

INTEGRATING INFORMATION AND COMMUNICATION TECHNOLOGY (ICT) INTO NIGERIAN EDUCATIONAL SYSTEM

Prof. B. E. Alumode

Nigeria needs to attain qualitative education for the enhancement of sustainable socio-economic development, global competitiveness and individual ability to survive in the contemporary environment. It is, therefore, imperative that anything that can lead to a speedy transformation of teaching and learning, and administration of education is most welcome. This is imperative as it can foster the production of graduates that can survive in the contemporary society, sustain national development, and compete globally. The need to have a standardized and coordinated development and deployment of ICT in education informed the development of the National Policy on ICT in Education.

Information and Communication Technology is mainly concerned with the use of technological tools for managing the communication process. It is concerned with the combination of technologies for collecting, storing, processing and delivering reformation (Anowor 2010). ICT encompasses computers, communications equipment and the services associated with them. It includes telephone, cellular networks, satellite communication, broadcasting media (Radio and television) and other forms of communication. Information and Communication Technologies comprise the use of at least a computer and the internet as well as computer hardware and software, networks and other devices that convert information (texts, images, sounds and motion) into general digital forms (Olibie, 2011). Federal Ministry of Education (FME, 210) described ICTs as the art and applied science that deal with data and information.

Information and Communication Technology (ICT) and Education in Nigeria

The Federal Republic of Nigeria (FRN, 2004) recognized education as an instrument par excellence for effecting national development and further recognized the crucial role of ICT in fostering a speedy transformation of teaching and learning. Consequent upon this, government declared that in recognition of the prominent role of ICT in advancing knowledge and skills necessary for effective functioning in the modern world, there is urgent need to integrate ICT into education in Nigeria. Thus government recognizes the fact that the attainment of qualitative education requires improvement on teaching and learning and educational administration which in turn require the integration of ICT into education.

This informed the Federal Ministry of Education in formulating the objectives of ICT in education which are to:

- i. Facilitate the teaching and learning processes;
- ii. Promote problem-solving, critical thinking and innovative skills;
- iii. Promote life-long learning
- iv. Enhance the various teaching/learning strategies required to meet the needs of the population;
- v. Foster research and development;
- vi. Support effective and efficient, education administration;
- vii. Enhance universal access to information; and
- viii. Widen access to education and the range of instructional options and opportunities

for anywhere, anytime, any-pace and any-path learning (FME 2010:14).

In order to achieve these objectives government resolved that it shall:

- (a) Build and encourage the development and sustenance of the ICT manpower required to achieve an ICT furthered education;
- (b) Establish and sustain a common ICT infrastructure platform for education and encourage the development of a national Education and research Infrastructure (NERI);
- (c) Ensure and encourage ICT Research and Development (R & D);
- (d) Engage and encourage regular stakeholders consultations, sensitization of the learning community, public awareness and intergovernmental relations to achieve a broad-based consensus on ICT in education;
- (e) Provide appropriate legal, regulatory and security framework to ensure that ICT in Education and the conduct of related activities are focused on achieving ICT-furthered education, and
- (f) Adopt creative financing models for ICT in education.

The globalization has brought to the fore the fundamental significance of global competitiveness in recent times as nations strive to meet their local needs on a global benchmark as well as meet the demands of completion on a global scale. Thus the importance of human capacity building in Nigeria through ICT in education and skills development that will usher in economic growth and social emancipation cannot be overemphasized. The global adoption of International Development Goals (IDG),

prominent among which are the goals of Education For All (EFA) and Millennium Development Goals (MDGs) has led to global reforms in education, social and economic context in the last two decades or so. Thus nations are challenged to involve strategic responses for the attainment of these IDG as well as meeting the country's specific development targets. Thus in 2004, Nigeria adopted the National Economic Empowerment and development Strategy (NEEDS) as a homegrown response to those global reform in the social and economic context (Obioma, 2009). The four cardinal points of NEEDS which can be summarized as:

1. Wealth creation
2. Employment
3. Poverty reduction
4. Value reorientation

Recognize education as a fundamental role in empowering the people to attain these cardinal points. The integration of ICT in education will further strengthen education in the achievement of Nigeria's ability to compete globally.

In addition if ICT is designed and integrated, its use in education can promote the acquisition of the knowledge and skills that will prepare teachers and students for the attainment of:

i. Vision 20-2020, to:

- a. make Nigeria one of the top 20 industrialized economy in the world by the year 2020;
- b. have zero tolerance for corruption;
- c. address tension in Niger Delta sub region and the recent menace of Boko Haram
- d. arrest power failure in Nigeria;
- e. be father of all irrespective of political and ethnic groups we belong to;
- f. make all political office holders servant leaders;

- g. have a clear separation of power without interference in the activities of other arms of government; and
- h. make Nigeria the financial hub of Africa by the year 2020;

ii. Nigeria's Seven-Point Agenda for the Development of

- a. power and energy
- b. transport sector;
- c. land reforms;
- d. security; and
- e. education.

iii. The United Nation's 8 Millennium Development Goals (MDGS)

- 1. eradication of extreme poverty and hunger;
- 2. achievement of Universal Primary Education;
- 3. promotion of gender equality and empowerment of women
- 4. reduction of child mortality;
- 5. improvement of maternal health;
- 6. combat HIV/AIDs, malaria and other diseases;
- 7. ensure environmental sustainability; and
- 8. development of global partnership for development.

Teachers' shifting role in Nigerian educational system, therefore, involves the application of technological innovations to the teaching and learning process. Technology is the substitution of machine for human effort. It is a systematic application of knowledge to practical task in almost all human endeavours. Technology has made communication easier through the invention of telephone, radio, television, film, computer, internet, etc. technology reduces wasting time and energy: various machines and instruments are designed to handle almost all human activities easily without wasting time.

Thus the integration of ICT into education has become sine-qua-non in bringing about sustainable development, enhancement global competitiveness and most importantly sustainable educational development. Educators and Policy Makers (FME, 2010) agree that ICT is of paramount importance to the future of education. They also agree that successful contributions to meeting the United Nations' Millennium Development Goals (MDGs), Education for All (EFA), Nigeria's Vision 20-2020 and the 7-point Agenda goals are most likely to be made by ICT in education initiative that focus on:

1. Increasing Access through Distance Learning:

Information and Communication Technology (ICT) can provide new and innovative means to bring educational opportunities to greater number of people of all ages especially those who have historically been excluded.

- a. Populations in rural areas
- b. Women facing social barriers and
- c. People with disabilities.

2. Enabling a Knowledge Network for Students

Since knowledge is a crucial input for productive process within today's economy, the efficiency by which knowledge is acquired and applied, determines economic success of a nation. The effective use of ICT can contribute to the timely transmission of information and knowledge, thereby helping education system to meet this challenge.

3. Training Teachers and Trainers

A large number of teachers and trainers are needed to meet the national vision 20-2020 and MDGs for education and the provision of opportunities to complement on-the-job

training and continuing education for teachers/trainers.

4. Broadening the Availability of Quality Educational Materials

Network technologies have the potential to increase the availability of quality educational materials and database, quickly and cheaply over long geographic distances with online resources. Thus teachers and trainers are offered access to a vast and adverse collection of educational materials, enabling them to design curricular that best meet the needs of the students.

5. Administration

This involves the management of material resources and more importantly human resources, students registration and monitoring of students environment and achievement (FME, 2010:3). The potential of ICT in fostering sustainable and quality education delivery is globally recognized. As a result, concerted efforts have been and are being made, especially at the policy level, to ensure the inculcation of ICT skills into pupils and students. It is now recognized that ICT is a very helpful instrument for facilitating teaching, and learning particularly at the tertiary level. Generally for universities to discharge their functions appropriately the use of ICT in the management of university educations becomes imperative. The challenge to do more with fewer resources facing education institutions calls for the use of ICT in the management of educational institutions especially at the tertiary level.

While it is true that technology is not a panacea for all educational ills, today's technologies are essential tools of the teaching trade (Kirschner and Selinger, 2012). To use the tools well teachers need visions of the

technologies' potential opportunities to apply them, training and just –in-time support and time to experiment. Only then can teachers be informed and fearless in their use of new technologies. Developing future teachers, in Nigeria, who know how to use modern learning technologies to improve student learning is a major challenge facing our modern learning technologies to improve student learning is a major challenge facing our nations teacher preparation system. Information and Communication Technology (ICT) offers the potential to meet the learning needs of individual students, to promote equality of opportunity, to offer high quality learning materials, and to increase self-efficiency and independence of learning among students of all ages. For the teaching profession, ICT is not only an essential tool for the teachers in their daily work but it also offers them opportunities for their own professional development. It can be used to encourage new ways of working as part of professional learning teams and it offers schools themselves the possibility of a faster route to establishing a meaningful role in the wider community. This is possible by embracing learners of all ages, linking and networking to other educational establishments and bringing professionals together across a range of areas.

The Journey So Far

The roadmap for the Nigerian education sector has four focal areas:

1. Access and equality;
2. Standards and quality assurance;
3. Technical and vocational education; and
4. Training and funding (FRN 2009).

In all, ICT was considered a stress area. The constitution of the Federal Republic of Nigeria places education on the concurrent list (FRN, 1979). Whereas the policy and standards with regards to ICT in education are the responsibilities of the Federal Government, the

implementation of ICT in education rests heavily on the states and Local Governments (FME, 2010). Information and communication technology occupies a very strategic position in Education in Nigeria today and series of initiatives and strategies have been put in place to integrate ICT into education.

The use of radio for literacy project which is facilitating access to education for illiterate and semi-illiterate Nigerians irrespective of their geographical location, gender and cultural settings is a common feature

Massive Production of ICT Infrastructure at the Institutional Level

Institutions under the purview of the federal Government have requisite ICT infrastructure include access to internet (FME, 2010: 4). In the states, similar efforts are going on. Private schools however, appear to be at the forefront in this regards.

Capacity Building for Teachers

Information and communication technology capacity building for teachers and educational administrators through international recognized certification with international Computer Driving License (ICDL) as the basic minimum certification for literacy is in place.

National Open University of Nigeria

The application of ICT to Distance Education and Open learning through the establishment of the National Open University of Nigeria (NOUN) which is helping to universalize access to university education is also in place. The main objective of NOUN is to provide functional cost-effective, flexible learning which adds life-long value to quality education for all who seek knowledge (NOUN, 2006). In specific terms the National Open University of Nigeria was establishment in 1983, closed in 1984 and resuscitated in 2002 to:

- i. Ensure equity and equality of opportunities in education generally but specifically in university education;
- ii. Provide a wider access to education generally but specifically university education in Nigeria;
- iii. Enhance Education For ALL (EFA) and life long learning;
- iv. Provide the entrenchment of global learning culture
- v. Provide instructional resources via an intensive use of information and communication technology;
- vi. Provide flexible and qualitative education; and
- vii. Reduce the cost, inconveniences and hassles of easy access to education and its delivery.

The instructional delivery of NOUN is based majorly on ICT (online teaching) as the teaching is provided through the following:

1. Audio tapes and video tapes which can be played over and over again and listened to as often as possible in whatever environment is convenient for the playbacks.
2. CD-ROMS. This constitutes one of the wonders of ICT and affords the opportunity of storing a vast amount of information that can be easily carried about. CD-ROM can be both audio and visual.
3. Radio and Television Broadcasts: Some courses are broadcast on the radio and some on television.
4. Computer Mediated Learning. Recent innovations in the field of communication technology are being exploited to make the delivery of instruction even more effective. As Nigeria becomes more accessible via the internet and more students get access to personal computers, learning at distance becomes more enabling.
5. Print materials. Each course has a study material written specifically for the course

and which students are expected to study prior to being examined.

6. The establishment and strengthening of the Computer Professional Registration Council of Nigeria (CPN) for the regulation, control and supervision of the computing profession and practice in Nigeria.
7. The establishment of Innovation Enterprise Institutions (IEIs) to address skills gap in such areas as ICT, position youths to favourably compete globally and increase access and alternative route to tertiary education.

The use of streamline the education delivery management framework, covers a wide range of salient areas: Formal and non-formal education in areas of agriculture, business, management education including adult and non-formal education, curriculum and instruction, educational management, nomadic education, science education, technology education, arts education, gender studies, educational technology, women education, economics education, music education, educational foundations and a lot more.

The Establishment of E-learning has:

- (i) made it possible for the learner to access the learning programme anytime convenient to him and can log in anywhere.
- (ii) reduced travel time and other associated costs of attending a course;
- (iii) brought about asynchronous interaction, providing participants and tutors with time to prepare their responses leading to succinct and to-the-point intervention and on-track, thoughtful and creative conversation.
- (iv) enhanced group collaboration creating shared electronic conversation. Aided by

group coordinators these sessions can be powerful for learning and problem solving.

- (v) new educational approaches can now be used. For example faculty from anywhere in the world, and faculty teams with different specialties can be put together and innovations of teachers can be shared among themselves for improvement and adaption; and
- (vi) enabled the recently developed intelligent Computer Assisted Instruction (ICA) programmes to generate and solve problems, diagnose students' misconceptions, select appropriate teaching strategies and carry on dialogues with students based on in-depth studies by researchers on how people think, learn and solve problems.

The introduction of Computer Acquisition Scheme which targets the provision of computers to government staff at all levels of education at preferential rates under a subsidizes consumer finance arrangement.

The articulation of policies that drive the development and deployment of ICT in Education, such as the compulsory computer education for all levels of education in the country.

The development of curriculum for computers education for all levels of education which would prepare students from the onset to adapt to the rapidly changing knowledge requirements and skills necessary to function in and contribute effectively to the contemporary society.

The development of National Information Technology Education Framework (NITEF) to guide the Development of Information Technology (IT) Education

The establishment of ICT services unit specifically to drive the delivery of innovative technology solutions and support services towards ensuring that all departments within the federal Ministry of Education are able to leverage modern ICT resources to optimize their respective functions. The unit also serves as an ICT coordination resource for the education sector at large, ensuring development of uniform standards, skill acquisition and using a convergence – driven approach to eliminate duplicitous expenditure.

The use of ICT to streamline the Education Delivery Management Framework through the establishment of converged Education Sector Database to serve as repository of education data across the entire education system, automate and transform the educational administration process for effective and efficient administration of education in Nigeria.

Implementation of the converged Examination Management Technology Platform (CEMTP) for effective and efficient management of National Examination.

Challenges to the Application of ICT in Schools

Despite the achievements and the benefits accruing from them, there are serious challenges which plague the implementation of ICT in Education in Nigeria.

1. Poor supply of power and telecommunication facilities

Power supply in Nigeria is very epileptic and are not conducive for ICT operation. The distribution of radio receivers, cinemas, television and computers is grossly inadequate and the use of the few available is hampered by power supply.

2. Inadequate qualified teachers

Inadequate teacher expertise is the bottleneck in the application of ICT in education. The cause is an alarming situation in teacher education. Although capacity-building of teachers on ICT is going on, a higher percentage of teachers at all levels are largely non-ICT literate.

There is also a highly insufficient pool of ICT professionals in the sector. The few ICT teachers available are mostly not at the cutting edge of ICT innovation. The education sector at the moment does not appear to have the competitive edge in ICT and is therefore unable to attract and retain ICT professionals.

3. Problem of teacher resistance to ICT

Some teachers still feel threatened by the computer. As a result, many are unwilling to utilize it as a teaching tool. If these machines are to supplement classroom learning, the teachers themselves must be willing and be able to use them in order to encourage their use by the students. If teachers do not realize the potential benefits of computers both for themselves and for their students, the available packages and equipment will never be effective as teaching tools.

4. Dearth of infrastructure

There is inadequate, low quality and in some cases outright non-availability of ICT infrastructure for teaching, learning and educational administration. The dearth of infrastructure for teaching learning and schools in rural areas. There is a great dichotomy between urban and rural schools and between public and private schools with regards to infrastructure.

- 5. Non-Regulation of IT education by government.** Information Technology (IT) Education especially at the non-formal sector is still largely uncoordinated non-standardized and unsupervised. Consequently there is proliferation of computer training outfits which offer all sorts of certification and programmes based on curriculum that are undefined.
- 6. Curriculum review.** There is generally lack of review and updating of existing ICT curricular, especially at the tertiary levels, to meet the changing social needs as well as low capacity of curriculum developers and implementers. The challenge of obsolete curriculum is even more compounded because of the highly dynamic nature of ICT. In addition integration of ICT into the curriculum is barely in its infancy.
- 7. Funding:** Fund is a major impediment to the integration of ICT into education in Nigeria. Most of challenges to the implementation of ICT: power, human and material resources and I infrastructure depend on availability of fund. The funds for the provision of others facilitates are not enough. This is attested to by the FRN (2010) by stating that, “although there is a gradual improvement in the funding of ICT in education, the funds are largely inadequate to provide the sector appropriately for the attainment of the national vision”.
- 8. Research and development:** Research and Development (R&D) is pivotal to the attainment of ICT furthered education, unfortunately, adequate attention has not been paid to R&B in ICT and in ICT in education, resulting in lack of appropriate impact (FME, 2010). There is therefore a

strong need for sustained investment and commitment to R&D in ICT.

From the above it is clear that the state of ICT in education in Nigeria is far from what it should be. The present situation therefore, calls for full integration of ICT in education in Nigeria. The Federal Government is aware of this status quo and is leaving no stone on unturned to take advantage of the opportunities offered by the technology in furthering education goals and significantly enhancing poverty alleviation strategies. In addition the government is ensuring that the citizenry, individual or corporate, is adequately equipped to face the challenges requisite and attendant to the realization of the national vision.

Concluding Remarks

The integration of Information and Communication Technology (ICT) into education is imperative. Currently, with respect to ICT in teacher education, it may be right to say that there is no nationally defined understanding of applicability of ICT for teacher education, either pre-service or on-going in-service. The range of styles of incorporation of ICT into teacher training reflects dependence on particular institutions or large scale projects to provide an impetus and interpret the requirements of teachers in schools.

For in-service and continual professional development, some initiatives are led by large government initiatives; others depend on teacher and classroom demand. It is evident that this reactive rather than proactive situation has contributed to the relatively slow uptake of the use of ICT in schools.

With respect to curriculum, teacher education and pedagogy, activity has been both fragmented and discontinuous. Curriculum development, teacher education and pedagogy

have been perceived and treated as discrete and separate.

It is evident that serious attention has to be paid to the question of teacher education which can underpin utilization of ICT into all aspects of pedagogy of a school. Integration will only come when the links between ICT, the curriculum and teachers' needs and professional development in schools are forged within this framework.

Let us bear in mind that equipping classrooms with computers and wiring up schools does not of itself create exciting new learning situations that are about changing the ethos of classroom and the culture of institutions. There is need for will power dedication and self determination.

The Way Forward

As stated before, for Nigeria to realize its vision of becoming one of the 20 largest economies in the world by the year 2020 (vision 20-2020), she has to put in more effort toward the transformation of its population into highly skilled and competent citizens, capable of competing globally. The education sector is very pivotal to the actualization of the vision. In 1990 the Jomtien Conference on the Education For All (EFA) identified six objectives to be achieved by member countries as follows:

- i. expansion of early child care and development activities;
- ii. universal primary education by the year 2000;
- iii. improvement in the learning achievement;
- iv. reduction of adult literacy rate to one-half of its 1990 level by the year 2000, with sufficient emphasis on female literacy;
- v. expansion of provision of basic education and training in other essential skills required by youth and adults.
- vi. Increased acquisition by individuals and families of the knowledge, skills and

values required for better living and sound and sustained development.

Information and Communication Technology (ICT) integrated into education is the answer. Recent, studies show the enormous potential of learning through ICT (E-learning). The promise of information and communications technology (ICT) on the continent is enormous. ICT is expected to act as a catalyst to Nigerian communities, allowing them to profit from and contribute to an increasingly, globalized society (Adibe, 2000). Emerging ICT holds much promise for breaking down traditional barriers that have limited higher education. E-learning could be used to make it possible for Nigerian secondary school graduates, only a fraction of whom can be accommodated in Nigerian tertiary institutions, to enroll directly, and without leaving their homes, in online universities in the country and around the world.

In this regard the Web-Based Education Commission in its report to the president and the Congress of the United States came to the conclusion that:

The question is no longer if the Internet can be used to transform learning in new and powerful ways. The commission has found that it can. Nor is the question should we invest the time, the energy and the money necessary to fulfill its promise in defining and shaping new learning opportunity. The commission believes that we should. We all have a role to play. It is time we collectively move the power of the internet for learning from promise to practice (Kerry, 2000:12)

From the above quotation, there is the indication that ICT has the power to transform education. The question now is what do we do to move forward?

All hands must be on deck. Education we have seen is in the concurrent legislative list which means that both Federal, State and Local

Governments have roles to place in the provision of education. In addition, the Federal Republic of Nigeria (2004) welcomes the contribution of voluntary agencies, communities and private individuals in the establishment of schools at all levels. Most importantly, government in recognition of the prominent role of ICT in advancing knowledge and skills necessary for effective functioning in the modern world would see the urgent need to integrate ICT into education in Nigeria. One can thus conclude that all tiers of government, voluntary agencies, communities and private individuals have roles to play in moving the integration of ICT into education forward in Nigeria. To this end there is the need for:

1. Manpower Development

Build and encourage the development and sustenance of ICT manpower required for the integration of ICT into education in Nigeria by:

- a) Enriching the environment for teaching and learning;
- b) Regular mandatory professional development of core ICT teachers and administrators;
- c) Continuous ICT training including content development and delivery for all staff;
- d) Periodic review of the curricular, in line with the National Information Technology Education Framework (NITEF), to reflect emerging paradigms and national goals;
- e) Promoting ICT proficiency with special focus on children, women and the physically challenged; and
- f) Carrying out needs assessment to identify skill gaps and encouraging the acquisition of appropriate ICT skills to mitigate the gaps;

2. Provision of Infrastructure

Because of the dearth of ICT infrastructure in Nigeria generally and in the education sector in particular there is the need to provide the

required infrastructure for the integration of ICT into education. This can be achieved by:

- a. Ensuring that all educational institutions and other relevant stakeholders are interconnected to create a common platform that will facilitate the sharing of resources and reduction of duplication;
- b. The support of equitable access to ICT resources by ensuring adequate supply of ICT systems for access to software and local content at all educational and other relevant institutions;
- c. Ensuring that systems for educational administration are in place and all necessary facilities for the storage and management of the ensuring data are provided in all educational establishments and institutions of learning;
- d. Promoting and encouraging the supply, development and hosting of indigenous content;
- e. Facilitating data and content-sharing among educational establishments and institutions; and
- f. Ensuring provision of alternative power supply.

3. Investment in Research and Development (R & D)

Because R&D is pivotal to the development and integration of ICT into education and because adequate attention has not been paid to R&D in ICT and ICT in education, there is the need for sustained investment and commitment to R&D in ICT which can be achieved through

- a. Providing adequate fund and encouraging Research and Development initiative to reveal new as well as improve existing ICT engendered pedagogies, teaching and learning aids, administrative techniques and tools among others;

- b. Providing and encouraging opportunities for Research and Development initiatives in personnel motivation and attitudes; and
- c. Supporting, promoting and encouraging ICT research and development.

4. Public Awareness

Public enlightenment in ICT in education is very important if we are to move forward. To this end government, voluntary agencies and enlightened individuals should engage in public enlightenment campaign and sensitization. This will ensure effective participation of stakeholders in the execution of ICT in education policies and strategies.

5. Government Policy

The Federal Ministry of Education (2010:22) stipulated that “government shall provide appropriate legal, regulatory and security framework to ensure that ICT in education and the conduct of related activities are focused on achieving ICT furthered education”. In view of the above, government should

- a. continue to review existing laws and enact new ones as necessary;
- b. provide and continually review standards and guidelines for ICT in education in line with national goals and global trends;
- c. develop requisite countermeasures to security threats in the learning environment with due consideration to the right, and freedom of the citizenry; and
- d. monitor and accredit ICT programmes and institutions.

6. Funding

Information and Communication Technology is a capital intensive venture and the traditional budgeting by government has not been adequate as it relates to ICT in general. Government should therefore adopt creative financing models for ICT in education by

- a. increasing budgetary funding for ICT in Education;
- b. intensifying the use of creative financing models such as Public Private Partnership (PPP).
- c. Harnessing partnerships with development partners for funding ICT in education; and
- d. Exploiting existing funding channels and schemes such as TEF and NITDEF

7. Community Learning Centres

Until computers are available enough at home, a nationwide network of community learning centers should be set up stocked with computer laboratories with broad band access and trained staff to access online distance learning courses. The trained staff of these community learning centres should provide tutoring support to individuals and groups engaged in learning. The centres can be connected to schools, hospitals, clinics or other community service centres to mobilize the different stakeholders.

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Prof. B. E. Alumode

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Prof. B. E. Alumode
Dean, Faculty of Education,
Ebonyi State University,
Abakaliki.