs) in distance education programs in Africa has not been encouraging and has been the topic of a good deal of debate globally. Although in Nigeria, the relationship between the development of ICTs penetration and use in distance education programs and its diffusion into the programs in higher education in general is dependent upon a number of factors.

The resources required for distance education are human, physical, financial and technological. His paper focus on the technological resources. The government of Nigeria accepts distance learning as a process through which additional formal educational qualification can be earned. This belief has been demonstrated through the recognition and coordination of distance and correspondence teaching institutions in Nigeria. Change is common to the educational sector, even if it comes slowly and with a great deal of reluctance from faculty and administration. Information technology of the last twenty years has begun to transform cultures across the globe, computers and related technologies are also now beginning to find their way into the classroom instruction. Although print materials remain the principal medium of instructions for distance education programme, there are attempts to apply to apply the various technologies to support this programme. At the forefront of technology – related change in education is ONLINE LEARNING through distance of internet technologies.

This paper therefore focuses on concepts of distance education and online learning, requirements for developing and implementing course materials into online, the possibilities for online learning, the definitions of technical terms used and conclusion.

**Concept of Distance Education**

Distance education is described as a set teaching and learning strategies (or educational methods) that can be used to overcome spatial and temporal separation between educators and learners. Okebukola and Shebani (2001) opined that distance education is an approach which combines the principles of learner centeredness, lifelong learning, flexibility of learning provision, the removal of barriers to access to learning, the recognition for credit of prior learning experience, the provision of learner support, the expectation that learners can succeed and the maintenance of rigorous quality assurance over the design of learning materials.

Chandler (1991) conceptualized distance education as an educational process in which a significant proportion of the teaching is conducted by someone removed in space and/or time from the learner. Distance education, according to Durosaro (2001), led to open approach to education which seeks to remove all unnecessary barriers to learning, while aiming to provide learners with a reasonable change of success in education and training system centred on their specific needs and located in multiple areas of learning. Here, the decisions about learning are taken by the learners.

Smith 7 Kelly (1981) paid attention to the characteristics of distance education as separation of teacher and learner, institutional accreditation, use of technical media, provision of a two-way communication, possibility of face-to-face meetings for tutorials and participation in the most industrialized for of education.

**Concept of Online Learning**

Information technology revocation of the last twenty years has began to transform culture across the globe; computer and related technologies also are now beginning to find their way into classroom instruction. At the fore-front of technology-related change in
education is the online learning through distance education which is defined broadly as educational application of internet technologies. Globally, online means operating within internet platform. Any activity that one carries out through gaining access to the World Wide Web (WWW) through internet is said to be done online. It can likened to using telephone – a user being online when engaging someone in conversation on the phone. It is commonly referred to as an information highway and the means of transmission. Gal breath (2000) perceived it as a loom, thus, emphasizing its interconnectivity which allows for shared information and communication between computer users. Internet technology is used to facilities resource provision and communication. The resource provision include word wide web (WWW), Telnet; File Transfer Protocol and Gopher and while the communication provision include electronic mail (e-mail), mailing lists and list serves, ‘Chat and Talk’ and conferencing. These terms are explained under the definitions of technical terms later in this paper.

**Implementation of Online course Materials**
The development of online learning into distance education involves six steps as indicated by Okebukola and Shabani (2001). These are:

1. Preparation of course text, audio and video films.
2. Web site design, hosting, publishing and promotion.
3. Designing and testing of site.
4. Acquiring Cyberspace
5. Running and Maintaining Online courses and learners support
6. Monitoring and Evaluation

The three major requirement for developing and implementing course material into online learning are connecting and acquisition of cyberspace, preparation of course content in cyberspace and online support service

1. **Connectivity and Acquisition of Cyberspace**
   Here, Computers must be networked and connected to cyberspace connectivity means linking up with the millions of computers that are already connected to the World Wide Web (Internet). The basic scheme in connectivity involves the installation of equipment that can upload/download data to and from Internet. In consists of:
   - A VSAT (Satellite)
   - Microwave/telephone line links
   - Software for data transfer
   - A Pentium grade PC with a modern and browser
   - Payment of connectivity fees to local ISP

2. **Presentation of Course Content in Cyberspace.**
   The web page represents the typical cyberspace-friendly format. The contents of the course-tests, audio and video are transformed into web pages.
   The requirements for presentation of course content are:
   - Hardware: A Pentium grade PC
   - Software: web authoring software
   - Personnel: web page designer/developer

3. **Online Support Service**
   The requirements are:
   - **Academic**: Minimum of two PCs connected to the Internet—one for use by the course teacher and the other for the teaching assistant.
- **Administration:** Minimum of one of one PC connected to the Internet for one support/help desk personnel for each department.

**Possibilities of Integrating Online Learning into Distance Education**

Audio – video and computer technologies are currently being used to support corresponding teaching and face-to-face instruction in a number of countries with varying degree of success. The introduction of online learning into distance education in Nigeria would be great importance to learners and teachers and among learners and teachers themselves. It is also an additional source of information and knowledge. Educational possibilities of online learning include the capacity to provide promptly up-to-date resources to a large number of learners easily and relatively cheaply. Changes made to resources can become available to students without incurring major additional distribution costs. Similarly, communication resources such as tutorial lectures can be distributed more often, thus reducing costs of ongoing communication by the education provider. Online learning strengthens the capacity to support a range of communication strategies especially easy asynchronous communication between educator and learners. Thus, students can post questions or ideas to educators, who can then respond at later times.

Online learning creates new possibilities for introducing flexibility to learners in terms of time, place and pacing of independent study. Access to the internet is relatively easy and comfort. Access can be achieved at home (in the comfort at the living room, study or bedroom) in the office, at the airport, in the train or even as one walks along the street as long one is able to access the Internet. Online course materials are within the reach, feedback to students is quicker and more efficient. There are no postal delays. The speed of feedback depends on how fast the learner.

The Internet is a huge resource into which learners can look for supplementary materials. Since online learners operate within Internet environment, they are well positioned to make very good use of the resource materials and also obtain articles and other materials that are relevant to their course of study and assignments in such courses. Visual sounds and texts can be embedded, easily in online presentation. Indeed, the teacher can interact with learners in real time.

Online learning provides access to students who either because of work commitments, geographical distance or poor quality or inadequate prior learning experiences are denied access to traditional full time contact education. Furthermore, online learning seeks to expand access to educational provision to a significantly larger number of learners. Many technology based educational initiatives have failed precisely because of their expense. This problem can quite easily occur in efforts to use internet technologies for educational purposes. Nevertheless, if planned carefully and coasted thoroughly, the use of these technologies can under certain circumstances create! Possibilities for achieving cost-efficiencies in educational provision.

**ICT and Education**

Information and Communication Technologies (ICTs) are advances in technologies that provide a rich global resource and collaborative environment for dissemination of ICT literacy materials, interactive discussions, research information, and international exchange of ideas, which are critical for advancing meaningful educational initiatives, training high skilled labor force, and understanding issues related to economic
ICTs highlight innovative efforts and partnerships and promote ICT literacy, and facilitate interaction between all sectors of a national economy including external spheres. Higher education institutions across the world have been adopting ICT teaching and learning technologies in an effort to create an environment for both students and their instructors to engage in collaborative learning environment and gain access to information (Ifinedo, 2006). Access to information through ICT is the amount of information accessible to individuals to support them in trying new strategies, thinking and creativity that are reflective in practice aimed at engaging them to new innovations through the use of ICTs (Ololube, In press). Information and communication technologies (ICTs) are indispensable and have been accepted as part of the contemporary world especially in the industrialized societies. In fact, cultures and societies are adjusted to meet the challenges of the knowledge age. The pervasiveness of ICT has brought about rapid changes in technology, social, political, and global economic transformation (Nwachukwu, 1994; Yusuf, 2005). As such, every nation invests heavily in higher education because it can produce unquantifiable benefits for individuals, organizations and the society as a whole.

Education is provided through formal and informal means. In formal settings the conventional (face-to-face instruction) and distance education (offered with separation in terms of physical location of instructors and students) have been used to provide educational opportunities to recipients. Open and distance education though not new in Nigeria has been given much prominence of recent. Many Nigerians benefited through the open education (correspondence) of Rapid Result College, and Exam Success Correspondence College, among others. It is also a means of providing access to basic information and tertiary education for Nigerians (Yusuf, 2006, pp. 22-29).

Notwithstanding the keenness by the federal and state governments to guarantee open and distance education in Nigeria, the use and penetration of ICTs in distance education teaching and learning has been a major obstacle that may have impeded proper implementation of the program by institutions of higher learning. The evidence seem glaring that Nigeria is not yet ready in her preparedness to integrate ICTs in all spheres of her national economy (Ololube, 2006, pp. 101-118). For example, a recent study conducted by the Global Information Technology (2005), the report used the Networked Readiness Index (NRI), covering a total of 115 economies in 2005-2006, to measure the degree of preparation of a nation or community to participate in and benefit from ICT developments. Nigeria was ranked 90th out of the 115 countries surveyed. United States of America topped the list, followed by Singapore, Denmark, Iceland, Finland, Canada, Taiwan, Sweden, Switzerland and the United Kingdom etc. Likewise, Nigeria was ranked 86th out of 104 countries surveyed in 2004 which still shows a decline in Nigeria’s preparedness to participate in and from ICT developments. Similarly, a study by Nigerian Information Technology Professionals in America in 2002 indicated that given current ICT penetration it may take Nigeria 50 years to catch up with America on the aspect of PC count per households (Iromanto in Yusuf, 2006, pp. 22-29).

The domain of distance education has not been unaffected by the penetrating influence of information and communication technology. Unquestionably, ICTs has impacted on the quality and quantity of teaching, learning, and research in distance education. Therefore,
ICT provides opportunities for distance education students, academic and non-academic staff to communicate with one another more effectively during formal and informal teaching and learning (Yusuf, 2005). For this reason, distance education programs in Nigeria need to integrate ICTs into their agendas, because the quality of teaching using ICTs to gain access to information is known in virtually all countries to be a key predictor of quality student learning. Therefore, effective manpower training is crucial using ICTs, because ICTs are tools that on the one hand can facilitates human resources development, and on the other hand, helps us to take full advantage of the potential of technology to enhance quality student learning via distance education (UNESCO, 2003).

**Definition of Key Terms**

**Browser:** - This is a piece of software in the computer that acts as a translator. This Software allows you to read information from a server on the internet. Browser enables information to be found by clicking on a series of hypertext coloured links that connect one document to another.

**Internet:** - Otherwise referred to as the 'Net', this is a network of millions of computers that are connected world wide and linked to share data. The internet offers services such as FTP, Telnet, Usenet, e-mail and (www) access. Information super-highway and Global Information Organization are other synonyms for the Internet.

**Online:** - This means operating within the Internet platform. Any activity that one carries out on gaining access to the World Wide Web (www) through the Internet is said to be done online. It can be likened to using the telephone - a user being on line when engaging someone in conversation on the phone.

**Download:** - transferring materials (data) from one storage device to another. Or when course materials are being transferred from the Internet to the computer of the learner.

**Telnet:**- is a service that enables a user to log on to another computer attached to the internet, by typing telnet followed by the hostname of the other computer.

**File Transfer Protocol (FTP):**- is a software programme that allows the transfer of files from a remote computer to the computer of an Internet service provider.

**Offline:** - operating outside the Internet platform. If you are using your computer without Internet connectivity you are said to be operating offline.

**World Wide Web (WWW):**- It is an Internet service or application that enables users to share visual information. The www contains a large network of data including hypertext documents which may contain images, animation, text and sound.

**Mailing list or distribution list** is a software function that allows a user to send a message to predetermined list of recipients. Gopher is a text based search and retrieval system for documents on the Internet.

**Electronic Mail (e-mail):**- allows for the sending of message or files from one computer to another.

**Mailing lists & listserve** use e-mail for one-to many and many too many communication.

**Chat and Talk:** - allows synchronous communication most similar to a telephone conversation. When 'talk' is used, two people arrange to be online at the same time and can then view each other's typing on a split screen synchronously. With 'chat' each
member of a discussion group types in his/her communication and all other members of
the group can see the words on their screens.

**Conclusion**
This paper examined the integration of online learning into distance education in Nigeria.
The education stakeholders are unlikely to provide for all those who need to be educated.
There is the need to integrate distance education through online into the educational
system so as to achieve accessibility to a large number and a richer mix of learner. It also
creates environmental friendliness, rapid feedback, multimedia presentation and ease in
the management of instruction. It is also cost effective. The www have finally brought
unprecedented opportunities for improved instruction in the nation's educational system.

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The natural environment of the 21st century is facing the threat of global warming and climate change due to human interaction with the environment. This paper focused on environmental challenges in the Niger Delta and the impact of oil spillage on the biodiversity of the wetland area of the zone. Appropriate Conservation and Sustainable approach were recommended, which include: Enforcement of environmental laws, cleansing of oil spill, restricting access to environmental resources and constant surveillance of our coastal areas and oil fields.

Introduction

Environmental Education refers to organized efforts to teach about how natural environment function and particularly how human beings can manage their behavior and ecosystems in order to live sustainably. The term is often used to imply education within the school system, from primary to post – secondary. However, it is sometimes used more broadly to include all efforts to educate the public and other audience including print materials, websites, medial campaign e.t.c.

Environmental education as Swan (1969) consented is learning processes that increase peoples’ knowledge and awareness about the environment and associated challenges, develops the necessary skills and expertise to address the challenges and foster attitudes, motivations and commitments to make informed decision and take responsible action as (UNESCO: Tbilisi declaration 1978) emphasized certain concepts, principles and policy of this declaration focus of environmental education as follows:

- Awareness and sensitivity about the environment and environmental challenges.
- Knowledge and understanding about the environment and environmental challenges.
- Attitude concern for the environmental and help to maintain environmental quality.
- Skills to mitigate the environmental problems.
- Participation for exercising knowledge and environmental related programs.

Environmental education programs therefore seeks to first engage with participants through developing a sense of nature appreciation which is then translated into action that affect conservation and sustainability.
Environmental Sustainability.

Environmental sustainability involves making decision and taking action that are in the interest of protecting the natural world with particular emphasis on preserving the capability of the environment to support human life.

Environmental sustainability is making responsible decision that will reduce your business negative impact on the environment it is not simply about reducing the amount of waste you produce or using less energy but is concerned with developing processes that will lead to business becoming completely sustainable in the future.

Human activities can potentially cause damage to all areas of the environment, some of the common environmental concerns include:

- Damaging rainforests and woodland through logging and agriculture clearing.
- Polluting and over – fishing of oceans, rivers fossil fuels.
- Damaging prime agricultural and cultivated land through the use of unsustainable farming practice.

NIGER DELTA

The Delta covers, 20,000km² within wetland of 70,000km² formed by sediment deposition. Home to 20 million people and 40 different ethnic groups, this flood plain makes up 7.5% of Nigeria’s total land mass. It is the largest wetland and maintain the third-largest drainage basin in African. The Deltas environment can be broken down into four ecological zones: coastal barrier islands, mangroves swamp forest, fresh water swamps, and lowland rainforests.

This incredibly endowed ecosystem contains one of the highest concentrations of biodiversity on the planet, in addition to supporting abundant flora and fauna, arable terrain that can sustain wide variety of crops, lumber or agricultural trees and more species of freshwater fish than any ecosystem in West Africa.

However, the region is by far the record holder among environmental disaster zones of the world which can perhaps be best encapsulated by a 1983 report issued by the NNPC. Long before popular unrest surfaced: We witnessed the slow poisoning of the waters of this country and the destruction of vegetation and agricultural land by oil spills which occur during petroleum operations. But since the inception of the oil industry in Nigeria, more than twenty five years ago, there has been no concerned and effective effort of the part of the government let alone the oil operators to control environmental problems associated with the industry.

OIL SPILLS

Extent of the problem

Nigeria has a total of 159 oil fields and 1481 wells in operation according to the ministry of petroleum resources. The most productive region of the nation is the coastal Niger Delta Basin in the Niger Delta or South-south region which encompasses 78 of the 159 oil fields.

The Department of Petroleum Resources estimated 1.89 million barrels of petroleum were spilled into the Niger Delta between 1979 and 1996 out of a total 2.4 million barrel spilled in 4,835 incidents (Daily independent 26 July, 2010) (approximately 220 thousand cubic metres) A UNDP report states that there have been a total of 6,817 oil spills between 1976 and 2001 which account for a loss of three million barrels of oil of which more than 70% was not recovered (UNDP 2006) most of these spills occurred off-shore (69%) a
quarter was in swamps and 6% spilled on land. Some are caused by sabotage and thieves, however most are due to poor maintenance by oil companies (shell).

The Nigerian National Petroleum Corporation places the quantity of petroleum jettisoned into the environment yearly at 2,300 cubic metres with an average of 300 individual spills annually (Browen 1999) However, because this amount does not take into account “minor” spills, the World Bank argues that the true quantity of petroleum spilled into the environment could be as much as ten times the officially claimed amount. The largest individual spills include the blowout of a Texaco offshore station which in 1980 dumped an estimated 400,000 barrels (64,000 m$^3$) of crude oil into the Gulf of Guinea and Royal Dutch Shell’s Forcados Terminal tank failure which produced a spillage estimated at 580,000 barrels 92,000 cm$^3$ (Nwilo & Badejo 2001). In 2010 Baird reported that between 9 million and 13 million barrels have been spilled in Niger Delta since 1958 (Baird J. 2010).

CAUSES

Oil spills are common event in Nigeria and occur due to a number of causes including: corrosion of pipelines and tankers (accounting for 50% of all spills) sabotage (28%) and oil production operations (21%) with 1% of the spills being accounted by inadequate or non-functional production equipment. The largest contributor to the oil spill total, corrosion of pipes and tanks, is the rupturing or leaking of production infrastructures that are described as “very old and lack regular inspection and maintenance (Nwilo & Badejo 2001) A reason that corrosion accounts for such a high percentage of all spills is that as a result of the small size of the oilfields in the Niger Delta, there is an extensive network of pipelines between the field, as well as numerous small network of flowline. The narrow diameter pipes that carry oil from wellheads to flowstations allowing many opportunity for leaks. In onshore areas most pipeline and flowlines are laid above the ground. Pipelines which have an estimate life span of about fifteen years are old and susceptible to corrosion. Many of the pipelines are as old as twenty to twenty five years (Brownwen 1999). Even shell admits that most of the facilities were constructed between 1960s and early 1980 to the then prevailing standard (SPDC) Shell Petroleum and Development Company) would not build them that way today.

Sabotage is performed primarily through what is known as “bunkering” whereby the saboteur attempt to tap the pipeline. In the process of extraction, sometimes the pipeline is damage or destroyed, oil extracted in this manner can often be sold. Damaged lines may go unnoticed for days and repair of the damaged pipes takes even longer. Sabotage and theft contribute further to environmental degradation.

While the popularity of selling stolen oil increases, the number of deaths are increasing. In late December 2006 more than 200 people were killed in the Lagos region of Nigeria in an oil line explosion.

Nigerian regulations of the oil industry are weak and rarely enforced allowing in essence the industry to self regulate (Baird J.2010)

CONSEQUENCES

Spills in populated areas often spread out over a wide area, destroying crops and agricultures through contamination of the groundwater and soil in agricultural communities, often a year supply of food can be destroyed instantaneously because of the careless nature of oil operation in the Niger Delta.

People in the affected area complain about health issues including breathing problems and skin diseases , many have lost basic human rights such as heath, access to
food, clean water and in ability to work. Oil contamination affects the fish population and affects the farmers that rely on fishing to support their families.

Theories and Examples

Central to Hardin’s article is an example (first sketched in an 1833 pamphlet by William Foster Lloyd) involving medieval land tenure in Europe of herders sharing a common parcel of land on which they are each entitled to let their cows graze. In Hardin’s example it is in each herders interest to put the next (and succeeding) cows he acquired onto the land even if the quality of the common is damage for all as a result through overgrazing. The herder receives all of the benefits from an additional cow, while the damage to the common is shared by the entire group. If all herders make this individually rational economic decision, the common will be depleted or even destroyed, to the detriment of all. Hardin also cited modern examples including the overfishing of the worlds oceans and ranchers who graze their cattle on government lands in the American West.

TRAGEDY OF THE COMMON

The concept of the tragedy of the common is extremely important for understanding the degradation of our environment. The concept was clearly expressed for the first time by Garrett Harding in his famous article in science in 1968 which is widely accepted as a fundamental contribution to ecology population theory, economics and political science.

Harding University of California santa Barbara.

The basic Idea.

If a resource is held in common for use by all, then ultimately that resource will be destroyed freedom in a common brings ruin to all “to avoid the ultimate destruction, we must change our human values and ideas of morality.”

1. Held in common means the resources in owned by no one, or owned by a group, all of whom have access to the resources.

2. Ultimately means after many years, maybe centuries. The time interval is closely tied to population increase of those who have access to the resources. The greater the number of people using a resource, the faster it is destroyed. thus the tragedy of the commons is directly tied to over population.

Hardin asks for strict management of common goods via increase government involvement or and international regulation. In addition, moral or ethic can lead to changes in use of the resources. How can this be done? Ostrom et all (1999) provide a possible answer

“solving [commons] problems involves two distinct element.

1. Restricting access and

2. Creating incentive [usually by assigning individual rights to or shares of the recourses for user to invest in the resource instead of overexploiting it.]

Both changes are needed for example, access to the north pacific Chalibut fishery was not restricted before the recent introduction of individual transferable quotal and catch limits protected the resources for decades, limiting access alone can fail if the resources users compete for share and the resources can become depleted unless incentive or regulations prevent over exploitation.

For much of the past most business have acted with little regard or concern for the negative impact and some organizations are guilty of significantly polluting the environment and engaging in practices that are simply not sustainable.
Environmental impact assessments have remained veritable tools in achieving environmental sustainability.

**WHAT IS EIA**

Environmental assessment (EA) and related procedures have been identified as key mechanisms used to translate the principles and criteria of sustainable development into practical strategies and actions. The 1992 conference on environment and development and agenda 21 put considerable emphasis on the potential ability of environmental assessment to achieve a more sustainable form of development. As part of precautionary principles, Principles 17 of Rio declaration provides that an evaluation of environmental impact must be taken by virtue of a national instrument in regard to whatever proposed activity that probably produce a considerable negative impact on the environment since then, the use of environmental impact assessment (EIA) as a management tool for improving the long term viability of many projects and as an avoidance mechanism against incalculable mistakes that can be expensive and damaging in environmental and social economic terms, has increased tremendously.

Although, there appear to be no universally acceptable definition of EIA, it has generally been defined to meant the examination, analysis and assessment of planned activities with a view to ensuring environmentally sound and sustainable development, it is a process of identifying, predicting and evaluating the forcible impact of both beneficial and adverse alternatives and mitigating measures with a view also to eliminating or minimizing negative impact and optimizing positive impacts.

It is also a process of decision making and means of ensuring that the project options under consideration are environmentally and socially sound and sustainable. Statutorily, it is defined as an estimate or judgment of the significance and value of environmental effects for natural, socio-economic and human receptors.

By identifying and evaluating the probable environmental effect of a proposed activity, EIA seeks to prevent adverse one from occurring, elaborating available option and means for minimizing unavoidable effects. It works to balances a proposed activity's socio-economic benefits with its environmental cost, in this sense, EIA contributes to prevention of environmental damage in the first instance as well as prudent environmental management through the life of a development activity. It is also a means of gathering environmental information which ultimately serves to (a) inform government decision makers about environmental consideration they should take into account before authorizing a development activity (b) identify and analyse ways in which the benefits of an activity likely has adverse environmental effects and (c) ensure the sustainable management of natural resources and the prevention of environmental degradation and (d) identify and analyse reasonable alternatives to the proposed development projects that have no environmental impacts.

Rather, the EIA process aims at finding the best project option, in both environmental and socio-economic terms, under the circumstance during its formative days, it was commonly viewed as concerning only impacts on the times, recognizing the utility of EIA, its horizons have broadened to incorporate a social impact assessment (SIA), environmental health assessment, risk assessment, strategic environmental assessment (SEA) and cumulative effects assessment.

**CONCLUSION**

The concept of sustainable national development can only be achieved through public private partnership participation. Conflict and policing will never solve problems of environmental challenges in Niger Delta. Various environmental laws should be enforced.
The National Environmental Standard and Regulation Enforcement Agency should be more pro-active in sanctioning companies engaged in the degradation of the environment. By enforcing laws and holding oil companies accountable for their actions, the risk of contamination can be greatly reduce. Geographical information system (GIS) can be put to work to quickly identify and track spilled oil. To hasten the clean up of spills, regional cleanup sites along the problem areas could help contain spills more quickly. Constant monitoring and air surveillance of our coastal lands and oil fields. Limiting the numbers of oil company and oil field that are licensed and the use of quota system. This measure we go a long way in reducing negative impact of exploration and usage of natural resources.

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THE IMPACT OF ICT ON UNIVERSITY STUDENTS’ ACADEMIC STUDIES

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Enugu-Nigeria

ABSTRACT

This study was carried out in university of Nigeria Nsukka to investigate the impact of ICTs on University Students academic studies. The study adopted a survey research method. The sample size is 300 students selected randomly from faculty of social science, University of Nigeria, Nsukka. Questionnaire was the instrument for data collection. Two research questions were developed to guide the study. Frequency and percentage were used to analyze the two research questions. The findings of the study reveal that ICT impacts at very high extent on university students’ academic studies. The study also indicated that university students use ICTs to support and improve their academic studies at a very high extent.

Keywords - Information and Communication Technology, Universities students, Improvement, Academic studies.

INTRODUCTION

The rapid growth in Information and Communication Technologies (ICT) has brought remarkable changes in our contemporary society. The use of ICT is already indispensable in the area of education especially in tertiary and secondary schools. ICTs are the technologies used in conveying, manipulating and storing of data by electronic means. They provide an array of powerful tools that may help in transforming the present isolated teacher-centered and text-bound classrooms into rich, student-focused, interactive knowledge environments.

The direct link between the use of ICT in students’ studies has been the focus of extensive literature during the last two decades. While some scholars believe that ICTs improve the students’ study habit, others do not support this view. Inline with the above, Valasidou and Bousiou (2005) stated that students frequently use ICT resources especially internet for their studies, and that internet has huge impact in improving students’ study habits. Leuven et al. (2004) against this view, stated that there is no evidence for a relationship between increased educational use of ICT and students’
performance. In fact, they find a consistently negative and marginally significant relationship between ICT use and some student achievement measures. Still, in support of Valasidou and Bousiou (2005) Abdulla Y. Al-Hawaj, Wajeeh Elali and E.H. Twizell (2008) stated that ICT has the potential to transform the nature of education: where and how learning takes place and the roles of students and teaching takes place and the roles of students and teachers in the learning process. Karim and Hassan (2006) also noted the exponential growth in digital information has changed the way students perceive study and reading and in how printed materials are used to facilitate study.

Based on the extended use of ICTs in education, the need appeared to unravel the myth that surrounds the use of information and communication technology (ICT) as an aid to teaching and learning, and the impact it has on students’ study habits and improvement to learning. Therefore, the present study aims to examine the impact of ICT on university students’ academic studies.

**PURPOSE OF THE STUDY**

The main purpose of this study was to investigate the impact of ICTs on University Students’ studies. Specifically, the study investigated;

1. If university students use ICTs to support their studies
2. If ICT usage improves university students’ studies

**RESEARCH QUESTIONS**

The following research questions guided the study:

1. Do university students use ICTs to support their studies?
2. Does ICT usage improve university students’ studies?

**MATERIALS AND METHODS**

The study was based on survey research design. The Researcher administered 300 questionnaires randomly to students of university of Nigeria, Nsukka. The administering of the questionnaire was personally carried out by the researcher and his research assistant. The return rate of the questionnaire yielded 100% return rate. The response of the questionnaire was analyzed using frequency and percentage.

**RESULTS**

The results of the analysis are presented in the tables below: **Table 1**

<table>
<thead>
<tr>
<th>Response</th>
<th>Frequency</th>
<th>Percentage</th>
</tr>
</thead>
<tbody>
<tr>
<td>High extent</td>
<td>160</td>
<td>53.3</td>
</tr>
<tr>
<td>Very high extent</td>
<td>110</td>
<td>36.7</td>
</tr>
<tr>
<td>Low extent</td>
<td>20</td>
<td>6.7</td>
</tr>
<tr>
<td>Very low extent</td>
<td>10</td>
<td>3.3</td>
</tr>
</tbody>
</table>

N=300
From the above table, the result shows that 160 (53.3%) of the respondents are of the view that they use ICTs at high extent in supporting their academic studies. While 110 (36.7%) of the respondents are of the view that they use ICTs at very high extent in supporting their academic studies the respondents indicated that they use ICT for academic studies. These two indications are greater than the opinion of the respondents who stated that they use ICTs on low and very low extent which is 20 (6.7%) and 10 (3.3%) respectively. Therefore the result shows that students use ICTs at high extent in supporting their academic studies.

Table 2
N=300

Percentage distribution of the respondents on the type of ICT resources that they use for their studies

<table>
<thead>
<tr>
<th>Response</th>
<th>Frequency</th>
<th>Percentage</th>
</tr>
</thead>
<tbody>
<tr>
<td>Internet</td>
<td>220</td>
<td>73.3</td>
</tr>
<tr>
<td>Cable TV</td>
<td>2</td>
<td>0.7</td>
</tr>
<tr>
<td>Resource CD/DVD</td>
<td>8</td>
<td>2.7</td>
</tr>
<tr>
<td>All of the above</td>
<td>70</td>
<td>23.3</td>
</tr>
</tbody>
</table>

From the above table, the result shows that 220 (73.3%) of the respondents are of the view that they often use internet for their academic studies. While 70(23.3%) of the respondents are of the view that they use all the enlisted ICT resources (Internet, cable TV, resource CD/DVD) for their academic studies. The opinion of the respondents on this two is greater than the opinion on those who state that they use of Cable TV and Resource CD/DVD which is 2 (0.7%) and 8 (2.7%) respectively. Therefore the result shows that students often use Internet for supporting their academic studies.

Table 3
N=300

Percentage distribution of the respondents on their frequency of using ICTs for academic studies

<table>
<thead>
<tr>
<th>Responses</th>
<th>Frequency</th>
<th>Percentage</th>
</tr>
</thead>
<tbody>
<tr>
<td>Often</td>
<td>80</td>
<td>26.7</td>
</tr>
<tr>
<td>Very often</td>
<td>190</td>
<td>63.3</td>
</tr>
<tr>
<td>Rare</td>
<td>30</td>
<td>10</td>
</tr>
<tr>
<td>Very rare</td>
<td>-</td>
<td>-</td>
</tr>
</tbody>
</table>

From the above table, the result shows that 80 (26.7%) of the respondents are of the view that they often use ICT for their academic studies; 190 (63%) of the respondents are of the view that they very often use ICTs for their studies, while 30 (10%) of the respondents are of the opinion that they rarely use ICTs for their academic studies. Therefore the result shows that students very often use ICTs for supporting their academic studies.

Table 4
N=300

Percentage distribution of respondents on the extent ICT facilitates their access to information
<table>
<thead>
<tr>
<th>Response</th>
<th>Frequency</th>
<th>Percentage</th>
</tr>
</thead>
<tbody>
<tr>
<td>High extent</td>
<td>50</td>
<td>16.7</td>
</tr>
<tr>
<td>Very high extent</td>
<td>220</td>
<td>73.3</td>
</tr>
<tr>
<td>Low extent</td>
<td>20</td>
<td>6.7</td>
</tr>
<tr>
<td>Very low extent</td>
<td>10</td>
<td>3.3</td>
</tr>
</tbody>
</table>

From the above table, the result shows that 50 (16.7%) of the respondents are of the view that ICT facilitates their access to information at high extent, 220 (73.3%) of the respondents indicated that they use ICTs at high extent in supporting their academic studies. 110 (36.7%) of the respondents are of the view that ICT facilitates their access to information at very high extent, while 20 (6.7%) and 10 (3.3%) of the respondents are of the view that ICT facilitates their access to information at low and very low extent respectively. Therefore the results show that ICT facilitate students’ access to information at very high extent.

**Table 5**

N=300

**Percentage distribution of the respondents on the extent ICT impacts their reading/studying**

<table>
<thead>
<tr>
<th>Response</th>
<th>Frequency</th>
<th>Percentage</th>
</tr>
</thead>
<tbody>
<tr>
<td>High extent</td>
<td>94</td>
<td>31.3</td>
</tr>
<tr>
<td>Very high extent</td>
<td>166</td>
<td>55.4</td>
</tr>
<tr>
<td>Low extent</td>
<td>30</td>
<td>10</td>
</tr>
<tr>
<td>Very low extent</td>
<td>10</td>
<td>3.3</td>
</tr>
</tbody>
</table>

From the above table, the result shows that 94 (31.3%) of the respondents are of the view that ICT impacts their reading/studies at high extent, 166 (55.4%) of the respondents are of the view that ICT impacts their reading/studies at very high extent. While 30 (10%) and 10 (3.3%) of the respondents are of the opinion that ICT impacts their reading/studies at low and very low extent respectively. Therefore the results show that ICT impacts on their reading/studies at very high extent.

**Table 6**

N=300

**Percentage distribution of the respondents on the extent ICT improves their studies**

<table>
<thead>
<tr>
<th>Response</th>
<th>Frequency</th>
<th>Percentage</th>
</tr>
</thead>
<tbody>
<tr>
<td>High extent</td>
<td>70</td>
<td>23.3</td>
</tr>
<tr>
<td>Very high extent</td>
<td>210</td>
<td>70</td>
</tr>
<tr>
<td>Low extent</td>
<td>18</td>
<td>6</td>
</tr>
<tr>
<td>Very low extent</td>
<td>2</td>
<td>0.7</td>
</tr>
</tbody>
</table>

From the above table, the result shows that 70 (23.3%) of the respondents are of the view that ICT improves their studies at high extent, 210 (70%) of the respondents are of the view that ICT improves their studies at very high extent, while 18 (6%) and 2 (0.7%) of the respondents are of the opinion that ICT improves their studies at low and very low extent respectively. Therefore the results show that ICT improves the university students’ studies at very high extent.
DISCUSSION

The main purpose of this study was to investigate the impact of ICTs on University Students Studies. The research seeks to find out if university students use ICTs to support their studies and if the use of ICT improves university students’ academic studies.

From the results of the study, students indicated that they use ICTs at high extent in supporting their academic studies. This is evidenced from their response in table I above where 160 (53.3%) and 110 (36.7%), making a total of 270 out of 300 students stated that they use ICT resources at high and very high extent respectively in their academic studies.

Also, majority of the respondents stated that they mostly use Internet more than other ICT resources for supporting their academic studies. This is in-line with the view of Valasidou and Bousiou (2005) who stated that students frequently use Internet for their academic studies.

On the second research question which seeks to find out if the use of ICT improves university students’ studies, the result shows that ICTs facilitates students’ access to information at very high extent. This is evidenced from the response by 270 (90%) of the respondents out of 300 (100%) of the respondents, who stated that ICT facilitates their information access at high extent and very high extent respectively. Also, the students indicated that ICT impacts and improves their studies. This is evidenced from table 5 and 6 where the respondents indicated that ICTs impacts and improves their learning and studies at very high extent. The result was gotten from the opinion of 166 (55.4%) of the respondents who were of the view that ICT impacts their reading/studies at very high extent (see table 5) and 210 (70%) of the respondents who were of the view that ICT improves their studies at very high extent.

CONCLUSION

The findings of the study revealed that ICT has great impact on the university students’ studies. The study also reveals that university students use ICTs to support and improve their academic studies.

REFERENCES


EDUCATIONAL BACKGROUND QUALIFICATIONS OF MBA STUDENTS OF USMANU DANFODIYO UNIVERSITY, SOKOTO (UDUS) AND THEIR PERFORMANCE IN THE MBA EXAMINATIONS: A RELATIONSHIP STUDY

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ABSTRACT

The study examines the relationship between background educational qualifications of students and their performance in the MBA examinations. It uses student’s entry qualification into the MBA programme at UDUS and their performance in the MBA examinations. The population of the study comprises of 212 graduates of MBA programme for four academic sessions which were randomly selected and withheld for confidentiality of the students’ results. A sample of 117 MBA students was selected for satisfying the requirements of the study. Student record (file) and senate approved results served as the main sources of data collection. The data collected were analysed using frequency table, percentage and average. The study finds that there is a significant relationship between student’s background educational qualification and his/her performance in the MBA programme. The study also finds that entry qualifications need not be in business or related areas for a student to perform better in the MBA examinations. This study therefore recommends among others that Business Schools should continue with the practice of obtaining postgraduate diploma in management or related areas if background educational qualification of the candidate is not in business or related areas before securing admission into the MBA programme.

Key Words: Background educational qualification, Performance, MBA programme, MBA examinations, Usmanu Danfodiyo University, Sokoto (UDUS)

INTRODUCTION

Universities are critical players in the national transformation agenda of Nigeria’s President, Dr. Goodluck Jonathan. This may be the reason why National Universities Commission (NUC) is increasingly subjecting Nigerian universities to performance inspection. Zezekwa and Mudavanhu (2011) opine that part of the success of the educational process is measured in the quality of students’ academic performance still at university. According to them differences in entry qualifications for a particular university course may be strong predictors
of students’ educational attainment. Thus, the more an individual is educationally exposed the easier things becomes for him or her. The brain opens up and the understanding of issues flow naturally. The previous knowledge gained while climbing the educational ladder will pave the way for good performance at that level and other higher levels.

According to Schneider (n.d.) education is theorised to have an influence on individuals’ attitudes by facilitating the evaluation of complex social situations, widening the individual’s knowledge and horizon of experiences as well as by direct exposure to norms and values in educational institutions.

Many factors determine the performance of students. These include teacher’s academic qualification (Adeyemi, 2012); entry qualification (Cheesman, Simpson, and Wint, 2006); gender disparity (Figueroa, 2000); financial constraints (Bailey, 2002) etc.

The educational qualification of MBA student and his/her performance largely depends greatly to his/her learning behaviour. The idea of previous experience in relation to learning situation is of enormous importance in achieving high result. Learner’s history of experience shows a varying degree of opportunity to learn. Consequently, each learner is different in his/her overall acquired ability to learn (Charles, 1978).

Thus, to a great extent, student’s past experience of knowledge help him/her a lot in performing and achieving better in another learning situation. However, Bloom and Carrot (1968) argue that with respect to previous experience, aptitude or ability to perform better is best considered a function of the opportunity to learn (time spent attending to the task, and quality of the instruction). Their assumption is that, if the quality of the institution is optimal for each learner, and if each learner attends for the amount of time necessary for him/her to master the task, then performance will not be normally distributed among the learners.

Over the years, the Postgraduate School of UDUS has been admitting candidates with different educational qualifications (Arts, Sciences, etc) into Masters Degree in Business Administration (MBA) full time programme. The entry qualifications of these students range from those with required first degree to those whose entry qualifications are not related to business or other related areas and have to enroll into the programme with Postgraduate Diploma in Management or Business Administration (PGDM or PGDBA) to meet one of the requirements for the MBA programme.

It is in this context that the research attempts to examine the relationship between the performance of MBA students and their entry educational qualifications. In an attempt to investigate this problem, the study is divided into four sections. Section two discusses the research methodology, section three presents and analysis the data collected while the last section concludes the paper.
METHODOLOGY

This study is a longitudinal research design. It uses the student entry qualification into the MBA programme at UDUS and their performance in the MBA examinations. The data collected was used to examine whether if there is a significant relationship between background educational qualifications of MBA students and their performance in MBA examinations.

The population of the study comprises of 212 graduates of MBA programme of UDUS for four academic sessions. The years were randomly selected and withheld for confidentiality of the students’ results but they are coded as W, X, Y and Z academic sessions.

The whole candidates for the four academic sessions were included in the study except those that deferred their admission for the session under consideration or senate did not their results due to one problem or the other. All the students use for the research and those with different problems are grouped/categorized in the Table 1.

**TABLE 1: CATEGORY OF STUDENTS WHO PARTICIPATED IN THE RESEARCH**

<table>
<thead>
<tr>
<th>Categories of student Background educational qualification</th>
<th>Students With entry qualification and performance</th>
<th>students with performance only</th>
<th>Students with deferred results</th>
<th>Students who deferred their admission</th>
<th>Grand Total</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>W  X  Y  Z</td>
<td>W  X  Y  Z</td>
<td>W  X  Y  Z</td>
<td>W  X  Y  Z</td>
<td></td>
</tr>
<tr>
<td>B.Sc ;B.A R.A</td>
<td>13  16  25  30</td>
<td>-</td>
<td>01  -</td>
<td>07</td>
<td></td>
</tr>
<tr>
<td>B.Sc ;N.B.A + PGDM</td>
<td>06  04  07  05</td>
<td>-</td>
<td>-</td>
<td>02</td>
<td></td>
</tr>
<tr>
<td>HND; BA R.A + PGDM</td>
<td>03  06  08 -</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td></td>
</tr>
<tr>
<td>HND;N.B.A + PGDM</td>
<td>-   -  01  01</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td></td>
</tr>
<tr>
<td>HND ; B.A. R.A + PGDM</td>
<td>12  15  07  05</td>
<td>01</td>
<td>- 01</td>
<td>01</td>
<td></td>
</tr>
<tr>
<td>HND; N.B.A + PGDM</td>
<td>02  04  01 -</td>
<td>-</td>
<td>-</td>
<td>01</td>
<td></td>
</tr>
<tr>
<td>SUB TOTAL</td>
<td>36  45  49  41</td>
<td>15  03  04 -</td>
<td>01  01</td>
<td>01</td>
<td>212</td>
</tr>
</tbody>
</table>

Source: Field survey

Table 1 shows that students under the category (students with qualification and performance) with a total of 171 were the ones selected to participate in this study because of availability of their files and results. The remaining students were not selected because of one problem or the other as shown in Table 1. Those with only examinations results but
without files numbered 22; those that had deferred results were 12. Lastly, 7 students deferred their admissions in the four years under review.

The data collected from students’ records were grouped into two categories i.e. entry background educational qualifications of the students (Student file) and their performances in the MBA examinations (Senate approved MBA results) for the four sessions. These were analysed using frequency table, percentage and average.

For clarity and lucid presentation of the data, the information collected from the students’ record (files) were grouped into six sets of categories i.e: (a) B.Sc Business Administration and related areas coded as B.Sc. B.A R.A (b) B.Sc Non Business Areas plus PGDM, coded as B.Sc N.B.A + PGDM (c) HND Business Administration and Related areas plus PGDM, coded as HND B.A.R.A + PGDM (d) HND Non Business areas plus PGDM coded as HND NBA + PGDM (e) HND Business Administration and related Areas plus PGDM, coded as HND B.A.R.A + PGDM (f) HND Non Business areas plus PGDM coded as HND N.B.A. + PGDM.

Again, the second category of data collected was the Senate approved results which was also grouped into three. They are (a) Quantitative performance: coded as QP used where applicable (b) Theoretical performance, coded as TP, used where applicable, (c) General performance, coded as GP used where applicable in the research.

Note also that PGDM used in this research represents other postgraduate diplomas (PGD) that qualified candidates into the MBA programme i.e PGD Accounting, PGD Bus. Admin., PGD marketing and other related fields/areas. AV is also used in the research for Averages, and where applicable.

RESULTS

Quantitative performance Analysis

To examine the quantitative performances of the students for the four academic sessions, Table 2 shows their Average General Performances:
Table 2: Average quantitative performances for the four academic sessions

<table>
<thead>
<tr>
<th>STUD. QUAL. CATEG O.</th>
<th>W</th>
<th>X</th>
<th>Y</th>
<th>Z</th>
<th>TOTAL GPA</th>
<th>AVERAGE GPA</th>
<th>PERCENTAGE %</th>
<th>POSITION</th>
</tr>
</thead>
<tbody>
<tr>
<td>B.Sc B.A.R.A</td>
<td>2.1</td>
<td>2.9</td>
<td>3.1</td>
<td>3.0</td>
<td>11.28</td>
<td>2.82</td>
<td>56.40</td>
<td>4&lt;sup&gt;TH&lt;/sup&gt;</td>
</tr>
<tr>
<td>B.Sc N.B.A + PDGM</td>
<td>3.9</td>
<td>3.5</td>
<td>3.5</td>
<td>3.1</td>
<td>14.26</td>
<td>3.57</td>
<td>71.40</td>
<td>1&lt;sup&gt;ST&lt;/sup&gt;</td>
</tr>
<tr>
<td>HD B.A.R.A + PDGM</td>
<td>19</td>
<td>3.2</td>
<td>3.0</td>
<td>-</td>
<td>8.18</td>
<td>2.73</td>
<td>54.60</td>
<td>6&lt;sup&gt;TH&lt;/sup&gt;</td>
</tr>
<tr>
<td>HD N.B.A + PDGM</td>
<td>-</td>
<td>-</td>
<td>4.0</td>
<td>1.5</td>
<td>5.50</td>
<td>2.75</td>
<td>55.00</td>
<td>5&lt;sup&gt;TH&lt;/sup&gt;</td>
</tr>
<tr>
<td>HND B.A.R.A + PDGM</td>
<td>3.2</td>
<td>3.1</td>
<td>3.0</td>
<td>1.9</td>
<td>11.59</td>
<td>2.85</td>
<td>57.00</td>
<td>3&lt;sup&gt;RD&lt;/sup&gt;</td>
</tr>
<tr>
<td>HND N.B.A + PDGM</td>
<td>2.5</td>
<td>3.3</td>
<td>-</td>
<td>-</td>
<td>5.96</td>
<td>2.98</td>
<td>59.60</td>
<td>2&lt;sup&gt;ND&lt;/sup&gt;</td>
</tr>
</tbody>
</table>
Table 2 indicates that those with B.Sc, N.B.A + PGDM performed more better in all the four academic sessions with total GPA of 14.26 and AV. GPA of 3.57.

**Theoretical Performance Analysis**

This section examines all the theoretical courses of MBA both core and electives offered by the MBA programme including research project, to arrived at their theoretical performances.

Table 3: Average general performances of MBA students in theoretical courses for the four academic sessions.

<table>
<thead>
<tr>
<th>Academic years</th>
<th>STUD. QUAL. CATEGOREIS</th>
<th>W</th>
<th>X</th>
<th>Y</th>
<th>Z</th>
<th>TOTAL GPA</th>
<th>AV. GPA</th>
<th>PERCENT</th>
<th>POSITION</th>
</tr>
</thead>
<tbody>
<tr>
<td>B.Sc B.A.R.A</td>
<td></td>
<td>3.02</td>
<td>3.27</td>
<td>3.30</td>
<td>3.29</td>
<td>12.88</td>
<td>3.22</td>
<td>64.40</td>
<td>2ND</td>
</tr>
<tr>
<td>B.Sc N.B.A + PGDM</td>
<td></td>
<td>3.55</td>
<td>3.51</td>
<td>3.29</td>
<td>3.36</td>
<td>13.71</td>
<td>3.43</td>
<td>68.60</td>
<td>1ST</td>
</tr>
<tr>
<td>HD B.A.R.A + PGDM</td>
<td></td>
<td>2.87</td>
<td>3.38</td>
<td>2.95</td>
<td>___</td>
<td>9.20</td>
<td>3.97</td>
<td>61.40</td>
<td>4TH</td>
</tr>
<tr>
<td>HD B.A. + PGDM</td>
<td></td>
<td>___</td>
<td>3.17</td>
<td>3.00</td>
<td>2.70</td>
<td>8.87</td>
<td>2.96</td>
<td>59.20</td>
<td>5TH</td>
</tr>
<tr>
<td>HND B.A. + PGDM</td>
<td></td>
<td>3.18</td>
<td>3.13</td>
<td>3.08</td>
<td>3.14</td>
<td>12.53</td>
<td>3.13</td>
<td>62.60</td>
<td>3RD</td>
</tr>
<tr>
<td>HND N.B.A. + PGDM</td>
<td></td>
<td>3.28</td>
<td>3.38</td>
<td>1.20</td>
<td>___</td>
<td>7.83</td>
<td>2.61</td>
<td>52.20</td>
<td>6TH</td>
</tr>
</tbody>
</table>

Source: Field Survey

Table 3 shows that MBA students with B.Sc, N.B.A + PGDM educational background performed more better at the over all level with total G.P.A of 13.71 and an AV. of 3.43 (68.60%).

**General Performance Analysis**
This segment examines and analyzes both quantitative and theoretical performances of the students in the MBA programme. This is to investigate the extent to which performances in either quantitative or theoretical courses determine the students general performances in the MBA programme as shown in Table 4.

### Table 4: Students’ General Performances for the four academic sessions

<table>
<thead>
<tr>
<th>YEARS &amp; PERF</th>
<th>STUD. QUAL.</th>
<th>W</th>
<th>T</th>
<th>G</th>
<th>X</th>
<th>T</th>
<th>G</th>
<th>Y</th>
<th>T</th>
<th>G</th>
<th>Z</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>B.Sc B.A.R.A</td>
<td>2.16</td>
<td>3.02</td>
<td>2.85</td>
<td>2.85</td>
<td>3.17</td>
<td>3.22</td>
<td>3.12</td>
<td>3.30</td>
<td>3.03</td>
<td>3.02</td>
</tr>
<tr>
<td></td>
<td>HD B.A.R.A + PGDM</td>
<td>1.95</td>
<td>2.87</td>
<td>2.69</td>
<td>3.23</td>
<td>3.38</td>
<td>3.44</td>
<td>3.00</td>
<td>2.95</td>
<td>2.99</td>
<td>-</td>
</tr>
<tr>
<td></td>
<td>HD N.B.A + PGDM</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>4.00</td>
<td>3.00</td>
<td>3.16</td>
<td>1.50</td>
</tr>
<tr>
<td></td>
<td>HND B.A.R.A + PGDM</td>
<td>3.29</td>
<td>3.18</td>
<td>3.19</td>
<td>3.13</td>
<td>3.17</td>
<td>3.23</td>
<td>3.00</td>
<td>3.08</td>
<td>3.09</td>
<td>1.97</td>
</tr>
<tr>
<td></td>
<td>HND N.B.A + PGDM</td>
<td>2.57</td>
<td>3.25</td>
<td>3.25</td>
<td>3.39</td>
<td>3.38</td>
<td>3.35</td>
<td>0.00</td>
<td>1.20</td>
<td>1.00</td>
<td>-</td>
</tr>
</tbody>
</table>

Source: Field Survey

Table 4 reveals that during academic sessions W, X, Y and Z, the MBA students quantitative and theoretical performances to a great extent determine their general performances. In year Y, students with HND, NBA + PGDM had GPA of 4.00 as their quantitative performance
and it was the highest score. This determined the category’s general performance of 3.16. Again, this group of students scored 3.00 as their theoretical performance in the same year. For year W, the table reveals that those with B.Sc., N.B.A + PGDM scored GPA of 3.90 as quantitative performance while their theoretical performance stood at GPA of 3.55 representing a general performance of 3.62.

Table 4 also shows that the least quantitative performance (0.00) was scored in year Y by those with HND, N.B.A + PGDM while the least theoretical performance of 1.00 was scored by the same category of students in the same year. This result may explain the general allegation against polytechnics of providing poor quality of education.

This also applies to all the remaining group of students in the sense that, G.P. depends more or less on the level/score obtained in both quantitative and theoretical courses. Obviously, the performance of a student in any of the group of courses contributes to the overall performance of the students.

**Background Educational Qualification of MBA students and their performances in Final Examinations**

This segment investigates the performance of MBA students in the final examinations in relation to the student’s background educational qualifications.

**Table 5: Summary of MBA students overall GPA for the four academic sessions.**

<table>
<thead>
<tr>
<th>Academic years</th>
<th>W</th>
<th>X</th>
<th>Y</th>
<th>Z</th>
<th>TOT AL GPA</th>
<th>AV. GPA</th>
<th>PERC ENTA GE %</th>
<th>POSITION</th>
</tr>
</thead>
<tbody>
<tr>
<td>STUD. QUALIFICATO N CATEGOREIS</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>B.Sc B.A.R.A</td>
<td>2.85</td>
<td>2.22</td>
<td>3.03</td>
<td>3.42</td>
<td>12.52</td>
<td>3.13</td>
<td>62.60</td>
<td>2ND</td>
</tr>
<tr>
<td>B.Sc N.B.A + PGDM</td>
<td>3.62</td>
<td>3.52</td>
<td>3.37</td>
<td>3.18</td>
<td>13.69</td>
<td>3.41</td>
<td>68.40</td>
<td>1ST</td>
</tr>
<tr>
<td>HD B.A.R.A + PGDM</td>
<td>2.69</td>
<td>3.44</td>
<td>2.99</td>
<td>_</td>
<td>9.12</td>
<td>3.04</td>
<td>60.80</td>
<td>4TH</td>
</tr>
<tr>
<td>HD B.A. + PGDM</td>
<td>_</td>
<td>_</td>
<td>3.16</td>
<td>2.50</td>
<td>5.66</td>
<td>2.83</td>
<td>56.60</td>
<td>5TH</td>
</tr>
<tr>
<td>HND B.A. + PGDM</td>
<td>3.19</td>
<td>3.23</td>
<td>3.09</td>
<td>2.93</td>
<td>12.44</td>
<td>3.11</td>
<td>62.20</td>
<td>3RD</td>
</tr>
<tr>
<td>HND</td>
<td>N.B.A.+</td>
<td>PGDM</td>
<td>3.25</td>
<td>3.35</td>
<td>1.00</td>
<td>7.60</td>
<td>2.53</td>
<td>50.60</td>
</tr>
<tr>
<td>-----</td>
<td>---------</td>
<td>------------</td>
<td>------</td>
<td>------</td>
<td>------</td>
<td>------</td>
<td>------</td>
<td>-------</td>
</tr>
</tbody>
</table>

Source: Field Survey

Table 5 affirms that there is a relationship between MBA students’ background educational qualifications and their performances in final examinations in the sense that the average performances of the six categories of the MBA students differed. As seen in Table 5, there exists a relationship between/among the level of GPAs and percentages obtained by each category of students i.e. holders of entry qualification B.Sc NBA + PGDM scored the highest GPA of 3.41 (68.40%) while those with B.Sc B.A.R.A + PGDM scored GPA of 3.13 (62.60%) and HND B.A.R.A + PGDM holders scored GPA of 3.11 (62.20%). Again, those with HND B.A.R.A + PGDM scored GPA of 3.04 (60.80%), HND, BA + PGDM obtained GPA of 2.83 (56.60%). Finally, students with entry qualification HND NBA + PGDM scored GPA of 2.53 (50.60%). These findings imply that those that have attained Bachelor degree (related or unrelated) as their entry qualification perform better than HND/HD holders (related or unrelated) in the MBA examinations.

CONCLUSION

The idea of previous experience in relation to learning situation is of enormous importance in achieving high result. To a great extent a student’s past experience of knowledge helps him/her a lot in performing and achieving better in another learning situation. The study found that there is a significant relationship between student’s background educational qualification and his/her performance in the MBA programme.

This study therefore recommends that Business Schools should continue with the practice of requiring MBA applicants to obtain postgraduate diploma in management or related areas if their background educational qualifications are not in business or related areas. There is also the need by supervisory agencies of polytechniques to ever more monitor the performance of teachers because quality improvement in tertiary education depends on the quality of instructions in the classroom.

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BUSINESS EDUCATION FOR SELF RELIANCE AND SUSTAINABLE DEVELOPMENT IN NIGERIA

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&

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Abstract

This paper examined the need for Business Education for Self reliance and Sustainable Development in Nigeria. It looked at the concept of Business Education and would go a long way in achieving self reliance and sustainable development. The researchers were of the opinion that would go far in harnessing a better economy where government and its constituted organs would stick up their major objectives. Therefore, Business Education becomes imperative in Nigeria following current trend of unemployment among youths who would always rely on government for sustenance. Recommendations were made on how to bring about a workable business that could bring about self reliance and sustainable development in the country.

Keywords: Self Reliance, Sustainable Development, Business skill, etc.

Introduction

Business Education being a dynamic field of study has transformed the educational system into the educational system to one which aims at grooming manpower to fill the over growing vacuum created by unemployment. It is alarming to know that graduate unemployment cuts across all disciplines in the country. It is
however, impossible to identify an academic field that is not adequately represented in the ever growing community of unemployed graduates that are unemployable.

Our graduate unemployment problem has generated several other socio-economic problems in the country. For instance, the issue of Islamists militancy (Boko Haram) in the Northern part of the country, the issue of the Niger Delta militancy, political thuggery among youths, increased rate of armed robbery and kidnapping can all be traced to graduate unemployment in the country. Mass unemployment in the country could be the result of students learning what is particularly not relevant to our stage of development (Uddin and Uwaifo, 2005). The situation of unemployment in Nigeria is indeed alarming (Ogunsola, 2009). This is owing to the fact that, thousands of unemployable youths are roaming the streets seeking government enhanced jobs, while the universities and other higher institutions keep producing graduates on a yearly bases, non-compatible with new jobs or vacancies to absorb these new job seekers (unemployable graduates).

According to Orim, Olayi and Ewa (2009), training in school is at variance with what labour market requires. This is because, there is a mis-match between school training and the realities in productive life in the job seeking world. The graduates concerned may not have been adequately trained by their institutions to become employable or self-reliant in terms of starting their own small or medium scale businesses.

Although, several attempts have been made by the Government to find solution to the problem of graduate unemployment without significant success. Inspite of all the efforts made by the UNESCO and Nigerian Government to enhance the skills of youths, later reports showed that all these did not pay sufficient attention to skill training for youths and adults (Babalola, 2010). Given the inadequacies of the current education systems, there is the need to incorporate Business Education for self reliance and sustainable development in the country.
Business Skill

The aim of business skill is to inculcate in the young people the need to see business opportunities, ideas and act on them promptly in order to take advantage over others. However, this should not stop at imparting knowledge alone but, ability to teach skills acquisition in various disciplines of study that a potential businessman might require, such as managerial skills, financial competencies, accounting skills, marketing and general business competencies. Business Education is one of that embraces skill building programme, creative thinking, productive development, marketing negotiation, leadership training and health generation (Kurato, 2003).

According to Ihekwoaba (2000) in Shaibu and Mbaegbu (2012), Business skill occurs when an individual develops a new venture or new approach to an old idea or a unique way of giving the market place a product or service by using resource in a unique way of giving the market place a product or service by using resourced in a new way under conditions of risks. In their views, Steinhoff and Burges (2003) in Shaibu and Mbaegbu (2012) opined that business involves risk financial material and human resources in a new concept or opportunity with an existing firm. It is also the dynamic process of creating incremental wealth (Hasty and Readon, 2007).

However, Gana (2008) looks at Business as the willingness, and the abilities of an individual to seek out investment opportunities in an environment and able to establish an enterprise successfully, based on the identified opportunities. Business skill is also the creation of an innovative, economic organization for the purpose of growth under conditions of risks and uncertainties (Dollinger, 2005). It is a clear manifestation of effective manipulation of human intelligence as demonstrated in creative performance.

Business Education

Business education represents a broad and diverse discipline that is included in all types of educational delivery systems-elementary, secondary and tertiary institutions. It includes education for office occupation, distribution, marketing
occupations, accounting, business teaching, business administration, business management, typewriting, stenography and secretarial education or studies.

Business education is often times described as education for and about business whose primary purpose is to prepare individuals for gainful employment in business occupations (Nwosu, 2003). The value of Business Education programme 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 themselves upon graduation from school. It is a programme of instruction that consists of two parts as follows:

a). **Office Education**: For office careers through initial refreshers and upgrading education leading to employability and advancement in occupations

b). **General Business Education**: A programme that provides students with information and competencies which are needed by all in managing personal business world (Osuala, 1987).

Business Education is a field of training in business practices and in specific skills such as accounting, management, information processing, keyboarding, typewriting, record keeping, shorthand. Business education is conducted on two distinct levels: education for administrative support personnel in business and industry, and collegiate education for business administration and for business teacher preparation (Cross, 2008). Business education therefore, should provide the individuals a foundation to work and live as productive citizens in a changing global economy

**Self reliance**

The term self reliance can be seen to mean being able to depend on one self, one’s resources rather than those of others. It has to do with what one can do himself/ herself. Self reliance also means relying on one’s own abilities and efforts to be independent. The desire of most developing countries including Nigeria, is to have a self- reliant and resilient economy capable of generating an internally self sustaining growth.
**Concept of Development**

The concept of development has to do with improvement in the quality of life or well being of the citizens of a country. According to Adegite (2010) economic development is more fundamental than economic growth as it goes beyond the mere rise in national income. To her, underdeveloped countries are characterized by abject poverty, ignorance, diseases, and low life expectancy rate, high illiteracy rate, low income etc. she insists that development cannot occur without growth. Oyisiku (2009) corroborates this view by stressing that development is growth plus positive change or better future.

Traditionally, economists have measured development in terms of increase per capita income or gross domestic product. However, it is impossible to record an increase in per capita income while many people still remain below the poverty line.

Development at the international level has taken a new dimension with the adoption of Millennium Development Goals (MDGs) and the commitment to meet these goals by 2015. Making a case for this new policy, Kayode (2009) opines that the achievements of the MDGs must be addressed within the context of national poverty reduction strategies, sound macro-economic policies, and executive management of public expenditure etc. for a country to have sustainable development, the development that had taken place over time must be enduring. Sustainable development therefore, implies increasing wellbeing over a very long time. The world commission on environment and development (1987) has defined sustainable development as “a development that meets the needs of the present without compromising the ability of future generations to meet their own needs.

**Sustainable development**

According to Mbata (2009), sustainable development means the all round development of individuals. It concerns not only personality development, but also nation building which goes beyond the construction of bridges, roads, skyscrapers and provision of other social amenities. Sustainable development should continue without damage to environment (Coventry and Nixon, 1999).
Sustainable development is believed to be a holistic approach to improving the quality of life. It postulates that there are intrinsic links among economic and social and environmental well being. Changes in one area will impact upon the other. It is a pattern of resources that aims at meeting human needs, while preserving the environment so that their needs can be met not only in the present, but also generations to come. It is development which meets the needs of the present without compromising the ability of future generations to meet their own needs (World Commission on Environment and Development, 1987). It is a way of protecting the environment, while improving living standard for all the populace.

Classes of Business skill

According to Paul (2005) business skill can be classified into the following occupations:

1. **Mining and agriculture occupation**: The business in this type of occupation is mainly on the provision of raw materials by extraction or basic preparation and selling of farm produce. Examples of such are those found in the quarry business, pot making, fishery, piggery, goatry, horticulture and cattle rearing.

2. **Manufacturing/ construction occupation**: The educators engaged in this type of business make or grow crops to be sold or engage in construction works. Good examples of people here are soap makers, bakers, carpenters, furniture makers, upholsters, leather workers, shoe makers, boat makers, architects, painters, book publishers, book producers, etc.

3. **Distribution occupation**: The educators here move products from their point of origin to where they are needed. Examples here are wholesalers, retailers, commission agents, insurance brokers, bakers, importers, marketers, general merchandise, etc.

4. **Service occupation**: This occupation is made up of educators who have artists (i.e. musicians, actors, comedians, etc), professional athletes, medical and health workers, hoteliers, caterers, dry cleaners fashion designers, cosmetologists, typists, computer operators, hair dresser, advertisers, etc.
Objectives of Business Education

Business education skills are needed to help the students from the starting stage of life to technological development. Business education should provide not only the skills required for operating machines or doing any specific job, but also to provide such knowledge and skills required for self reliance and sustainable developments.

According to Akinola (2006), the following are the objectives of business education:

1. To prepare the students for employment after graduation.
2. To meet the manpower needs of the society.
3. To increase the options available to each student and serving as motivation in order to enhance all types of learning.
4. To present a laboratory in which students practice skills, knowledge and attitude to make the classes instruction more meaningful and relevant.
5. To provide an opportunity through the use of local business for the students to acquire additional skill and knowledge.
6. To give the students background of training that would contribute to rapid advancement on the job.
7. To make students develop good working habits and attitude needed in the development of personality traits such as punctuality, responsibility, accuracy, fact, adaptability and service of responsibility that makes for efficient work.
8. To help develop the high attitude towards work and the habit of mind conducive to the proper use of technology.
9. To provide the knowledge and skills necessary for industrial, commercial and economic development.
10. To provide who can apply scientific knowledge to the improvement/solutions, and convenience of man.
11. To give training, and impart the necessary skills leading to the promotion of craftsmen, technicians and other skilled personnel who will be enterprising and self reliant.
12. It is also out to stimulate and encourage creativity and to enable our young and women to have an intelligent understanding of the increasing complexity of the society.

**Relevance of business education**

Below are, some relevance of business education before and after graduation:

1. The knowledge gained from business education can be used by the students to be able to flow effectively in the labour market.
2. The knowledge of business education will help the students to be experts in the production of powder soap, setting up barbing salon, tailoring business/computer centre, etc.
3. It will help the students to use modern machines in terms of communication and recording and storing of information.
4. It will help the students to interact and gain information, which will help boost teaching and learning.
5. Establishing printing publishing in the rural areas and will save the people there, the transport of going to the town to buy books and other stationeries.
6. Items will be sold at cheaper rates and would also get to the hand of the poor individuals at reasonable prizes.
7. The knowledge of skill will help the graduate of business education open up nursery/primary schools, secondary schools, extra mural lessons, etc. which will be useful to the society and enable them generate income as well, thereby bringing about sustainable development.
8. It encourages wealth creation which could lead to higher gross domestic product (GDP)
9. It would provide convenience for people in the country.
10. It helps to raise the standard of living of business beneficiaries and like most industrialized nations, may survive in a complex society.

**Challenges of business education**

According to Inegbenebor (2005), the following are the major challenges of business education which need to be addressed to attain the desired goals.
1. **Orientation of school administration.** It is important to state many school administrators are ignorant of the value and potential of business education in national competitiveness and development. Therefore, business education in such schools may not have the level of support that it needs to gain acceptance among students and staff.

2. **What to teach and to who?** Most teachers or instructors do not know what to teach and the people who are being taught. Inability to distinguish between business education and management will always pose a challenge to business.

3. **Who is to teach?** The skill business is seen by people to be an all-comers’ game. The popularity of the required preparation to jump in to the train or bandwagon. Yet, the teaching requires special training and experience.

4. **Lack of teaching materials:** The lack of teaching material especially the right materials that are suitable for the teaching of the skills in Nigerian schools constitutes a challenge in business education.

5. **Un-coordinated and weak institutional support for education:** The government and its agencies responsible for business development have not addressed the problem of business education at all levels of the educational system.

**Ways forward**

Having considered the above challenges business education, the following recommendation or strategies have been drawn in order to help pave for self-reliance and sustained development of the nation:

- Proper orientation of the students: there is the need for skill edict to have a significant promotional content that would stimulate and sustain the interest of the students in the programme. The issue of wage earner culture should be discouraged by encouraging a self-reliant culture.

- Proper orientation of school administrators: through intensified support, school administration should strive to educate them on education in order to be well equipped and help transform the country for sustainable
development. The national university commission (NUC), and the national board for Technical Education (NBTE), should go beyond prescribing the minimum academic standards with respect to education organizing seminars and workshops with the aim of enhancing the competence of school administrators.

- Knowledge of what teach and to whom: these should be a forum for educators to brainstorm for the purpose of generating ideas for use by institutions of higher learning. This is not to suggest that a standard programme should be forced on them.

- Competent teacher to handle entrepreneurship: the National University Commission (NUC), and each university, polytechnic and college of education should build capacity in this area to have meaningful result. A good technique that can be useful in improving teachers’ interest is to encourage the educational institutions involved to share resources, knowledge and experience in this area through seminars, conference and workshops.

- Provision of teaching material: Materials should be provided match current demand of the society. The delivery of skill development programme in the country should be indentified with the teachers adequate furnished with repellant materials.

- Coordinated and speedy institution support” the government in partnership with agencies such as the Small and Medium Enterprise Development Agency (SMEDA), Industrial Training Fund (ITF), National Directorate of Employment (NDE), Tertiary Education Trust Fund (TETF), etc should address this issue with the aim of proving funds to the University, Colleges of education and other institutions for business education in order to help promote self reliance and sustainable development.
Conclusion

Preparing the graduates for the competitive world of work has been the sole aim of Business in education. Skill acquisition and entrepreneurship education are considered indispensable towards self-reliance and sustainable development of the nation.

Therefore, administrators, teachers, students and individuals of the public should be retrained in special skills via workshops, seminars, conferences, symposiums, etc. in order to improve their skills, knowledge and understanding of the programme in business education their capacity for self-reliance and national development. Once the above recommendations are strictly followed, they would go a long way in enhancing self-reliance and sustainable development in the country.

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IMPACT OF EDUCATION ON DOMESTIC VIOLENCE

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Abstract
Process of socialization completes with education. As domestic violence is a common feature of Indian society, it is rooted in tradition. Through process of socialisation men are socialised to behave authoritatively and women are socialised to bear all sorts of torture meted out by her husband as a part of normal life. The main objective of this study is to find relation between education and spouse abuse. It is a quantitative study based on the analysis of 400 women in west Uttar Pradesh. Face to face in depth interview has been used as a tool to collect data. Women who were presently married and victim of any form of emotional and physical violence have been purposely selected for the study. Results suggest that education have restricting effect on violence. Women who were illiterate or had lower level of education were more than four times likely to face violence. In addition to it they were eight times more likely to face very high intensity of violence. Although emotional abuse was found more among graduate and above but overall rate of emotional violence decreased with increase in rate of education. Education challenges historic division of gender based on inequality. Prevention of domestic violence ultimately depends upon changing the norms of society regarding traditional attitudes about gender. Domestic violence is curable by re-socializing both the genders and social construct.

KEY WORDS: Socialization, Education, Wife Abuse

Introduction
Education, in its largest sense, is a thing of great scope and extent. It includes the whole process by which a human being is formed to be what he is, in habits, principles. Education includes social and cultural process that assists in the preparation of the child into membership in the society. So education can be defined as process to inculcate norms, values attitudes morals and skills. Schooling is what happens inside the walls of the school, some of which is education. Education happens everywhere, and it happens from the moment a child is born, and some people say before until a person dies. Education is synonym of socialization. The members of the society ensure continuity in
each generation with regard to various aspects of society. Socialization in a traditional society stabilizes social norms and values.

Family is the foundation unit of society. Serving as an agent of larger society, the family not only encourages its own members to adjust and confirm but acts as a unit which is ruled by family heads. As an agent of patriarchal socialization it confirms and sustains women into subordinate position and thinking of men that they are superior to women and have a right to control women. The discrimination of gender roles are developed as a part of personality through socialization process and consequently reflected in all realms of life. Femininity roles and characteristic of gender are learnt and they are reinforced during the socialization practice within diverse family relationships. From the very beginning of life, girls are groomed to accommodate the male-dominated, patriarchal society. They work in the home, look after siblings, and assist their mothers in the fields. Then they are married off early to soon become mothers themselves, still unarmed with knowledge and rights.

Men's attitudes towards women are also learned during gender role socialization. These attitudes are learned first through observation of culture in families and then through communities, such as schools, peer groups, workplaces. Such socialization leads to powerlessness of women, which ultimately leads to violence and inability of women to defend them. It is important for a society to construct gender by informal socialization for stability and continuity of the society.

Despite the existence of a worldwide movement against violence against women, there is no single accepted definition of violence. Some human rights activists prefer a broad-based definition that includes "structural violence" such as poverty, and unequal access

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1 Report : Gender Stereotypes: The impact of socialisation and education ;Page no 2-6(accessed through internet from www.QEC-ERAN.ORG on 12/7/2011 )
to health and education. Others have argued for a more limited definition in order not to lose the actual descriptive power of the term.\(^5\)

In 1993 the United Nations defined violence against women as:

\[\text{“Any act of gender-based violence that results in, or is likely to result in, physical, sexual or psychological harm or suffering to women, including threats of such acts, coercion or arbitrary deprivations of liberty, whether occurring in public or private life”}.\]

In behavioral terms violence against women ranges from simple suppression to abuse aggression. It is the establishment of control and fear in a relationship through violence and other forms of abuse. This violence can take the form of physical assault, psychological abuse, social abuse, financial abuse, or sexual assault.

Different communities have different definitions of abuse, and conceptualizations of domestic violence vary across communities and from one country to another.

The Protection of Women from Domestic Violence Act, 2005 says that any act, conduct, omission or commission that harms or injures or has the potential to harm or injure will be considered domestic violence by the law.

Around two-thirds of married women in India are victims of domestic violence. Seventy per cent of married Indian women between the age of fifteen and fifty have been physically assaulted, raped or coerced into sex by their spouses\(^7\). Every six hours in India a young married women is burnt alive beaten to death or driven to commit suicide\(^8\). It is estimated that more than 15000 women suffer from dowry related violence every year.

The trend on violence against women in family was recently highlighted by the India's National Crime Records Bureau (NCRB) stated that while in 2000, an average of 125

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\(^6\) The United Nations Declaration on the Elimination of Violence against women In 1993. According to Article 1 of the declaration.


\(^8\) INCLEN 2000
women faced domestic violence every day, the figure stood at 160 in 2005\(^9\) and in 2010 this number has increased to 257 per day\(^10\). The category of domestic violence (rate of cruelty by husband and relatives) is growing annually at 7.9\% per year.\(^{11}\)

The topic of domestic violence is still a huge taboo in the Indian communities\(^12\). Many perceive a "discussion" on domestic violence in the Indian society as disrespect to the Indian culture. Great efforts are made by the victim to keep the family intact\(^13\). Verbal violence and mental cruelty are often not seen as sufficient reason to put family life at stake by reporting them to the police.

Although India has taken decisive steps to prevent domestic abuse against women in recent times through section 489A, and the new act i.e. Domestic Violence Act 2005 but even after the coming of this act, the victimized women are conditioned by society to accept violence silently.

**Objectives of study:**

The main objective of this study is to find relation between education and spouse abuse. Second objective is to find relation between education level of husband and wife and their experiences as executor and victim of violence

**Methodology**

It is a quantitative study based on the analysis of interview survey conducted in Agra district, in west Uttar Pradesh. This study is based on primary data. A sample of 400 women has been taken for this study. Purposive sampling technique was utilized for data collection. Women who were presently victim of any form of emotional and physical violence have been selected for the study. The sample consisted of literate and illiterate women both. Face to face in-depth Interview is used for collecting data. Physical and emotional violence has been divided in accordance to intensity in three categories low intensity, high intensity and very high intensity.

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\(^9\) India's National Crime Records Bureau (NCRB)2005 (accessed through internet \text{http://ncrb.nic.in})

\(^10\) India's National Crime Records Bureau (NCRB) 2011 (accessed through internet \text{http://ncrb.nic.in})

\(^11\) India's National Crime Records Bureau (NCRB) 2011(accessed through internet \text{http://ncrb.nic.in})

\(^12\) Second human development report 2008 December Uttar Pradesh Page 149

\(^13\) Domestic violence you can end it! Published by break through :building human rights culture 2008;Page no 1 accessed through internet on 7/3/13www.breakthrough.tv
Data Analysis

Data was cleaned and entered into SPSS version 16 software for analysis. Cross tables have been made with the help of the software.

Limitations of the study

*This study is based on self reported incidents of abuse. Only one sided version of the incidents of violence has been studied so it may seem biased towards women.

*Only two forms of abuse that is physical violence and emotional violence has been studied.

Results:

<table>
<thead>
<tr>
<th>Education level of wife</th>
<th>No violence was found</th>
<th>Low intensity violence</th>
<th>High intensity violence</th>
<th>Very high intensity violence</th>
<th>Total</th>
</tr>
</thead>
<tbody>
<tr>
<td>Illiterate</td>
<td>0</td>
<td>13</td>
<td>70</td>
<td>78</td>
<td>161</td>
</tr>
<tr>
<td>Primary</td>
<td>2</td>
<td>7</td>
<td>37</td>
<td>46</td>
<td>92</td>
</tr>
<tr>
<td>Senior secondary</td>
<td>1</td>
<td>9</td>
<td>28</td>
<td>38</td>
<td>76</td>
</tr>
<tr>
<td>Graduate</td>
<td>2</td>
<td>7</td>
<td>17</td>
<td>12</td>
<td>38</td>
</tr>
<tr>
<td>Above</td>
<td>3</td>
<td>8</td>
<td>15</td>
<td>7</td>
<td>33</td>
</tr>
<tr>
<td>total</td>
<td>8</td>
<td>44</td>
<td>167</td>
<td>181</td>
<td>400</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Education level of wife</th>
<th>No violence was found</th>
<th>Low intensity violence</th>
<th>High intensity violence</th>
<th>Very high intensity violence</th>
<th>Total</th>
</tr>
</thead>
<tbody>
<tr>
<td>Illiterate</td>
<td>-</td>
<td>16</td>
<td>76</td>
<td>69</td>
<td>161</td>
</tr>
<tr>
<td>Primary</td>
<td>-</td>
<td>10</td>
<td>33</td>
<td>49</td>
<td>92</td>
</tr>
<tr>
<td>Senior secondary</td>
<td>-</td>
<td>7</td>
<td>30</td>
<td>39</td>
<td>76</td>
</tr>
<tr>
<td>Graduate</td>
<td>-</td>
<td>1</td>
<td>15</td>
<td>22</td>
<td>38</td>
</tr>
<tr>
<td>Above</td>
<td>-</td>
<td>2</td>
<td>11</td>
<td>20</td>
<td>33</td>
</tr>
<tr>
<td>total</td>
<td>-</td>
<td>36</td>
<td>165</td>
<td>199</td>
<td>400</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Educational level of husband and Physical violence</th>
<th>No violence</th>
<th>Low intensity</th>
<th>High intensity</th>
<th>Very high</th>
<th>Total</th>
</tr>
</thead>
<tbody>
<tr>
<td>Education</td>
<td>No violence</td>
<td>Low intensity</td>
<td>High intensity</td>
<td>Very high</td>
<td>Total</td>
</tr>
</tbody>
</table>


Education has been found to have restricting effect on violence. Education has affected husband and wife, perpetrator and victim of violence both. Physical violence decreases with increase in education level of women. Women who were illiterate or had lower level of education (up to senior secondary) were more than four times likely to face violence. Prevalence of very high intensity of violence was also found more among illiterate.

In other studies also education was found to have controlling effect on violence. National level studies suggest same trend about relation between education and domestic violence. According to NFHS-3, 46% of illiterate women faced violence in comparison to 12% women with 12 years of formal schooling.

<table>
<thead>
<tr>
<th>Education level of husband</th>
<th>No violence was found</th>
<th>Low intensity violence</th>
<th>High intensity violence</th>
<th>Very high intensity violence</th>
<th>Total</th>
</tr>
</thead>
<tbody>
<tr>
<td>Illiterate</td>
<td>-</td>
<td>6</td>
<td>53</td>
<td>41</td>
<td>100</td>
</tr>
<tr>
<td>Primary</td>
<td>-</td>
<td>11</td>
<td>37</td>
<td>31</td>
<td>79</td>
</tr>
<tr>
<td>Senior secondary</td>
<td>-</td>
<td>13</td>
<td>58</td>
<td>79</td>
<td>150</td>
</tr>
<tr>
<td>Graduate</td>
<td>-</td>
<td>4</td>
<td>12</td>
<td>30</td>
<td>46</td>
</tr>
<tr>
<td>Above</td>
<td>-</td>
<td>2</td>
<td>5</td>
<td>18</td>
<td>25</td>
</tr>
<tr>
<td>total</td>
<td>-</td>
<td>36</td>
<td>165</td>
<td>199</td>
<td>400</td>
</tr>
</tbody>
</table>

14 UNGEI at 10; a journey to gender equality in education: May 2010; Page no 5 (accessed through internet on 6/7/13; http://www.ungei.org ; )
Very high intensity of violence also decreases with level of education attained, it means women who were educated had to face high to low amount and intensity of violence. Women who were illiterate or who had passed senior secondary were eight times more likely than graduates and above to face very high intensity of violence graduation and above. Physical abuse is always accompanied with emotional abuse. Although emotional abuse was found to be more prevalent among graduate and above. Overall rate of emotional violence decreased with increase in rate of education. High to very high intensity of mental violence was also committed more against illiterate and lowly educated women.

Husbands who avoided physical violence were educated more than senior secondary; among them six were educated up to graduation and above. The intensity of violence also decreased with increase in education. Husbands who were illiterate and lesser educated were also more likely to use high to very high intensity of violence. In addition to it they were also overall more violent than counterpart. In a large scale study of Uttar Pradesh it was found that greater proportions of abusive men than non abusive men had low levels of education.

Discussions

As domestic violence is a common feature of Indian society, it is also a learned behavior and not a psychological disease. Wife abuse is rooted in tradition, through process of socialisation women are socialised to bear all sorts of torture meted out by her husband as a part of normal life. The process of socialisation continues in two forms one is formal and the other one is informal. Tradition socializes woman to be in inferior, secondary and submissive position and bear all kinds of violence meted out against her and also keep silence about it. While lack of information discourages the women to speak up. Education plays an important role because it teaches gender equality and to be free of

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16 violence against women: a health system response; collaborative effort of national commission for women, unfp, chetna ; Page no3 (accessed through internet on 13/7/2013)
17 Sandra L. Martin, Amy Ong Tsui, Kuhu Maitra,and Ruth Marinshaw: Domestic Violence in Northern India,; American Journal of Epidemiology 1999 page 421,422
18 Report : Gender Stereotypes: The impact of socialisation and education ;Page no3(accessed through internet from www.QEC-ERAN.ORG; on 12/7/2011 )
all biases. The illiterate or lesser educated women are more traditional in nature and attitude. They do not complain any abuse formally. Because they are not educated so they are not aware of many facts\(^{19}\). The level of awareness increases in accordance with the education.

Marriage at the early age affects year of attending formal education\(^{20}\). If a woman is married at young age it also implies that there education will also be interrupted\(^{21}\). Females who are married at younger age are not aware of their basic human rights also “meri shadi gyrah saal main hui. jo mere pati aur saas kehte they main wahi karti thi, fir bhi wo mujhe marte they .fir bhi main chup rehti thi dheere dheere sab sahi ho jayega, meri maa bhi sab kuch sahti thi usne mujhse kaha tha sabki seva karma aur sabka kehna manana” (I was married at the age of eleven. I always obeyed what my mother in law and husband said to me. still they treated me badly. But I kept silence; everything will be fine one day. My mother also accepted all sort of violence. She told me to serve everybody and follow everybody orders quietly).

Although all the respondents are victim of domestic violence but the degree of violence meted out against them is different. The lesser educated women bear more violence in comparison to educated women. The in-laws and husband of the respondent are more protective and careful towards educated women. They fear doing any harm to educated women.

Educated women are more likely escape violent situations with help of alternative economic options while uneducated women accept violence silently. So acceptance level of violence also differed in accordance to education. The victims as in case of uneducated women “kya hua agar kabhi mere pati mujhe marte hai, mujhe pyar bhi to karte hai .ghar main rahne dete hai , hai, yeh sab to sahna hi padta hai .do bartan hote hai to takraenge hi mujhe koi shikayat nahi hai” (so what if my husband hits me

\(^{19}\) A study of domestic violence and torture among females of urban area; Shubhodaya: Center for Rehabilitation of Victims of Torture and Violence (SCRVTV) (Website : www.sosrac.com; Page no 56; 20/7/2013)

\(^{20}\) UNGEI at 10; a journey to gender equality in education: May 2010 (accessed through internet on 6/7/13; http://www.ungei.org page no 20 )

\(^{21}\) Education from a gender equality Perspective usaid’s office of women in development by the equate project ,management system international 2008; Page no 1 ;accessed through internet on 12/6/2011
sometimes, he loves me too. At least he doesn’t drag me out of the house. One has to bear this also. I don’t have any complaints against him).

In case of a highly educated who is working in government sector she said that “bus ab bahut ho gaya, paanch saal se mujhe pareshan karrahe the, woh mere chote se bachee ko bhi bahut marte hai, main unhe dus din ka time diya hai sudharne ko. nahi toh main alag ho jaungi” (Now it is enough. He has been torturing me since five years. He abuses my small child also. I have given him ten days to improve his behavior. Otherwise I will separate from him)

Prevalence of superstitions were also a common feature among uneducated and women residing in rural areas like a women said “maine panditji ko pucha to unhone kaha ki in par buri aurat ka saya hai, woh inko dheek nahe hone deti ,isliye yeh mujhe marte hain ,iski shanti karwani padegi tab sab sahi ho jayega”. (I have asked priest about his behavior, he had said he is in affected by bad spirits. This is the reason of his anger against me. Priest will treat him soon). The women did not believe in taking legal or other actions rather they believed as their fate and has accepted it. Other women interviewed replied “mere pujari ne choti puja ki thi .uska ek mahina theek asar raha. Purohit ne kaha hai ab asar kam ho raha hai, badi puja hogi, jyada paisa to lagega hi”. (Priests have done small ritual to see its effect on him. It has positive effect for only one month. Priest has suggested for big ceremony, obviously it will cost more).

The degree or level of violence meted against them also differentiated literate and illiterate. Like in case of lesser educated women a victim said “mere pati roj sharab pi kar ate they aur mujhe roj roj marta tha ,ghar se nikal deta tha , fir bhi main kuch nahe kahti thi. ek din who mujhe jungle main bhand kar chod aye aur kaha ki janwar tuje mar dalenge, main tujhe sath nahe rakhonga. Ek anjan admi ne mujhe bachaya aur fir main wapas apne baba ke ghar chali gayi .to who mujhe saat mahine baad wapas lekar gaye. usne mere baba se mafi bhi mangi ” (My husband came home drunk everyday and used to beat me. He used to drive me out of his house. Still I did not say anything. One day he tied me with rope and abandon me in jungle and said wild animals would finish you up as I don’t want to keep you .Then I decided to return to my father’s house. My husband returned back after seven months to say sorry and to take me back.
Conclusion

Educated women have far better opportunity compared to uneducated women in the society. With the aid of education and law and order it is effortless to escape from those issues. So it is needed to educate all types of women in the society. Education gives strength, wealth, health and power to the individual. Education helps in the reduction of the inequality among individuals and that is why education is one of the basic rights of every human being in the Universal Declaration of Human Rights. The constitution of UNESCO also has a motto to achieve “The ideal of equality of educational opportunity without regard to race, sex or any distinction, economic or social.”

However, with the changing world, the concept of education is experiencing a complete transformation. Today education is a powerful agent of social change because education has made people think. Education challenges the taken for granted truth that women are entirely different from men. The institution of educational system is contributing to reduce the social gap by making the individual better suited to the needs of the ever changing dynamic world. We often think the ultimate goal of our efforts in women’s education is to give women a sense of empowerment and opportunities to direct that empowerment towards positive social, economic and eventual cultural change. In this perspective education is the key to create equality and justice. But what happens when educated, empowered women are unleashed into a culture that is not ready to accept this new identity? At that time violence happens, to control the person and socialize according to the persistent culture. So the traditional values and norms must also change according to time.

Prevention of domestic violence ultimately depends upon changing the norms of society regarding traditional attitudes about gender. To achieve this, firstly pre marital training should be made compulsory. It will develop understanding and respect for other sex. Secondly the concept of gender and human rights must be introduced in the curricula of schools, universities, professional colleges, and other training settings.

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22 Domestic violence against women and girls; No.6-June 2000 UNICEF Innocenti Research Centre; Page no 14 (accessed through internet www.unicef-icdc.org on 3/12/11)
Thirdly Education must encourage communication between two genders. Communication encourages understanding. It is found that lack of communication between two sexes also increases differences. This was found to be more significant in rural areas, where husband and wife are prevented to converse in front of elders. Fourthly media can also play positive role in educating citizens against domestic violence\textsuperscript{23}. Regarding media campaign of “\textit{bell bajao}”, it was found that this campaign has increased awareness about domestic violence\textsuperscript{24}. And finally there must be recognition and commitment to the principle of free compulsory primary and secondary education for both boys and girls.

\textsuperscript{23} Report : Gender Stereotypes: The impact of socialisation and education ;Page no 7 (accessed through internet from\texttt{www.QEC-ERAN.ORG}; on 12/7/2011 )

\textsuperscript{24} Breakthrough’s Bell Bajao! A Campaign to Bring Domestic Violence to a Halt(Page no44-47)
THE EFFECT OF MICRONUTRIENTS AND HIGHLY ACTIVE ANTIRETROVIRAL THERAPY (HAART) ON THE CD4 COUNT, VITAMINS, MINERALS AND LIVER ENZYMES IN HIV INFECTED PATIENTS ATTENDING BARAU DIKKO GENERAL HOSPITAL KADUNA, NIGERIA.

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ABSTRACT
The effect of micronutrient and highly active antiretroviral therapy and its implication on vitamin A, C, E, CD4 count, Zinc, Selenium Body Max Index and markers of liver disease was evaluated. Serum vitamins A, C, & E, Aspartate transaminase, Alanine transaminase, CD4+ Count, BMI, Zinc and Selenium were measured in 108 randomly selected HIV infected patients already on HAART at the HIV special treatment clinic of Barau Dikko General hospital, Kaduna. After their baseline assessment, 54 of these patients were randomly selected and placed on a certified micronutrient supplementation (IMMUNACE) for three (3) months and the remaining 54 were not given micronutrient supplement for the same period of time. There was significant increase (p<0.05) in vitamin A, C, E, and CD4 count, BMI, selenium, AST and ALT of supplemented group compared to their corresponding baseline. Significant decrease was observed in zinc, of supplemented group compared to their corresponding baseline. There was significant increase (p<0.05) in serum vitamin A, E, CD4 count, zinc, selenium, of non-supplemented group compared to their baseline. While there was significant decrease in serum BMI of the non-supplemented group compared to their baseline. Significant difference (p>0.05) was not found in serum vitamin C, AST and ALT of non-supplemented group compare to their baseline. There was significant increase (p<0.05) in serum vitamin A, C, E, zinc, selenium, BMI, CD4 count of supplemented group compared to the non-supplemented group. The present study shows that micronutrient supplementation may be a beneficial adjunct to HAART and may also improve liver function and nutritional status among HIV infected persons.

Keywords: Micronutrients, Retroviral Therapy, Liver Enzymes, HIV, Infected, Vitamins.

INTRODUCTION

Human immunodeficiency virus (HIV) is a lentivirus (a member of the retrovirus family) that causes acquired immunodeficiency syndrome (AIDS), [26] a condition in humans in which the immune system begins to fail, leading to life-
threatening opportunistic infections. Infection with HIV occurs by the transfer of blood, semen, vaginal fluid, pre-ejaculate, or breast milk. The four major routes of transmission are unsafe sex, contaminated needles, breast milk and transmission from an infected mother to her baby at birth (vertical transmission). HIV infection in humans is considered pandemic by the World Health Organization [21]. In HIV-infected persons, low serum concentrations of vitamins and minerals, termed micronutrients are associated with an increased risk of HIV disease progression and mortality [11]. Micronutrient supplements can delay HIV disease progression and reduce mortality in HIV-positive persons not receiving highly active antiretroviral therapy [28]. With the transition to more universal access to HAART, a better understanding of micronutrient deficiencies and the role of micronutrient supplements in HIV-positive persons receiving HAART has become a priority [16]. Hepatic toxicity is a common complication of antiretroviral treatment in HIV patients usually indicated or heralded by the elevation of liver transaminases measured in the blood. There has been reported evidence of hepatic toxicity in all class of the drugs presently in use hepatic toxicity is normally due to increased rate of cytolysis and significantly elevated serum transaminase level [17]. General liver enzymes elevations are common in patients with HIV infection and Antiretroviral drugs presents difficulty in diagnosis and management because of the intricacies of the pathogenic mechanism involved [19]. Liver toxicity and micronutrients deficiencies are thus a growing problem among HIV patients on HAART; hence, there is a need to monitor their liver enzymes activities and nutrient status among patients on HAART.

SUBJECTS AND METHODS

STUDY AREA
The study was carried out in Kaduna state; Nigeria. Kaduna State is located in the North Western part of Nigeria, the State is bounded by Kano, Zamfara, Jos, Bauchi and Niger state to the north, south East and West respectively. Kaduna State is third in population after Lagos and Kano and it remains central to all political activities of northern Nigeria. Barau Dikko general hospital is one of the oldest tertiary heath facility in Kaduna after Ahmadu Bello Teaching Hospital Shika.

STUDY DESIGN
The Study is mainly a prospective study involving 108 randomly selected HIV-infected patients that were managed at the Special treatment clinic (STC) in the outpatient Unit of Barau Dikko General hospital Kaduna and already on highly active antiretroviral therapy (HAART). Participants were divided into 2 groups. Group one consist of 54 patients that were supplemented with a registered Pharmacosupplement (Immunace) daily for 3 months, while Group two consist of 54 non-supplemented participants all were observed for a period of 3 months respectively. Blood sample was collected from the 108 recruited participants and was used to establish a baseline data of their Serum Vitamins A,C,E,Zinc,Selenium,CD4 counts, ALT,AST & BMI status respectively. All
participants were patients whose CD4 counts are less than 300 cells/mm³ and who take their HAART daily and keep to their appointment date. It’s assumed that all the patients kept to outlined guidelines for participating in the study. Patients with Co infections (Hepatitis) and pregnant women were all excluded from the studies. Written consent was sought from the participants with the right to opt out, participant were also assured of confidentiality on all given information about their status. Ethical approval to conduct the study was gotten from the ethical committee of the Kaduna State health Management Board, Kaduna State, Nigeria. Pharmacosupplements (immunace) containing vitamins A, C, E, Zn and Se, certified by a registered pharmacist in Barau Dikko General Hospital Kaduna was given to the 54 patients on group one while their demographic and other physical data of weight, height, sex, level of education, income and number of partners was extracted from the patients file. Blood samples was obtained from each patient from the two groups after three months and allowed to clot at room temperature before being centrifuged to separate the serum. The serum was used for Micronutrients, Biochemical & Hematological measurements respectively.

Anthropometric Measurements.
Body weight of each patient was measured without shoes and in light clothing; with the use of portable bathroom scale to the nearest 0.1 kg. Height was measured using a vertical measuring rod constructed with a non-stretchable tape firmly attached.
Anthropometry measurement was conducted as adapted from Jellife [10].
- BMI calculated as weight (kg)/Height (m²)
- Weight in kilograms (kg).
MEASUREMENTS OF MICRONUTRIENTS
Trace elements of (Se, Zn) were determined with atomic absorption spectrophotometer (AAS) – Buck 200 using a direct method as described by Kaneko [14].
While Vitamin A, C & E was determined by the following methods,
  Determination of Vitamin A in Serum by colorimetric method [2].
  Determination of Vitamin C in serum by Roe & Kuther,[20]
  Determination of Vitamin E in Serum by Fabiank[4].

BIOCHEMICAL MEASUREMENTS
Determinations of Aspartate Transaminase & Alanine Transaminase by Reithman & Frankel methods, (1957) as modified by Wilkinson [30].

HAematological Measurement
Determination of CD4+ counts level:
This will be determined by the Flow cytometry technique, using Cyflow Counter machine (PARTEC GmbH, Germany).

STATISTICAL ANALYSIS
Statistical Package for the Social Sciences (SPSS) Statistical Software for windows (version 15:0; Standard Licensed Incorporated, 2003 was used to account for complex survey design, primary sampling units and stratification variables. Students’-test was used to compare between the mean of BMI, CD4 count, micronutrients, Liver markers of AST & ALT. At p< 0.05 level of significance.

RESULTS
Table 1 presents the mean serum vitamin A, C and E, Zinc and Selenium, Body Mass Index (BMI), CD4+ count,
Aspartate transaminase (AST), Alanine transaminase (ALT) in the supplemented group and their corresponding baseline. There is significant difference between the mean serum vitamin A, C and E, of supplemented group 41.40µg/dL, 4.22mg/dL, 26.91µg/dL compare with that of their corresponding baseline 21.46µg/dl, 0.47mg/dl, 0.17µg/dl respectively (P < 0.05). There is also a significant difference in mean serum selenium, BMI, CD4+ count in the supplemented group 23.99µg/dL, 26.63Kg/m2, 442.74cell/mm3 when compared to their corresponding baseline 22.61 µg/dL, 24.99 Kg/m2, 321.96 cell/mm3 respectively. No significant difference (P <0.05) in mean serum of Zinc in the supplemented group 64.78 µg/dL, compared to their corresponding baseline 65.07 µg/. There is also a significance difference (P <0.05) in the serum selenium Aspartate transaminase and Alanine transaminase levels for supplemented group 23.99 µg/dL, 27.43u/L,43.32u/L compared to the baseline 22.61 µg/dL,26.23u/L,41.22u/L respectively.
Table 1: serum vitamin A, C and E, Zinc and Selenium, BMI, CD4 count, AST and ALT in the supplemented group and their baseline

<table>
<thead>
<tr>
<th></th>
<th>SUPPLEMENTED GROUP</th>
<th>BASELINE</th>
</tr>
</thead>
<tbody>
<tr>
<td>Vitamin A (µg/dL)</td>
<td>41.40±0.62</td>
<td>21.46±0.31</td>
</tr>
<tr>
<td>Vitamin C (mg/dL)</td>
<td>4.22±0.07</td>
<td>0.47±0.01</td>
</tr>
<tr>
<td>Vitamin E (µg/dL)</td>
<td>26.91±0.06</td>
<td>0.17±0.00</td>
</tr>
<tr>
<td>Zinc (µg/dL)</td>
<td>64.78±0.24</td>
<td>65.07±0.16</td>
</tr>
<tr>
<td>Selenium (µg/dL)</td>
<td>23.99±0.06</td>
<td>22.61±0.06</td>
</tr>
<tr>
<td>BMI (kg/M²)</td>
<td>26.63±0.07</td>
<td>24.99±0.09</td>
</tr>
<tr>
<td>CD4+count (cells/mm³)</td>
<td>442.74±3.53</td>
<td>321.96±3.72</td>
</tr>
<tr>
<td>Aspartate Transaminase (u/l)</td>
<td>27.43±0.09</td>
<td>26.23±0.08</td>
</tr>
<tr>
<td>Alanine Transaminase (u/l)</td>
<td>43.32±0.34k</td>
<td>41.22±0.29l</td>
</tr>
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</table>

Results are expressed as mean± SE, N=54. Values on the same row having the same superscript differ significantly p<0.05. No significant difference p<0.05 in values on the same row with different superscript.

Table 2 presents the mean serum of vitamin A, C, and E, Zinc and Selenium, Body Mass Index (BMI), CD4 count, Aspartate transaminase and Alanine transaminase of the non-supplemented group with their corresponding baseline. There is significant difference in the mean serum vitamin A and E, Selenium, Zinc and CD4+ count of the non-supplemented group 35.33µg/dL, 1.38 µg/dL, 25.63 µg/dL, 66.30 µg/dL, 296.00cell/mm³, when compared to their corresponding baseline 24.96µg/dL, 0.20 µg/dL, 22.61 µg/dL, 58.16 µg/dL, 269 cell/mm³ respectively at p<0.05. Mean serum BMI, and vitamin C 22.90 kg/m², 0.71mg/dL of the non-supplemented group indicate no significant difference p< 0.05 compare to their corresponding baseline 22.52 kg/m², 0.42 mg/dL respectively. There is no significant difference in the mean serum of Aspartate transaminase, Alanine transaminase P>0.05 in non-supplemented group,33.22u/L,73.12u/L, compared to their corresponding baseline, 32.12u/L, 71.14u/L respectively.

Table 2: Serum vitamin A, C and E, Zinc and Selenium, BMI, CD4 count, AST and ALT in the non-supplemented group and their baseline

<table>
<thead>
<tr>
<th></th>
<th>NON-SUPPLEMENTED GROUP</th>
<th>BASELINE</th>
</tr>
</thead>
<tbody>
<tr>
<td>Vitamin A (µg/dL)</td>
<td>35.33±1.24</td>
<td>24.96±0.82</td>
</tr>
<tr>
<td>Vitamin C (mg/dL)</td>
<td>0.71±0.01</td>
<td>0.42±0.01</td>
</tr>
<tr>
<td>Vitamin E (µg/dL)</td>
<td>1.38±0.01</td>
<td>0.20±0.00</td>
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</tbody>
</table>
Table 3 compare serum vitamin A, C, and E, Zinc and Selenium, BMI, CD4+ count, Aspartate transaminase, Alanine transaminase, of supplemented and non-supplemented group. There is significant difference p<0.05 in the mean serum of vitamin A, C and E, Zinc, Selenium, BMI and CD4 count of supplemented group 41.40 µg/dL, 4.22 mg/dL, 26.91 µg/dL, 64.78 µg/dL, 23.99 µg/dL, 26.63 kg/m², 442.74 cell/mm³ compare to the non-supplemented group 35.33 µg/dL, 0.71 mg/dL, 1.38 µg/dL, 66.30 µg/dL, 25.63 µg/dL, 22.96 kg/m², 296.00 cell/mm³. There is also significant decrease in the serum level of AST and ALT of the supplemented group 27.43 u/L, 43.32 u/L compared to non-supplemented group 33.22 u/L, 73.12 u/L respectively.

Table 3: serum vitamin A, C and E, Zinc and Selenium, BMI, CD4+ count, AST and ALT of the supplemented and non-supplemented group

<table>
<thead>
<tr>
<th></th>
<th>SUPPLEMENTED GROUP</th>
<th>NON-SUPPLEMENTED GROUP</th>
</tr>
</thead>
<tbody>
<tr>
<td>Vitamin A (µg/dL)</td>
<td>41.40±0.62&lt;sup&gt;a&lt;/sup&gt;</td>
<td>35.33±1.24&lt;sup&gt;a&lt;/sup&gt;</td>
</tr>
<tr>
<td>Vitamin C (mg/dL)</td>
<td>4.22±0.07&lt;sup&gt;b&lt;/sup&gt;</td>
<td>0.71±0.01&lt;sup&gt;b&lt;/sup&gt;</td>
</tr>
<tr>
<td>Vitamin E (µg/dL)</td>
<td>26.91±0.06&lt;sup&gt;c&lt;/sup&gt;</td>
<td>1.38±0.01&lt;sup&gt;c&lt;/sup&gt;</td>
</tr>
<tr>
<td>Zinc (µg/dL)</td>
<td>64.78±0.24&lt;sup&gt;d&lt;/sup&gt;</td>
<td>58.16±0.22&lt;sup&gt;d&lt;/sup&gt;</td>
</tr>
<tr>
<td>Selenium (µg/dL)</td>
<td>23.99±0.06&lt;sup&gt;e&lt;/sup&gt;</td>
<td>22.61±0.12&lt;sup&gt;e&lt;/sup&gt;</td>
</tr>
<tr>
<td>BMI (Kg/M²)</td>
<td>26.63±0.07&lt;sup&gt;f&lt;/sup&gt;</td>
<td>22.96±0.07&lt;sup&gt;f&lt;/sup&gt;</td>
</tr>
<tr>
<td>CD4+ count(cells/mm³)</td>
<td>442.74±3.53&lt;sup&gt;g&lt;/sup&gt;</td>
<td>296.00±2.78&lt;sup&gt;g&lt;/sup&gt;</td>
</tr>
<tr>
<td>AST(U/L)</td>
<td>27.43±0.09&lt;sup&gt;h&lt;/sup&gt;</td>
<td>33.22±0.06&lt;sup&gt;h&lt;/sup&gt;</td>
</tr>
<tr>
<td>ALT(U/L)</td>
<td>43.32±0.34&lt;sup&gt;i&lt;/sup&gt;</td>
<td>73.12±0.06&lt;sup&gt;i&lt;/sup&gt;</td>
</tr>
</tbody>
</table>

Results are expressed as mean± SE, N=54

Values on the same row having the same superscript differ significantly p<0.05. No significant difference p>0.05 in values on the same row with different superscript.
Figure 5 presents percentage distribution of sex of the patients used in this study. The finding from this study revealed that 61.7% are female while 38.3% are male.

![Pie chart showing sex distribution](image)

Figure 5. Percentage distribution of sex of patients

Figure 6 presents percentage distribution of the age of the patients used in this study. The finding from this study revealed that 13.3% are between 16 – 25 years, 43.3% are between 26 -35 years, 30.8% are 36-45 years and 10.8% are between 46-55 years while 1.7% are 56 years and above.
FIGURE 6. Distribution of Patients Age with Sex

Sex
- male
- female

%
Figure 7 presents percentage distribution of the economic status of the patients used in this study. The finding from this study revealed that 19% earn < 5,000, 55% earn between 5000- 10,000 and 17.2% earn 10,000 – 35,000 while 8.6% earn above 35%.

**FIGURE 7. Distribution of Patients Monthly Income with Sex in Naira**
Figure 8 presents percentage distribution of the educational levels of the Patient recruited for the study. The finding from this study revealed that 29.2% of the patients had no formal education, 16.7% had primary education, 29.2% had secondary education, and 12.5% are undergraduates while the remaining 12.5% had postgraduate education.
Figure 9 presents distribution of marital status of the patients used for this study. Observation from this study shows that 61.1% of the patients are married, 19.2% are singles, 12.5% are widowed, while 7.2% are divorced.
Figure 10 presents percentage distribution of the sexual habit of patients used for this study. The finding from this study revealed that 58% are single, 16% have double partner and 26.1% have more than two partners.

DISCUSSION
The present study shows that micronutrient supplementation has beneficial effect on HIV seropositive patients both on HAART and also an improvement of liver function. This is seen in table 3 of this study, when comparing group on supplementation and group not on supplementation and also group on supplementation and its baseline (table 1). This is in line with [9,2]. In an observational study comparing HIV positive person, it was observed that HIV infected person have lower or deficient serum concentration of several micronutrients and more commonly thiamine, selenium, zinc and vitamin A, B-3, B-6, B-12, C, D, and E to be individually associated with low CD4 cell count, advance HIV related disease and faster disease progression or HIV related mortality. Jaguar et al., [8] also in a placebo control of HIV infected adults placed on a daily supplement of vitamin A, C, E for 6 months. At baseline, concentration of vitamin A, C and E were significantly lower compared with a small group of
HIV negative healthy volunteers. At follow up, concentrations of vitamin A, C and E increased significantly in supplemented group than the placebo group. Observation from the result of the study shows an increase in level of selenium in the supplemented group. This finding agrees with Burbano et al. [3]. In a placebo control trial, 186 HIV- positive adult placed on selenium for 2 years, 85 of them on HAART. The 2 groups had similar level of selenium at baseline. At follow-up, the supplemented group had a higher serum selenium level, less risk of decrease CD4 cell count and decrease hospital admission in the patients. The result also shows an increase in the level of CD4 cell count, this agrees with Kaiser et al., [12]. In a randomized controlled trial conducted in 40 HIV infected adults found that comprehensive micronutrients supplementation for 12 weeks significantly increased the CD4 cell count. This is consistent with Franceschini et al., [6]. A CD4 count <300 cells/mm3, remained an independent predictor of HIV-1-related morbidity and mortality. Malnutrition, often accompanied by low serum level of micronutrient was common in HIV infection prior to introduction of HAART and is still common especially in places where there is limited access to ART. Chronic diarrhea, malabsorption, impaired nutrient storage, increase energy demand and altered metabolism were the primary contributors to these nutritional deficiencies [23]. The result of the present study indicates increase in BMI in the supplemented group compare with its corresponding baseline. This is in line with Tang et al, [26]. In HAART era, wasting has become less common and patients are increasingly overweight and obese. The result indicates decrease in serum level of zinc in the supplemented group compare with their corresponding baseline, as presented in table 1. A slight decrease in serum level of zinc seen in the supplemented patients compared with the baseline value might be due to the increase in the hepatic zinc intake. As hepatic zinc up take increases, zinc level decreases reflecting zinc role as acute phase reactant [22]. Since zinc plays a role in acute infection and its subsequent altered metabolism in chronic infection, it has been argued that serum levels may not be an accurate reflection of immune impairment related to zinc body stores and zinc availability in HIV [24]. Zinc has both enhancing and inhibiting activities depending on the concentration of zinc in the surrounding tissues [15]. This decrease may also be due to the rapid binding of zinc ions to HIV protease (an enzyme responsible for cutting of viral peptide chain to form new infectious viral particles) making it inactive, thereby preventing the production and proliferation of new HIV viruses. Multiple studies have shown if sufficient zinc ions are bound to the protease enzyme, it remains inactive [31]. The low serum level of zinc in the supplemented subjects might also be due to the inclusion of zidovudin (AZT) in the HAART regimen. AZT metabolism necessitates a zinc dependent thymidin kinase for conversion to its active forms, which could lead to decrease in effectiveness of the drug in zinc deficient patients [1]. In the non-supplemented group, there was significant difference (p<0.05) in mean serum level of vitamin A and E, selenium and zinc. This can be attributed to the beneficial effect of HAART. This finding agrees with [3]. In a randomize control
trial of HIV positive adults, the participants receiving HAART are at less risk of hospitalization due to opportunistic infection. The increase observe in the non-supplemented group compared to their corresponding baseline can also be from the dietary intake of its source by the patients. The patients were advised on the importance on taking diets rich in these minerals and vitamins during the recruitment process and they adhered to it. The increase observe in CD4 count might be due to the beneficial effect of HAART and its ability to reconstitute immune system functions, increase CD4 count and decrease viral replication, [9]. Statistical significant difference was not observed in the AST and ALT measured as indicated in table 2 of non-supplemented patient and corresponding baseline.

A slight increase observe in BMI of the non supplemented patient compared with their corresponding baseline values is evident, but does not produce a significant difference (P>0.05). This might be due to the fact that these patients experience chronic diarrhea, malabsorption, impaired nutrient storage; increase energy demand and altered metabolism were the primary contributors to these nutritional deficiencies, [23].

No significant difference was observed in the mean serum vitamin C of the non supplemented patients as compared with the baseline value. This is in line with almost all scientific findings on vitamin C level in HIV disease. Vitamin C has been reported to be rapidly consumed by cells in state of pathology compared with normal cell, [5]. This indicates an increase oxidative stress in these patients. Oxidative stress occurs from the action of the virus and its medication. HIV infection increases the oxidative stress process, which is further increased by the use of antiretroviral therapy (ART), [13].

The serum increase in the vitamins A, C and E indicates improvement in the antioxidant defense system of the supplemented subjects. This subsequently causes reduced oxidative stress, reconstitute proper immune function and increase in CD4+ count in the supplemented patients compared with their non supplemented counterparts. Furthermore, this research found a slight reduction in the mean serum zinc level of the non supplemented subjects. This might be due to the increase in zinc absorption in the lungs as a result of HAART medication, as reported by Graham [7]. It has been found that zinc deficiency can be associated with chronic renal disease [18].

The present study further justifies other studies on role of micronutrients supplementation in HIV positive Patients. There would be immune reconstitution, reduced oxidative stress, and increased CD4+ count in HIV diseases conditions, [3]. This is seen in the increased mean serum levels of vitamins A, C, and E, in the supplemented patient compared with their non supplemented counterparts. This increase mean serum level of vitamin A, C and E is justified by the increased CD4+ count. Mild liver toxicity was observed among all the HIV infected patients enrolled for this study, this could possibly be because of the absence of risk factors that can contribute to the development of severe liver injury in all the patients, this results agrees with that of Sulkwosi, [25].
This study further reveals that socio-economic factors such as level of education, income, multiple partners to be one of the most predisposing factors. Furthermore, it was observed that individuals within the age of 26-35 are those mostly infected with the virus, with females having the highest percentage. Observation from the study also shows that singles (not married) are predisposed to the infection and equally those with multiple partners. Also the demographic data revealed that female are the most infected with the virus.

ACKNOWLEDGEMENT.

We wish to express our sincere thanks and gratitude’s to Tertiary Education Trust Fund (TETFUND), Kaduna State AIDS Control Agency (KADSACA), and all Management and Staffs of Barau Dikko General Hospital Kaduna for Giving Financial Support and Resource materials for the successful completion of these studies.

REFERENCES


CURRENT ISSUES IN FLOOD DISASTER: CHALLENGES AND IMPLICATIONS FOR SCIENCE AND TECHNOLOGY TO ENHANCE ENVIRONMENTAL EDUCATION

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Department of Geography, College of Education, Katsina-Ala, Benue State of Nigeria

Abstract

The paper is on current issues in flood disaster. The paper discussed the effects of climate variability and change on the environment. The paper examined the challenges of flood disaster and implications of flood disaster for science and technology. The paper also discussed adaptation strategies for flood disaster. The paper concluded that the challenges of flood disaster have affected people negatively in flood areas resulting in disruption of socio-economic activities and loss of properties. Suggestions/recommendations were made that government should carry out flood adaptation strategies and enforce land use control measures to meet the prevailing challenges of flood.

Key words: Climate change. Flood disaster. Adaptation. Science and Technology

INTRODUCTION

Climate is the average weather condition of a place over a long period of time. According to Wikipedia (2013), climate encompasses the statistics of temperature, humidity, atmospheric pressure, wind, precipitation, atmospheric particles and other meteorological elemental measurements in a given region over long periods. Zabbey and King (2007) opined that climate change means any change in climate overtime whether due to natural variability or as a result of intense human activities in the environment. Climate change is any alteration from elements of weather like temperature, humidity, pressure, wind and precipitation.

Morristown (2010) defined flood as an overflow of water onto normally dry land, the inundation of a normally dry area. In the same vein, Caldwell (2012) affirmed that flood is any high flow, overflow, or inundation by water which causes or threatens damage. Flooding can rise from overflowing rivers (river flooding), heavy rainfall over a short duration (flash flood) or an unusual inflow of sea water onto land (ocean flooding). Flood is an overflow of water that comes from a river or other bodies of water and causes or threatens damage.
Siepmann (1999) defined Science as the field of study which attempts to describe and understand the nature of the universe in whole part. Wikipedia (2013) viewed science as a systematic enterprise that builds and organizes knowledge in the form of testable explanations and predictions about the universe. Science is any type of knowledge-base that can have some predictable outcome.

Technology according to Khali (2000) is all knowledge products, processes, tools, methods, and systems employed in the creation of goods or in providing services. Supporting the view, Lowe (1995) said technology is the structured application of scientific principles and practical knowledge to physical entities and systems. Technology is an object or set of operations created by man to assist in achieving some goal. Science is an organize body of knowledge while Technology is the application of science to make something that works.

**THE EFFECTS OF CLIMATE VARIABILITY AND CHANGE ON THE ENVIRONMENT**

Dinse (2009) defined climate change as the way climate fluctuates yearly above or below a long-term average value. Climate variability refers to short term (daily, seasonal, annual, inter-annual, several years) variations in climate. The effects of climate variability and change on environment may vary in terms of degree, magnitude, frequency and duration. Somarin (2010) opined that increased concentration of Green House Gas (GHGs) in the atmosphere causes disruptions in climate system such as changes in precipitation regime and frequency and severity of extreme events like typhoons, hurricanes, flood among others. Tunde, Adeleke and Adeniyi (2013) said effects of climate variability and change are caused by natural activities like interaction of the oceans and the atmosphere, changes in the energy received from the sun and volcanic eruptions while Human-induced alterations of the natural world have contributed to high increase in the rate of gaseous emissions into the atmosphere, thereby causing global warming. The environmental problems like recurring droughts, high rate of deforestation, and soil degradation among others may be exacerbated by climate change.

**CHALLENGES OF FLOOD DISASTER**

Flood disaster according to Ezemonye and Emeribe (2011) is an unforeseen and sudden event that causes damage, destruction and human suffering. According to WHO (2002), Flood disaster is a happening that frequently cause damage including disruption to roads, rail lines, airport, electricity supply systems, water supplies and sewage disposal systems. Floods are the most recurring, widespread, disastrous and frequent natural hazards of the world. Adedeji, Oladesu and Bongwa (2012) Stressing on the challenges of flood said that, heavy rainfall coupled with bad human activities in relation to the environment and lack of drainage infrastructure in most Nigerian cities left hundreds of people distressed and homeless as a result of flood. Similarly, Nigerian Compass (2012) also viewed that, states such as Kogi, Kwara, Anambra, Delta, Cross River, Edo and Bayelsa were been caught up in the floods and hundreds of people were confirmed dead. Duru and Yusuf (2012) writing on flood
in Benue State stated that, Worst hit by the devastation were houses within the banks of the river and most structures within five kilometers radius of the river and some of the communities were affected. In a related development, Jenkins (2011) opined that, dirty water, mud and silt that floods bring into our homes, backyards, streets and local play grounds cause a range of conditions including diarrhea, skin disease and soft-tissue infections. Ken (2013) stated that, flood can distribute large amount of water and suspended river sediment over vast areas which help to replenish valuable topsoil components to agricultural lands. Queensland Government (2012) also affirmed that, flood events can result in long-term benefits to agricultural production by recharging water resource storages, especially in drier inland areas, and by rejuvenating soil fertility by silt deposition. Floods destroy homes, kill animals and humans alike but they also bring soil and new life to the land they affect.

**Causes of Flood**

According to Wikipedia (2012), Heavy rainfall caused the Lamingo dam to overflow near Jos, sweeping across a number of neighborhoods in Jos and approximately 200 homes were submerged or destroyed. Identified causes of flood according to Atedhor, Odjugo and Uriri (2011) are increasing rainstorm, obstruction of drainage system; absence of drainage system, poor land use control, global warming and soil. Flooding arises mainly because of blocked natural and man-made drainages and poor maintenance of water dams/reservoirs which seldom give way after persistent heavy downpours.

**Implications of Flood Disaster for Science and Technology**

Development in any nation of the world is viewed in terms of how science and technology is able to combat factors that affect the citizens negatively like the aspect of flood disaster. Queensland (2012), enumerated these implications of flood disasters to include;

Socially: As most people are well aware, the immediate impact of flood will include loss of human life, damage to property, destruction of crops, loss of livestock, and deterioration of health conditions owing to water-borne diseases.

Economically: Damage to public infrastructure will affect a far greater proportion of the population. Flood damage to roads, rail networks and key transport hubs, such as shipping ports, can have significant impact on regional and national economies.

Psychologically: Floods will traumatize victims and their families for long periods of time. Displacement from one’s home will cause continuous stress.

Environmentally: Flood will degrade already degraded systems, removal of vegetation in and around rivers, increased channel size, among others. According to I S D R (2013) science and technology will help to understand the mechanism of natural hazards and to analyse the transformation of these hazards into
disasters. Science and Technology will provide knowledge and application of skills to put machineries in place to tackle the issue of flood disaster in any nation.

**Adaptation Strategies for Flood Disaster**

Discussing on flood adaptation strategies, Atedhor, Odjugo and Uriri (2010), pointed out that embankment; either concrete or sandy may be constructed to prevent water from entering residential houses. Adaptation options that would be effective for flood disaster in developing nations according to Kolawole, Olayemi and Ajayi (2011) include: (i) Environmental policy reforms, changes in urban and housing design, removal of laws that can inadvertently increase flood vulnerability.(iii) Capacity building to integrate climate change and its impact into urban development planning involving local communities, raising public awareness and education on climate change and enabling representation at international meetings. Planting of vegetation to reduce extra water, terracing hillsides to slow flow down hills as well as control of man-made channels to divert flood water among others will serve as adaptation strategies/control.

**CONCLUSION**

Flood can come from overflowing rivers, heavy rainfall over a short duration or an unusual inflow of sea-water onto the land, causing damage to lives and property. Effects of climate change vary in degrees and magnitude worldwide. Changing rainfall interased with anthropogenic factors like obstruction of drainage system, and poor control of land use resulting to increase flooding. The challenges of flood disaster have affected people negatively causing disruption of socio-economic activities and loss of properties, heavy rainfall coupled with bad human activities in relation to the environment and lack of drainage infrastructure in most cities, left hundreds of people distressed and homeless as a result of flood. Flooding will have a lot of implications on the citizens in terms of loss of lives and damage to properties, infrastructure, and displacement of people from their homes causing trauma, removal of vegetation in and around rivers, increasing channel size among others. However, these can be combated through the application of the knowledge of science and technology in controlling flood disaster in any nation. Adapting to flood disaster can be possible through construction of embankment, enactment of environmental laws to control landuse, educating people on the effects of climate change as well as planting of vegetation to reduce extra water, terracing hillsides to slow flow down hills as well as control of man-made channels to divert flood water.

**RECOMMENDATIONS/SUGGESTIONS**

- The government and other well meaning individuals should carry out flood adaptation strategies to meet the prevailing challenges and proper land use control be enforced to prevent people from blocking drainages and building on areas prone to flooding.
- Flood disaster education should be included in the syllabus of all levels of education e.g. primary, secondary and tertiary levels.
• An awareness campaign should be established both in urban and rural areas to educate people on flood disaster issues.
• Flood disaster officers should be appointed and charged with the responsibility of synthesizing citizenry on the effects of flood disaster in countries especially Nigeria.
• Flood disaster laws should be enacted and violators of flood disaster laws should be punished forth with. This will prevent and check citizens from blocking drainages and building on water channels.

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CONFRONTING VISION 20:2020 CHALLENGES: THE PLACE OF ENVIRONMENTAL EDUCATION IN UNIVERSAL BASIC SCIENCE

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Abstract

Survival of living organisms on earth cannot be guaranteed without redressing the present devastating environment. Active involvement of all and sundry is highly necessary to manage the present intensive exploitative demands on the environmental resources by organisms. This was why a survey of the place of environmental education in Universal Basic Science for confronting vision 20:2020 challenges from the North central zone of Nigeria was examined in this paper. 536 students randomly selected from 10 Junior Secondary Schools in 4 randomly selected states from the zone participated. Two research hypotheses were tested through t-test analysis of Environmental Challenges Achievement Test (ECAT) scores. The results revealed that there were significant differences in students’ achievement on the inclusion of environmental concepts in the students’ knowledge of environmental management as well as the contributions of environmental education in resolving vision 20: 2020 environmental challenges. It was recommended among others that every child of school age should be involved in tree planting and cover cropping in all their localities every year; and the need for collaboration between government and farmers in a way that farmers would be helped directly to adopt new techniques and sustainable farming practices in addition to regulated grazing of animals.

Key Words: Vision 20:2020, Resources, Environmental management, Challenges, Basic science.
Introduction

Nature endows the human species with abundant resources for survival. Man in effect interacts with the natural gifts in order to harness the benefits therein. This interaction has however resulted into imbalance within the ecosystem and has been manifested in series of environmental problems. The signal on environmental degradation had long been noticed in the 1960s when public concerns about the health and environmental hazards of pesticides and other toxic chemicals used by industries were raised (Encarta, 2008). Furthermore, it was recorded that several catastrophic events that followed the use of the chemicals necessitated California to focus attention on the need for environmental conservation that culminated into the first National Earth Day of April 22, 1970, a day recognizing environmental concerns in the United States. Since then concerted efforts had been made on proper environmental management, prominent was that by the United Nations Environmental Programme of 1972 which was formed to encourage international cooperation in conservation and development strategies. Collaboration on environmental conservation issues included the 1987 Montreal Protocol to protect the ozone layer, and the 1992 United Nations Conference on Environment and Development (UNCED) in Rio de Janeiro, Brazil.

Like any other countries of the world, Nigeria is faced with series of environmental problems such as: pollution, oil spillage, desertification, flooding, erosion, sand dunes, land slides, storm, and waste disposal among others. Some factors identified by Ogunbiyi (2007) as responsible for the various environmental problems confronting Nigeria include:

(a). low level of awareness about the consequences of people’s actions on the environment,

(b). the poverty level of the people, and

(c). the adoption of non-sustainable modes of development.

Findings from the report of Alao (2008) on building Nigerians response to climate change, reveal that “the problem of the environment sticks like a sore thumb at the G8 submit in Japan, raising questions of commitment to promises of reducing poverty in vulnerable regions of the world”. Environmental disasters have of recent become a common coin to the entire world and not to the G8 alone. There is every convincing evidences that the world is under serious threat from the environment. But analysts had posited that the environment was only compelled to respond to the abuses mounded on it by human activities. This has created a great concern for world leaders, which is why the issue of environment ran too close to call with matters of economy and poverty at the G8 submit (Alao, 2008). Since the world leaders had been accused of paying lip service to the problem of global warming, they therefore put the issue of environment
as one of the important Agenda and promising to set a target of cutting carbon emissions by 50% by the year 2050. As observed by Ashworth (2008), the world is changing fast this time because climate change and unregulated irrigation projects are becoming major drivers for redrawing maps. He maintains that “we can literally see environmental disasters unfolding before our eyes; we have a real fear that, in the near future, famous geographical features will disappear forever”. It will not be out of sense to agree that environmental disasters pose problems to the health of both the living and those who are yet to be borne. It is therefore necessary to inculcate the skills of developing and maintaining a healthy environment into everyone. This among other necessities as opined by Ake (2001) called for the articulation of vision 20:2020 policy by the Obasanjo administration (1999-2007). By 2009, the Nigeria Vision 20:2020-Economic Transformation Blueprint that could make Nigeria one of the 20 largest economies in the world by 2020 was released as directed by the Yar’adua administration (Igbuzor, 2009). The blueprint stipulates a 10 year plan for stimulating Nigeria’s economic growth. It involved the analysis of 29 thematic areas of which a dimension of environmental consciousness and sustainable management rank paramount. To realize the vision, a need to immediately address the most debilitating constraints to Nigeria’s growth and competitiveness was noted as a means for creating the platform for success. In spite of the documented dividends of the vision, there are serious defects with respect to environmental management that made it difficult for the attainment of the goal of the vision to be realized. For instance, the vision’s strategy did not take into consideration the means through which the poverty level of the people could be tackled, and there was no laid down procedure to attack corruption in the vision with respect to comprehensiveness, consistency, publicity, non-partisanship, and the like (Eleri, 2009).

The Problem

This study was conducted to examine the place of environmental education in Basic Science as a means for confronting vision 20:2020 environmental challenges. The study specifically tested the following hypotheses:

1. There is no significant mean difference in the inclusion of environmental education in Basic Science on students’ knowledge of environmental management.
2. Environmental education in Basic Science has no significant contribution on resolving vision 20:2020 environmental challenges.

Methodology

The study adopted a survey design. The entire Junior Secondary School Students I and III in the North central states of Nigeria constituted the population. It was assumed that they have been exposed to topics related to their environment in Basic science but with different levels of coverage. Four out of the six states in this zone were selected by
balloting [Benue, (Bn); Kwara, (Kw); Nasarawa, (Na) and Niger, (Ng)]. A school from any three local government headquarters in each of the states selected was purposively selected to ease accessibility. The 12 schools selected were randomly assigned into 6 intact JSS 1 and 6 intact JSS III classes. A sample of 545 participated in the study. Students’ teachers on teaching practice from these states assisted in the distribution and retrieval of the instrument used for gathering data in this study.

The instrument used for this study was a 20-item objective questions tagged Environmental Challenges Achievement Test (ECA T). It was made up of two parts. Part 1 required student’s school and class, while the second part contained 20 objective questions with options A-E. The draft was extracted from past National Examinations Council (NECO) Junior School Certificate Examination papers. It was assumed that the questions had undergone standardization by the examination body and as such was taken to be valid and reliable for the study.

**Data Analysis**

Only 536 copies out of the 545 copies of the question papers administered could be gathered after the response. The responses were sorted out based on level for hypothesis 1 to be addressed and then on combined states level to address hypothesis 2. The t-test computation of the scores was carried out as indicated in tables 1 and 2 as follows:

**Table 1: T-Test Analysis on Students Knowledge of Environmental Management**

<table>
<thead>
<tr>
<th>Respondents</th>
<th>N</th>
<th>( \bar{X} )</th>
<th>SD</th>
<th>df</th>
<th>Tcal</th>
<th>Tcrit</th>
<th>P</th>
</tr>
</thead>
<tbody>
<tr>
<td>JS I</td>
<td>283</td>
<td>42.5</td>
<td>3.2</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>JS III</td>
<td>253</td>
<td>63.6</td>
<td>4.7</td>
<td>532</td>
<td>3.257</td>
<td>1.96</td>
<td>0.015*</td>
</tr>
</tbody>
</table>

*Significant at .05 alpha level.
Table 2: T-Test Analysis on the Contributions of Environmental Education in Resolving Vision 20:2020 Environmental Challenges

<table>
<thead>
<tr>
<th>Respondents</th>
<th>N</th>
<th>$\bar{X}$</th>
<th>SD</th>
<th>df</th>
<th>Tcal</th>
<th>Tcrit</th>
<th>P</th>
</tr>
</thead>
<tbody>
<tr>
<td>Bn &amp; Ng</td>
<td>275</td>
<td>62.38</td>
<td>11.17</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Kw &amp; Na</td>
<td>261</td>
<td>83.09</td>
<td>95.02</td>
<td>532</td>
<td>3.465</td>
<td>1.96</td>
<td>0.002*</td>
</tr>
</tbody>
</table>

*Significant at .05 alpha level.

Discussion

**Hypothesis 1**: There is no significant mean difference on the inclusion of environmental concepts in Basic Science on students’ knowledge of environmental management.

The result in table 1 reveals that there was a significant mean difference on the inclusion of environmental concepts in Basic Science on students knowledge about environmental management ($t$-cal = 3.257 > $t$-crit = 1.96; at $p < .05$). The hypothesis was therefore rejected as a result. The level of awareness and exposure of students to environmental knowledge reflected the true picture of what they could score from the achievement test on environmental issues. This was while there was a significant mean difference between JS I and JS III students’ achievement. This further shows that the greatest changes in the environment and the effects have been learned by JS III students and environmental mismanagement had been recognized by them as a threat to human survival. This finding corroborated the view of Graffits (2004) that value clarification strategies develop people’s cognitive, affective and psychomotor domains. In the same vein, Superka (2003) had discovered that academic ability had significant effects on people’s knowledge of environmental concepts and their attitudes to the environment. It is clear therefore that the inclusion of environmental concepts in Basic Science has improved students’ mind set in active participation in the process of tackling the environmental problems due to man-made or climate change. The more the students were exposed to environmental concepts, the more they become aware that the indiscriminate degradation of the environment and over-dependence on agrochemicals as well as pollution were due to poverty that has eaten deep into the nerves of every Nigerian. In view of this, tackling poverty among Nigerians is non-negotiable and it ought to find a place in Vision 20:2020 if there is genuine intention for the realization of the objectives of the Vision. Although environmental degradation may be natural or
man-made, it was endowed of man to prevent and control it. This is clear evidence here that the inclusion of concepts about the control of environmental degradation in Basic science will prepare the students for proper management of the environment and may cause them to unconsciously educate other members of their communities. From the foregoing, the nature of environmental stimuli confronting a given area of the country determines the people’s reactions. In effect, to address the environmental issues in vision 20:2020, this study has found that the people need a ‘psychological restoration’ that can acquaint them with up-to-date information on the positive knowledge about environmental management as contained in Basic Science.

**Hypothesis 2:** Environmental education in Basic Science has no significant contribution for resolving vision 20:2020 environmental challenges.

Table 2 reveals that there was a significant contribution of environmental education in Basic Science for resolving vision 20:2020 environmental challenges in the North central of Nigeria (t-cal = 3.465 > t-crit = 1.96; at P < .05). This necessitated the rejection of the hypothesis. The results here lay high credence on the means through which environmental education in Basic Science can help resolve environmental challenges in vision 20:2020. It has been recorded that one of the defects of the strategies of the vision is poor implementation (Adejuwon, 2009). Damage inflicted through poor implementation of the vision’s policy can be extremely detrimental to the health and economic value of the grasses and soil (Nolte and Dykzeul, 2002).

Now that Nigeria as a whole is more vulnerable to the impacts of environmental conflicts in a way that it has included ‘shifts’ in the boundaries of major ecological zones, it is expedient to inculcate the tenet of proper environmental management in the students for a span of many years without truncation. Unfortunately, the vision did not include teachers among the experts that formulated the strategy and worst still, the strategy did not receive a wide spread notification (Igbuzor, 2009). In order to confront the challenges ahead with reference to: alteration in animal and plant compositions, greater soil erosion and flooding in areas of higher rainfall, heightened drought and desertification in the northern regions, accelerated sea level rise, salt water intrusion along the coastal belt and man-made oil spillage causing havoc to aquatic life, teachers ought to be duly represented. This is because teachers who are on the field have situation knowledge the happenings in the environment, and such occupy better position to contribute realizable objectives. Observations showed that in the North central zone, the type and extent of damage inflicted by a few selected animal species such as the cattle and sheep feeding on the vascular tissue of grasses in stand of up to six months (especially when there was rain) was in the form of removing the shoot with their incisors. Any grass however is vulnerable, in addition to cattle occasionally trampling the entire grass. Damage on the grassland can be extensive with a single herd and flock of foraging cattle and sheep covering several acres per day. The severity of grass and soil nutrient loss is compounded when the herdsmen set the grasses ablaze in
a selfish intent of inducing the sprouting of fresh grasses to feed their herds/flocks. Other negative impacts on environmental resources and infrastructural developments include: indiscriminate refuse disposal, wind erosion, heighten environmental heat (warming), as well as desert encroachment, which are aftermath of human activities. The primary worst threat and substantial damage occurs through cutting of the few scattered trees for timber or conversion to charcoal through crude destructive distillation (a reciprocal compliment to poverty). Similarly, burning or grazing of grassland, reduction of old growth trees to supply fuel wood for domestics have been made the villagers to become the primary force of landscape degradation. Also, increased hunting pressure causes declination of the populations of large mammal fauna and flora. Restoration/re-grassing efforts become difficult or impossible since human occupants of this zone add to environmental damage from their daily activities. The indiscriminate tillage of land and unregulated use of agrochemicals aggravates environmental pollution and prompted sudden climatic challenges. These challenges can be resolved as informed by this study if the students were not denied the basic requirements to acquire basic education. This is where Government policy implementation has to receive a genuine turn around.

Based on these findings, the researcher believes that it is expedient that vision 20:2020 involves everyone on the crusade on environmental management by venturing into non-market amenity services. These services are the outputs or benefits of grassland which cannot be bought and sold in a traditional market. Such services include: clearing the air, preserving the natural environment, preventing erosion, preserving biodiversity, reducing the threat of climate change, and providing erosion control services. The ability to preserve the output of the non-market amenity services depends on policies intended to preserve grassland and grassland amenities. In all, the economic impact caused by the animal species and the humans is a function of the current damage plus future loses with the cost associated with replacement. For burnt or trampled grasses and cut trees, the loss is accounted for by estimating the time required to reestablish the tree and the grasses to cover the soil. Thus in time, the resource loss is the monetary value anticipated at the time of soil usage plus the monetary value for protection up to the damage, and the time-integrated costs associated with reestablishment of future natural resources.

In the public interest, Vision 20:2020 will do well if there is a forum for grass service to assess the nation’s public and private renewable resources and develop a national renewable resource programme that will include: a thorough analysis of environmental and economic impacts, coordination of multiple-use and sustained-yield, and public participation. The role of grass service could be such that have the responsibility and opportunity to assure a national natural resource conservation posture that will meet the citizens’ needs in perpetuity. The knowledge derived from coordinated public and private learning by students will promote a sound technical and ecological base for the
The negative impacts of human and other animal species on grassland resources can be extensive. Although damage is most often considered in terms of reduced productivity or delayed harvest cycles, attempts to replace trees or grasses after a harvest or a fire outbreak can also be complete failures because of foraging livestock. The full impact of the animals on grassland resources is frequently difficult to assess because of the complexity of the resources. This provides some insight into the economic and environmental consequences of animal species damage to grassland resources. The temporal and spatial scales of grassland ensure varied habitats, and animal species change with the habitat. Therefore, whether calculating potential damage losses or figuring costs to implement preventive measures to protect grassland resources the estimates must be based on the current state of the grassland, reflecting the species presence which in turn, affect the potential type and the extent of damage and future controls that must be needed as the nature of the resource changes and becomes vulnerable to a new suite of animal species capable of inflicting damage. Exposing students to these challenges in Basic Science will no doubt radiate precautions to adults who indulge in natural resources destruction or exploitation.

**Conclusion**

There is a long rope to pull on environmental management for a healthy North central geopolitical zone of Nigeria. For people to rise to the environmental challenges in vision 20: 2020 there is urgent need for conservation, sustainable use and protection of natural resources which include: plants, animals, mineral deposits, soils, clean water, clean air and fossil fuels such as coal, petroleum and natural gas. Educators and resource managers spoke of total environmental control and envisioned a discipline that would create a harmonious relationship between man and his environment. In the context of the nation’s vision of becoming one of the 20 largest economies in the world by the year 2020, a vibrant and technology enabled activity is crucial.

This is why the learning of environmental concepts in Basic Science is adequate for addressing environmental challenges in the zone. We need greenery to be able to survive, however, environmental degradation and disasters are threatening the green situation in Nigeria, we therefore need to act fast by controlling pollution and reducing causes of devastations that could trigger disasters in our environment by practicing Agriculture that would promote growth in national output, and supports expansion in the industrial sector, enhance foreign exchange earnings, provide food for the teeming population, provide gainful employment, create wealth and reduce poverty on a sustainable basis.
Recommendations

In spite of the billions of dollars which the Federal government had raked from oil exploration to cater for environmental disasters, there seemed to be no impact. Vision 20: 2020 should be in the position to direct the search-light to some other reliable targets which can help in activating efforts on environmental management and at cutting mismanagement of natural resources in order to reinforce environmental development. For this reason, the following were recommended:

1. There is need to involve every child of school age in tree planting and cover cropping in all their localities every year.

3. There should be collaboration between government and farmers in a way that farmers would be helped directly to adopt new techniques and sustainable farming practices in addition to regulated grazing of animals.

4. Policy to combat desertification incorporated into national sustainable development strategies should be implemented adequately.

5. Policy implementation and consistency on poverty eradication should form a clause and be included in the constitution of the federation.

6. Vision 20: 2020 should reflect a means by which people in collaboration with the government could turn devastated environment into tourist centers as done in Germany.

7. State/stakeholders should identify all lands that require reforestation/re-grassing for treatment.

8. Government should honestly implement Basic Education for all policy to letter.

References


URL: http://lib.colostate.edu/research/agric/damageprobs/econimpact.html retrieved on 28/03/2013.
DO LEARNING STYLES INFLUENCE STUDENTS’ UNDERSTANDING OF CHEMISTRY CONCEPTS AND ACADEMIC PERFORMANCE IN CHEMISTRY?

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ABSTRACT
The study was conducted on 167 grade 11 natural science students in two preparatory schools in Ethiopia. It was designed to predict the extent of variation in academic performance in some fundamental chemical concepts in the topics: Atomic structure & periodic table, and chemical bonding and structure from variations in Felder-Silverman’s learning styles. Data were collected through Amharic version of Felder-Soloman’s Index of Learning Style (ILS) questionnaire and chemistry test. The data showed that 1.2% variation in academic performance in the fundamental concepts in chemistry was linked to the variations in Felder-Silverman’s learning styles, and this variation was not statistically significant at $\alpha=0.05$. This implies that the role of learning styles on academic performance on the fundamental concepts considered in this study was not statistically significant. Hence, from this study it can be possible to conclude that the influence of learning styles on academic performance is less likely to be the same across fundamental concepts in chemistry.

INTRODUCTION
Current trends in education in general and chemistry education in particular shows that there is emphasis on differentiated instruction that support individual differences such as learning styles (Timothy & Kimberly, 2010), philosophy and nature of chemistry (Erduran, 2009; Scerri, 2001), and pedagogical content knowledge (Park, Jang, Chen, & Jung, 2011, Shulman, 1986). However, most of the time these efforts are separate and not well synthesized into a more comprehensive pedagogical content knowledge in chemistry education.

Particularly, the separate research efforts on learning styles in one hand and nature of chemical concepts in the other hand could bring burdens to teachers in their instructional decisions during their chemistry classes. Because, such
disintegrated efforts could put chemistry teachers in a confusing scenario of choices.

For instance, according to Danili & Reid, (2004) and Dalton & Tasker, (2006) chemical representations can influence instructional presentations. Therefore, at times the representational nature of fundamental chemical concepts mismatches to a particular learning style of students the chemistry teacher could fall in to the thrust of choices in instructional decisions. Thus, under this scenario, chemistry teachers’ can be challenged by prioritizing different instructional variables in their instructional decisions, i.e. what should be considered first, the types of learning styles or the nature of chemical concepts. And therefore how chemistry teachers’ keep the balance of considering learning styles and nature of chemistry in their instructional decisions is remain a niche to be studied.

In this connection, this paper examines the role of learning styles on academic performance in some fundamental concepts of chemistry (see figure 1). As it is presented as a background in the figure below in both schools the chemical concepts were taught in a similar instructional context. Hence, in order to observe the interaction between learning styles and academic performance in chemistry, the current study identified one learning style model and some fundamental concepts in chemistry.

Figure 2. A Concept map: as a tool to visual interactions between Felder-Silverman’s learning styles and academic performance on some fundamental chemical concepts.
Felder-Silverman learning styles is the one among more than 70 learning styles (Coffield, Moseley, Hall, & Ecclestone, 2004), and it is mainly used in chemical engineering education. Since, chemical engineering is similar with chemistry (Johnson, 2006 and McCormack 1938); Felder-Silverman’s learning style is selected for this study.

On the other hand, there are fundamental concepts in chemistry identified by academics in philosophy of chemistry (Caldin, 2002; Schummer, 2003, 2006). For example, pure substances, molecules, molecular structure and aromaticity, atoms and subatomic particles, chemical reaction, affinity, energy, chemical theories, models and laws were some of the fundamental concepts in chemistry identified by Caldin and Schummer. Therefore some of these fundamental chemical concepts which existed in the topics: Atomic structure & periodic table, and chemical bonding and structure in grade 11 chemistry text book were considered for this study.

The current study was designed to show the link between Felder-Silverman learning styles and academic performance on some fundamental concepts in chemistry and give an insight that needs to be considered for more plausible and possible instructional actions. Therefore research question of this study were: How much variance in academic performance on some fundamental concepts in chemistry can be explained by variations in Felder-Silverman learning styles? and How well do the learning styles predict academic performance on some fundamental concepts in chemistry among preparatory school natural science students?

**RESEARCH METHOD**

Context of the study: This study was conducted on grade 11 natural science students in two preparatory schools (pre-university) in Ethiopia. In Ethiopia, education in preparatory schools is a pre-university education where students attend university introductory courses.

Instructional context of the schools: In both preparatory schools, chemistry is being taught through standardized TV instruction, standardized students’ chemistry textbook, and classroom chemistry teacher with same educational rank (all were first degree holders).

**Sampling Technique**

Populations of the study were 902 natural science students. Therefore, out of 902 students, 167 students were willingly participated in this study. The sample size was estimated by the formula: $50 + 8k$ or $104 + k$, $k$ stands for the number of independent variables (Leech, Barrett, & Morgan (2005). However, to minimize non-response rates, the sample size for this study was 167 students.
These 167 participants of the study were selected using a disproportionate stratified sampling technique based on their academic performance in the schools. That is the total elements of the population (902) were first rank ordered based on their academic performance in the school. Thereafter, 25% (42) of participants were selected from the 1st quartile, 50% (83) were selected from the interquartile range (Q1-Q3), and the remaining 25% (42) were selected from the 3rd quartile of the 902 rank ordered population elements.

**Instruments**

The translated (Amharic) version of Felder-Soloman’s Index of Learning Styles was used to identify students learning styles on Felder-Silverman learning styles. Their academic performance on fundamental concepts in the topics: Atomic structure & periodic table, and chemical bonding and structure were measured using a 22 item chemistry test. The items were constructed based on tables of specification and the following formula:

$$\frac{\text{total number of items per topic}}{\text{number of items in the test x periods allotted for the topic}} = \frac{\text{the total number of periods for topics in which the test is constructed}}{\text{the total number of periods for topics in which the test is constructed}}$$

**RESULT AND DISCUSSION**

A. Answering the research questions from the sample statistics

The mean (m) and standard deviation (std.) of academic performance of sensing learners (m = 11.90, std. = 3.01), intuitive learners (m = 11.7, std. = 3.15), visual learners (m = 11.72, std. = 3.05), verbal learners (m = 12.06, std. = 3.02), active learners (m = 11.88, std. = 2.92), reflective learners (m = 11.83, std. = 3.17), sequential learners (m = 11.49, std. = 3.09) and global learners (m = 12.04, std. = 3.01) showed only slight difference. These comparisons of means of academic performances of students with different learning styles suggest that their academic performance on the same test constructed from some fundamental concepts in chemistry is approximately the same. These sample statistics shows that academic performance of students with different learning styles on fundamental chemical concepts in the topics: Atomic structure & periodic table, and chemical bonding and structure was comparable. This implies that performance of the sample students on these fundamental concepts in chemistry was not linked to learning style differences.

B. The linear regression model fit and significance test on the data points

Regression Model:

$$\text{Academic Performance} = \beta_0 + \beta_1 (\text{Visual/Verbal}) + \beta_2 (\text{Sensing/Intuitive}) + \beta_3 (\text{Active/ Reflective}) + \beta_4 (\text{Sequential/Global}) + \epsilon$$

The fulfillment of assumptions of multiple regression, such as linearity, normality (using scatter plots), collinearity (using VIF, Tolerance), and normality of
residuals (using residual plots) were checked on the data and followed by the regression analysis. The result of the regression analysis that shows the proportion of prediction of academic performance in chemistry in the fundamental concepts that could be explained by learning styles was reported using the coefficient of determination (R square) (see table 1).

Table 1. Test of the Regression model: Model Summary

<table>
<thead>
<tr>
<th>Model</th>
<th>R</th>
<th>R Square</th>
<th>Adjusted R Square</th>
<th>Std. Error of the Estimate</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>.109a</td>
<td>.012</td>
<td>-.013</td>
<td>3.056</td>
</tr>
</tbody>
</table>

a. Predictors: (Constant), Sequential/Global, Visual/Verbal, Sensing/Intuitive, Active/Reflective  
b. Dependent Variable: Performance

As it can be seen from the above table, the coefficient of determination (R square) is 0.012. This means that only 1.2% variations in academic performance on some fundamental concepts in chemistry in the topics: Atomic structure & periodic table, and chemical bonding and structure can be predicted from variation in learning styles. The remaining 98.8% of variance in academic performance in chemistry in some fundamental concepts could be explained by variables other than learning styles. Therefore, this implies that the total power of learning styles to explain academic performance on these concepts in chemistry is very small/nearly nil. This 1.2% variation in academic performance that linked to learning styles was subjected to statistical significant tests (see table 2).

Table 2. Analysis of ANOVA for testing the statistical significance of the regression model

<table>
<thead>
<tr>
<th>Model</th>
<th>Sum of Squares</th>
<th>Df</th>
<th>Mean Square</th>
<th>F</th>
<th>Sig.</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>Regression</td>
<td>4</td>
<td>4.539</td>
<td>.486</td>
<td>.746</td>
</tr>
<tr>
<td></td>
<td>Residual</td>
<td>162</td>
<td>9.336</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>Total</td>
<td>166</td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

a. Predictors: (Constant), Sequential/Global, Visual/Verbal, Sensing/Intuitive, Active/Reflective  
b. Dependent Variable: Performance

As table 2 above indicated that the probability of finding R square of the sample in the population that explain academic performance in chemistry via learning styles is not statistically significant at $\alpha = 0.05$, $F(4,162) = 0.486$, $p = 0.746$. That is predicting academic performance on the fundamental concepts in chemistry in the topics: Atomic structure & periodic table, and chemical bonding and structure via learning styles was not statistically significant at $\alpha = 0.05$, $F(4,162) = 0.486$, $p = 0.746$. This implies that the combination of different learning style dimensions (i.e. the regression model) is less likely to predict students’ academic performance on the fundamental chemical concepts considered in this study. Therefore, none of the learning style dimensions in this regression model are important predictors of academic performance on the fundamental concepts considered in this study.
According Felder & Silverman (1988) and Towns (2001), the mismatch between learning styles and instructional methods negatively affects student’s academic performance. However, according to the finding of this study and other studies such as Al-Jaroudi (2009), the effect of learning styles on academic performance may not be the same across fundamental concepts in chemistry. For instance Al-Jaroudi (2009) reported that there was not statistically significant relationship between the 4-dimensions of Felder-Silverman learning styles and pre-service elementary teachers’ conceptual understanding of chemistry and the nature of matter taught in a simulated learning environment.

From the result of the current study and other similar studies such as Al-Jaroudi (2009), it can be possible to conclude that learning styles have not the same influence across different fundamental chemical concepts in chemistry. Hence chemistry teachers need to give relative priority to representational nature of the fundamental concepts and other instructional variables than to worry much on learning styles for teaching fundamental chemical concepts such as atomic structure & periodic table, and chemical bonding and structure. Moreover, a further study requires to be conducted to see the influence of learning styles on other chemical concepts.

ACKNOWLEDGEMENTS

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REFERENCES

EARLY CHILDHOOD EDUCATION IN NIGERIA: ISSUES AND PROBLEMS

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Abstract

The paper discusses the issues and problems of early childhood education in Nigeria. It establishes that the Federal Government of Nigeria in its National policy on Education has given official recognition to the development and provision of early childhood education in the country. This combined with a number of factors to give rise to an unprecedented expansion in the provision of child care and early childhood education institutions in the country. However, nearly all the early childhood education in the country is provided by private proprietors. It also identifies the inability of government among others to put to effect most of the measures it stated in the National Policy on Education aimed at ensuring that the policy objectives are achieved. It has also established that the provision of early childhood education will have positive influence on the educational development of children in later life.

Key words: Education, Early Childhood, Issues, Problems

Introduction

Early years in life are the most important to the formation of intelligence, personality and social behaviour of a child. The year before a child reaches Kindergarten are among the most critical in his or her life to influence learning. That is why modern societies show serious concern for the education of their young ones by providing needed support to prepare them to succeed later in school (Ejieh, 2006). It is common practice in most societies to make provision for early childhood education programmes of various sorts for children below the official school-going age (usually 6years) mainly to prepare them for education in primary schools (Obidike, 2012). The Federal Government of Nigeria recognizes the importance of early childhood education in Nigeria and as a result it was given prominence in the National Policy of Education (FRN, 2004) as one of the programmes in the Nigerian educational system.

Bagudo (2008), posited that reports across the globe revealed that an estimated figure of one hundred million children, struggle daily for survival in villages and cities, and are exposed to the risks of hunger, poverty, disease,
illiteracy and abuses. In support of this view, Mahuta (2007) stresses that the need to address the problems and salvage these children and the next generation of children from these menace, has necessitated the programme of Early Childhood Care Development and Education (ECCDE).

Mahuta (2007) also stated that the aim of ECCDE is to foster the proper development of the children, identify and address their problems, harness their potentials, mould their character, enhance their learning, equip them for life, so that their actions are channelled towards positive personal, communal and global development in all ramifications of life.

A Brief History of Early Childhood Education in Nigeria

In Nigeria, organized education of the child below primary school age did not receive official recognition until very recently, receive the attention it deserved. The concept of infant schools was introduced in Nigeria by the missionaries in the early 20th century when such schools were set up in the Western and Eastern regions of Nigeria. Early Childhood education in the form of nursery school or pre-primary education as we know it today in Nigeria is largely a post-colonial development. The semblances of it during the colonial era were the Kindergarten and infant classes, which consisted of groups of children considered not yet ready for primary education. As groping for instruction in schools was not age-based during that period, some children aged six or even more, could be found in some of the infant classes (Tor-Anyiin, 2008). With the phasing out of infant classes, some parents began to feel the need for nursery schools.

During that period, (pre-independence) all efforts for provision of early childhood education were confined to the voluntary sector and received little or no support from the government (Tor-Anyiin, 2008). It was for the first time in 1977 with the introduction of National Policy on Education by the then military government of Nigeria that the importance and need for early childhood education was given official recognition and linked with the child’s educational performance in primary school. Gradually, early childhood institution stayed, and by 1985, Nigeria had about 4200 early childhood educational institutions. While by 1992 the number increased to about 8,300 (Federal Government of Nigeria/UNICEF 1993).

Nowadays, early childhood educational institutions are located in various places and buildings compuses of universities and Colleges, premises of some industries and business organizations, church premises, residential buildings with unprecedented expansion owing to the high demand for early childhood care and education by parents (Ejieh, 2006).

Concept of Early Childhood Care and Education

Maduewesi (1999) refers to early childhood care and Education as the education offered to children who have not yet reached the statutory age of
beginning primary school. He further maintained that it is a semi-formal education arrangement, usually outside home where by young children from about the age of 3 years are exposed through play like activities in a group setting through mental, social and physical learning suited to their developmental stages, until the mandatory age of government approved formal schooling. FRN (2004) refers to Early childhood care and Education (pre-primary education) as an education given in an educational institution to children aged 3-5 plus prior to their enrollment in the primary school.

**Objectives of Early Childhood Education**

The objectives of early childhood education according to FRN (2004) are:

1. Effect a smooth transition from home to school
2. Prepare the child for the primary level of education
3. Provide adequate care and supervision for the children while their parents are at work (on the farm, in the market or offices)
4. Inculcate social norms
5. Inculcate in the child the spirit of inquiry and creativity through the exploration of nature, the environment, art, music and playing with toys and so on.
6. Develop a sense of cooperation and team spirit
7. Learn good habits, especially good health habits and.
8. Teach the rudiments of numbers, letters, colours, shapes, forms and so on through play.

**Basic Curriculum Provision of National Policy on Pre-Primary Education**

The FRN (2004) outlined some steps the government designed to achieve the objectives of pre-primary education in Nigeria, which are as follows;

(i) Encourage private efforts in the provision of pre-primary education

(ii) Making provision in Teacher Training Institution for production of specialist teacher in Pre-primary education.

(iii) Ensuring that the medium of instruction will be principally the mother-tongue or the language of the local community.

a. Develop the orthography for many more Nigerian languages, and.

b. Produce textbooks in Nigerian languages, FRN reported that some of these developments are already being pursued in the University Departments of
linguistics under the auspices of some state ministries of Education. This Language centre will be expanded so as to have wide scope;

(iv) Ensure that the main method of teaching in the pre-primary institutions will be through play and that the curriculum of teacher training college is appropriately oriented to achieve this.

Early Childhood Education and its Problems

Nigerian education system since independence can best be described as a system riddled with crisis. It is not strange for this to be so, because we had inherited the system from our colonial master (Eriba, 2011). Judged against this premise, it becomes very challenging for Nigerians to manage the educational system passed to them by the British. So the system becomes inundated with diverse crises since independence. According to Eriba (2011), the educational system has been in a state of permanent crisis that it has lost quality, efficacy and functionality over the years. Early childhood education in Nigeria is not left out in these crises which tend to make the gains of education less spectacular. The challenges which these problems have precipitated for the nation will be highlighted in few key areas so as to provide a framework for considered action by the stakeholders.

Proliferation of Early Childhood Institutions

The official provision made in the National Policy on Education (FGN 2004) mandated the Government to encourage private efforts in the provision of early childhood education in the country. Moreso, owing to the high demand for early childhood education by parents, it does not take a long time for newly established early childhood institutions to grow and develop. According to Nwakaego (2007), it is becoming customary to operate a early childhood institution in every household. currently, early childhood education institutions are located in various places and buildings-campuses of some universities and colleges, premises of some industrial and business organizations, church premises, residential buildings some part or the whole of which are hired for use as early childhood schools (Ejieh, 2006). The flip side of this proliferation of early childhood institutions is that, the issue of standard and “regulations” have been waved off. The end result is that the young minds are offered “substandard” and “irregular” education that can not breed egalitarianism and self-reliant individuals of the society and leaders of tomorrow.

Quality and Qualification of Teachers

The quality of the teachers determines the strength of any educational system and the value of the learners (Okoro, 2004). In Nigerian early childhood institutions today, the teacher quality is generally low. It is only a few of the nursery schools especially those owned by educational institutions, private companies and wealthy individuals that can afford to engage the services of university graduate teachers and holders of Nigerian Certificate in Education
(NCE) qualifications, competent and committed teachers and are also capable of retaining such teachers. Most others employ a few NCE teachers (if any at all), who are usually underpaid, while others employ mainly Grade Two teachers and secondary school leavers with school Certificate or General Certificate (ordinary level) qualification. In a situation where most of the teachers in our early childhood institutions are unqualified and/or unprofessional, effective teaching and learning cannot be achieved.

**In-effective Supervision of Early Childhood Institutions**

No educational plan however excellent it may be, can be effectively implemented if the school supervision is ineffective. State Ministry of Education officials are in principle, supposed to visit and inspect the physical plant, the human and other resources available in a proposed nursery school and if these are found to be adequate, the ministry would approve the school for operation. In most cases these visits are made a long time after the school had become operational and had been paying the prescribed taxes. The same is true in regard to teachers in nursery schools. Some of the people employed to teach the children are neither trained to teach nor do they know how to handle or relate to children.

**Language Policy Implementation**

Inspite of the laudable provision of the language policy nothing much seems to have been achieved. Firstly, the position of Nigerian language as a medium of instruction is hard to come by. The FGN/UNICEF (1993) reported that about 93.2% of teaching and learning in Nigeria preschools was done in English. The 6.8% use immediate language shows clear lackadaisical attitude towards the implementation of the issue of medium of instruction in mother-tongue or language of immediate community. This problem is likely to be connected with parents and pupils interest in English which has been in use since 1842, as well as its official position in Nigeria (Tor-Anyiin, 2008). The low literacy rate even in English indicates poor implementation of the language policy, he further maintained that lack of implementation of language policy has affected the quality of Nigeria Educational development.

**Teacher-Pupil Ratio**

The policy position of teacher pupil ratio of 1:25 is also not implemented due to lack of supervision or monitoring. In deed, since businessmen/women dominates this education sector, profit maximization is their main concern. As such, employing more teachers to maintain this ratio is not beneficial to them, hence, early childhood institutions have a ratio that depends on available children. This goes further to explain the accommodation problem of this educational level. Though higher institutions are now offering early childhood education courses, however, Government non-encouragement in terms of scholarship and teachers’ poor financial remuneration is blocking many of the opportunities to go for such courses and help man the institutions. Indeed, since, the proprietors are money
conscious their payment is not encouraging to warrant many people take to the study of early childhood education (Tor-Anyiin, 2008).

**Negligence on the Part of Government**

Of all the measures that Federal Government undertook in order to facilitate the achievement of the objectives of early childhood education, the only one it has effectively accomplished is the granting of permission for private efforts in the provision of early childhood education in the country, with virtually less or non participation by the public sector. This, in addition to lack of supervision to ensure the maintenance of standards, has led to increases in numbers of early childhood education institutions in the country. Significant provision is yet to be made in public or private teacher training institutions in the country for the production of specialist teachers, it is doubtful if it can attract many clients, as neither the Federal nor any state government has established any nursery or early childhood schools where graduates of such a programme can be employed. Work in private nursery or early childhood institutions would probably have no attraction for specialist in early childhood education teachers because of low wages and job insecurity associated with teaching in such institutions (Ejieh, 2006).

**Prospects**

The Universal Basic Education (UBE) Act (2004) has an expanded scope which includes programmes and initiatives for early childhood education and development. The UBE programme has made provision for every public primary school to have a pre-primary school linkage to cater for children aged 3-5 years. This linkage will serve as a strategy for getting children ready for school and school ready for children (Hua, 2010).

An inventory of ECC faculty in Nigeria conducted by FGN/NERDC/UNICEF in 2003 showed that most of the ECC facilities are private owned (42% of the sample population are private owned and 34% by the government, followed by 21% by local communities). Now that the Early Childhood Development Programme is covered by the UBE law, government ownership at state/LGA/community level is certain to increase, particularly regarding centre’s catering for the 3-5years olds.

Early childhood care has been included in the Bachelor’s degree curriculum of the Faculty of Education of some of Nigeria’s Universities since 1991. The concept has also been integrated in the syllabus of Colleges of Education throughout the country. In-services training on the early childhood development concept and learner centered pedagogy for handling young children is continually provided to teacher/caregivers in public ECC/ pre-school facilities in UNICEF supported 111 focus LGAs nationwide. However, only now it is being recognized that early childhood care and early stimulation is the basis upon which attainment of the child’s fullest potential depends.
The Child Right Act (2003), the UBE Act (2004), the National Policy on Education, Food, Nutrition and Health are laws and policies which have given shape to different sectoral interventions on Early Childhood Care and development in Nigeria. Currently however, an Integrated Early Childhood Development (IECD) policy, that integrates interventions from the various sectors to promote an integrated holistic approach to the development of the child in its very earliest years.

Efforts are also targeted at vulnerable or disadvantaged children through community-driven and home based care and support for young children age 0-3 years supported by UNICEF in 222 focus communities nationwide has boosted access of very vulnerable and disadvantaged children to early childcare and early learning (UNESCO 2007). Launching of the children and AIDS campaign in Nigeria with increased focus, care and attention to children affected by the HIV and AIDS’ scourge. Increased advocacy has been mounted with government and other stakeholders to ensure that young children are fully protected from the scourge of the disease.

According to UNESCO (2007), the curriculum for Early Childhood Education in Nigeria was reviewed and revised in 2003/2004 using an integrated bottom up approach, targeting children age 0-5 years. This revised curriculum has been approved for use by the government, and a training manual to facilitate use of the curriculum; is in process of development. The training manual is expected to promotes the integrated approach and cover all sectoral interventions- health, nutrition, water and environmental sanitation, psycho-social care, early learning and creating a conducive environment for them to service, live, learn and reach their full potentials.

Recommendations

There is need for state ministry of education officials to enforce the regulations laid down by the Federal Ministry of Education in regard to the provisions of early Childhood Education. Effective quality monitoring units should be set up by ministries of education and provide with necessary logistic support to ensure that minimum standards are maintained in both public and private pre-primary institutions.

Government should regulate salary of all teachers in early childhood education as well as school fees. The poor salary solely determined by respective exploiters of Early Childhood schools owners scare away many parents in sending their children. Poor salary denies such schools of professional or qualified and dedicated teachers hence children are denied quality education.

Respective state ministries of education under National supervision should handle the issue of orthographies. Decentralization will be more helpful as respective states will know the mother tongues or the language of immediate environment. More so, Local Government Education Authorities (LGEA) rather than states should assist in the production of textbooks in the spoken language in
the area. Regular supervision and monitoring with stiff penalties for offenders will help to maintain the teacher-pupil ratio. This will also help teacher to supervise the learning experience of the play method.

Effective measures should be ensured in the training of early childhood/pre-primary teachers through adequate scholarships, approving the mounting of such programmes in all Universities, Institutes of Education and College of Education. Moreso, if Nigeria wants to achieve the objectives of education for all, then, there is need for Early Childhood Development to cover children of 0-3years.

Conclusion

The importance of a solid foundation in education is obvious. Early Childhood education is where the foundation is laid. Poor performance in the other levels of academic can be traced to this foundation level. So a thorough knowledge of what, and how education is been handled at this level is imperative. Therefore, government needs iron determination to implement the strategies that will necessarily enhance quality and quality development of early childhood/pre-primary education in Nigeria.

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RELATIONSHIP BETWEEN PRIMARY SCHOOL PUPILS PERFORMANCE IN ART AND IN SCIENCE IN SOKOTO STATE

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Abstract

The study was on the relationship between primary school pupils performance in Cultural and Creative Art (CCA) and in Basic Science and Technology (BST) in Sokoto state. Primary science is taught in the primary school as a core subject, as such it has been of interest to researchers and stakeholders to raise the standard of children performance and achievement in science in primary school. Correlational research design was adopted in the conduct of this research. 360 children were sampled from 12 primary schools for the study through the four State Universal Basic Education Board (SUBEB) zones in Sokoto state. Two instruments were developed by the researcher in BST and CCA, which were validated by experts and found reliable at 0.86 and 0.78 respectively. Pearson r was employed in the analysis of data hypothesis was formulated and tested at .05 level of significance. Result showed that there is significant relationship between primary school pupils performance in BST and in CCA in Sokoto state. As a recommendation, relevant authorities such as inspectors, supervisors and other education regulatory agencies should monitor the trend in relationship and difference of performance of primary school pupils in BST, CCA and such other subjects taught at primary school. The researchers suggest that further research should be carried out on causation of relation between BST, CCA and such other subjects taught in the primary school.

KEY WORDS: Relationship, Primary, Performance, Art and Science

INTRODUCTION

Science and its application are the foundation of economic and industrial development of the world. The effect of science and technology on industrial revolution cannot be overemphasized. The Federal Government of Nigeria (FGN) attempt to attain the Millennium Development Goals (MDGs) by 2015, and by extension the need to implement the National Economic and Empowerment Development Strategy (NEEDS), which is summarized in the Preface of the
National Educational Research and Development Council (NERDC, 2007), prompted the National Council on Education (NCE) to approve a new curriculum structure with subjects listing that include Basic Science and Technology (BST) and Cultural and Creative Art (CCA). Primary education, as referred to in the Federal Republic of Nigeria (FRN) National Policy on Education (2004), is the education given in institutions for children aged 6 to 11.

Young (1979) affirmed science as an important subject for the primary school. Ibrahim (2000) described Art as means of: ‘Beautification/Decoration (body and environment); Livelihood i.e. provides vocation / employment opportunities, career, foreign exchange etc; Entertainment /Aesthetic satisfaction; Universal language; Communication /illustrations, among others’. These are all integral parts of science. Primary Science now known as Basic Science and Technology (BST) and Art now known as Cultural and Creative Art (CCA) are taught in the primary school in Nigeria and most other countries, and through tertiary level in a more specialized discipline. Relationship may exist between subjects taught in primary school.

As teachers, we tend to wrap up subjects into neat little ‘boxes’. We label those ‘boxes’ reading, social studies, physical education... and so on. But in fact, these subjects overlap. For example, the ability to think in a scientific way is useful in many other subjects. So, when you have the opportunity, try to relate the subjects to each other on the time-table. Projects are often a useful way of doing this (Young, 1979: 55).

It is in this regard that the researchers investigated the relationship between performance of primary school pupils in cultural and creative art and their performance in basic science and technology in Sokoto state. There has been reports that primary school children are under performing in basic science and technology, as studied by Osafehinti and Gyuse in Okpongete (1992); Gorard, Meece and Jones (1996), Kathryn and Ellen (2000); Gorard, Rees and Salisbury (2001). It is the objective of these research to find out relationship between children performance in Basic Science and Technology (BST) and their performance in Cultural and Creative Art (CCA) in primary schools of Sokoto state.

Due to the nature of the study, research question was raised as guide to the conduct of the research, thus ‘is there any relationship between children performance in Basic Science and Technology (BST) and their performance in Cultural and Creative Art (CCA) in primary schools of Sokoto state?’. Research hypothesis was developed and tested at .05 level of significance; There is no significant relationship between children performance in Basic Science and Technology (BST) and their performance in Cultural and Creative Art (CCA) in primary schools of Sokoto state.

The study was limited to some selected public primary (Basic) schools from the four educational zones of State Universal Basic Education Board.
A total of 12 schools where CCA is taught were selected for the study. The limitation is as a result of the pre-research information gathered, that many primary schools in the study area do not teach cultural and creative art, some due to lack of specialized teachers, others due to lack of interest.

Literature is scarce in this relatively new area of study, however available literature is reviewed in the following areas:

**Comparison of Cultural and Creative Art and, Basic Science and Technology Curriculum in the 9-years Basic Education Curricula for Primary 4-6**

Examining the curriculum document of the two subjects closely, The researcher observes so much in common in the themes and topics that relate to Primary 4, Theme 4, Characteristics of Values in Cultural and Creative Arts; Hard work, Honesty, Precision, Creativity (which is not found in the Basic Science and Technology curriculum themes and topics). On the other hand the researcher still observes commonality in primary 4, theme 1 and 2 of the Basic Science and Technology Curriculum “Measurement; Length, Breadth, Area of object, Time” and, “Soil constituents, Air, Water, Leaf litters, Dead and living Animals; Water; Evaporation, Condensation;” which were not featured in the Cultural and Creative Art Curriculum for primary 4-6. A deep study in the curriculum will make one observe many missing links between the related curricula of the two subjects.

**Pupils performance in Basic Science and Technology, and in Cultural and Creative Art**

Osafehinti and Gyuse in Okpongete (1992), Oyedapo (2007) described a growing index of seemingly lack of interest and poor performance by students in science subjects at school certificate levels which is not unconnected with the foundation level (primary school). As a result, many Nigerians are illegible for science programmes beyond the certificate level. Okpongete (1992) described irrelevant science curricula as the cause of poor performance of children in science at various levels. Akinmade and Gyuse in okpongete (1992), Jessica (2010), NZCERD (2009), Sandra (2006), Kathryn and Ellen (2005) found that many children under achieved in science. Sandra (2006) reported that Art is critical to children performance in other subjects. In a similar study by Kathryn and Ellen (2005) Arts participation and SAT scores are correlates.

**RESEARCH METHODOLOGY**

The study used the ‘Correlational Research Design’, which is one of Descriptive Research Designs that describes an existing relationship between variables. “A Correlational study describes the degree to which two or more quantitative variables are related, and it does so by the use of a correlation coefficient” (Jack and Norman, 2000). However there is no manipulation of variables in Correlational research. Test performances in BST and CCA are the two variables studied in this research, they are termed Criterion and Predictor Variables. BST score is a predictor variable, while performance in CCA is the criterion variable in these study.

The population of the study consist of all primary six pupils in public schools in the study area (Sokoto state). However, there were 1674 total
enrolment of class six pupils for the year of data collection (2011/2012 academic session) in the sampled schools of the four educational zones of SUBEB in Sokoto state (see FME, 2010/2011). Among the 1698 Government approved public schools in Sokoto State, twelve (12) primary schools were selected using ‘Simple Random Sampling Method’ for the study, the selection was justified because of the fact that many primary schools in the state do not teach CCA, thus the researcher selected only schools that teach CCA. The research is limited to public schools, three schools each from the four (4) SUBEB zones in the state. The researcher selected primary six as target for the study purposively, Thirty (30) pupils, twenty males and ten females were selected by ‘Hat-draw’ method in each of the selected schools for the study, the selection was justified by average number of children per class (48 pupils) and the ratio of male and female gender in the schools. A total sample of three hundred and sixty (360) pupils were used for the study (CCA and BST).

Completion and multiple choice performance tests items were developed by the researcher and employed for the study. The tests were constructed with reference to Onafowakan (2004) Primary Science Topics Skills/Activities; Victor and Lambert (1975) Measurement of Creativity in Art. These are in compliance with the National Board for Education Measurement (NBEM), National Examination Council (NECO): 1994, 2000, and 2003 National Common Entrance Examination into secondary schools. The items are also in cognizance with the National Policy on Education year 6 (vi) syllabus, scheme of work and curriculum, developed by the National Educational Research and Development Council (NERDC, 2007). There are two instruments administered for the study: Performance Tests in CCA and in BST. The tests were administered to the pupils and the scripts were collected and marked by the researcher, and the mean scores were compared thereafter. The instruments were also validated by experts in science education. Pearson Product Moment Correlation Coefficient was used to find correlation of the split half result scores. Spearman-Brown prophecy formula was also used to get the reliability of the instruments after the pilot testing of the instruments, hence 0.78 and 0.86 reliability (r ) co-efficient was established for CCA and BST instruments respectively, at .05 level of significance.

ANALYSIS AND RESULTS

The analysis of data for research hypotheses that guided this study was accomplished by using the mean, standard deviation, Pearson Product-moment correlation co-efficient (r ) and t-Test. r was used to analyze the hypothesis. r is a parametric statistic that measures relationships. Data was processed and analyzed electronically via Statistical Package for Social Science (SPSS, 16th Version). The data obtained in this research is here presented and analyzed in tables and hypothesis tested accordingly. There is no significant relationship between children performance in Basic Science and Technology (BST) and their performance in Cultural and Creative Art (CCA) in primary schools of Sokoto state.
Table: Showing relationship between children performance in Basic Science and Technology (BST) and their performance in Cultural and Creative Art (CCA) in primary schools of Sokoto state

<table>
<thead>
<tr>
<th>Variable</th>
<th>N</th>
<th>( \bar{X} )</th>
<th>SD</th>
<th>Cal-r</th>
<th>Crit-r</th>
<th>Decision</th>
</tr>
</thead>
<tbody>
<tr>
<td>BST</td>
<td>360</td>
<td>9.07</td>
<td>3.782</td>
<td>.487</td>
<td>.195</td>
<td>Ho1 rejected</td>
</tr>
<tr>
<td></td>
<td>358</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>CCA</td>
<td>360</td>
<td>7.40</td>
<td>2.551</td>
<td>.487</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

The table shows that with mean score of 9.07 and standard deviation of 3.782 in BST, and mean score of 7.40 and standard deviation of 2.551 in CCA, the correlation between BST and CCA scores of children (r-cal .487 > r-crit .195) is significant at .05 level and degree of freedom 359, and with a calculated r value of .487 less than .195 critical r value, Null hypothesis (Ho) is rejected, meaning that there is significant relationship between BST and CCA mean scores of children in primary schools of Sokoto state. Further study of the coefficients of correlation reveals that children have higher mean scores in BST than in CCA (9.07 > 7.40).

Discussion
Hypothesis (HO) was tested and found that pupils performance in Basic Science and Technology (BST) and their performance in Cultural and Creative Art (CCA) are related significantly. Critical r value is less than calculated r value (.195 < .487), Ho1 is rejected. In other words children score more in BST than in CCA. This finding may not be unconnected to Oyedeji and Alausa (1994) who observed primary school teachers preference for science and mathematics among other school subjects in Ogun state of Nigeria. Ibrahim (2008) reported on ‘understanding the nature of science learning at primary school level in Nigeria as directed in recent years, is making progress in providing children with aptitude in science and its application and making others scientifically and technologically innovative and literate’. Kathryn and Ellen (2000), mention that arts participation and Standard Achievement Test (SAT) scores are related. Although the research discovered average under achievement in BST which is related to Gyuse and Okpongete (1992). However, this is contrary to Oyedapo (2007), NZCERD (2009), Sandra (2006) and Jessica (2010) who maintained that children in their case study schools identified arts as one of their favorite subjects in the United States (US). BST is now observed to be the favorite subject of children in this research in primary schools of Sokoto state.

Summary of Finding
The major finding in this research is here summarized thus:
There is significant relationship between pupils performance in BST and their performance in CCA in primary schools of Sokoto state, even though pupils perform more in BST than in CCA.

CONCLUSION
In conclusion the researcher realizes that there is significant relationship between performance of pupils in Basic Science and Technology (BST) and their performance in Cultural and Creative Art (CCA) in the sampled primary schools of this study in Sokoto state. Children perform more in BST than in CCA. On gender and performance, although male gender out-perform the female gender in BST performance test, but the difference is not significant.

Implications of the Study
The study implies that performance of children in Basic Science and Technology influences their performance in Cultural and Creative Art

Recommendation
By the conduct of this research, the researcher recommend that: Relevant authorities such as inspectors, supervisors and other education regulatory agencies shall look in to the cause effect of the relationship of performance and achievement of children in BST, CCA and such other subjects taught at primary school.

Suggestions for Further Research
The researcher suggests that further study shall be carried out in the following areas:
1. Other factors that improve the achievement and performance of children in BST (primary science)
2. Cause effects of the relationship between pupils performance and achievement in BST and in CCA in lower basic education and such other levels and subjects.

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CONSTRUCTION OF WATER PURIFYING DEVICE

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ABSTRACT

The consumption of non-purified water in almost all rural and parts of urban settlement have been an issue to human health and in some cases result to death among the infants and adults. Water is essential to human life but naturally not pure for human consumption due to the concentration of particulate matters including suspended particles, parasites, bacteria, algae, viruses, fungi and a range of dissolved materials derived from the surface that the water may have made contact with. Artificial means have been adopted by man to eliminate the influence of this foreign body from water to make it safe for consumption. However, the intake of chemical has an advance influence on a man. For example chlorine has a bleaching action. In an effort to seek for means of substituting for the use of artificial means for purifying water, the abundant solar energy was exploited. This paper therefore focused at construction of a simple water-purifying device by using solar energy. In constructing these devices local materials were used and were powered by natural sources of energy (solar energy). The constructed device was used and tested with room temperature of about 305°k then after exposing it to the solar energy the temperature roused to about 360°k after some hours. The research work ended by making suggestions for more research work on the project.

Key words: water, purification, solar energy, heat and temperature

INTRODUCTION

As the adage goes “necessity is the mother of invention” so it is with the current needs of Nigerians to develop technological goods that would improve on the economics needs of the nation and make the youth industrious. The national policy on education (2009) revised edition seeks the educational system to revitalize the study of science from its non-functional status to functional status.
where results could be translated into goods and services so as to improve on the existing technologies. To this end it is inherent that Nigeria needs orientation on how to use the available recourses both artificial and natural to reduce the excessive dependences on importation of finished goods. At recent, the consumption of non-purified water in almost all rural and part of urban areas is an issue of concern causing danger to the human life. The country in spite of it being in tropical region of the world had be backward in developing technological goods that would sustain its economy and the youth through exploitation of the available natural recourses like the radiant sun energy for use. The country has been depending on imported machineries and equipments, these massive importations of foreign technologies have left the citizens to be practicing repairs and non fabrications of goods. It is therefore of importance to re-emphasize on the negative consequences on the country and the youth on importation of these finished goods and seek indulgence that the university system provide some form of functional education to bring out potentialities of individual through using available materials and the natural solar energy for constructing functional easy-reached goods. This paper therefore wishes to present a constructed water purifying device constructed from simple available materials and the principal energy source being the sun.

LITERATURE

“We no longer suffer from stomach illness that’s because the water is clean and safe” like many other people in rural African with no access to safe drinking water she used to sterilize her water by boiling it. But she says the smoke from the firewood to heat the water use to irritate her eyes. She is also glad she no longer has to go to fetch wood from the bush. Mrs Longwa 2006 says, “I fill the plastic bottles, put them on black painted roof where they stay for a whole day”. The sun heats the water, helped by the black roof, which help to absorb the heat. Solar radiation means a combination of ultra-violet rays and heat destroys the bacteria which cause common water-borne diseases like cholera, typhoid, dysentery and diarrhea. After eight hours in the sun, it is ready for drinking. According to World Health Organization 2007 1.1 billion people lack access to an improve drinking water supply, 88 percent of the 4 billion annual cases of diarrheal disease are attributed to unsafe water and inadequate sanitation and hygiene, and 1.8 million people die from diarrheal diseases each year. The WHO estimates that 94 percent of these diarrheal cases are preventable through modifications to the environment, including access to safe water. Simple techniques for treating water at home, such as chlorination, filtration, filters, and
solar disinfection, and storing it in safe containers could save a huge number of lives each year.

According to wilderness medical society, water temperatures above 160°F (70°C) kill all pathogens within 30 minutes and above 185°F (85°C) within a few minutes. So in the time it takes for the water to reach the boiling point 212°F or (100°C) from 160°F (70°C) all pathogens will be killed even at high altitude. According to professor G Kang 2005 solar disinfection of water is an inexpensive, effective and acceptable method of increasing water safety in a resource limited environment, and can significantly decrease diarrhoeal morbidity in children. The second law of thermodynamics explains as indicated by gibbs (2007) that in “all heat engines energy is taken in as high grade energy and only some of it is converted to useful work, the remaining being emitted as low grade energy at a lower temperature”. This explanation was supported as a world-wide view as explained that heat effect is observed by increase or decrease in temperature and by this work the constructed item would be expected to have a change in temperature from $T_1$ as the initial temperature of the water to $T_2$, as the final temperature when it has been exposed to sun light for some time.

According to Jerry A. Nethanson 2003 water has a remarkable tendency to dissolve other substances. Because of this, it is rarely found in nature in a pure condition. Temperature plays a more important role in wastewater treatment and water pollution control. Biological wastewater treatment systems are more efficient at higher temperature. He also said one problem with chlorination of water supplies is that the chlorine can react with organics in the water, forming toxic compounds. The toxic compounds are cancer causing substances. Prof R. C Sachdeva 2007, convection boiling may occur when a liquid is forced through a channel or over a surface which is maintained at a temperature higher than the saturation temperature of the liquid. The mechanism and hydronamics of flow boiling are much more complex than in pool boiling because the bubble growth and separation are strongly affected by the flow velocity. The flow boiling is a two-phase mixture of the liquid and its vapor.

**METHOD OF CONSTRUCTING A WATER PURIFYING DEVICE**

The materials needed for the construction of the device includes; a metal box, wooden box, two rubber reservoir tanks, copper pipes, metal sheet, pane of glass, black paint and converging lens. One hole was drilled at the top of the metal box which is the inlet and one near the bottom which is the outlet. The reservoir supplying water to the purifying device and the metal box were painted
black to enhance the absorption and retention of heat. The copper pipe was run from the inlet to the outlet. The collector plate was painted black and placed flat on the copper pipe. The whole set up was placed inside a wooden box to prevent loss of heat to the surrounding. A pane of glass was placed on the top to focus sun rays on the heater and trap all the infrared radiation. A converging lens was placed on its holder attached to the box to converge the sun rays on the constructed device. The lens was adjusted regularly due to the changes in the direction of the sun rays. Water from the supplying reservoir whose temperature was determined as initial was allowed to flow through the inlet and hot water was received at the outlet. The experiment was repeated for three days and the average values of the initial temperature, the final temperature of the water and its time of exposure to the solar energy were recorded.

**SUMMARY OF READINGS TAKEN WITH THE CONSTRUCTED DEVICE**

<table>
<thead>
<tr>
<th>Initial Temperature $T_1$ ($^0K$)</th>
<th>Final Temperature $T_2$ ($^0K$)</th>
<th>Time (GMT)</th>
</tr>
</thead>
<tbody>
<tr>
<td>305</td>
<td>307</td>
<td>9</td>
</tr>
<tr>
<td>305</td>
<td>313</td>
<td>10</td>
</tr>
<tr>
<td>305</td>
<td>333</td>
<td>11</td>
</tr>
<tr>
<td>305</td>
<td>353</td>
<td>12</td>
</tr>
<tr>
<td>305</td>
<td>360</td>
<td>13</td>
</tr>
<tr>
<td>305</td>
<td>358</td>
<td>14</td>
</tr>
<tr>
<td>305</td>
<td>356</td>
<td>15</td>
</tr>
<tr>
<td>305</td>
<td>343</td>
<td>16</td>
</tr>
</tbody>
</table>

**DISCUSSION**

The solar device was designed in such a way that it would trap the solar energy from the sun so that it could be used to purify the water. The experiment was repeated for three days. The average temperatures and time were recorded. It was found that the temperature of water at the constructed device increased with time to a maximum of 360$^0K$ at 13GMT and decreased to 343$^0K$ at 16GMT. From such readings it was confirmed that really heat could cause the temperature of substances to rise as described by Fullick (2002). Graph of
temperature verses time was plotted. From the graph it was observed that the temperature of the heater increased as time increased but declined towards the evening. The solar panel absorbs the infrared rays from the sun which is converted to heat which the water at room temperature absorbed to produce hot water. It was also observed that this process can work only in the presence of sufficient sunshine. This experiment was performed April/May 2013 when the sun intensity was very high in Potiskum, Yobe State.

**CONCLUSION**

A water purifying device was successfully designed from local materials and a reasonable hot water that was capable of destroying micro organism that would have been infiltrated into the body of the water was produced.

**RECOMMENDATIONS**

The following recommendations should be ad held to, to make the research work more perfect.

- Method of storing heat for days when the sun intensity is low or when there is no sun should be research on.
- Effort should be made to make the water to rotate between the supplying reservoir and the heating device before channeled to the consumption reservoir to improve the temperature of the water.
- Every effort should be made to improve the water temperature more than $360^\circ$K.
- The number of running copper pipes should be increase to improve the temperature of water going into the consumption reservoir.
- This constructed device could be used to replace the water reservoir mounted by the borehole sinkers in the urban and rural area of the country Nigeria.
Collector plate placed on 
Cupper pipe

Graph of temperature against time

Temp in °K

0 2 4 6 8 10 12 14 16 → Time
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Rose Longwa 2006. Using the sun to sterilized water (BBCN, Wednesday, 22 March 2006 01:43GMT.)
EDUCATIONAL IMPLICATION OF ATTENTION DEFICIT HYPERACTIVITIES DISORDER STUDENTS AT F.C.E. (SP.) OYO

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

ABSTRACT
This research work examined the Educational Implication of Students’ with Attention Deficit Hyperactivities Disorder in F.C.E. (Sp.), Oyo. Attention Deficit Hyperactivity Disorder (ADHD) is the medical term used to describe a neurobiological condition that affects between 5 and 12 percent of children worldwide with impairing levels of inattentive or hyperactive/impulsive behaviour as well as those with a formal diagnosis of ADHD (APA, 2000). Medical, educational and legal organization view ADHD as a behavioural disorder but they also recognize that many children with ADHD (as many as one in four) also have Learning Disabilities (LDS). Beyond difficulties-to manage behavior, ADHD also include impairment in one or more process related to perceiving thinking, remembering, or learning. Therefore, it may be more useful to view ADHD as a learning disorder although one that differs from currently recognized reading or non-verbal LDS. Twenty (20) students at 200 level in the department of Computer Science, F.C.E. (Sp.), Oyo with G.P.A. between 0.00 to 1.50 were used for the study. A structured questionnaire was distributed to them and the data gotten were analysed using simple percentage and Chi-Square. The results revealed that students with Attention Deficit Hyperactivities; repeat class, achieve lower grade in Computer Science course, process information slower than their peers and could learn effectively through motivation. Finally, conclusion was drawn and recommendations given.

Keywords: Intellectual Disability, Attention Deficit Hyperactivity Disorder (ADHD), Intellectuals Functioning, Adaptive Behavior and Six-Hour Retardation.

INTRODUCTION
Attention Deficit Hyperactivity Disorder (ADHD) is the medical term used to describe a neurobiological condition that affects between 5 and 12 percent of children worldwide with impairing levels of inattentive or
hyperactive/impulsive behaviour as well as those with a formal diagnosis of ADHD (APA, 2000). A diagnosis is based on developmentally inappropriate behavioural symptoms that begin in pre-school years and tend to persist through childhood adolescence and adulthood (APA, 2000). These symptoms include inattention hyperactivity and or impulsivity. Medical, educational and legal organization view ADHD as a behavioural disorder, but they also recognize that many children with ADHD (as many as one in four) also have Learning Disabilities (LDs) (APA, 2000). ADHD is associated with subtle but important structural and functional difference in the brain specifically those region that support critical psychological processes. These process, include execution function, memory, learning and speed of information processing (Tannock, 2002; Shaw, et al, 2006).

Beyond difficulties to manage behavior, ADHD also include impairment in one or more process related to perceiving thinking, remembering, or learning. Therefore, it may be more useful to view ADHD as a learning disorder though one that differs from currently recognized reading or non-verbal LDS.

Many children with ADHD - not yet those with a Learning Disability (LD) are at high risk for academic under achievement or failure despite having or above average intellectual abilities (Curries & Stabile, 2006). It should be noted that while the term “mental retardation” is still widely used within education and government agencies, however, many advocacy groups feel that this label has too many negative connotations. The newer terms of “intellectual disability” or “developmental disability” are becoming far more accepted and prevalent with the field. Prevalence ratings for intellectual disabilities are consistent, highlighting the often hidden nature of intellectual disabilities within other disability classifications. The US Department of Education reports 5,971,495 student receiving special education services in the 2003-2004 school year of that Number 9.6% or 573,264 student received special education service based on classification of intellectually disabled (TCCD, 2008). The large majority of individuals considered intellectually disabled are in the mind range with an IQ of 50-70 (TCCD, 2008). For many of these individuals, there is no specific known cause of their developmental delays. The validity and reliability of the IQ tests used with these individuals are often in question. However, if a student is evaluated and scores an IQ of 70 or lower, he or she is considered to have an intellectual disability (TCCD, 2008). The problems with these Labels are that the guidelines can be altered as in the 1970’s when eligibility guidelines shifted and thousand that were previously “mental retarded” were miraculously cured by changing federal regulation.

The two characteristics shared in varying degree by all individuals with intellectual disabilities are limitations in intellectual functioning and limitations in adaptive behaviour. Limitations in intellectual functioning often include difficulties with memory recall, task and skill generalization, and those students may demonstrate a tendency towards low motivation and learned helplessness (TCCD 2008). Issues in adaptive behaviour skills, social skill and practical skills
are inherent in individuals with intellectual disabilities. Also they often exhibit deficits in self-determination skills, including skill areas such as choice making, problem solving and goal setting (TCCD, 2008). Students labeled as mildly intellectually disabled demonstrate delays in cognitive social and adaptive behaviour skill within typical classroom settings often when they are in different settings, the same individual function quite capability both socially and vocationally.

In their adult lives, these individuals can be independent and well adjusted in the world outside of school setting. It is only in the context of academic demands and intensive intellectual challenges that their abilities appear impaired. This type of school-based diagnosis has been referred to as six-hour retardation, reflecting the time the student is actually in the classroom and appears to be academically impaired (TCCD, 2008). The assertion that intellectual disability is a school-based diagnosis underlines the often arbitrary nature of eligibility requirement in this disability category for future adult services. A label of intellectual disabilities prior to age 18 is necessary for individual to receive specialized services beyond high school. Impact on learning with the appropriate supports in place, students with intellectual disabilities can achieve a high quality on life in many different aspects.

**STATEMENT OF THE PROBLEM**

Longitudinal epidemiological surveys in Canada and the United States shows that, childhood ADHD (and particularly childhood inattention) predict subsequent lower achievement scores in reading and mathematics - 8 to 10 percent lower (Tannock, 2007). These surveys also indicate an increased risk for grade repetition and high school incompletions as well as under employment and poor workplace performance in adulthood (Currie, 2006; Spiral and Fischel, 2005; and Kassler, et al, 2005 in Tannock, 2007). Cognitive research shows that individuals with ADHD process information more slowly than their peers and have difficulty with executive function, particularly working memory (Shanahan, Pennington, Yerys et al, 2006; and Martinussen, Hayden, HoggJohnson, Tannock; 2005 as cited by Tannock, 2007).

**SIGNIFICANCE OF THE STUDY**

Students with disabilities have a set of unique characteristics that hinder their integration in school and consequently their learning. With this work, we intend to find out the effect of ADHD on students with intellectual disabilities.

**SCOPE OF THE STUDY**

This study was limited to the Federal College of Education (Sp.) Oyo, Oyo state. The researchers carried out the research work on the Educational Implication of Attention Deficit Hyperactivity Disorder on twenty (20) students of 200 Level in Department of Computer Science of Federal College of Education (Sp) Oyo, Oyo State.
STUDY POPULATION
The target population of the study consisted of twenty (20) students in 200 level of Department of Computer Science whose GPA were between 0.00 - 1.50 at the end of their 200 level in Federal College of Education (Sp) Oyo, Oyo State.

SAMPLING PROCEDURE
Purposive sampling method was used to select Students with Intellectual Disability in the Department of Computer Science of Federal College of Education (Sp.) Oyo. The students selected were those with Grade Point Average (GPA) between 0.00 -1.50 in their 200Level results.

INSTRUMENT FOR DATA COLLECTION
The data for this study were collected through a self-structured questionnaire. The instrument used was divided into the two sections: Section A and B. Section A deals with respondents Bio-Data, while Section B was used to obtain information on respondents’ deposition to question items. A four-scale of Strongly Agreed (SA), Agreed (A), Strongly Disagreed (DS), and Disagreed (D) was used.

VALIDITY OF THE INSTRUMENT
The survey instrument was validated using content validity with the help of expert which included lecturers from special education.

PRE-TEST
The instrument was pre-tested by administering the questionnaire to five (5) respondents outside the study area.

DATA ANALYSIS
Data collected were subjected to descriptive statistics using frequency counts percentages distribution and Chi-square to analysis the data collected.

Presentation and Interpretation of Findings: Table 1
Percentage and Chi-Square analysis of students with Intellectual Disability having difficulties in Conception, Social and Practical skills.

<table>
<thead>
<tr>
<th>S/N</th>
<th>ITEM</th>
<th>SA</th>
<th>A</th>
<th>%A</th>
<th>SD</th>
<th>D</th>
<th>% D</th>
<th>TOTAL</th>
<th>%TOTAL</th>
</tr>
</thead>
<tbody>
<tr>
<td>1.</td>
<td>Do students with intellectual disability having ADHD repeat class?</td>
<td>10</td>
<td>5</td>
<td>75</td>
<td>-</td>
<td>5</td>
<td>25</td>
<td>20</td>
<td>100</td>
</tr>
<tr>
<td>2.</td>
<td>Do students with intellectual disability having ADHD obtain low scores in Computer science courses?</td>
<td>8</td>
<td>5</td>
<td>65</td>
<td>4</td>
<td>3</td>
<td>35</td>
<td>20</td>
<td>100</td>
</tr>
<tr>
<td>3.</td>
<td>Do students with intellectual disability having ADHD process information slower than their peers?</td>
<td>12</td>
<td>-</td>
<td>60</td>
<td>5</td>
<td>3</td>
<td>40</td>
<td>20</td>
<td>100</td>
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</table>
4. Do students with intellectual disability having ADHD exhibit deficits in self-determination such as choice making and goal setting?

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<tr>
<td>6</td>
<td>7</td>
<td>65</td>
<td>3</td>
<td>4</td>
<td>35</td>
<td>20</td>
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</table>

5. Do students with intellectual disability having ADHD have difficulties in conception, social and practical skills?

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<tbody>
<tr>
<td>9</td>
<td>3</td>
<td>60</td>
<td>2</td>
<td>6</td>
<td>40</td>
<td>20</td>
</tr>
</tbody>
</table>

6. X Responses

<p>| | | | | | | |</p>
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<tbody>
<tr>
<td>9</td>
<td>4</td>
<td>65</td>
<td>2.8</td>
<td>4.2</td>
<td>35</td>
<td>20</td>
</tr>
</tbody>
</table>

$\alpha = 0.05$, $X^2_{tab} = 9.488$, $X^2_{cal} = 1.319$

The above table indicates that 75% of the respondents from Item 1 agreed that students with intellectual disability students having ADHD repeat class, while 25% disagreed that they do not repeat class. Therefore, this implies that students with intellectual disability student repeat classes. This is in line with the finding of (Currie; 2006, Spira, and Fischel, 2005, and Kaseler, et al 2005 in Tannock, 2007) which stated that “an increased risk for grade repetition and high school incompletion as well as under employment and poor work place performance in adulthood”, are common among the Intellectual Disabled.

Item 2 shows that 65% of the respondents are of the opinion that the intellectual disabled students having ADHD achieve lower grade in computer science courses as a result of their low Intelligent Quotient, while 35% of the respondents disagreed with the statement. This implies that, students with intellectual disability having ADHD obtain lower marks in computer science courses. This is in agreement with Tannock (2007) which states that “children with ADHD obtain lower scores in mathematics and reading”.

From item 3 above, it was revealed that 60% of the respondents are of the opinion that intellectual disabilities students having ADHD process information slower than the peers. This implies that students with intellectual disability having ADHD process information slower than their peers. This is in agreement with the findings of (Shanahan, Pennington, Yer’s, et al, 2006; and Martinussen, Hayden, HoggJohnson, Tannock, 2005) which stated that individual with ADHD process information more slowly than their peers and have difficulty with executive function particularly working memory”.

Item 4 indicate that 60% of the respondents agreed that students with intellectual disability learn effectively through motivation and reinforcement, while 40% of the respondents are of the opinion that students with intellectual disability do not learn through motivation. This shows that students with intellectual disability having ADHD could learn effectively through motivation. This disagreed with Texas Council for Developmental Disability (TCDD, 2008) which stated that, limitations in intellectual functioning, task and skill generalization, and those students may demonstrate tendency towards low motivation and learned helplessness”.

From the analysis on the item 5, it could be observed that students with intellectual disability having ADHD have difficulties in conceptual social and
practical skills. The result shows that 70% of respondents agreed that students with intellectual disability have difficulties in conceptual social and practical skills, while 30% are of the opinion that the intellectual disability does not have difficulties in conceptual social and practical skills.

**TABLE 2:** Percentage and Chi-Square analysis of students with Intellectual Disabilities demonstrating Delay in Cognitive and Adaptive Behaviour Skills within typical classroom setting.

<table>
<thead>
<tr>
<th>S/N</th>
<th>ITEM</th>
<th>SA</th>
<th>A</th>
<th>%A</th>
<th>SD</th>
<th>%D</th>
<th>TOTAL</th>
<th>%TOTAL</th>
</tr>
</thead>
<tbody>
<tr>
<td>1.</td>
<td><strong>DO Students with Intellectual Disabilities having ADHD demonstrate Delay in Cognitive and Adaptive Behaviour Skills within typical classroom setting</strong></td>
<td>8</td>
<td>5</td>
<td>65</td>
<td>2</td>
<td>5</td>
<td>35</td>
<td>20</td>
</tr>
<tr>
<td>2.</td>
<td><strong>Do students with intellectual disabilities have difficulties with memory recall?</strong></td>
<td>9</td>
<td>3</td>
<td>60</td>
<td>3</td>
<td>5</td>
<td>40</td>
<td>20</td>
</tr>
<tr>
<td>3.</td>
<td><strong>Do students with intellectual disabilities demonstrate limitations in intellectual functioning task and skill generalization?</strong></td>
<td>9</td>
<td>5</td>
<td>70</td>
<td>3</td>
<td>3</td>
<td>30</td>
<td>20</td>
</tr>
<tr>
<td>4.</td>
<td><strong>Students with intellectual disabilities do not demonstrate tendency towards low motivation?</strong></td>
<td>9</td>
<td>4</td>
<td>65</td>
<td>2</td>
<td>5</td>
<td>35</td>
<td>20</td>
</tr>
<tr>
<td>5.</td>
<td><strong>X Responses</strong></td>
<td>8.75</td>
<td>4.25</td>
<td>65</td>
<td>2.5</td>
<td>4.5</td>
<td>35</td>
<td>20</td>
</tr>
</tbody>
</table>

\[ \alpha = 0.05, \ X^2_{\text{cal}} = 0.44 < X^2_{\text{tab}} = 7.815 \]

Responses to Item 1 showed that 65% of the respondents agreed that students with intellectual disability having ADHD demonstrate delays in cognitive and adaptive behaviour skill within typical classroom setting, while 35% disagreed. This is in line with Texas Council for Developmental Disabilities (2008), which stated, “students’ labeled as mildly intellectually disabled demonstrate delays in cognitive, social and adaptive behaviour skill within typical classroom setting”.

It was revealed in Item 2 that student with intellectual disability having ADHD have difficulties with memory recall and task. 60% agreed with the statement while 40% disagreed.

Result of analysis of item 3 showed that 70% of the respondents agreed, while 30% disagreed. This implied that students with intellectual disabilities having ADHD demonstrate limitations in intellectual functioning task and skill generalization.
Result of item 4 showed that 65% of the respondents agreed that students with intellectual disability having ADHD could learn effectively through motivation, while 35% of the respondents disagreed that students with intellectual disability cannot learn through motivation. This disagreed with (Tannock, 2005) which stated that, “limitation in intellectual functioning task and skill generalization and those students may demonstrate tendency towards low motivation and learned helplessness”.

RECOMMENDATIONS

In view of the outcome of the research work, the following recommendations were made:

1. All teacher preparation programs should ensure that the latest ADHD scientific evidence and most recent advances in education intervention are core component of their curricular.

2. Government should provide Assistive Technology to help them in their academic work.

3. School-based intervention where teacher modified their instructional practices and used behavioural management techniques should be encouraged.

CONCLUSION

In conclusion, we need to re-conceptualize individual with Attention Deficit Hyperactivity Disorder. Researches into treatment of ADHD outcomes shows that medical and psychological interventions are generally effective in reducing disruptive and off-task behaviour in students with Attention Deficit Hyperactivity Disorder. (TCCD, 2008) These include medication, parental training, behaviour training, social skill training and multimodal approaches.

Students with ADHD will benefit from an inclusive educational model where teachers use latest teaching strategies. Indeed, these instructional practices could be considered best practices for all students in main stream classroom.

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American Psychiatric Association.


NEEDED COMPETENCIES AND STRATEGIES FOR IMPROVING TEACHING OF HOME ECONOMICS EDUCATION IN KADUNA STATE

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Abstract
This paper focuses on competencies needed by N.C.E. and B.Ed Home Economics graduates in Kaduna State. It deals with needed competencies, constrains, and the way students could be helped to acquire the necessary competencies. Three research questions were answered. The sample was made up of the total population of 660 students of Home Economics who are into business. The finding revealed inter alia 15 needed competencies, 9 constraints that could hinder student's competency and 7 ways of helping students acquire the necessary competencies and recommendations were made.

Key words: Competencies, Strategies and Home Economics.

Introduction
The goal of Home Economics as a vocational subject is to equip students with all the pertinent practical knowledge and social skills necessary for them to take a productive role in the economy. A teacher of Home Economics education also has the sole responsibility of impacting these knowledge and skills to students in the subject area. The teacher implements curriculum, motivates learning, facilitates learning and guides learning in Home Economics for the benefit of the students and society.

Nigeria as a Nation has great human and material resources but it is bedeviled by a number of problems such as underemployment, unemployment, poverty and rapid technological development. According to UNICEF (2002), wide spread of poverty, hunger and unemployment is an enduring problem affecting an estimated 800 million people worldwide and it is a factor responsible for at least five 5 million death each year. Apparently these problems are connected to the fact that learners are prepared for employment and not necessarily for job creation. Olaitan, Nwachuku, Oyemachi, Igbo and Ekong (1999) opined that Home Economics has low effectiveness because the program is not job oriented but are based on theoretical foundations of available textbooks and teachers back ground.

Creak Training Centre (2001) argued that as long as the majority of Nigerians remain without adequate knowledge and skills needed to develop the various sectors of the economy, unemployment and underdevelopment will
prevail. The reality of the situation of our society today is that vocational subjects like Home Economics have not been able to attain this laudable goal of skilled man power that provide self-employment.

Furthermore Aguasim (1995) rightly observed that praxeology is the key to vocational education especially vocational Home Economics and most other purposeful education at all level while practice without praxeology will usually have adverse effects since it is not based on theory. It is therefore more appropriate for students to have adequate exposure to both theory and practical aspects of the course.

Adequate competencies are needed by graduate of Home Economics in order to be self-employed. Competency is a successful performance of a task through the use of knowledge, skills attitude and judgment (Olaitan and Ali 1997). Competency based Home Economics Education becomes more important with the need to reduce unemployment and promote self-employment. With competency based Home Economics Education, Home Economics students will become more competent and empowered.

The competencies needed by students when possessed and utilized with help students to become self-employed earing will be enhanced and poverty is reduced. It is against this background that this article seeks to identify competencies needed for improving teaching and learning of Home Economics with the view to proffering suggestions that could improve the teaching and learning of Home Economics.

**Purpose of the Study**

The main purpose of this study was to investigate needed competencies and the strategies for improving teaching of Home Economics in Kaduna State. Specifically the study determined:

i. Competency needed by the students of Home Economics
ii. Constraints in acquiring the competency
iii. Ways of helping students acquire the necessary competencies.

**Research Questions**

- What are the competencies required by graduates of Home Economics to become self-employed.
- What are the constraints in acquiring the needed competencies.
- How can the students be helped to acquire the needed competencies

**Design/Area of Study**

This study employed descriptive survey research type to find out the competencies needed by Home Economic students to become self-employed.

According to Kerlinger (2004) survey research is a useful tool employed by the researcher when they are interested in the opinion and attitudes of people.

The questionnaire is divided into three sections and each section tests the research questions. In section one there are twenty questions, eleven in
section two and seven in section three. The area of study was Kaduna State; it is located at the center of Northern Nigeria. It shared boundaries with Niger state Plateau state, F.C.T. Zamfara and Katsina.

**Population of the Study**

The population of the study was N.C.E and B.Ed graduates of Home Economics in the area of the study. The entire population was studied. The respondents were all self-employed in twelve identified small scale enterprises zoned into two areas i.e. residential and commercial zones.

**Sample**

The sample for the study was made up of N.C.E. and B.Ed graduates that are in business. All the 660 that were self-employed was selected.

**Instrument for Data Collection**

A four point scale of Highly Needed, Averagely Needed, Slightly Needed and Not Needed was used for section one, while Strongly Agree, Agreed, Disagreed and Strongly Disagreed was used for the remaining two sections. Any item whose mean value is 2.50 and above was regarded as Needed and Agreed while below 2.50 was regarded as Not needed and disagreed.

**Validation**

The instrument was validated by two experts in the field of Home Economics before being used for data collection.

**Reliability**

The reliability of the instrument was determined using Crombach Alpha and reliability coefficient of 0.87 was obtained.

**Data Collection and Analysis Technique**

A total of six hundred and sixty (660) copies were administered, 648 were completed and retrieved this represent 98% return. Mean score was used for data analysis and to answer the research questions. The cutoff point of 2.5 was used.

**Table I: Needed Competencies by Graduate Students of Home Economics**

<table>
<thead>
<tr>
<th>Questionnaires Items</th>
<th>Mean</th>
<th>Remark</th>
</tr>
</thead>
<tbody>
<tr>
<td>1. Need to learn how to set up a standard restaurant</td>
<td>3.79</td>
<td>Needed</td>
</tr>
<tr>
<td>2. Need to develop critical thinking and problem solving skills</td>
<td>3.72</td>
<td>Needed</td>
</tr>
<tr>
<td>3. Need adequate knowledge on how to raise money for funding business</td>
<td>4.49</td>
<td>Needed</td>
</tr>
</tbody>
</table>
4. Need to perfect cake baking  
5. Need to perfect icing of cake  
6. Need to know how to use the computer in combining colours in food  
7. Need to perfect pattern drafting  
8. Need to perfect free hand cutting  
9. Perfect how to produce fast dye Batik and tie and dye  
10. Need to perfect bead making  
11. Need to be able to use the computer in constructing patterns and combing different colours  
12. Need to be able to use computer in production and grading of dress patters for commercial and large scale production.  
13. Need to know how to run a catering services (cooking for events)  
14. Interior Decoration (Sewing of curtains and blinds, decoration of cushions)  
15. Need to know how to arrange funeral event (decoration of beds, parlor, making of wreaths, decorations of canopies)  
16. Need to know how to make embroidery on clothes  
17. Need to know how to make models and toys  
18. Need to know how to make laundry and dry cleaning  
19. Need to know how to make soap and detergent making  
20. Need to develop managerial skills

Table 1 reveals that seventeen out of twenty items were needed competency, and items 4, 7 and 15 were the not needed competencies with a mean score below 2.5.

**Table 2: Constraints that could Affect the Attainment of Competency by Students**

<table>
<thead>
<tr>
<th>Questionnaires Items</th>
<th>Mean</th>
<th>Remark</th>
</tr>
</thead>
<tbody>
<tr>
<td>1. Inadequate infrastructure</td>
<td>3.2</td>
<td>Agreed</td>
</tr>
<tr>
<td>2. Insufficient equipment and funding</td>
<td>3.7</td>
<td>Agreed</td>
</tr>
<tr>
<td>3. No enough time for theory</td>
<td>2.3</td>
<td>agreed</td>
</tr>
<tr>
<td>4. No enough use of demonstration method</td>
<td>3.6</td>
<td>Agreed</td>
</tr>
<tr>
<td>5. No enough time for practical’s</td>
<td>3.9</td>
<td>Agreed</td>
</tr>
<tr>
<td>6. No qualified teachers</td>
<td>2.1</td>
<td>Disagreed</td>
</tr>
<tr>
<td>7. Teachers need constant retraining from time to time because of constant advancement in technology</td>
<td>4.5</td>
<td>Agreed</td>
</tr>
<tr>
<td>8. Inadequate I.C.T knowledge and the part of the teachers and the students.</td>
<td>4.5</td>
<td>Agreed</td>
</tr>
<tr>
<td>9. Inadequate funding</td>
<td>4.2</td>
<td>Agreed</td>
</tr>
<tr>
<td>10. Lack of managerial skills</td>
<td>4.7</td>
<td>Agreed</td>
</tr>
<tr>
<td>11. No knowledge or problem solving skills and critical thinking</td>
<td>4.8</td>
<td>Agreed</td>
</tr>
</tbody>
</table>
Table 2 shows that two out of the eleven items were disagreed upon by the respondents as not been constraints they are item 3 and 6, these items had a mean score below 2.50 while the remaining 9 items were agreed on as constraints to students competency.

**Table 3: Possible ways of helping students acquire the necessary competencies.**

<table>
<thead>
<tr>
<th>Items</th>
<th>Mean</th>
<th>Remark</th>
</tr>
</thead>
<tbody>
<tr>
<td>1. Teachers are to be re-trained in their area of specialization from time to time for teachers and students up-dating.</td>
<td>4.2</td>
<td>Agreed</td>
</tr>
<tr>
<td>2. Practical and theory should all be emphasize</td>
<td>3.8</td>
<td>Agreed</td>
</tr>
<tr>
<td>3. Demonstration of each skill should be carried out to build competency.</td>
<td>4.0</td>
<td>Agreed</td>
</tr>
<tr>
<td>4. Students should be able to practice each of the skills on their own before graduation</td>
<td>4.7</td>
<td>Agreed</td>
</tr>
<tr>
<td>5. Both teachers and students should be computer savvy</td>
<td>4.6</td>
<td>Agreed</td>
</tr>
<tr>
<td>6. Students should be able to master managerial skills</td>
<td>4.9</td>
<td>Agreed</td>
</tr>
<tr>
<td>7. Attend seminars, workshop and conferences.</td>
<td>4.8</td>
<td>Agreed</td>
</tr>
</tbody>
</table>

Table 3 reveals that all the seven items were agreed on as ways students could be helped to acquire needed competencies before graduation.

**Discussion**

Findings from the study reveals in table 1 that the respondents agreed on seventeen items as the needed competencies required, four out of the items had mean response which is below 2.5. these are: cake baking, perfect pattern drafting, perfect sewing of curtains blind and decorate cushions, for enough time for theory: while the needed competencies are: set up and manage standard restaurant, know how to raise fund for the business, perfect icing of cake, knowledge or computer for teaching both food and clothing, have managerial skills, perfect making of tie and dyes, beads making, know how to carry out outdoor catering services, manage funeral events, perfect making of models, toys, laundry and dry cleaning. The findings agree with Anyakoha (2001) noted that Home Economics must be ready to learn, acquire new knowledge, skills and apply their new acquisition for solution of the problems that challenge the family. Home Economist must be alert to societal problems and changes like unemployment and must keep abreast science and technology.

Table 2 reveals that eight items scored above 2.5 expect two items which scored less than 2.5 and that reveals that qualified teachers are on ground and that there is enough time for the theoretical aspect of the course. The eight items that scored above 2.5 are inadequate infrastructure in some cases, insufficient funds and equipment for practical compare to the number of students, no enough time for demonstration and practical’s, need for retraining of teachers and students in line with development in science, technology and I.C.T. and managerial skills and problem solving skills. All of these were agreed on by the respondents as
constraints to attaining needed competencies by students. This finding is in line with a survey that was carried out by Iloejo and Anyawu (1991) which revealed that failure rate of small scale business set up by Home Economics students are high and this failure can be attributed to lack of adequate entrepreneurial skills critical thinking, lack of enough time for practical’s.

Possible ways of helping students acquire the necessary competencies as reveals in Table 3 is that all the items were agreed upon as a way forward. Teachers have to be re-trained in their area of specialization in line with science and technology from time to time, practical’s and theory should be emphasized, demonstration of each skills for the students, both teachers and students should be computer savvy, have managerial skills, and attend seminars, workshop and conferences.

Lemchi (2001) noted that Home Economics students need managerial skills, competency in computer, critical thinking and getting updated information from workshops.

Students can be helped to acquire necessary competencies needed to be self-employed if the above are fulfilled.

**Conclusion**

The study reveals the competencies needed to be improved upon by students of Home Economics, in Kaduna State, constraints that could affect the attainment of competency by students and possible ways of helping students acquire the necessary competencies.

**Recommendations**

1. Challenging environment that will serve as impetus for competency and skills improvement by students and teachers of Home Economic should be created and sustained by Federal Government through tertiary institutions.
2. Tertiary institutions should organize seminar and workshops for their old students to up-date knowledge and skills in line with science and technology.
3. Graduate students should endeavor to attend conferences, seminars and workshops to upgrade their competency and skills.
4. Government should constantly review teachers tenancy based on skill competency to ensure quality.
5. There is the need to reorganize Home Economics curriculum to have balance between knowledge and skills and values, so that the curriculum become competency based.
6. There is need to have realistic time allocated for acquiring the desired competency.
7. Soft loans should always be given to Home Economics students on graduation by banks and the government to enable them to establish small scale enterprise.
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Abstract

Gifted and talented students are the hinges and future hopes of any human society. They are like precious metals which need to be held tenaciously and nurtured carefully starting from parents at home to teachers in variant classrooms. In the Nigerian context, innumerable gifted and talented students have faded away unnoticed, several are still diminishing each day like a flower, and many more are yet to be spotted out and developed. To this effect, parents and teachers are indispensable in the discovering and developing many hidden gifts and talents of children and students. This essay is a snapshot and attempt to reflect on how parents and teachers can help in the discovering and developing of gifts and talents in so many Nigerian children and students. Furthermore, the author wishes to examine some concepts of some writers regarding gifted/talented students, characteristics of gifted/talented students, ways to identify and assess them, challenges they may face, impacts of undeveloped gifts/talents on individual and society, and some recommendations on what to do to see that no gifted/talented child or student is left behind.

INTRODUCTION

In the perspective of the Nigeria’s philosophy of education, “every Nigerian child has a right to equal educational opportunities irrespective of any real or imagined disabilities each according to his or her ability.” One of the roles of education is to help every student, notwithstanding his or her gender, background, culture, religion, ability, etc., to develop his/her potential to its fullest. Hence, education in Nigeria should endeavour to engage students fully in the learning process and provide varieties of experiences and opportunities for them to thrive. Therefore, every Nigerian child needs all round education in order to develop holistically especially the development of the innate gift(s) each possesses and the acquisition of novel talents. For this reason, all students deserve the opportunities to learn, grow, unfold, and be challenged to strive for academic excellence at all levels of education, in order to become good citizens who are capable of taking right and good decision, able to manage themselves and others.

Within the four walls of schools, there exist varieties of exceptionalities such as “Giftedness,” “Talentedness,” Mentally challenged, Emotional and Behavioural Disorder, Attention Deficit Disorder (ADD), Attention Deficit / Hyperactivity
Disorder (ADHD), and so on. However, students whether mentally challenged or with exceptional gifts and talents and learning potential require specific knowledge and attention from their parents, teachers, school authority and government, both state and federal. Giving them appropriate attention, careful nurturing of their gifts, ambitions, suitable education, and support are of paramount importance because gifted and talented students have the potential to make a unique and terrific contribution to their various communities and to the society at large. But if they are ignored, they will use their gifts and talents in a wrong way or become delinquent youths and the communities and society in which they live will lose their noble services. Therefore, one should be in accord with the Davis assertion that the consequences for neglecting the students with extraordinary gifts and talents include loss of academic growth, loss of creative potential, and sometimes loss of enthusiasm for educational success, and professional achievements, thereby loosing significant contributions each would have made to the society. Nevertheless, students with other exceptionalities such as ADD or ADHD can reach a great height if appropriate teaching strategies such as differentiated instruction or adapted program and different teaching/students’ learning styles are employed. Nonetheless, the main focus of this paper is gifted/talented students and the roles of parents and teachers in their development.

CONCEPT OF GIFTEDNESS AND TALENTEDNESS:

There is no single or universally accepted definition for Giftedness/Talentedness. Consequently, to find a definition of giftedness or talentedness is not as easy as one could imagine because it is based on the particular definition a state, country, school board or region adopts. Hence, the selection process of those to be included in the special services of a gifted program is influenced by the particular definition given by the school board or locality. There are also variant views, ambiguity and inconsistence in the use of the terms gifted and talented. Some people, including experts, use them interchangeably when describing the same person. For instance, people can say that a person is a “talented musician” or a “gifted musician,” a “talented artist” or a “gifted artist,” a “gifted or talented writer” or scientist. However, some authors such as Davis, Rimm, and Siegle used the word gifted to denote both gifted and talented just for convenience sake. Gifts deals with a special aptitude. It is special aptitude in the sense that it is not attainable by everybody, but by a few. They are naturally innate in human persons, while talents or specific skills “are learned capabilities.” Talents deal with specific skill one acquires. In other words, talents are acquired competences.

One might venture to accept the explanations given about the difference between gift and talent, but can ask a question regarding talent. Davis maintains that talents are specific skills one learned, but one may inquire thus: “can a person acquire and develop any talent without an atom of gift of that particular talent in the person?” I can argue that a person is able to acquire a specific skill because there is already a bit of innate gift of that skill in the person. To illustrate it in another way is to say that
people are talented because they are gifted, and they are talented differently because they are gifted differently. Some are highly gifted, some are somewhere in the middle, and some are still less gifted. Hence, they need training to bring that bit of gift to its fullest if possible. For example, a person with an iota of gift of something can learn or acquire that skill faster in the training, but the one without any trace of gift of a particular talent may spend hours, weeks, months, and even years to acquire a particular skill which the other person learned in a very limited number of hours. To be more specific, when teaching two different students how to play a musical instrument that is unfamiliar to both of them, you may notice that after few minutes or hours one is already advancing in it while the other cannot make a headway after so many hours or days of lessons and practices. What could be the cause? There is no other reason than that the other person has a bit of gift of that talent hidden in him or her. Therefore, proper experiments or research may be needed to prove that gifts play significant role in the acquisition and development of talents.

Despite the controversial positions on the interpretation and the use of terminologies (gifted and talented), there is a definition that most people, including experts, have generally accepted. It took its root from the definition given by Maryland in the United States’ Department of Education. According to this definition, children referred to as gifted and talented are those children that are identified by professionally qualified personnel as having outstanding abilities, capable of high performance, and have demonstrated achievement and/or potential in any of the following areas: general intellectual capability, specific academic aptitude, prolific thinking, leadership ability, visual and performing arts, and psychomotor capability. (As this definition went through reviews, psychomotor capability was dropped). This definition is acceptable to many because it does not focus on high general intelligence only, but incorporates gifts from different facets such as gifts in specific academic areas, arts, creativity, leadership, and et cetera.

From the Maryland definition, so many other definitions, conceptions, and interpretations emerged. Some of these notions include the IQ definition which sets up a point on the IQ scale and anybody scoring about that fixed point is referred to as a gifted person. Despite the popularity of the IQ definition, it received some criticisms. Many criticized IQ because it does not take into account persons who are highly creative, artistic or gifted in other particular areas. It recognizes only linguistic and logical mathematical types of intelligence. It also underestimates a person’s ability. For example, if someone scores one or half a point below the cut-off point (such as 134 or 134.4 out of 135), the person is not regarded as being gifted. In spite of the criticism geared toward IQ test, it cannot be underestimated as one of the good indicators of giftedness. One may agree with the critiques that it cannot be seen as the only way to identify giftedness or seen linguistics and logical mathematical type of intelligence as the only forms of giftedness. Hence, one can suggest that it will be a good move to re-examine the concept of the IQ scale, because one may have a very high IQ, but anything can happen inwardly during the test, and the person will score 134 or 133 instead of 135 or above. Thus, it may be good idea to reset IQ scale in the form of a range. That is, persons seen as gifted or having high IQ can fall within the range of 133 to 135 or higher to accommodate inevitable or unforeseen circumstances.
Another concept worthy of mention is Gardner’s Theory of Multiple Intelligences (MI). Gardner argues that every one of the intelligences has a neurological basis, a unique set of core operations, and its own symbol system. An example can be seen in the ability in language, numerals, and musical notation. Some intelligences are correlated with others such as mathematical and musical ability, linguistics and sports ability. According to MI theory, students can excel in the following areas: linguistics, logical-mathematical, interpersonal, intrapersonal, spatial, naturalistic, musical, bodily kinaesthetic, and technological. Just as other definitions such as IQ, Gardner’s theory also underwent some criticisms. One criticism is that “more than ten years after it was introduced, it has yet to be firmly grounded in research.” Some critiques argue that it is faddish but did not explain why it is faddish.

In my own perspective, gifted and talented students are those students who from birth have inherited from their creator special distinctiveness which differentiates them from their peers and makes them first among equals. Gifted and talented students are not only those who are uniquely endowed with rare possibilities, but also those who have the ability to persevere in reaching the full realization of those gifts and talents. I am maintaining this view of perseverance because it is one thing to have gift or talent, but it is another thing to live up to it. Thus, many geniuses in our world today work round the clock to uphold their claims. This entails that teachers and parents need to encourage and spur their students and children to pursue their gifts and talents with determination and passion. Having examined the different definitions and conceptions of giftedness and talentedness, one might inquire about the characteristics those termed as gifted and talented exhibit.

CHARACTERISTICS OF STUDENTS WHO ARE GIFTED OR TALENTED:

There are so many good qualities students who are gifted or talented portray. Some of these attributes include unusual alertness in infancy and later, early and rapid learning, rapid language development as a child, superior language ability (verbally fluent, large vocabulary and complex grammar), academic superiority, large knowledge base, superior analytic ability, reasoning, and high-capacity memory, high curiosity and exploration (for example, having interest in new topics, going beyond what was taught and exploring how and why), high career ambitions, active in getting and sharing information, enjoying learning, reading, asking many and critical questions, motivating others, demonstrating self-confidence, thriving on complexity and becomes unusually upset at injustice, criticizing works for self and others, making sophisticated use of techniques and media, discussing in detail, enjoying debating, relating well with adult, etc. As students who are gifted or talented have so many good qualities, they also have some impediments. However, due to the limit and nature of this paper, their negative traits will not be discussed. Instead, ways to identify and assess hidden gifts and talents will be discussed. Nova Scotia Department of Education (NSDE) observes that there is no one profile of a gifted learner, and maintains that not all the characteristics of gifted and talented students are seen at a given time. Hence, if all the gifts and talents cannot be portrayed at a
stretch, how then, can the hidden ones be seen or spotted out and who will be responsible for the identification and assessment?

WAYS TO IDENTIFY AND ASSESS GIFTED AND TALENTED STUDENTS:

Some talents and gifts are already developed and can easily be recognized in classrooms because students had been given the opportunities to express them in the curricular and extracurricular activities that were offered in schools, while some are still hidden and can only be identified when students are exposed to various domains and “hands-on” experiences that are not offered within the curriculum. Since there is no one general way of viewing a gifted student, it is important that parents and teachers have the knowledge of the different characteristics of giftedness and talentedness in order to pinpoint them when students exhibit them.

EFFECTIVE ENRICHMENT PROGRAM:

As already mentioned, students with gifts and talents may not show all of these characteristics at any given period. For this reason, to identify them, schools through teachers need to provide and implement school-wide effective enrichment program in order to provide opportunities for students to manifest and develop their hidden gifts and talents. The effective enrichment program will aim at offering challenge, and support the growth in students’ observable gifts and talents. It will also aim at providing new and different experiences to enable all students to reveal their hidden gifts and talents.

Additionally, the process of identifying and assessing students with gifts/talents should be holistic because people are gifted or talented differently. One may be academically very outstanding or artistically gifted in music and not so good in Math or Science. Another may be gifted in Hockey sport or basketball, but performs poorly academically. If only academic aspect is considered, the sportive aspect will be neglected and since the student cannot measure up academically, he or she may end up as a drop-out.

HIGH STANDARD CURRICULUM

There is another means of recognizing potentials in students who are gifted, especially those gifted, but are underachieving because they do not have access to proper challenging curriculum that would help to bring out their gifts to surface. Jane M. Jarvis, in her article argued that “high-quality curriculum” can play a great role in the unmasking process of different gifts and talents that students possess. She maintained that if the curriculum and education accessible to all students do not engage, challenge, offer appropriate support, and highlight different strengths and potentials, students’ gifts/talents will likely remain dormant regardless of the particular identification tools used. She added that high quality curriculum designed for gifted education needs to respond to significant advance performance, and to uncover and foster hidden potential. It still remains a teacher’s primary role to see that the curriculum he/she is using is of good quality. Hence, teachers should be
involved in the development of a curriculum or scheme he/she will use for his/her class so as to make it meet the needs of gifted students. The work he/she gives to gifted students must challenge them. He/she must give them advanced materials that go beyond what would be taught in their regular grade-level classrooms. Otherwise, they will be bored and dwindled away. The curriculum the teacher designed for gifted students must take into account what is being studied as well as the processes that the teacher uses to engage his/her gifted students. The teacher can employ higher level thinking process, creative skill, problem solving, and research skill strategies when assigning and assessing students’ work. Appropriate modifications should be made for all students, and the outcome should be a curriculum that works more effectively to challenge and help students to perform at higher levels and provide opportunities for the development of different potentials. Furthermore, the assumption that “giftedness is multifaceted,” and can be manifested differently in individuals and that it can be latent, should be a guiding principle to teachers in the curriculum planning for uncovering of hidden gifts. As it is necessary to unmask, assess, and nurture students’ hidden gifts and talents, it is also very crucial to note that gifted and talented students can encounter some difficulties along the way.

OBSTACLES OR CHALLENGES FACING GIFTED STUDENTS

The obstacles or challenges gifted students might face include social isolation. Gifted students may face social isolation because often they have difficulty in social interactions with their classmates. Students or children with gifts and talents can appear to be defiant toward authority and classmates. For example, in classroom, they can interrupt or argue with the teacher by taking exception to what is being taught. They have strong sense of communal justice and morality. Hence, they challenge the oversimplifications and common assumptions. They can also argue against their classmates’ responses to a particular question in the classroom. They are quick in giving response to any question thrown to the whole class, and can think very critically. They can also be domineering in their answers and very political. Hence, they are not so much liked by their peers because they seem to be threats to them. They can go extra miles to achieve their optimistic goals. Teachers have a great role to play here. They need to help them to strike at a balance and be a bit tolerant to others who are not as gifted as themselves. Teacher should help them understand that everybody in the class have equal right to participate fully and air their own perspectives in class.

A gifted student tends to mask his/her gift because he/she often finds him/herself in an awkward situation in which he/she begins to perceive that his or her outstanding knowledge makes others, especially age or classmates uncomfortable. Sometimes he/she is being called all sorts of names such as “I know it all” (IKA), “seekinee” or attention seeker whenever he/she talks. For this reason, his or her difference by others is potentially discrediting because his/her knowledge interferes with normal social interactions. He/she cannot interact freely with others because his/her way of reasoning does not concur with others. Hence, he/she will try to
camouflage in other to fit in with peers or those around him/her. In my opinion, this mask can be very detrimental because a lot of gifted students can go unidentified.

CULTURAL ISSUES/GENDER EQUITY

In some cultures, females are not allowed to attend school. Their territory and workplace end in their mothers’ kitchens and backyard. They cannot speak openly as their male counterparts. In some cultures, girls can attend schools, but may not have equal rights as boys in terms of speaking publicly and taking some kinds of subjects in schools. In such a situation, females that are gifted or talented will never thrive or find their proper positions in the society. Thus, they can suppress their gifts and abilities due to social structures and expectations for males and females. This can lead them to develop a very low self-esteem and become underachieved because they tend to live and act in accordance to the stereotype constructed for them by the culture. Furthermore, gender equity can be an issue at stake. Equity means fairness in treatment, giving people their due share, respect, right, etc. As some females may experience discrimination and maltreatment, teachers can help to better the situation by ensuring that both males and females have an equal share of the teacher's attention, creating an inclusive classroom and including questions that ask both males and females to use analytical and higher-order of thinking, and praising or criticizing both males and females and accepting male and female staff/students contributions as equally valid.

FEAR OF BEING DIFFERENT

Sometimes students hide their gifts for the fear of being stigmatized as gifted. Sometimes, peers can become jealous and bully gifted them due to their outstanding performance. The above named obstacles may have some impact on students. The students in question might begin to shy away and stop performing as they should, especially if they do not have backbone. In my mathematics class, there is one boy who has been taking first position since his Junior Secondary School to Senior Secondary School. Each time he stood up to answer question, other students will murmur, trying to shun him down, but he never relent from answering questions and excelling. In contrast to him there was another boy in the same class who is very intelligent too, but fears his peers due to yelling at him. He has been taking second or third and sometimes seventh position. But I know very well that he is a potential candidate for first position, but due to the fear of other class mates, he does not work hard as he should. Any teacher in that situation has a duty to stand up for justice and give necessary correction, admonition, and proper education concerning bulling, intimidation, envy, jealousy, and their consequences. He/she should help the bulling students understand that everyone is specially gifted in one way or the other. Hence, they should work towards discovering their own gifts and try to develop them rather than envying another person.
ENVIRONMENT AND CHANCE ISSUES

Many gifted students have not developed their gifts to the fullest due to the issues of good environment and chance. One may be highly gifted, but he/she is not in a conducive environment. Also, a student may not be able to get opportunity that can help him or her develop the gift he/she has. For example, in a country like Nigeria, so many students are exceptionally gifted in music, sports, arts, and other academic areas, but lack able teachers and musical instruments to help them reach their potential. There was no provision for them, particularly students in the remote domain. Hence, many gifts have just decayed away without any means of fostering them. It is only a few whose parents are rich or have somebody at the “top seat” may manage to find their way out to realize their aspirations. Having explored the different conceptions of giftedness and talent, their characteristics, ways of identification, some challenges and hindrances that might emerge, examining some specific roles parents and teachers can play in the identification and development of gifted and talented students become paramount important.

ROLES OF PARENTS/TEACHERS IN THE IDENTIFICATION/DEVELOPMENT OF GIFTED AND TALENTED STUDENTS:

The primary role of both parents and teachers in the identification and development of gifted students is the knowledge of the concepts and characteristics of students who are gifted. This is important because knowing what it means to be gifted student and the early signs of giftedness will be of great help to parents and teachers in the early discovering and development of those students who are gifted.

PARENTS’ ROLES

It is essential to involve both parents/guardians in the process of the identification of gifts especially in the case of very young children. This is because students may not portray their gifts in the school setting, but may do so at home where they are more acquainted and comfortable with the environment and their parents. Parents are the primary teachers or educators of their children. For this reason, they should be very vigilant in observing extraordinary behaviours as they interact with their children, especially at the infancy since some of the signs of giftedness are unusual alertness in infancy, early and rapid learning, and rapid language development as a child.

FUNDING OF GIFTED/TALENTED STUDENTS’ EDUCATION

Funding of their tuitions and other bare necessities that will enable them reach their potentials is very essential duty. Notwithstanding, sometimes a gifted student may not be from a very well-to-do family. In such case, parents must not shy aware and allow their child’s gifts to rotten away. They can obtain loan from bank or seek for help from friends so as to support their child’s training. They can equally beckon on government to assist or start early enough to make some savings towards the education of their child, especially when they notice the uniqueness of their child.
Apart from providing funds, parents/guardians should give moral support and encouragement to their child. It is their duty to find appropriate schools and check their children after school period to ensure that they do the homework assignments given to them by their teachers. They should make sure that their children are receiving proper and comprehensive education, eating good balanced and healthy diet to enable their brain to function properly and retain when they study.

TEACHERS’ ROLES
Just as parents are the primary educators of their children, teachers are both primary and secondary educators. Consequently, teachers have the role of identifying unique performances displayed in their classrooms by their students in order to help them unfold and develop them. As identification should be based on general intellectual ability, language arts, mathematics, science, social studies, creativity, and leadership, it is the duty of a teacher to take into consideration students’ interests when developing enrichment programs for gifted students. It is vital to explore students’ personal interests because their intrinsic motivation, skill development, and performance are enhanced when their areas of personal interests are involved. Some of the ways teachers may find out students’ interests are through conversation, formal interviews, and interest inventories. The use of interview is very essential because it will help the teacher to get further insight in identifying the student’s characteristics and interests that were not visible or easily measurable in the classroom setting. The key aims of the interview are to explore the student’s responses to questions concerning his/her motivation, learning style, creativity, and problem solving ability. Additionally, every teacher should endeavour to have deep knowledge of the Gardner’s theory of multiple intelligences already discussed.

CREATING A GOOD CONDUCIVE LEARNING ENVIRONMENT
It should be a number one responsibility of any teacher to create a good conducive learning environment. I maintain that creating a good conducive learning environment is of paramount importance because a good conducive learning classroom together with good teacher-student rapport, good cooperation and healthy social interaction will promote learning, creativity, leadership skill, and cultural understanding. When students feel safe, loved, appreciated, heartened, and reinforced in their efforts to outclass in their studies, sky will be their limit especially the gifted ones.

PROVISION OF APPROPRIATE ACTIVITIES
As already specified, Kanaitsa observed that academically gifted students set themselves apart from the other students because of their amazing knack to grasp ideas, organize them effectively and make use of them appropriately. Hence, teachers have the task of searching for activities that can challenge gifted students. Teachers also need to know the appropriate ways to use those activities so that gifted students can fully benefit from them. Gifted students are likely to have extra time in class because of their smartness. They can finish their class work before the stipulated time or before others. As result, teachers need to get extra works ready for gifted
students or give them an activity such as asking them to creatively develop something by exploring further the current topic they are studying. A teacher can ask a gifted student to do things such as carrying out an inquiry research project or designing something using computer in a particular area of interest and share with his/her peers in their classrooms by way of power-point presentation or movie. This will help the student to develop critical thinking, organizational, problem solving, creativity, and leadership skills. Thus, teacher will only play the role of a moderator and facilitator helping students to discover and choose the right information by themselves. In addition, students who are gifted or talented can be requested to represent their schools at local or state level and even at a national or international level in quiz, music, dance, or debate competition. This act or opportunity will expose them and will widen their horizons.

CONTROL OVER GIFTED STUDENTS VIA INDEPENDENT PROJECTS

As gifted students tend to finish their assigned work very quickly, some may become disruptive in the classroom when they are not actively engaged. To avoid all the troubles and to keep them focused in their learning, teacher has a role of modifying his/her curriculum to suit the gifted students by providing them with independent projects. This may require some time for planning, but the outcome will be very rewarding. When given independent project, teacher should try to avoid giving similar work as a gifted student may not be willing to do something relating to what he/she has already done and mastered. Hence, teacher can compact the curriculum so that gifted students can skip assignments especially things they are already capable of doing. While the rest of students are completing work that can be skipped by the gifted students, teacher can give them independent projects in place of other classroom work. Independent projects can be given in any subject area in accordance with the curriculum outcomes. There is also a need to give the students a check list of what the teacher is expected of them. For example, in a Language Arts classroom where there are gifted students, they can be asked to work in groups of two or independently to do a research on the time line of the current novel being studied, to prepare a Power Point presentation on the plot, symbols, and mood of the novel being studied, a bulletin board of the main characters in a novel or the themes, or a skit, music or dramatic production of the climax or conflict in the novel being studied.

USE OF TIERED INSTRUCTION

Sometimes, teachers make the common mistake of turning gifted students into classroom “tutors” instead of challenging them. It is the duty of a teacher to realize that gifted students are just like any other exceptional student. So, they need an education that is individualized and goal oriented in order to help them reach their maximum potential. Teachers have a role of applying various teaching methods and strategies to ensure that gifted students are fully engaged to attain their academic excellence. Some of the strategies for engaging gifted students include tiered instruction, provision of a learning center, mentorships, acceleration, and curriculum compacting. Tiered lessons and assignments are processes in which a student works with the same essential ideas and outcomes and use the same key skills, but works at
different levels of complexity and open-endedness. In such situation, the emphasis is on the concept rather than learning differences. Teacher has the duty to decide the technique for different tiers. He/she may want the varying tiers to be based on the students’ readiness, ability, interest in a topic, or preferred learning style. It is the teacher’s role to conduct diagnostic test or assessment in order to develop a lesson or activity accordingly and make adjustment when necessary into different tasks at variant levels of understanding. Tiered tasks and assignments are vital because they provide gifted students the opportunity to produce ideas, reflect on their intellectual needs, work in areas of interest, and develop higher-level thinking skills.

PROVISION OF GOOD LEARNING CENTER AND ACADEMIC ACCELERATION

It is teacher’s role to provide a good learning center to enable students to engage in activities designed to extend their learning and thinking skills, and to provide the opportunities for creativity and excellent production as they investigate particular topics and issues. It is also the duty of a teacher to learn how to apply acceleration practice which helps gifted students meet their curriculum outcomes at a faster pace. It takes place when a student has advanced beyond age, appropriate coursework and/or grade-level groupings. Acceleration may occur within the classroom, the school, or outside school, and can be done through acceleration by subject or grade, advanced courses, advanced placement, curriculum compacting, early admission to post-secondary study, extracurricular activities outside school hours, use of mentors to provide support beyond the classroom activities, et cetera.

ENCOURAGEMENT AND SUPPORT TO RISK TAKING

Gifted students fear failures and humiliations. They can be over anxious and sensitive. Consequently, they try to avoid any task they feel they might not excel. Teachers have great role to play by letting them understand that failures are not bad occurrence all through. Sometimes, they can be a stepping stone to a great height. Hence, teachers should encourage them to take up hard tasks.

USE OF MULTIPLE AND CORRECT FORMS OF ASSESSMENTS & EVALUATION

Without doubt, it is a teacher’s role to know and use multiple and correct forms of assessments that will help him or her in the identification, instruction, progress, and evaluation of students who are gifted. Hence, gifted students’ teachers need to be very conversant with the diagnostic assessment, formative, and summative assessment. In other words, their identification process should come from different sources and different assessment strategies namely, assessment for learning, assessment of learning, and summative assessment. Some of the sources of data for identification and assessment include anecdotal observations from teachers, parents and guardians, peers, mentors, and students themselves, developmental history such as parents’ descriptions of the child’s exceptional abilities and interests, examples of the student’s creativity, achievement and aptitude tests which measures specific knowledge and skills in a particular area such as report card grades and a student’s
natural talents or special abilities for doing or learning how to do certain kinds of activities, intelligence or cognitive tests including off-level testing, demonstrations of creative and critical thinking such as journals and learning logs, “Off-level testing” which measures a student’s performance beyond a particular grade level; this type of test is given when student is discovered to be two or four grade level above his/her age or classmates. In this case, the classroom assessments designed for higher grade levels or “above grade-level benchmark is used to evaluate the performance and the product.

SOME IMPACTS OF UNTRAINED OR “SUFFOCATED” GIFTS OR TALENTS ON INDIVIDUAL AND SOCIETY

It might interest you to know that inherent gifts can be a two-edge sword in the sense that they can make the life of the gifted individual terrific and exciting or miserable. When gifts are identified at early stage and are well nurtured, great will be the fruits, but if neglected, one may end up tragically. Thus, it is deemed appropriate to comment briefly on the impacts of untrained or “suffocated” gift on those concerned and on the society at large. One might like to ask the following questions: How can a gift be suffocated in a child or student? Is that possible? The answer is yes. As mentioned previously, neglecting the students who are gifted would lead to the loss of academic growth, loss of creative potential, etc., and significant contributions each would have made to the society. In other words, the country will lose valuable personnel, remain underdeveloped or lagging behind in the competitive world as compared to the contemporary society. It will suffer from shortage of labour and loss of income tax it would have collected from these gifted students when they start to work.

On the part of the individual, there will be psychological impacts. The student may remain unhappy because his or her interest is unjustly denied him or her. Consequently, the student may be under-rated or placed in the areas of studies he or she is not proficient and the outcome will be over stress because the student will insert more energy than usual, working round the clock. A student may exhibit an aptitude of extraordinary gift, but teachers or formators, or the person in authority will smother it. He or she may choose to ignore it or use intimidation and suppression to block it from being developed. Even when the student makes an honest effort to manifest the gift and make some outstanding production due to the innate gift that is in him/her, people tend to see nothing, but look for ways of suppressing these gifts. The gifted student may end up suffering or developing stomach ulcer, chest pain, constant migraine headache because the bottled gift is boiling within, looking for a way out. Thus, some many gifts in some young people in our country, Nigeria are under-developed or “suffocated” due to fear, shyness, culpable ignorance, neglect, envy, or negligence on the parts of those responsible to make the training take place. Furthermore, I would like to propose the following few recommendations:

RECOMMENDATIONS

The first point of the recommendation is knowledge of differentiated instruction. Each trained teacher should have, at least, a basic knowledge of special education
and the use of differentiated instructions in classroom settings to enable each student benefits from the lessons and develop fully his or her gifts. Differentiated instruction will also help a teacher to know the ability of each student in his or her class and be able to help each student to discover his areas of strength and pursue it.

A second point of recommendation is the provision of subsidies and mandatory extracurricular activities. Government or school authority should make a provision for and mandatory extracurricular activities in every school both public and private. This will provide opportunity for students to try their abilities in various areas and go for the ones for which they are more competent. Hence, provision of things such as musical instruments (pianos, guitars, violins, clarinets, flutes, trumpets, recorder, et cetera) and sports equipment and crafts, drama club, cultural dancing club, modernism club where students do hands on activities such as assembling of cars, planes, computers using toys-like objects. Government should also provide enough funds for scholarships or loans for both males and females gifted students in particular those of them that are from indigent families. Government should provide equal opportunities in all aspects of education for both male and females. Identification process needs to be accessible to all students irrespective of the gender, cultural background and social status. Strategies use in the identification should include both qualitative and quantitative information.

CONCLUSION

In conclusion, I cannot pretend to have exhausted this topic, but maintain that it is a very vast and interesting aspect of exploration and discovery which needs more time to digest the key areas of interests. Giftedness is “multifaceted” or complex. It can manifest itself differently in various individuals and groups. For this reason, all hands should be on deck to see that no gifted child, especially in Nigeria, is left behind due to poverty, tribe, race, ethnicity, social status, and environment. Teachers, parents/guardians, school administrators, and other school personnel should strive to ensure that no gift slips away unnoticed regardless of individual background. Appropriate techniques should be used to see that hidden gifts are unmasked, nurtured, enhanced, and supported to its fullest realization.

REFERENCES:


ATTITUDE OF FEMALE STUDENTS TO RESEARCH-TEACHING LINKAGE: A CASE STUDY OF STUDENTS OF LAGOS STATE POLYTECNIC, IKORODU

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ABSTRACT
The connection between teaching and research is an important element of learning in higher institution. Thus, this study measured attitude of female students of Lagos State Polytechnic, Ikorodu-Lagos to the connection between teaching and research. It also identified the module (s) of research-teaching linkage in terms of curriculum design most preferred by students. Frequency table, mean score, standard deviation and bar chart were used to analyze data obtained through questionnaire and personal interview of respondents. Result revealed that students had strong positive attitude towards teaching and research connection with slight deviance in teaching with skill of research-teaching models by the teachers. The study therefore recommends that students should be motivated more to attend and participate in conferences, workshops and seminars related to their field of study and application of research findings be incorporated into the curriculum.

Keywords: research, teaching, learning, institution, female-students

INTRODUCTION
The ability to seek critically, evaluate and integrate appropriately is an evidence for a good research and innovations which is recognized as an important aspect of effective development in professional practice (Williams and Coles, 2003). The emphasis on the linkage between research as a discipline for student in higher institution has increase in recent years. Most institutions have formulated strategies to link teaching and research effectively which have stimulated the staff to become more active in research. This reason is based on the belief that research has a positive effect on teaching as it keeps teaching up-to-date on new methodological approaches. And on development which are of theoretical or applied significance to their subjects. The consequence of this is that students should be kept up-to-date with the subject they are learning. Ball and Mohammed, (2010) viewed that teaching and research are inseparable. They are of the opinion that we live in an age where intersections and integration are the breeding ground of novelty. It is at the intersection and integration of learning, discovery, and
citizenship, and through integration of all these fundermental that will inspire students to achieve their potential. In such an intellectual climate where gifts are discovered, passions are ignited, and purpose is imagined. We must integrate to discovery into all aspects of learning (Halliwell, 2008).

Attitude has recently received considerable attention from all spheres of learning. Most researchers have concluded that student’s attitude is an integral part of learning and that should become an essential component of learning pedagogy. Attitude according to Saracaloglu, (2005) is a manner of consistency toward an object. It is characterized by a large proportion of emotional involvement such as feelings, self-relationship in community. It is an evaluative reaction to some referent or attitude object, inferred on the basis of the individual’s beliefs and opinions about the referent.

Developing educational sector requires repositioning of female within the sector. The reality of the gross under-representation of sub-Saharan African girls and women in science, mathematics, and technology (STM) is unsettled (Kouassi, 1999). The ‘unbalanced’ complex and inequality of female towards scientific findings and teaching mirrors the situation found in the level of technological transformation. The government’s focus on the continuing professional development of teachers; the standards and requirements being set for registration and the renewed attention to bridging the gap between research and practice from professional bodies, indicate that the professional teacher is expected to be a user of research evidence. This is further emphasized by new attempts to enhance access to research for teachers such as online access to research digests and reports and provision of systematic reviews of research information by organizations and institutional journals.

To this end, the connection between research and teaching, sometimes referred to as the nexus, should be emphasized as a core business in learning institutions. The curriculum has become the central site where the teaching research linkage has been realizing (Ball and Mohamed, 2010). There are numbers of possible reasons for seeking a greater understanding of the ways in which research and teaching are inter-related. These include increasing student motivation; flexibility in the curriculum in order to keep pace with the fast rate of change within the research and development agenda of the discipline; and providing an educational experience preparing them to be independent and life-long learning. Only a few students will specialize in research. But many will be professional and their roles will require them to constantly update their own skills, keep pace with ongoing change, and apply the high level skill associated with design, understanding and analysis. These are often associated with a curriculum that has successfully been integrated to teaching and research perspectives.

To develop linkages between research, learning and teaching in which academic staff build the teaching-research nexus through approaches will include:

- Drawing on personal research in designing and teaching courses;
Placing the latest research in the field within its historical context in classroom teaching;
Designing learning activities around contemporary research issues;
Teaching research methods, techniques and skills explicitly within subjects;
Building small-scale research activities into undergraduate assignments;
Involving students in departmental research projects;
Encouraging students to feel part of the research culture of departments;
Infusing teaching with the values of researchers; and
Conducting and drawing on research into student learning to make evidence based decisions about teaching.

The challenges for higher institutions which support the student experience of research are to recognize the complexities of the potential relationships between research and teaching. Therefore they develop practical integrated strategies to manage any tension and disruptive interactions. Moreso, they exploit positive relationships to deliver strategic aims. Thus, the central objective of this linkage is how research informs teaching and does not consider how teaching might inform research; which it can in many disciplines. An ideal way to achieve many of the dimensions of the teaching-research nexus is to draw on the knowledge, skills and experience of the visiting researchers/teachers who pass through an institution each year; through presentations and lectures to undergraduates, or through their leadership of class discussions.

In order to identify the nature of research-teaching link, it is important to understand that there are many ways of linking research and teaching other than students learning about subject knowledge through lectures. Students may learn about research methods and techniques by undertaking their own projects, whether individually or in teams; they may assist staff with their research’ and they may gain experience of applied research-based approaches in the way they teach through, for example, adopting an inquiry-based learning and investigating the learning that takes place in their courses, to enhance their own teaching.

Ball and Mohamed (2010) provided a useful distinction between research-led, research-oriented, research-based and research-informed teaching thus:

1. Research-led: The curriculum is structured around subject content and the content selected is directly based on the specialist research interests of teaching staff. Teaching is often based on a traditional information transmission model. The emphasis tends to be on understanding research finding rather than research processes and limited emphasis is placed on maximizing the potential positive impacts of teaching on research.
2. Research-oriented, in this case, the curriculum places emphasis as much on understanding the processes by which knowledge is produced as on learning the codified knowledge that has been achieved. Careful attention is given to the teaching of inquiring skills and on acquiring a research
ethos. The research experiences of teaching staff are brought to bear in more diffuse way.

3. Research-based: The curriculum is largely designed around inquiring based activities, rather than on the acquisition of subject content. The experiences of staff in processes of inquiry are highly integrated into the student learning activities; the division of roles between teacher and student is minimized; the scope for two-way interaction between research and teaching is deliberately exploited.

4. Research-information/tutored, There is drawn consciously on systematic inquiring into the teaching and learning process itself.

The core of research activity according to Ball and Mohamed (2010) should be ‘knowledge pursuit and creation by academics within an intellectual space that celebrates scientific inquiry, integrity, rigor, critique and autonomy. If this is achieved then it will be beneficially economical and social; consequences may flow in the form of knowledge dissemination, education, funding, and institutional, career and academy status’ (Morrison, 2002).

Many different discussions have been advanced in support of the idea that doing research will improve teaching. Literature revealed that exposure to a person who is actively engaged in research will result in students acquiring the “qualities of mind”. Furthermore, if academic teachers are not involved in research, then they are simply not at the forefront of their discipline. Hence the students are at disadvantage. Students seeking a higher education do so because they expect to have teachers who have gone beyond the average level of knowledge. Profound knowledge of teacher about subject is considerably more important in the students’ eyes than the instructional skills of an academic.

Therefore, this study shall provide answer to the following research questions:

1. Which mode of research-teaching linkage in terms of curriculum design is most preferred by female students?
2. What is the attitude of the female students toward research-teaching linkage?

The focus of the study is to investigate the attitude of female students to research-teaching linkage and repositioning of female education for technology transformation, with the objectives:

1. To identify which mode of research-teaching linkage in terms of curriculum design is most preferred by students, that is, research-tutored; research-based; research-led; or research-oriented.
2. To measure attitude of students towards research-teaching linkage.

**METHODOLOGY**

The study population was the 95 number of final year female students of school of agriculture and technology selected from department of Agricultural Extension and Management, Hospitality Management Technology and Computer Science of
the Lagos State Polytechnic, Ikorodu in 2011/2012 session. The rationale for the selection of final year students was that it is expected that their views about the linkage would be more discerning. For this study, a random sample of 80 students was chosen and questionnaire and interview schedule were used as the most appropriate means of obtaining independent data from students. The instruments were face validated by expert teachers in research methodology. The questionnaire used was divided into three parts. The first aimed to obtain demographic data of the respondents, the second part sort to find the knowledge of students about research-teaching linkage in term of the curriculum design: research-tutored, research-based, research-led or research-oriented. Students were provided explanations of these four modules. The third part included 21 variables which were considered as indicators of the extent to which respondents’ attitude towards the research-teaching linkage.

Likert scale of 5 (most preferred), 4 (preferred), 3 (undecided), 2 (less preferred) and 1 (not preferred) was used to measure the respondents’ response to their preference on the four modules listed. While, scales of 1 (strongly disagree), 2 (disagree), 3 undecided, 4 (agree) and 5 (strongly agree) was used to measure the respondents’ attitudes towards the nexus. In addition bar charts, standard deviation, percentages and the mean difference were used to measure and analyze data obtained, using the Statistical Packages for Social Science (SPSS) version 11. A total of 71 valid and usable questionnaires were completed and used for analysis, given a response rate of 88.75%.

RESULTS

The results show that most of the female students surveyed (62.0%) were within 21 – 25 years of age (Fig. 1) with majorities (94.4%) being single and 85.9% as prospecting Higher National Diploma (HND) graduates.

Table 1: Level of preference of research-teaching linkage

<table>
<thead>
<tr>
<th>S/N</th>
<th>Variable</th>
<th>Most preferred (5) MP</th>
<th>Preferred (4) P</th>
<th>Undecided (3) U</th>
<th>Less preferred (2) LP</th>
<th>Not preferred (1) NP</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>Research-Led: Teaching curriculum structured around current subject content.</td>
<td>9b 15.8</td>
<td>7 12.3L</td>
<td>10 17.5</td>
<td>19 33.3H</td>
<td>12 21.1</td>
</tr>
<tr>
<td>2</td>
<td>Research-Oriented: Curriculum emphasizes teaching process of knowledge construction in the subject area.</td>
<td>7c 12.3</td>
<td>9 15.8</td>
<td>5 8.8L</td>
<td>18* 31.6H</td>
<td>18* 31.6H</td>
</tr>
<tr>
<td>3</td>
<td>Research-Based: Curriculum designed on students undertaking inquiry based learning rather than acquisition of subject content.</td>
<td>4L 7.1</td>
<td>9 16.1</td>
<td>17 30.4</td>
<td>15 26.8H</td>
<td>11 19.6</td>
</tr>
</tbody>
</table>
4. **Research-Tutored:** Curriculum emphasizes on focused learning on students writing and discussion skills of essay and papers.

<table>
<thead>
<tr>
<th>Variable</th>
<th>N</th>
<th>S</th>
<th>M</th>
<th>*SD</th>
</tr>
</thead>
<tbody>
<tr>
<td>Teacher should use examples from his/her research in lectures.</td>
<td>62</td>
<td>239</td>
<td>3.85</td>
<td>1.14</td>
</tr>
<tr>
<td>Research in your discipline is important.</td>
<td>61</td>
<td>230</td>
<td>3.77</td>
<td>1.24</td>
</tr>
<tr>
<td>An academic researcher makes a good teacher.</td>
<td>62</td>
<td>232</td>
<td>3.74</td>
<td>1.38</td>
</tr>
<tr>
<td>You feel that academic research carried out in LASPOTECH is credible.</td>
<td>60</td>
<td>213</td>
<td>3.55</td>
<td>1.17</td>
</tr>
<tr>
<td>Being involved in research activities is beneficial.</td>
<td>58</td>
<td>204</td>
<td>3.52</td>
<td>1.33</td>
</tr>
<tr>
<td>There is a two-way transfer of knowledge in the class, i.e. between you and the teacher.</td>
<td>60</td>
<td>211</td>
<td>3.52</td>
<td>1.38</td>
</tr>
<tr>
<td>Research modules enabled you to have a positive attitude towards knowledge.</td>
<td>62</td>
<td>218</td>
<td>3.52</td>
<td>1.25</td>
</tr>
<tr>
<td>Due to research modules, you have gained an analytical approach.</td>
<td>58</td>
<td>203</td>
<td>3.50</td>
<td>1.22</td>
</tr>
<tr>
<td>The research modules gave you much more self-confidence.</td>
<td>61</td>
<td>212</td>
<td>3.48</td>
<td>1.21</td>
</tr>
<tr>
<td>Research plays an important role in enhancing the quality of your educational experience in general.</td>
<td>63</td>
<td>217</td>
<td>3.44</td>
<td>1.38</td>
</tr>
<tr>
<td>It could be stated that you are generally satisfied with the links between research and teaching.</td>
<td>61</td>
<td>210</td>
<td>3.44</td>
<td>1.16</td>
</tr>
<tr>
<td>The research-modules approach is of a great value to you.</td>
<td>62</td>
<td>213</td>
<td>3.44</td>
<td>1.28</td>
</tr>
<tr>
<td>Teacher facilitates teaching through illustration from personal experience.</td>
<td>62</td>
<td>213</td>
<td>3.44</td>
<td>1.25</td>
</tr>
<tr>
<td>You feel the currency of teacher’s knowledge.</td>
<td>62</td>
<td>212</td>
<td>3.42</td>
<td>1.17</td>
</tr>
<tr>
<td>Due to research modules, your opportunity to enquire and criticize has been increased.</td>
<td>60</td>
<td>199</td>
<td>3.32</td>
<td>1.30</td>
</tr>
<tr>
<td>Much more applied practical curricula are needed.</td>
<td>62</td>
<td>204</td>
<td>3.29</td>
<td>1.35</td>
</tr>
<tr>
<td>You are aware of the majority of research that goes on in your field.</td>
<td>59</td>
<td>193</td>
<td>3.27</td>
<td>1.11</td>
</tr>
<tr>
<td>The link between teaching and research has motivated you to study and attend classes.</td>
<td>64</td>
<td>207</td>
<td>3.23</td>
<td>1.42</td>
</tr>
<tr>
<td>You feel that teacher is too busy in his/her own research and should give more time to students.</td>
<td>61</td>
<td>196</td>
<td>3.21</td>
<td>1.31</td>
</tr>
<tr>
<td>Teacher shows eagerness in class to teaching.</td>
<td>60</td>
<td>190</td>
<td>3.17</td>
<td>1.18</td>
</tr>
<tr>
<td>You have many opportunities to present/publish research work.</td>
<td>61</td>
<td>185</td>
<td>3.03</td>
<td>1.44</td>
</tr>
</tbody>
</table>

**NB:** N = frequency, S = sum statistic M = mean statistic, SD = standard deviation, superscripts 1-21; descending means score of respondents.

Result shows that 58.6% of respondents first learn about research methodology after secondary school, majorly, at higher school. This result is further affirmed by the mean score of 2.44 and the variance of response from the scale showing a
slight nearness in responses of respondents (SD=0.79). Also, valid percentage of 54.9 and 19.7 revealed that female students surveyed learn/heard about research methodology as subject taught by teacher and when they undertake research project respectively. Thus, mean score of 3.74 showed that respondents perceived the relationship between research and teaching as tangible connection relating to the transmission of advanced knowledge and the most recent information and as an intangible connection relating to the development in student’s approach and attitude towards knowledge. However, about 40.5% also perceived the relationship as global connection describing the interaction between teaching and research at both department and individual levels. Fig. 2 shows that respondents were more familiar with research-oriented as research-teaching modules (36.5%), research-based (22.2%), research-tutored (20.6%) and research-led (4.8%) respectively and about 15.9% of respondents were not familiar with any of the modules listed.

To provide answer to the first research question in this study, respondents revealed that both research-tutored and research-led modules were the most preferred linkage (33.3% and 15.8% respectively), whilst research-oriented and research-based were less preferred (31.6% and 26.8% respectively) despite being familiar with these two modules (Table 1). Also, it was gathered from interview that they were familiar with the project report style of discussion of their research work during departmental viva (oral examination). The students’ attitudes toward research-teaching linkage were measured with variables shown in Table 2. Results revealed the level of mean statistics in descending order, showing that respondents agreed that teacher should use examples from his/her research in lectures (M=3.85) and undecided response towards having many opportunities to present/publish research work (M=3.03) as the highest and lowest mean score respectively. Also, the variability between each score and the mean was evidence as responses of respondents surveyed were nearer to the mean score (*SD=1.14 & 1.44)

Majority of the respondents agreed that (M=3.52) the modules enabled them to have positive attitude towards knowledge, this is further affirmed as they felt that being involved in research activities is beneficial and aid transfer of knowledge between teacher and student. Also, it aid students in getting an analytical approach and a remarkable development in their research skills and self-confidence. The positive attitude of respondents toward the linkage, development of research skill and self-confidence was confirmed by the work of White and Irons (2007) cited by Ball and Mohamed (2010) as the modules are crucial to satisfying students with the teaching-research linkage. Ball and Mohamed (2010) suggested that lecturers could be considered as power engines, generating satisfaction amongst students through their enthusiasm, currency of knowledge and effective communication. However, students needed more examples derived from their research to be discussed in lectures which is in consonance with the level of response by the respondents in this study that teacher should use examples from his/her research in lectures (M=3.85).
CONCLUSION AND RECOMMENDATIONS

This study investigated the attitude of female students to research-teaching linkage and which of the modules the students’ preferred. Results showed that the students surveyed had a positive attitude towards this linkage since it helped them develop their research methodology skills and aid their research project work. The study also unexpectedly found that teachers are too busy in their own research and thus do not give their students enough time was not supported, showing that the teachers plan their time well to enable a balanced approach to research and
teaching. Furthermore, research-tutored module that allows curriculum emphasizes on focused learning on students writing and discussion skills of essay and papers. Thus, this module is students focused and allow students participation in research.

To this end, the following recommendations were deduced from the study:

1. Female students should be motivated more to take part in conferences, workshops, and seminars and any other related academic exercise related to their course.
2. Some of the implications and applications of the researcher’s work should be incorporated in the curriculum content of study.
3. Female students should be provided with updates of the school research activities to enhance the credibility of the institute to the students.

This study required more investigation on how institutions respond to students’ disposition in their policies and strategic planning and further study is required in testing the attitude of male students towards the linkage. Moreover, given the complex nature of the research-teaching nexus, more success factors and other stakeholders, such as academics and managers, and also, male students should be investigated using multivariate analysis to build collaborative system with stronger links between research and teaching.

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PRESERVATION OF ZOBO DRINK (CALYCES OF HIBISCUS SABDARIFFA) USING KOLANUT

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ABSTRACT

This study investigate the efficacy of two species of kolanut being Kola acuminate (ABATA) and Kola nitride (GBANJA) as antimicrobial agent in the preservation of Zobo drink from the calyces of Hybiscus sabdariffa which is commonly called ZOBO. 5mls extracts of the caffeine was added to 50mls of prepared Zobo drink using Escherichia coli (ATCC 23716) indicator organisms for 96hours. Physiochemical analysis for pH, Brix content, growth measurements of the indicator organisms were carried out at 24hourly interval starting at zero hour. The ash and caffeine contents were also noted for the Kolanut samples only. The results obtained from the various analyses were of immense benefit at enhancing the shelve stability of the drink and thereby making it available all the year round for its numerous consumers.

Keywords: Preservation, Zobo-Drink, Kolanut, Extract, Consumer.

INTRODUCTION

Additives are defined under the Food Labeling Regulations (1995) as any substances that are not commonly regarded or used as food which are added to, or used in or on food at any stage to affect its keeping qualities. Preservatives are chemical additives that are used to make foods have a desired shelf-life by preventing them from bacterial spoilage, retarding growth of molds and prevention from other chemicals that will change the food quality in terms of color, taste, aroma and texture.

In recent years, Nigeria obtains her food colors from the developing countries and regulations of these countries have been modified to a level that the conventional sources of food colors are limited. Reducing the supply of certain food colors with a polyphenol content of 67%. Kolanut could serve as a potential source of food color. When the red nut is extracted with 50% methanol, it yields a reddish extract, which becomes deeper when extracted with 1% hydrochloric acid in methanol. The pod husk and also the testa contain high amount of pectin, which can be extracted and used in jam and jelly production.
Kolanut belongs to the family of *Sterculiaceae*. Its tree is an evergreen tree native to tropical Africa and it grows well in soils suitable for cocoa and coffee. The seeds are extensively used as a condiment by the natives of Western and Central tropical Africa, Kolanut constitute an important article to trade in West Africa because they are rich in caffeine.

There are different types of cola seeds derived from different species but there are just three edible ones in Nigeria. These include *Kola acuminata* popularly called **ABATA** in Yoruba land and usually cherished for ceremonial uses. *Kola nitida*, which is known as the one used commercially because its consumption is very high and it is cherished amongst the Northerners. It is referred to as **GBANJA** amongst the Southerners. It consists of the separated cotyledons of the kernel of the seed; when fresh, it nearly white and on drying it undergoes a fermentation turning reddish brown and losing much of its astringency. *Kola verticilata*, this type is not eaten by many people especially Nigerians because of its sting taste but it can also be mentioned amongst the others.

Zobo, a non-alcoholic beverage popularly consumed in northern Nigeria is produced from the dried calyces of the rosell plant *Hibiscus sabdariffa* by boiling and filtration(Ameh *et al.*, 2009). It is gaining wide acceptance, being consumed by severe millions of people from different socio-economic classes and background. Zobo drink has been shown to be good source of natural carbohydrate, protein and vitamin C which constitutes the major reason for consuming soft drink and fruit juice (Braide, Oranusi and Peter-Ikechukwu, 2012). Several researchers have study the preparation and preservation of zobo drinks with different food items, such as lime. Nwachukwu, Onovo and Ezeama (2007) revealed that total coliforms and total viable counts generally decreased in values following treatment of zobo drink samples with lime juice.

Efforts have been made by researchers to find various uses of Kolanut but it has not been really satisfied in the area of food preservation. Kolanut contains caffeine serve as a stimulant and decreases fatigue. Although some studies have been employed in preservation of some fruit juices but its use as preservatives has not been fully exhausted. The use of chemical preservatives at small allowable concentrations to control the growth of microorganisms in beverages is desirable and gaining research interest worldwide (Nwafor and Ikenebomeh, 2009). It is on the basis of the preservative role of the caffeine from Kolanut that this study is conducted. Braide, *et al* (2012) stated that in spite of the increasing popularity of Zobo beverage, one of its limitations for large scale production is that it deteriorates rapidly. The drink contains microorganisms (*Bacillus, Streptococcus, Staphylococcus, Leuconostoc, Lactobacillus, Aspergillus, Penicillium, Geotrichum, Fusarium and Alternaria*). These lead to its spoilage. Therefore, the study will specifically addresses the following objectives:

1. To determine the physiochemical analysis on two popular species of Kolanut available in Nigeria.
2. To determine the preparation of caffeine extract from the two species of Kolanut.
3. To determine the preservative effect of the extract on zobo drink by studying the antimicrobial effects of the caffeine on selected strains of micro-organisms.

METHODS AND PROCEDURE

Samples of the calyces of *Hibiscus sabdariffa* and sugar were obtained at Mile-12 market, Lagos state. Kolanut samples, *Abata* and *Gbanja* were also obtained from this same market. The samples were kept in clean transparent polythene bags and stored at room temperature of 28°C. The calyces sample was prepared by sorting which involves the removal of unwanted particles such as dirt, stones, etc. The calyces of *Hibiscus sabdariffa* was extracted for its anthocyanin components using the hot water extraction method. 1000mls of hot water was added to 200g of the calyces of Hybiscus sabdariffa, then boil for 5 minutes. This was left for 30 minutes to cool for removal of calyces using fine seive. Thereafter, 100g of sugar was added to produce the Zobo drink.

The two species of Kolanut of interest *Abata* and *Gbanja* were extracted separately using the wet milling procedure. The Kolanut were washed and Cleaned, then weighed 80g. These 80g was wet milled by adding 100ml distilled water and then strained with fine seive to remove unwanted solids. Centrifugation at 10,00r.p.m for 20 minutes was done to extract Kolanut and stored in refrigerator. Indicator organism for anti-microbial experimentation was *Escherichia coli* (ATCC 23716) and was obtained from the culture collection unit, in the Department of Biotechnology, Federal Institute of Industrial Research, Oshodi. The organisms were maintained on Nutrient Agar slants at 4°C in the refrigerator.

Experiments on the Antimicrobial Effects of Kolanut Extracts on Zobo Drink

50mls of Zobo drink was accurately measured into boiling tubes and 5mls of the Kolanut extracts was added to each tube and later autoclaved at 5kg for 5 minutes using the autoclave. The tubes were allowed to cool to room temperature. On cooling, they were aseptically inoculated with colonies (2.0 x 10 cfu/ml) of the test organisms. The inoculated tubes were allowed to remain at room temperature (28 ± 2°C) for 96 hours. At 24 hourly intervals, parameters which include brix reading, pH measurements, growth of the indicator organism were monitored and recorded.

Determination of pH from samples

The pH of the experimental samples were determined using the pH meter (unicam 9450 model) after its initial standardization to pH 4.0 and 7.0

Brix reading determination

This was determined using the hand refractor-meter.

Growth of indicator organisms: spectrophotometry method
The growth of indicator organisms for antimicrobial experimentation was carried out using the spectrophotometer (spectronic 20D model) at 540nm throughout the period of experimentation. The experimented sample was determined against the control sample that is, without the Kolanut extracts.

**Direct plate count method**
This was carried out by serial dilution of both the control sample and the experimental sample (Kolanut extracts) and placing out from 10 dilutions onto Nutrient agar plates using the pour plate method. The surface organisms were counted and recorded.

**Analysis of Kolanut Samples**

**Determination of the ash content**
5g of each Kolanut sample was separately weighed into porcelain crucible previously ignited and weighed organic matter was charred by igniting the material on a hot plate in a fume cupboard. The crucibles were placed in the muffle furnace and maintained at 600°C for 6 hours. They were then cooled in a desiccators and weighed immediately (AOAC, 1990).

\[
\% \text{ Ash} = \frac{(\text{weight of crucible + ash}) - (\text{weight of empty crucible})}{\text{sample weight}} \times 100
\]

**Determination of the Caffeine Contents from Kolanut Samples**

**Gravimetric method**
This was carried out as described by Akoh, (1981) where 5.0g of each Kolanut sample was separately weighed into 300ml flask. 10g of magnesium oxide, 200ml was added and later boiled gently under reflux for 2 hours. This was later cooled and transferred to a 500ml volumetric flask, made up to mark with distilled water, mixed and later filtered. 300mls of the filtered sample was boiled with 15ml of 10% sulphuric acid until the volume drops to 100ml. To this was added 10ml chloroform. The chloroform extract was later washed with 5ml of 1% potassium hydroxide solution. The chloroform was later evaporated to dryness in an oven at 100°C and weighed. The residue was later transferred to Kjedahl flask with small portions of concentrated sulphuric acid. This was later digested using Kjedahl catalyst (5 selenium tablets). This was later followed by distillation for 15minutes (AOAC, 1990). The filtrate was then titrated against 0.05N HCL.

\[
% \text{ Total Nitrogen} = \frac{\text{Sample titer (V2)} - \text{Blank titer (VI)}}{0.1 \times 0.014 \times 100}
\] 
Sample weight of Caffeine = % N2 x 3.464.

**RESULTS**

**Physiochemical Analysis of Kolanut Samples**
The Ash contents for the two (2) varieties of kola were calculated thus;

\[
\% \text{ Ash} = \frac{\text{weight of crucible ash} - \text{weight of empty crucible}}{\text{sample weight}} \times 100
\]

\[
\% \text{ Ash for Abata} = \frac{(65.06 - 65.0)}{5} \times 100
\]
\[
\frac{0.06}{5} \times 100 = 1.2\%
\]

% Ash for Gbanja
\[
\frac{65.08 - 65.0}{5} \times 100 \frac{0.08}{5} \times 100 = 1.6\%
\]

Caffeine Content Determination
Caffeine = % N2 x 3.464
% N2 = Sample titer (V2) – Blank titer (V1) x 0.1 x 0.014 x 100

Sample weight for Abata:
\[
\% N2 = (18.5 – 12.40\text{mls}) \times 0.1 \times 0.014 \times 100 = 0.854\%
\]
% Caffeine = 0.854 x 3.464 = 2.958%

Sample weight for Gbanja
\[
\% N2 = 20.2 \times 0.1 \times 0.0014 \times 100 = 1.092\%
\]
% Caffeine = 1.092 x 3.464 = 3.782%

Table 1: pH determination of samples

<table>
<thead>
<tr>
<th>SAMPLES</th>
<th>pH READINGS</th>
</tr>
</thead>
<tbody>
<tr>
<td>Gbanja</td>
<td>5.66</td>
</tr>
<tr>
<td>Abata</td>
<td>5.29</td>
</tr>
<tr>
<td>Zobo drink</td>
<td>2.94</td>
</tr>
<tr>
<td>Zobo drink + Abata Extracts</td>
<td>3.42</td>
</tr>
<tr>
<td>Zobo drink + Gbanja extracts</td>
<td>3.50</td>
</tr>
</tbody>
</table>

Table 2: Changes in the pH reading during antimicrobial experiment with zobo drink

<table>
<thead>
<tr>
<th>SAMPLES</th>
<th>0</th>
<th>24</th>
<th>48</th>
<th>72</th>
<th>96</th>
</tr>
</thead>
<tbody>
<tr>
<td>Gbanja extracts with zobo drink</td>
<td>3.50</td>
<td>3.20</td>
<td>2.70</td>
<td>2.50</td>
<td>2.50</td>
</tr>
<tr>
<td>Abata extracts with zobo drink</td>
<td>3.42</td>
<td>3.30</td>
<td>3.24</td>
<td>3.20</td>
<td>3.18</td>
</tr>
<tr>
<td>Zobo drink without extracts</td>
<td>2.94</td>
<td>3.38</td>
<td>4.50</td>
<td>6.20</td>
<td>6.54</td>
</tr>
</tbody>
</table>

Table 3: Changes in the brix content during antimicrobial experiment with zobo drink

<table>
<thead>
<tr>
<th>SAMPLES</th>
<th>0</th>
<th>24</th>
<th>48</th>
<th>72</th>
<th>96</th>
</tr>
</thead>
</table>

BRIX READING/TIME (HOURS)
Table 4: changes in the growth of *Escherichia coli* in zobo drink

<table>
<thead>
<tr>
<th>SAMPLES</th>
<th>0</th>
<th>24</th>
<th>48</th>
<th>72</th>
<th>96</th>
</tr>
</thead>
<tbody>
<tr>
<td>Gbanja extracts with zobo drink</td>
<td>1.340</td>
<td>1.300</td>
<td>1.200</td>
<td>1.090</td>
<td>0.940</td>
</tr>
<tr>
<td>Abata extracts with zobo drink</td>
<td>1.340</td>
<td>1.280</td>
<td>1.200</td>
<td>1.070</td>
<td>0.870</td>
</tr>
<tr>
<td>Zobo drink without extracts</td>
<td>1.340</td>
<td>1.540</td>
<td>1.610</td>
<td>1.840</td>
<td>1.985</td>
</tr>
</tbody>
</table>

Table 5: changes in the Colony Forming Units (CFU) of *Escherichia coli* in zobo drink

<table>
<thead>
<tr>
<th>SAMPLES</th>
<th>0</th>
<th>24</th>
<th>48</th>
<th>72</th>
<th>96</th>
</tr>
</thead>
<tbody>
<tr>
<td>Gbanja extracts with zobo drink</td>
<td>2.0 x 10⁴</td>
<td>1.8 x 10⁴</td>
<td>1.5 x 10³</td>
<td>1.8 x 10²</td>
<td>1.5 x 10²</td>
</tr>
<tr>
<td>Abata extracts with zobo drink</td>
<td>2.0 x 10⁴</td>
<td>1.9 x 10⁴</td>
<td>1.4 x 10³</td>
<td>1.2 x 10²</td>
<td>1.0 x 10³</td>
</tr>
<tr>
<td>Zobo drink without extracts</td>
<td>2.0 x 10⁴</td>
<td>3.2 x 10⁴</td>
<td>2.5 x 10³</td>
<td>3.2 x 10³</td>
<td>4.2 x 10³</td>
</tr>
</tbody>
</table>

Physiochemical Analysis of Kolanut Samples

The physiochemical analysis of the kolanut samples as earlier calculated revealed that the ash content for **Gbanja** and **Abata** were 1.2% and 1.6% respectively. The caffeine content from **Gbanja** and **Abata** samples were 2.958% and 3.782% respectively. The result showed that **Gbanja** sample was high in both ash and caffeine content when compared to **Abata**. However, the caffeine content obtained disagreed with the result obtained by (Kordylase, 1990) with caffeine content of 2%.

pH Determination of Samples

The pH reading of all the samples investigated was as shown in Table 1. The result showed that both the Kolanut extracts and the zobo drink samples were within the acidic range for food samples. pH measurement is important physiochemical parameter that tends to ensure good shelf stability of food samples. High acid range food confers more antimicrobial effects on contaminating organisms.

Changes in the pH Reading during Antimicrobial Experiment with Zobo Drink

Table 2 revealed that there was a gradual reduction in the pH of the medium to an acidic range. The gradual acidic release might prevent the multiplication of the *Escherichia coli* which is the indicator organisms. The control samples however, showed an increase in pH with time.
Changes in the Brix Content during Antimicrobial Experiment with Zobo Drink
Changes in the Brix content revealed that the Kolanut extracts sample were able to maintain the sugar level throughout the period of experiment. The caffeine content from the Kolanut samples might have hindered the fermentation by the indicator organism (Escherichia coli). The control utilization of the sugar in the medium and hence there was a sharp reduction in the sugar content from 15 Brix to 2.0. Brix has shown in Table 3.

Changes in the Growth of Escherichia coli in Zobo Drink
The result revealed that Zobo drink containing the Kolanut extracts showed a downward trend in the growth of the Escherichia coli over time. The control sample however, showed an increased growth of the Escherichia coli over time. The fall in the growth of Escherichia coli in the Zobo drink with Kolanut extracts might have been due to the caffeine; the active ingredients for its antimicrobial effects. The caffeine like other forms of chemical preservatives must have prevented the growth of the indicator organism from growing.

Changes in the Colony Forming Unit of Escherichia coli in Zobo Drink
Table 5 showed that Zobo drink containing the Kolanut extract had a gradual fall in the growth number of inoculated Escherichia coli when compared to the control (without the growth) that had an increased number in the growth of the inoculated Escherichia coli.

CONCLUSION
Zobo drink is a product made from the calyces of Hibiscus sabdariffa using hot water extraction. The product was formulated and prevention of the product with kolanuts of Kola acuminata and Kola nitida was very effective using Escherichia coli as the indicator organism. The use of preservatives in the preservation of Zobo drink is highly very necessary since the drink is prone to fermentation during storage. The use of the Kolanut extracts has helped to arrest the growth of the micro-organisms and hence, helped in the maintenance of the product during storage.

RECOMMENDATION
Zobo drink is a highly refreshing drink that is consumed by majority of Nigerians. The use of Kolanut extracts will therefore help to increase the shelve life of the products for its consumption at anytime. The use of Kolanut extracts will also help to retain the quality of the products. It is on the basis of this that the use of Kolanut extracts is therefore recommended in the preservation of Zobo drink.

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CONFLICT MANAGEMENT IN THE NIGERIAN UNIVERSITY SYSTEM

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ABSTRACT

Conflict is an attendant feature of human interaction and cannot be eliminated; however, its proper management and transformation are essential for peace and progress in human society. It has been observed that Nigerian universities has for decades been faced with so many crisis ranging from conflict between academic staff and university administrators, students versus academic staff, students versus university authorities, non-academic staff versus university administrators. The conflicts have given rise to distrust and hostility among professionals and academics, thus, contributing in hampering smooth, effective and efficient administration in the universities. It also appeared that despite this situation, stakeholders in education seemed to develop non-challant attitude towards these conflicts. If this role conflict is not checked it can be descriptive and negative as people involved will often see one another as enemies. This is unwholesome for the University community and Nigeria educational system as a whole. This paper examined conflict management in higher institutions of learning with specific reference to Nigerian Universities. Some causes of conflict were identified as well as ways these conflicts could be managed. Well-fashioned recommendations on how conflict could be more effectively managed for the achievement of the system's mission, goals and objectives and in particular the pursuit of industrial harmony in the system were also made.

Keywords: conflict, conflict management, university system, violence, collective bargaining

INTRODUCTION

The nature and character of the university as an academic organization entails the achievement and maintenance of a harmonious environment conducive for the
working together of various groups of staffs and the management team for the attainment of preselected missions and objectives. However, in recent years, the industrial relations terrain in the Nigerian University system has been saturated with series of industrial conflicts with consequent adversities on the advancement of knowledge (Ajayi, Modupe, 2000).

Conflict today has become part of organizations. This is more so in an organization as a university with a structure that allows two or more units or groups to share functional boundaries in achieving its set objectives. In universities, people with differing nature - students, lecturers and administrative staff - have to work harmoniously together. Hence, the organizational structure is such that staff and staff, students and students, and staff and students share functional boundaries of exchange of knowledge.

Conflicts will always occur but a well-managed conflict will not degenerate to violence. Since violence will not erupt without conflict as antecedents, one can assume that many of the conflicts in tertiary institutions and insecurity degenerated is because their antecedents (causes) were not properly managed or that the conflicting parties did not explore the power of communication and conflict manager's personality in resolving the crises (Agbonna; Yusuf & Onifade, 2009).

It has been observed that Nigeria universities has for decades been faced with so many crisis ranging from conflict between academic staff and university administrators, students versus Academic staff, students versus university authorities , Non-Academic staff versus university administrators. The conflicts have given rise to distrust and hostility among professionals and academics thus contributing in hampering smooth, effective and efficient administration in the universities. It also appeared that despite this situation, stakeholders in education seemed to develop non-challant attitude towards these conflicts. If this role conflict is not checked it can be descriptive and negative as people involved will often see one another as enemies. This is unwholesome for the University community and Nigeria educational system as a whole.

This paper examines conflict and conflict management in higher institutions of learning with specific reference to Nigerian Universities. Some causes of conflict are identified and possible ways of managing such conflicts are examined.

**CONCEPTUAL UNDERPINNINGS**

Many people view conflict as an activity that is almost totally negative and has no redeeming qualities. Some consider it as dysfunctional, destructive, and the same time as a catalyst for change, creativity and production (Posigha & Oghuvwu, 2009).

Conflict involves a situation of disagreement between two parties (Amusan, 1996). Accordingly, a conflict situation is characterized by the inability of those concerned to iron out their differences and reach an agreement on issues of common interest. This inability manifests in one form of protest or the other such as strikes and other work disruptions (slow-downs, sabotage and planned absenteeism). Ejiogu (1990) also perceived conflict as mutual hostility and all
kinds of opposition or antagonistic interaction including disagreements or controversies about ideas, values, and ways of life. The major types of conflicts identified by Ejiogu (1990) are:

1. Conflict due to hierarchy of positions
   a. subordinate conflict - between the boss and his subordinate (such as between lecturers and students);
   b. superordinate conflict - between the administrator and an authority over him (e.g. Vice Chancellor and the Visitor);
   c. lateral conflict - between an administrator and his peer (e.g. between Vice Chancellors of two universities);
2. Conflict based on the relationship between the objective state of affairs and the perceived state of affairs by conflicting parties (this conflict could be veridical, contingent, displaced, misattributed or latent);
3. Conflicts based on antagonistic source such as conflict between cultural values and institutional expectations, role expectation and personality roles, and deriving from personality discord.

Organizational conflict is defined as the behaviour intended to obstruct the achievement of some other person’s goals. Conflict is therefore a product of incompatibility of goals and it arises from opposing behaviours. It can be viewed from the individual group or organization levels.

Mullins (1999) identified three potential sources of organization conflict. They are:
(i) Individual - such as attitude, personality characteristics of particular person, needs, illness and stress.
(ii) Group - such as group skills, the informal organization and group norms.
(iii) Organization - such as communications, authority structure, leadership style and management behaviour.

We need to know that individual sources of conflict often develop into groups as well as organizational conflict. From the potential sources highlighted above the nature of the union leader will determine to a large extent the achievement of the union’s demand.

The management styles employed by the organization would then determine whether the conflict will be subdued or aggravated for example. An autocratic leader will use coercion rather than persuasion to achieve his own goals. If the calibers of the ideologues of Karl Marx who believed in radicalism are the Union Leaders, then the organization runs a risk of heading for precipice.

In many cases, lack of synchronization of individual goals within the organizational goals may make an individual to work contrary to the corporate goals of the organization. There is also departmental conflict, which can inhibit the attainment of the organizational goals a department requires. Organizations that disregard the existence of informal group run the risk of being run aground. A union may also take up complaints of individual members of the union as it relates to job content. Where the union feels that the union member concerned is being over-employed the union may take up the case on behalf of the employee in question and the refusal of the organization to bow to the threat of the union may generate conflict of a higher magnitude.
Robins (1998) believed that conflict is a positive force and necessary for effective performance. This approach encourages a minimum level of conflict within the group in order to encourage self-criticism, change and innovation and to help prevent apathy or too great a tolerance for harmony and the status quo. Conflict is an inevitable feature of organizational life and should be judged by its own performance.

The contemporary world is increasingly multicultural and the identity crisis resulting from this sometimes threatens sustainable human development. This makes the promotion of understanding and dialogue to be a prime issue in the management of multiculturalism, global peace and security (Oloyede, 1999). Conflict is an inevitable friction in any organization.

Efficient and effective management of conflicts is fundamental to the development of any society, but the prevailing situations in Nigerian universities constitute a reversal of this reality. Conflict in higher education is inescapable. Conflict exists at every level of our academic world. And while conflict can be negative and can cause deep rifts in the framework of the institution, it can also be used as a tool to take the institution and the people in it from stagnation to a new level of effectiveness. What makes the difference is conflict management (Holton, 1998).

The importance of tertiary education to the national development cannot be overemphasized. Fatile& Adejuwon (2011) indicated that no meaningful development can take place in a crisis-ridden system torn apart by crisis as witnessed in the educational institutions in the country today. Experience has shown that students’ crisis is as old as the tertiary institutions in Nigeria itself. Today, students’ militancy in the nation’s tertiary institutions has come to be an issue of serious concern.

However, revolts, protests, unrests and violence, as well as incessant closure of schools for months in the wake of unrest have become a regular characteristic of Nigerian’s tertiary institutions (Adeyemi; Ekundayo & Alonge, 2010).

Conflict results from human interaction in the context of incompatible ends and where one’s ability to satisfy needs or ends depends on the choices, decisions and behaviour of others. It is therefore, possible to argue that conflict is endemic to human relationships and societies. It is the result of interaction among people, an unavoidable concomitant of choices and decisions and an expression of the basic fact of human interdependence (Adejuwon & Okewale, 2009).

Conflicts on campus are growing in number, kind, and complexity. The current university context is clearly more challenging than in the past. The range of conflicts and the forums available for their management are much more far-reaching than ever before. In short, society has changed, and so has the university.

There are basically four forms of conflict. Intra-personal, Inter-personal, Intergroup or Intra group. Conflicts become interpersonal or inter-group when they take the form of open actions such as hostile reactions, strike actions, etc. against another persons or groups but until the hostile feelings are acted upon, it remains at the level of intrapersonal problem only. In an organization a person’s
role can be in conflict with another person’s, individuals or groups emanating from the responsibilities entrusted to them in an organization. Roles conflicts arise as a result of role ambiguity where people are not clear about what they expect of each other or of one another, where roles are not properly spelt out and individuals’ or groups’ responsibilities are not clearly stated, workers may not be able to build up expectations of one another because of role ambiguity (Olutade 2005).

**Causes of Conflicts**

Potentials for conflicts are multifarious within the university system. Some of these are indicated below:

**Continuous competition for scarce resources:** Research, teaching, student amenities, staff pay and other welfare services all have their claims on the limited resources at the disposal of the university. Hence, there is deprivation (relative or absolute) of the needs of all the groups within the system. The consequences of inadequate provision of financial resources to the university system are the decay of structures and the decline in services and functions. According to Sanda (1992), there is direct connection between deprivation which leads to frustration, and aggression. The conflicts which result from the frustrated are often directed against the defined aggressors or perpetrators of the undesirable state of affairs. Gross mismanagement of available resources could also result in conflicts. These conflicts could take the form of strikes, demonstration, boycott of lectures and violent riots.

**Perceived goal incompatibility:** The potential for conflict is likely to be high where groups or individuals perceive and interpret the same phenomenon differently. In the university system, attention needs to be focused on the critical point of contact between the teacher and the learner.

The psychology of learning suggests that students will not learn well unless they are actively involved in the process, and so accept responsibility for their learning activities. So, if students do really feel that they are learning, much else will be forgiven. If not, they need to be listened to; otherwise, they might engage themselves in other activities they consider worthwhile.

**Autonomy and academic freedom:** Autonomy drives are those when one group either seeks to exercise control over some activity that another party regards as its own domain or seeks to insulate itself from such control (Idowu, 1985). Academic freedom, according to Sanda (1992) connotes freedom to organize the university, design and teach courses, associate with others, project, imbibe, exchange and hold ideas without any fear of harassment or victimization, and challenge established orthodoxies without any fear of contradiction, all in the pursuit of truth.

However, events such as outright ban of university staff and students' associations fear of premature retirement, or rationalization of programmes as a result of government overregulation all result in decreasing autonomy, decline in morale, goal displacement and ultimately, conflicts.
Management style of universities: Though a university is an academic enterprise, a lot of academic effectiveness rests on administrative support machinery. Hence, the management competencies of university managers determine to a large extent, the severity of conflicts within the university, irrespective of the origin of the conflict (internal or external). Managers who have tendencies to authoritarianism and dogmatism are particularly conflict-prone. In university administration, eight spheres are identified for the goal of quality education to be attained (Sanda, 1991). These spheres are finances, students, academic programme, committee system, personnel, welfare, reward system and physical facilities. Any significant lapse (s) in any of these areas might lead to a revolt. Role Ambiguity/Role Dissatisfaction, Conflicts occur when the role prescriptions are vague and uncertain

Difference in values and lifestyles: Probably because of the concentration of young adolescents, possibly experiencing freedom and independence for the first time, the university campuses are filled with and threatened by, noise, aggressive styles of dress, sexual behaviours, aesthetics and secret peer associations (e.g. cultism). The older members - academic and administrators - impose rules and regulations. The young may answer back by demanding for, and claiming, their democratic rights, culminating in minor conflicts or even ghastly skirmishes between the students and the university authority.

Politics and national issues: In addition to conflicts arising from situations intrinsic to the university, some arise due to political objectives outside the university. Political control of education in terms of financial and administrative policies bring about conflicts between the university and the government. The Federal Government, through the Federal Ministry of Education and National Universities Commission (NUC), controls the structure, curriculum, budget and calendar of the universities. Also through Joint Admissions and Matriculation Board (JAMB), all admissions to the universities are controlled and manipulated (Quota system). Moreover, national issues, especially with political undertones, do bring about conflict. Policies such as privatization, university autonomy and democratization of university management usually spark off controversies. Politics especially on campus relating to appointment of key officers such as Vice Chancellor also result into conflicts. These conflicts often lead to disruptions of academic activities and university calendars.

Similarly, causes of role conflict in the university includes work interdependence, differences in performance criteria and reward systems, differences in units and subunits orientation and goals and differences in status and jurisdictional ambiguities. Personal or behavioural such as differences in background, personal traits, values, communication, perceptions, attitudes, and emotions.

Possible ways of Managing Conflicts in Nigerian Universities

Efficient and effective management of conflicts is fundamental to the development of any society, but the prevailing situations in Nigeria constitute a reversal of this reality. Managing conflict towards proactive and constructive
action is the best approach in resolving conflict in the university. When conflict arises, we need to be able to manage them properly, so that it becomes a positive force, rather than a negative one, which would threaten the individual or group. If conflicts arise and are not managed properly, it will lead to delays of work, disinterest and lack of action and in extreme cases, it might lead to complete breakdown of the system.

In resolving university conflict, developing a constructive communication process and influential conflict negotiator's personality are very important. No doubt, schools cannot avoid experiencing one conflict or the other but a great deal of such conflict can be managed and be guided from disrupting school efforts towards attaining its manifest and latent goals if the conflicting parties are systematic in the way they communicate their grievances, situation of the conflict and their readiness to negotiate for peace and if the negotiator mediating the resolution process is of good personality (Agbonna; Yusuf & Onifade, 2009).

Conflict management in schools demands appropriate leadership style of the school administrator or chief executive.

Leadership and administrative expertise remains central. A more participatory and supportive style of leadership and management behaviour is likely to assist in conflict management. Demers in Magaula (2007) articulated three strategies of peaceful crisis resolution between and among warring parties; mediation, arbitration and reconciliation. Magagula (2007) also argued that each of the approaches of Demers could be used by universities to resolve crisis among and between aggrieved parties.

Clarification of goals and objectives is also vital. The clarification and continual refinement of goals and objectives, role definitions and performance standards help to avoid misunderstanding and conflicts.

Focusing attention on super-ordinate goals, that are shared by parties in conflicts, may also help to defuse hostility and lead to more cooperative behaviour. Providing valid information and avenue for expression of views Information is needed to avoid blocking of communication flow that may lead to differences in perceptions. Effective management information system (MIS) is essential to provide requisite information which minimizes delays and ensures maximum utilization of resources. Most Nigerian universities lack effective computerized management information system for capturing, processing, storing, retrieving and disseminating relevant information (Alabi, 2002).

There is need for better understanding and cooperation between the University system as a whole and the government. The decision-makers and their advisers need to be better informed on how the universities operate, while the university community needs to acquaint itself with the ways of the government, generally. Invariably, the universities will neither develop attitudes of hostility or servility towards the government, nor the government intolerant of the universities.

Ibukun (1997), highlighted some conflict resolution measures such as the use of authority, and command, problem solving, appeal to superior organisation goals, changing the structure of the organisation, prevention and avoidance,
expansion of opportunities and resources, compromise and agreement and
changing the behaviour of people involved in conflict through dialogue.

CONCLUSION

Conflict potentials in the universities are varied. Hence the need for all the
groups within the system to recognize these potentials and deliberately make
certained efforts to curtail the negative consequences of conflicts. This
curtailment could be achieved through meaningful interactions and effective
communication; resourcefulness and resource management; and cooperation
between the universities and the state. All these measures would culminate in
drastic reduction in negative conflict potentials and consequent high goal
attainment potential.

RECOMMENDATIONS

The following strategies for future conflict resolution in Nigerian
Universities are worthwhile:

- In the events of any organizational conflict the personalities
  involved in union activities should not be attacked, instead, the
  problem should be the focus.
- The management should give room for bargaining rather than
  using coercion such as sign- back register
- Conditions that promote effective conflict management should
  include consideration of a wide range of alternative solutions, a
  cooperative climate, an organized and orderly process, and
  avoidance of artificial conflict-reducing devices such as voting or
  relying on a leader to make the final decision.
- Thus, conflict management should not be seen to connote a rigid
  approach that suits all situations, rather, it should involve a series
  of concerted efforts to prevent and or arrest a seemingly serious
  crisis

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S-PM2 BACTERIOPHAGE AS A REMEDY FOR PHOTOINHIBITION IN AGRICULTURAL CROPS

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Over exposure of plants to light causes Photoinhibition which leads to a halt in the photosynthetic pathway. The natural tendency of photoprotection in a plant gets exhausted due to severe photodamage. Photodamage is manifested as a decline in both quantum yield and $P_{\text{max}}$, and recovers very slowly (hours to days). Some plants can survive through photoinhibition unharmed though with very low production of flowers and fruits. Severe photodamage results in bleaching of pigments, damage to membranes (photo-oxidation) and may even lead to tissue death.

This occurs even in the agricultural food and cash crops. Some plant species are unable to recover from Photoinhibition, which greatly affects the quality of produce. This leads to a huge loss in the gross agricultural crop production output around the world.

Light induced Photoinhibition is responsible for the reduction in efficiency of Photosystem II pathway. Because of this, the two important proteins D1 and D2 undergo severe damage (Richter et al., 1990a). Mann et al in the Volume 424 of Nature journal show that a bacteriophage known as S-PM2 encodes the D1 and D2 proteins, allowing Photosynthesis to continue in Cyanobacteria present in Oceans. If this bacteriophage is used to study the possibility of adopting such S-PM2 viruses in plants as well, a large amount of crop loss can be stopped. This paper will analyse the possibilities of using bacteriophages like S-PM2 to help plants recover from Photoinhibition by rebuilding D1 and D2 proteins.
Photoinhibition can be reversible, playing a protective role for the photosynthetic systems, but it can also reflect damage that has already occurred in the photosynthetic apparatus, being irreversible in this case.

**The Phenomenon of Photoinhibition of the Photosynthetic apparatus:**

Photoinhibition is the inhibition of photosynthesis caused by excessive radiance which can damage the photosynthetic apparatus and destroy the photosynthesizing pigments (Powles, 1984). Osmond (1994) referred to this as chronic photoinhibition.

The natural evolution of plants has followed a path between maximizing the capture of light to enhance photosynthesis and minimizing the potential damage that results from excess light in the photosynthetic apparatus (Long et al., 1994). Light differs from other climatic elements in nature by the amplitude and rate of its variation. During the day, plants face many alterations in the quality and quantity of the radiation received. Plants can respond to low frequency variations in quality and quantity of light by adapting their photosynthetic ability to disperse the intercepted radiation (Anderson et al., 1988; Osmond & Chow, 1988). When high-frequency variations occur, or when plants are not able to adapt themselves to the prevailing light conditions, there may be a surplus of stimulation in the photosynthetic apparatus, which can lead to photoinhibition (Long et al., 1994). Photoinhibition can be caused by ultraviolet light (UV), by visible light (V) and by the interaction of both (Powles, 1984).

Photoinhibition is also referred by terms like photooxidation, photoinactivation, photolability, solarization. These have been used to designate the reduction of photosynthetic capacity induced by the exposure of the plant or its leaves to an excess of visible light and photodynamic reactions (Powles, 1984; Krause, 1988). The term photoinhibition has also been used as a synonym for the damage caused to photosystem II (PS II), but this damage to PS II is considered photoinhibition when there is a decrease in the whole photosynthetic capacity and not in just one component of the photosynthetic apparatus (Long et al., 1994).

In practice, the consequences of photoinhibition are:
1. reduced maximum quantum efficiency for CO$_2$ absorption and release of O$_2$;
2. decreased convexity in the response curve of photosynthesis to light; reduced photochemical activity of PS II (Fv/Fm, ratio of fluorescence of chlorophyll $a$);
3. and decreased maximum photosynthetic rate (PSmax) (Boese & Huner, 1992; Long et al., 1994).

The decreases of Fv/Fm were noticed preceding reduction in PS$_{\text{max}}$; actually, they can occur without causing any alteration in PS$_{\text{max}}$ (Long et al., 1994). A prolonged exposure of plants to excessive radiation may result in the photodestruction of the photosynthetic pigments, since the discoloration (bleaching) of these pigments depends on oxygen and light; this phenomenon is normally called photooxidation, which can cause the death of the plant (Powles, 1984; Hendrey et al., 1987).

In most cases, photooxidation is a secondary phenomenon, occurring after a slow phase during which there is already a decrease of the photosynthetic activity dependent on light intensity and exposure time, but without any changes in the pigment pool (Powles, 1984; Long et al., 1994). Therefore, photoinhibition of photosynthesis does not appear after the destruction of the pool of pigments; on the contrary, the bleaching of pigments occurs when a certain degree of photoinhibition has already occurred (Hendrey et al., 1987). As a rule, plants adapted to full sunlight are able to acclimate and grow in shady conditions, whereas shade-grown plants may not bear full sunlight (Smith, 1982).

When a sunlight plant grown under low radiance conditions is transferred to high radiance, there is an enhancement in the photosynthetic capacity as the plant adapts itself to the increase of irradiance. However, leaves from these plants may show photoinhibition, with a decline in photosynthetic activity and in the quantum yield, if this transfer is abrupt. In this case, mature leaves that at first suffered photoinhibition may suffer discoloration of the photosynthesizing pigments, leading to cellular death. Young leaves, developed after transfer to high irradiance, do not exhibit photoinhibition. Plants acclimated to low irradiance and
exposed to high irradiance are more severely photoinhibited than are those primarily adapted to high irradiance (Long et al., 1994). This difference shows that the photosynthetic capacity influences susceptibility to photoinhibition.

The light-harvesting complexes must have pigments of such shape and size that they can transfer energy to reaction centers efficiently. Thus, when the plant develops in shade, there is an increase in the ratio between antenna pigments and reaction centers (Anderson & Osmond, 1987; Osmond & Chow, 1988; Horton & Ruban, 1992). The result of this adaptation is that photosynthesis saturates at low irradiances. As a consequence, under high irradiance, the absorption rate exceeds the rate that can be used for photosynthesis, predisposing the plant to damage induced by the excessive radiation (Horton & Ruban, 1992).

Under normal conditions, a considerable amount of photons is intercepted by the photosynthetic apparatus, funnel shaped to the reaction centers and transferred, via electron transport chain, to production of NADPH₂ and ATP (Powles, 1984). According to the accepted electron transport scheme, there should be 8 mols of photons for a reduction of 2 mols of NADPH⁺, which is linked to the synthesis of 2.66 mols of ATP. In C₃ plants, 2 NADPH and 3 ATP are necessary to assimilate one CO₂ in carbohydrate (Krause, 1988). The main drains of this chemical energy are the cycles of photosynthetic reduction of CO₂ (PCR) and the photorespiratory carbon oxidation (PCO). In this way, a large fraction of intercepted photons is transferred to propel carbon metabolism. When this metabolism is lacking, the use of excitation energy is insignificant, even though radiation absorption remains constant; this can result in photoinhibition (Powles, 1984). Actually, photoinhibition also depends on the rate of light absorption through the leaf (Anderson & Osmond, 1987).

**The Mechanism of Photoinhibition:**

Since 1956, when Kok published his work (Long et al., 1994), it has been proposed that the primary site of damage of photoinhibition is the reaction center of PS II.
There are currently two hypotheses concerning the primary site of damage of photoinhibition of PS II: the first is related to the reaction center; and the latter, to protein D1. In the first hypothesis, according to Powles (1984), transportation of electrons through PS II is inhibited when photoinhibition is induced by a surplus of light or by illumination without the recycling of carbon. Observation that the action spectrum for photoinhibition follows the action spectrum of photosynthesis, and that the initial symptom of photoinhibition is the decreased photochemical efficiency of PS II, supports the hypothesis that photoinhibition is a result of energy absorbed by photosynthetic pigments and funneled to the reaction center of PS II, modifying it (Havaux & Davaud, 1994; Long et al., 1994). This modified reaction center captures radiant energy efficiently, but it converts this captured energy into heat (Krause, 1988). The second hypothesis says that the initial site of damage of photoinhibition is the D1 protein (Richter et al., 1990a).

Actually, research in the last 15 years has established the role of the D1 protein in the photoinhibition phenomenon. Hundal et al. (1990) verified inactivation and/or debasement of this protein of PS II associated with photoinhibition. Greer et al. (1986) and Leitsch et al. (1994) confirmed the blockage in recovery from photoinhibition by chloramphenical, an inhibitor of the D1 protein synthesis. Closure of D1 with powerful oxidizing radicals can clarify the vulnerability of this protein (Richter et al., 1990b). Working with mutants of the D1 polypeptide of *Synechocystis*, Maenpaa et al. (1995) suggested that a modification in the structure of the D-de loop of D1 could affect the mechanism of recovery from photoinhibition. Ji and Jiao (2000) showed that PS II photochemical efficiency (Fv/Fm) decreased and that nonphotochemical quenching (qN) increased in rice leaves when synthesis of the D1 protein was inhibited. In DTT (Dithiothreitol)-pretreated leaves, when xanthophyll cycle was inhibited, there was a decrease in qN and, consequently, more loss of the D1 protein (associated with a large decrease in Fv/Fm). They
concluded that the turnover capacity for the D1 protein is an important physiological basis for tolerance of photoinhibition.

**Action of S-PM2 bacteriophage:**

Bacteriophage S-PM2 infects several strains of the abundant and ecologically important marine cyanobacterium Synechococcus. A large lytic phage with an isometric icosahedral head, S-PM2 has a contractile tail and by this criterion is classified as a myovirus. The linear, circularly permuted, 196,280-bp double-stranded DNA genome of S-PM2 contains 37.8% G+C residues. It encodes 239 open reading frames (ORFs) and 25 tRNAs. Of these ORFs, 19 appear to encode proteins associated with the cell envelope, including a putative S-layer-associated protein. Twenty additional S-PM2 ORFs have homologues in the genomes of their cyanobacterial hosts. There is a group I self-splicing intron within the gene encoding the D1 protein. A total of 40 ORFs, organized into discrete clusters, encode homologues of T4 proteins involved in virion morphogenesis, nucleotide metabolism, gene regulation, and DNA replication and repair.

The discovery that S-PM2 encoded the D1 and D2 proteins of photosystem II suggests that a component of the phage's replicative strategy is to maintain the structural and functional integrity of at least part of the photosynthetic apparatus in order to provide energy for phage replication.

This important discovery will have a great impact on the agricultural sector which looses a lot of produce every year owing to the photoinhibition.

**Future directions in research:**

Clearly much remains to be done to understand the complex interactions between the S-PM2 bacteriophage and the photoinhibitory regulation in the plants. The S-PM2-Cyanobacterial system provides us with an excellent experimental model system to accomplish such a task (Mann et al, 2000). Potentially the most exciting outcome of this future work will be the application of the phage’s job in larger plants, especially food and cash crops. Since many
crops find it difficult to emerge from photoinhibition leading to a great drop in the crop produce amount. If this proves true, it means there will be a direct and potentially important role of phage in the agricultural revolution. Phages are both unbelievably abundant and unbelievably diverse in nature. These characteristics, coupled with their unusually promiscuous genetic exchange, may make phages the preferred testing ground for this kind of experimentation.

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STRATEGIES FOR CLOSING THE GENDER GAP IN SCIENCE & TECHNOLOGY (S&T) CLASSROOMS IN NIGERIA SECONDARY SCHOOLS: TEACHERS’ PERCEPTION OF GENDER MAINSTREAMING

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Abstract
The study invested teachers’ perception of gender mainstreaming as a strategy for closing the gender gap in S&T classrooms. The study was carried out in Enugu education zone of Enugu State. The population of the study comprised a total of 397 teachers teaching Physics, Chemistry, Biology, Basic Science and Basic Technology in the zone. A sample of 150 teachers was drawn from all the co-educational secondary schools in the zone using stratified random sampling technique. The instrument for data collection was a structured questionnaire developed by the researchers. It was face the content validated by two experts in S&T education and one expert in measurement and evaluation. The reliability coefficient was determined to 0.81 using cronbach alpha coefficient three research questions which guided the study were answered using means, standard deviation and variance. The findings of the study revealed that; gender-related unethical ideologies and practices exist in S&T classrooms; even though teachers are aware that gender gap in S&T can be narrowed down by mainstreaming gender in S&T classrooms, teachers do not presentation of lessons.

Keywords: Gender, Gender Gap, Science, Technology, Gender Mainstreaming.

Introduction
Science is the process of acquiring knowledge about the physical and natural world and phenomena by using systematic observation and experimentation. Technology on the other hand is the right application of scientific knowledge in solving problems emanating from the environment. According to Okeke (2007), science is a systematic process of obtaining verifiable and testable knowledge about nature and natural occurrences utilizing careful observations and experiments. He also defined technology as the practical application of science in solution of problems encountered in the environment. The aphorism “educate a boy, educate a human being, educate a girl, educate several nations” has indicated the widely accepted importance of educating women especially in science and technology as a pre-requisite for social transformation and development (Elechi, 2010). Science and technology education are viable tools for empowering women and girls. This is why it is important to explore the various instructional strategies
that could be adopted in closing the gender gap which exists in science and technology classrooms.

Gender is a set of physical and mental characteristic behaviours and roles which distinguish between males and females. Opong in Aja – Okorie (2002) defined gender as a term used to describe and analyze roles, relationships, status, expectations, obligations and the entire notion of what is ascribed by culture to males and females at a given time in history. Udousoro (2011) viewed gender as a cultural construct that distinguishes the roles, behaviours, mental and emotional characteristics between males and females developed by a society. According to Umoh (2003), gender is a psychological term used in describing behaviours and attributes expected of individuals on the basis of being born as either male or female. Okeke (2008) opined that gender is a broad analytical concept which draws out women’s roles and responsibilities in relation to those of men. Gender is not synonymous with sex. While sex refers to biological composition of man and woman, gender describes those roles and behaviours which are socially and culturally assigned to males and females.

There is strong evidence in Literature that gender gap exists in science and technology classrooms and this gap is in favour of the males. Gender gap is a noticeable statistical difference in behaviour or attitude between males and females. This noticeable difference (gender-gap) is not biologically pre-determined but the male-child and the female-child are socialized into a highly gender-stereotyped culture right from home. To eradicate the gender gap in science and technology education, Okeke in Okon, Udofia and Williams (2010) recommended alterations in materials, pedagogies, ideologies (the belief system) and practices of learners, teachers and stakeholders in S&T education. Shackelford (1992) argued that gender gap in science and technology education can be narrowed down by creating a proactive feminist environment. According to him, a proactive feminist classroom is student-centered and non-hierarchical with emphasis on community and co-operation. Okoli (2012) reported that gender mainstreaming has been globally recognized as the most effective strategy to achieve gender equality and justice in all fields of life and in all sectors of development. She recommended five instructional strategies that could be adopted in gender mainstreaming thereby achieving equality between males and females in S&T classrooms. The five instructional strategies are

1. Use of teaching strategies that promote co-operation rather than competition.
2. Use of gender inclusive languages or expressions.
3. Use of gender inclusive images, pictures and textual materials.
5. Eliminating/avoiding behaviours or utterances that are gender sensitive in S&T classrooms.

The present study explored the various instructional strategies that could enhance the promotion of gender equality and the extent to which these strategies are being employed by S&T teachers.
Gender Mainstreaming As a Strategy for Closing the Gender Gap in S&T Classrooms.

Gender mainstreaming according to Okoli (2012) was established as a major global strategy for the promotion of gender equality in Beijing platform for action emanating from the fourth United Nations World Conference on women in Beijing in 1995. She described gender mainstreaming as a strategy for bringing gender issues into the mainstream of society so as to ensure gender equality. The Economic and Social Council (ECOSOC) in Okoli (2012) defined gender mainstreaming as “the process of assessing the implications for women and men of any planned action, including legislation, policies or programmes in any area and at all levels so that women and men benefit equally and inequality is not perpetuated”.

The ultimate goal of gender mainstreaming is to close the gender gap in S&T classrooms thereby achieving equality between males and females. To close the gender gap in S&T classrooms through gender mainstreaming, Okoli (2012) proposed five instructional strategies which S&T teachers can adopt.

1. Use of teaching strategies that promote cooperation rather than competition. Co-operative learning strategies have been found to enhance achievement and interest in science for both boys and girls (Okebukola, 1985). Hesse-Biber & Gilbert (1994) asserted that one way to change the traditional classroom structure is by teaming students in co-operative learning dyads. During practical classes in science, students should be made to work in small groups with roles shared among them. Examples of cooperative learning strategies include; games, simulations, role-play, group discussion and career oriented teaching. Saymour in Elechi (2010) found out that females prefer cooperative learning in S&T but science teachers do not give them opportunities to carryout tasks equally with the males in order to learn co-operatively.

2. Use of gender inclusive languages or expressions: the use of masculine nouns and pronouns to refer to both males and females should be avoided in S&T classrooms. The following gender – inclusive nouns have been recommended for use in S&T classrooms e.g.

humankind instead of mankind
human being in place of man (to refer to males and females).
chair person instead of chairman etc.


“an academic institution that neither encourages nor discourage students of either sex is inherently discriminatory against women because it fails to take into account differentiating external environments from which female and male students come”. 
S&T classrooms before now have been dominated with masculine pictures, images and textual materials. Gender mainstreaming can be achieved through de-sexing S&T instructional materials (Okoli 2012). To de-sex instructional materials used in S&T classrooms, female pictures, images and textual materials should be used to illustrate scientists at work doctors, nurses, engineers, etc. This will go a long way in dispelling the myth that science is masculine.

4. Use of gender inclusive teacher – student interaction in S&T classrooms. A gender inclusive classroom is one where equal opportunities are provided for male and female students to interact with their teacher as well as among themselves. Sadker and Sadker (1982) and Grayson (1988) investigated teacher – student interaction patterns and found that some teacher behaviours provide more instructional time to male students than their female counterparts. This lowers the self esteem of the female students. Equal attention, time and opportunities should be given to all students irrespective of whether the learner is a male or a female.

5. Elimination/avoiding behaviours or utterances that are gender sensitive in science and technology classrooms. Okoli (2012) advised S&T teachers to avoid the use of jokes or behaviours that negatively impinge on the personality or cultural roles of male and female students.

Statement of the Problem

Inspite of the efforts made at national and global levels to ensure that females are given equal rights as their male counterparts, research studies still reveal under-achievement and under-representation of women in S&T classrooms. The under-representation of women and girls in science and technology has been traced to socio-cultural, gender stereotyping, economic and pedagogical barriers. If this is allowed to continue, the advancement we are clamouring for in S&T will remain a mirage. The present study explored the various instructional strategies that could be adopted in closing the gender gap in S&T classrooms.

Purpose of the Study

The study aimed at exploring the various instructional strategies that could help in closing the gender gap observed in S&T classrooms. Specifically, the study sought to determine.

- the gender-related unethical ideologies and practices that are prevalent in Nigeria S&T classrooms.
- the strategies for promoting gender equality in S&T classrooms.
- the extent to which S&T teachers employ the identified strategies in S&T classrooms.

Research Questions

1. What are the gender – related unethical ideologies and practices that are prevalent in S&T classrooms in Nigeria?
2. What are the strategies for promoting gender equality in S&T classrooms?
3. To what extent do S&T teachers employ these strategies in daily presentation of lessons?

Research Method

The design of this study is descriptive survey. The study was carried out in Enugu Education zone of Enugu State comprising of three local government areas. The population of the study consisted of 397 teachers teaching chemistry, physics, biology, basic science and basic technology in all the public secondary schools. The sample was made up of 150 teachers selected through stratified random sampling technique from all the co-educational secondary schools in the zone.

The instrument used was four-point likert scale questionnaire developed by the researchers. The instrument was face and content validated by two experts in Science Education and one expert in measurement and evaluation. Trial testing was done on 30 teachers from Agbani education zone. The reliability coefficient of the instrument was established to be 0.81 using cronbach alpha co-efficient. The questionnaires were administered to 150 teachers and there was 100% return as the questionnaires were filled and collected on the spot. Four responses; Strongly Agree (SA), Agree (A) Disagree (D) and Strongly Disagree (SD) were obtained. The responses were assigned 08; 4; 3; 2 & 1. The data were analyzed by computing the mean, standard deviation and variance for each item. In other to take a decision on whether and identified factor as indicated by the respondents should be accepted, the researchers chose a mean cut-off point of 2.50. thus a questionnaire item with a mean score 2.50 or above was accepted while an item with a mean score of less than 2.50 was rejected. The standard deviation and variance were also presented to show how the individual raw scores from which the mean was computed were scattered about the mean.

Results

Research Question One: What are the gender – related unethical ideologies and practices that are prevalent in Nigeria S&T classrooms?

Table One: Responses On the Gender Related Unethical Ideologies and Practices that are Prevalent in Nigeria S&T Classrooms.

<table>
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<tr>
<th>S/N</th>
<th>ITEMS</th>
<th>SA</th>
<th>A</th>
<th>D</th>
<th>SD</th>
<th>X</th>
<th>STD</th>
<th>VAR</th>
<th>DECISION</th>
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<tr>
<td>1</td>
<td>Leadership positions are reserved for the males while females deputize them.</td>
<td>80</td>
<td>50</td>
<td>15</td>
<td>05</td>
<td>3.37</td>
<td>0.80</td>
<td>0.64</td>
<td>Accepted</td>
</tr>
<tr>
<td>2</td>
<td>Boys dominate practical activities and manipulation of</td>
<td>70</td>
<td>40</td>
<td>25</td>
<td>15</td>
<td>3.10</td>
<td>1.01</td>
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apparatuses

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<th>SA</th>
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<th>SD</th>
<th>K</th>
<th>STD</th>
<th>VAR</th>
<th>DECISION</th>
</tr>
</thead>
<tbody>
<tr>
<td>3</td>
<td>Teachers believe that boys are superior to girls when it comes to mental ability or intellectual capacity</td>
<td>60</td>
<td>50</td>
<td>30</td>
<td>10</td>
<td>3.07</td>
<td>0.93</td>
<td>0.87</td>
<td>Accepted</td>
</tr>
<tr>
<td>4</td>
<td>Boys are reprimanded more often than girls.</td>
<td>65</td>
<td>40</td>
<td>25</td>
<td>20</td>
<td>3.00</td>
<td>1.07</td>
<td>1.14</td>
<td>Accepted</td>
</tr>
<tr>
<td>5</td>
<td>Teachers give more attention to boys than girls.</td>
<td>40</td>
<td>60</td>
<td>30</td>
<td>20</td>
<td>2.80</td>
<td>0.98</td>
<td>0.97</td>
<td>Accepted</td>
</tr>
<tr>
<td>6</td>
<td>Difficult tasks are given to boys to perform.</td>
<td>95</td>
<td>20</td>
<td>30</td>
<td>05</td>
<td>3.37</td>
<td>0.92</td>
<td>0.84</td>
<td>Accepted</td>
</tr>
<tr>
<td>7</td>
<td>Easy tasks are given to girls to perform.</td>
<td>80</td>
<td>40</td>
<td>17</td>
<td>13</td>
<td>3.25</td>
<td>0.97</td>
<td>0.94</td>
<td>Accepted</td>
</tr>
<tr>
<td>8</td>
<td>Teachers believe that boys are more energetic than girls.</td>
<td>70</td>
<td>60</td>
<td>10</td>
<td>10</td>
<td>3.27</td>
<td>0.86</td>
<td>0.73</td>
<td>Accepted</td>
</tr>
</tbody>
</table>

Each item in table one scored above 2.50 which is the level of acceptance indicating that S&T teachers agree that gender-related unethical ideologies and practices exist in S&T classrooms in Nigeria.

**Research Question Two:** What are the strategies for promoting gender equality in S&T classrooms?

**Table Two:** Responses on Strategies for Promoting Gender Equality in S&T Classrooms.

<table>
<thead>
<tr>
<th>S/N</th>
<th>ITEMS</th>
<th>SA</th>
<th>A</th>
<th>D</th>
<th>SD</th>
<th>K</th>
<th>STD</th>
<th>VAR</th>
<th>DECISION</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>Use of teaching strategies that promote co-operation rather than competition.</td>
<td>55</td>
<td>35</td>
<td>10</td>
<td>50</td>
<td>2.63</td>
<td>1.28</td>
<td>1.64</td>
<td>Accepted</td>
</tr>
<tr>
<td>2</td>
<td>Use of games</td>
<td>65</td>
<td>15</td>
<td>60</td>
<td>10</td>
<td>2.90</td>
<td>1.05</td>
<td>1.10</td>
<td>Accepted</td>
</tr>
<tr>
<td>3</td>
<td>Use of simulations</td>
<td>40</td>
<td>50</td>
<td>20</td>
<td>40</td>
<td>2.60</td>
<td>1.15</td>
<td>1.32</td>
<td>Accepted</td>
</tr>
<tr>
<td>4</td>
<td>Use of role – play</td>
<td>40</td>
<td>60</td>
<td>35</td>
<td>15</td>
<td>2.83</td>
<td>0.94</td>
<td>0.88</td>
<td>Accepted</td>
</tr>
<tr>
<td>5</td>
<td>Group discussion</td>
<td>50</td>
<td>30</td>
<td>35</td>
<td>35</td>
<td>2.63</td>
<td>1.17</td>
<td>1.37</td>
<td>Accepted</td>
</tr>
<tr>
<td>S/N</td>
<td>ITEMS</td>
<td>VHE</td>
<td>HE</td>
<td>LE</td>
<td>VLE</td>
<td>X</td>
<td>STD</td>
<td>VAR</td>
<td>DECISION</td>
</tr>
<tr>
<td>-----</td>
<td>----------------------------------------------------------------------</td>
<td>-----</td>
<td>-----</td>
<td>------</td>
<td>-----</td>
<td>-----</td>
<td>-----</td>
<td>-----</td>
<td>----------</td>
</tr>
<tr>
<td>1</td>
<td>Use of teaching strategies that promote co-operation rather than competition</td>
<td>13</td>
<td>45</td>
<td>57</td>
<td>35</td>
<td>2.24</td>
<td>0.91</td>
<td>0.83</td>
<td>Rejected</td>
</tr>
<tr>
<td>6</td>
<td>Use of career-oriented teaching</td>
<td>70</td>
<td>40</td>
<td>30</td>
<td>10</td>
<td>3.13</td>
<td>0.96</td>
<td>0.92</td>
<td>Accepted</td>
</tr>
<tr>
<td>7</td>
<td>Use of gender – inclusive language or expression e.g. chair person instead of chairman, humankind instead of mankind.</td>
<td>80</td>
<td>40</td>
<td>20</td>
<td>10</td>
<td>3.27</td>
<td>0.93</td>
<td>0.87</td>
<td>Accepted</td>
</tr>
<tr>
<td>8</td>
<td>Use of female images, pictures and textual materials to illustrate a scientist at work, a doctor, a nurse, etc.</td>
<td>90</td>
<td>40</td>
<td>10</td>
<td>10</td>
<td>3.40</td>
<td>0.88</td>
<td>0.78</td>
<td>Accepted</td>
</tr>
<tr>
<td>9</td>
<td>Use of gender inclusive teacher – student interaction i.e S&amp;T teachers giving equal attention, time and opportunities to all students whether male or female</td>
<td>40</td>
<td>60</td>
<td>25</td>
<td>25</td>
<td>2.77</td>
<td>1.03</td>
<td>1.05</td>
<td>Accepted</td>
</tr>
<tr>
<td>10</td>
<td>Avoiding behaviours or utterances that are gender sensitive in science and classrooms</td>
<td>60</td>
<td>50</td>
<td>30</td>
<td>10</td>
<td>3.06</td>
<td>0.93</td>
<td>0.87</td>
<td>Accepted</td>
</tr>
</tbody>
</table>

In table 2, all the items scored above 2.50 which is the level of acceptance showing that S&T agree that the instructional strategies listed in items 1 – 10 can promote gender equality in S&T classrooms.

**Research Question Three:** To what extent do S&T teachers employ the identifies strategies in daily presentation of lessons?

Table Three: Responses on the Extent to Which S&T Teachers Employ the Identified Strategies in Daily Presentation of Lessons.
<table>
<thead>
<tr>
<th></th>
<th>Use of games</th>
<th>10</th>
<th>40</th>
<th>80</th>
<th>20</th>
<th>2.27</th>
<th>0.77</th>
<th>0.60</th>
<th>Rejected</th>
</tr>
</thead>
<tbody>
<tr>
<td>3</td>
<td>Use of simulations</td>
<td>15</td>
<td>25</td>
<td>70</td>
<td>40</td>
<td>2.10</td>
<td>0.91</td>
<td>0.83</td>
<td>Rejected</td>
</tr>
<tr>
<td>4</td>
<td>Use of role – play</td>
<td>20</td>
<td>30</td>
<td>80</td>
<td>20</td>
<td>2.33</td>
<td>0.87</td>
<td>0.76</td>
<td>Rejected</td>
</tr>
<tr>
<td>5</td>
<td>Group discussion</td>
<td>18</td>
<td>42</td>
<td>75</td>
<td>15</td>
<td>2.42</td>
<td>0.83</td>
<td>0.69</td>
<td>Rejected</td>
</tr>
<tr>
<td>6</td>
<td>Use of career oriented teaching</td>
<td>32</td>
<td>38</td>
<td>50</td>
<td>30</td>
<td>2.48</td>
<td>1.04</td>
<td>1.08</td>
<td>Rejected</td>
</tr>
<tr>
<td>7</td>
<td>Use of gender inclusive language or expression e.g. chairperson instead of chairman, humankind instead of mankind etc.</td>
<td>25</td>
<td>30</td>
<td>55</td>
<td>40</td>
<td>2.27</td>
<td>1.03</td>
<td>1.06</td>
<td>Rejected</td>
</tr>
<tr>
<td>8</td>
<td>Use of female images, pictures and textual materials to illustrate a scientist at work, a doctor, a nurse, an engineer, etc.</td>
<td>20</td>
<td>20</td>
<td>80</td>
<td>30</td>
<td>2.20</td>
<td>0.91</td>
<td>0.83</td>
<td>Rejected</td>
</tr>
<tr>
<td>9</td>
<td>Use of gender inclusive teacher – student interaction i.e S&amp;T teachers giving equal attention, time and opportunities to all students whether male or female.</td>
<td>50</td>
<td>30</td>
<td>40</td>
<td>30</td>
<td>2.67</td>
<td>1.14</td>
<td>1.30</td>
<td>Accepted</td>
</tr>
<tr>
<td>10</td>
<td>Avoid behaviours or utterances that are gender sensitive in S&amp;T classrooms.</td>
<td>45</td>
<td>40</td>
<td>15</td>
<td>50</td>
<td>2.53</td>
<td>1.23</td>
<td>1.53</td>
<td>Accepted</td>
</tr>
</tbody>
</table>

In table 3, only items 9 and 10 scored above 2.50 showing that respondents agree that S&T teachers give equal attention, time and opportunities to all students irrespective of their sex. Again the response to item 10 shows that S&T do not use gender sensitive utterances or behaviours that negatively impinge on the personality or cultural roles of male and female students. However, items 1 – 8 scored below 2.50 which is the level of acceptance. This implies that even though S&T teachers accept that these instructional strategies can promote gender equality, they do not employ the recommended strategies in S&T classrooms.
Discussion

In research question one, all the eight items listed were accepted by the S&T teachers in Enugu state as gender-related unethical ideologies and practices that are prevalent in Nigeria S&T classrooms. These ideologies as practices include; reserving leadership positions for boys while girls deputize them, allowing boys to dominate practical activities and manipulation of apparatuses; reprimanding boys more often than girls; teachers giving more attention to boys than girls; giving difficult tasks to boys to perform and giving easy or less difficult tasks to girls to perform and the belief that boys are more energetic than girls. This finding implies that the S&T classroom environment in Nigeria is not conducive for the girl-child. It presents science as masculine and entirely reserved for the male-folk. The result is agreement with sadker and sadker (1982) and Grayson (1988) who found out that some teacher behaviours provide more instructional time to male students than their female counterparts. When the environment is not favourable or encouraging to the girl-child, it is automatically discriminatory against the female-folk. This agrees with studies by freeman (1975) who argued that an academic institution that neither encourages nor discourages students of either sex is inherently discriminatory against women because it fails to take into account differentiating external environments from which female and male students come.

In research question 2, all the ten items were accepted by the respondents as strategies that can promote gender equality in S&T classrooms. These instructional strategies include; the use of co-operative learning strategies such as games, simulations, role-play, group discussion, and use of career-oriented teaching, use of gender-inclusive language or expressing e.g. use of female images, pictures and textual materials, use of gender-inclusive teacher-student interacting, and teachers avoiding behaviours and utterance that can narrow down the gender gap in S&T classrooms. The result is in agreement with shackle ford (1992) who said that technological gender gap can be narrowed down by creating a proactive feminist environment. It is also consistent with Okoli (2012) who reported that gender mainstreaming has been globally recognized as the most effective strategy to achieve gender equality and justice in all fields of life and in all sectors of development.

The result in table 3 reveals that even though S&T teachers are aware that mainstreaming gender in S&T classrooms can promote gender equality, the recommend instructional strategies are not being employed by teachers in daily presentation of lessons. This finding is consistent with Saymouir in Elechi (2010) who found out that females prefer cooperative learning in S&T but science teachers do not give them opportunities to carry out tasks equally with the males in order to learn cooperatively.
**Recommendations**

1. Science and technology educators and researchers should develop computer games and simulations using the national curricular for science and technology subjects.
2. Curriculum planners should incorporate girl-friendly curricular materials in their programmes.
3. Science and technology educators should explore more cooperative learning strategies that can motivate the girl-child into science and technology.
4. Authors of textbooks and charts should use female photographs to illustrate scientists at work, a doctor, an engineer, a technologist, etc.
5. Professional bodies such as STAN and ministries of education should organize seminars, workshops and conferences to update sciences and technology teachers of the identifies instructional strategies that can promote gender equality in S&T classrooms.

**Conclusion**

The learning environment in S&T classrooms is no conducive for the females. Teachers present science and technology as masculine. A change in the status quo requires a change in materials pedagogies, and practices so as to motivate the female into Science and Technology.

**References**


role of the science Teacher. Gender and STEM Education: Breaking Barriers to Girls Education in STM. Okeke and Opara (ed). STAN series 1, 46.


