

Academic Leadership: The Online Journal

Volume 6
Issue 4 Fall 2008

Article 11

10-1-2008

Perspectives in Provisions for Science and Technology Education in Nigeria: The Way Forward

Adebola Ifamuyiwa

Kehinde Alebiosu

Follow this and additional works at: <https://scholars.fhsu.edu/alj>

 Part of the [Educational Leadership Commons](#), [Higher Education Commons](#), and the [Teacher Education and Professional Development Commons](#)

Recommended Citation

Ifamuyiwa, Adebola and Alebiosu, Kehinde (2008) "Perspectives in Provisions for Science and Technology Education in Nigeria: The Way Forward," *Academic Leadership: The Online Journal*: Vol. 6 : Iss. 4 , Article 11.
Available at: <https://scholars.fhsu.edu/alj/vol6/iss4/11>

This Article is brought to you for free and open access by FHSU Scholars Repository. It has been accepted for inclusion in Academic Leadership: The Online Journal by an authorized editor of FHSU Scholars Repository.

Academic Leadership Journal

Introduction

The Nigerian educational system took its root from the traditional system of the pre – colonial era. This was a period of indigenous education in which traditional education activities were practiced in various vocations like farming, weaving, blacksmithing, pot making, traditional medicine, hunting, etc. Learning at that time was characterized by apprenticeship and much of unrealized and unexplained science and technology were practiced. There was no formal curriculum but the training was relevant to the needs of the society. Some authors described the training as somehow primitive and localized (Ajeyalemi, 2008), because it was informal.

Essentially, the science that was regarded as informal and indigenous was practiced in the pre-colonial era. It was stimulating, informative and useful. It provided a lead way for understanding, interpreting and relating with the world and nature. The limitations however are numerous especially in its inability to provide adequate scientific explanations for causes and events observed in the natural world. The science practice lacked documentation and it was conservative and authoritarian.

This era ushered in western education with the advent of missionaries in Nigeria. It was through this that the informal or crude science became reformed as the formal science and technology. There was better understanding that transformed individuals and Nigeria as an entity from the world of yesterday to western world characterized by increasing discoveries, inventions and innovations. This development also paved the way for the integration of science and technology into the curricula of schools. The curriculum conference of 1969 finally gave rise to a change in Nigerian educational policy which cemented the urge to develop relevant education system that would serve as a tool for accelerating national growth and development. The stride championed a reformation in science and technology education in Nigeria.

The science that is formal involve a systematic study of natural phenomena and its study allows students to experience the richness and the excitement of the natural world as they engage in inquiry, critical thinking and the demonstration of skills. The scientific enterprise is one that is challenging and innovative. It blends with technology which focuses on inventions and problem solving. Consequently, the harmonious interplay of science, technology and society is the springboard for sustainable development. It equally facilitates and enhances industrial and technological progress among the people and within a nation. This consciousness stems into global agitations for literacy in science and technology.

Science and Technology in the National Education Policies

The promotion of science and technology education is a warmly embraced venture. Nigerian educational system prioritized science and technology with policies that are favorably disposed to science and technology education. The national policy on education and the national policy on science and technology made good provisions for science and technology education. Government through the

education policy empowered the Early Childhood Care and Education (ECCE), the Basic Education, the senior secondary education, technical and scientific education and tertiary education with robust plan for science and technology education in the programmes. (FGN, 2004). The policy came into existence in 1977 and education was conceived as an instrument “par excellence” in achieving national unity, objectives and goals. The policy derives its philosophy from the five main national goals which are;

- a). a free and democratic society
- b) a just and egalitarian society
- c). a great and dynamic economy
- d). a land full of bright opportunities for all citizens.

While adopting education as instrument par excellence, the federal government gave premium on the importance of science and technology and in line with global perspectives of science for all, made provisions for science and technology education in the national policy on education. Meanwhile, the aims and objectives of Nigerian education according to the policy include;

- i) the inculcation of national consciousness and national unity
- ii) the inculcation of right type of values and attitudes for the survival of the individual and the Nigerian society.
- iii) the training of the mind in the understanding of the world around
- iv). the acquisition of appropriate skills, abilities and competencies both mental and physical as equipment for the individual to live in and contribute to the development of the society.

The item (iii) of the above listed is a strong pointer to government positive disposition to science and technology education which was brought to light in further policies and programmes.

The federal government specified the goals of science education in the policy and states as follows;

“Special provisions and incentives shall be made for the study of the sciences at each level of the National education system. For this purpose, the functions of all agencies involved in the promotion of the study of sciences shall be adequately supported by government. In addition, Government shall popularize the study of the sciences and the production of adequate number of scientists to inspire and support national development” (FGN, 2004).

It further states that “science and technology shall continue to be taught in an integrated manner in the schools to promote in the students, the appreciation of basic ideas”. (FGN, 2004). These are clear indications that the national policy on education gives premium to science and technology education.

In furtherance to government support for science and technology education, Information and Communication Technology (ICT) which is an integral aspect of science and technology is adopted by the policy to apply to all levels of education. Such provisions for the primary and secondary levels of education are contained in section 4, number 19(m), and section 5 number 30 which states as follows;

“In recognition of the prominent role of information and communication technology in advancing knowledge and skills necessary for effective functioning in the modern world, there is urgent need to integrate information and communication technology (ICT) into education in Nigeria. (FGN, 2004; pp 17). Government shall provide necessary infrastructure and training for the integration of ICT in the school system in recognition of the role of ICT in advancing knowledge and skill in the modern world (FGN, 2004; pp 24).”

At the level of the ECCE, government objective is to inculcate in the child the spirit of inquiry and creativity through the exploration of nature and the local environment. While at the primary school level, it is incorporated into the Basic education programme. The free universal Basic Education (UBE) Act 2004 was readjusted to redress flaws so that it becomes more realistic and enforceable. It allows for federal intervention in Basic Education to be truly needs – based, which coincidentally is a watchword for science and technology education.

There are major education policy reforms geared towards entrenching 6-3-3-4 education policy. Government intervened in education with a new reform that has recently been succinctly spelt out but I guess is yet to be clearly understood by all. The policy focuses at purposely enhancing quality, ensuring balance national development and accelerating the attainment of the globally acclaimed Education for All (EFA). The 9 year Basic Education curriculum is such that provides that Nigerian children will be in school for 9 years of continuous schooling made up of 6 years of primary education and 3 years of junior secondary education. The programme is targeted at improving relevance, quality and efficiency in education, reducing school drop out and promoting the acquisition of functional, literacy, numeracy, life skills and values for life long education and useful living. (NERDC, 2007). It lays emphasis on communication and entrepreneurial skills.

The place of science and technology in this programme is amplified in the lower basic education class (primary 1 – 3) where basic science and technology is one of the core subjects. At the middle (primary 4 – 6), and upper (junior secondary 1-3) classes, computer studies and ICT are compulsory. The programme stresses that instructional strategies that are activity based and ICT driven will be adopted. (NERDC, 2007).

Some Robust Initiatives for Science and Technology Education

Bold steps are taken by government and stakeholders in education and in science and technology to improve the quality of science and technology education in terms of delivery and content. There is no gainsaying that prominence must be given to science and technology in schools. It must be rich and elaborate enough to provoke the love and interest of students. It is in pursuance of this that government formulated some policies and initiated some programmes that will enhance the status of science and technology education which gear towards the achievement of global standards.

Government initiated the National Policies on; Science and Technology, Information and Technology, Biotechnology, Space and so forth. In addition, there are research institutes like the African Institute for

Science and Technology (AIST) and the Centre for Space Science and Technology Education (CSSTE), policy making bodies and curriculum development agencies like the Centre for Comparative and Adaptation Study (CESAC), and the Association for Supervision and Curriculum Development (ASCD), We also have National Councils like Nigerian Academy of Science (NAS), and the National Council on Science and Technology (NCST), boards on technical and science education like the National Board on Technical Education (NBTE), associations like the Science Teachers Association of Nigeria (STAN). They all contribute immensely towards science and technology education development.

ICT offers access to information globally, thus creating enabling environment for development in science and technology. This is of great value to a country like Nigeria and in recognition of this, the Nigerian computer society emerged. This is a society for Nigerians around the world in the IT industry ranging from students to professionals. The aims of the society are robust and geared towards global development. (NSC, 2007). ICT is regarded as a strong weapon for sustainable development empowering people for global competitiveness. This culminated in the development and propagation of ICT policy in Nigeria and for the Nigerian University system. To this end, the National universities commission (NUC) in 1994 initiated efforts to put in place a National ICT network with full internet connectivity in Nigerian universities (Gusen & Olarinoye, 2007). Quite a number of information technology and electronic networking associations and organizations further emerged in the bid to strengthen the capacity of science and technology education in Nigeria.

In existence too are associations and organizations that are affiliated to international bodies like the International Society for Technology in Education (ISTE), The Society for Engineering Education (SEE), The Association of Science -Technology Centers (ASTC), United Nations Educational and Scientific Organization (UNESCO), International Council of Associations for Science Education (ICASE), and the like. These have significant impacts on science and technology education in Nigeria.

The Nigeria National Policy on Science and Technology:

The policy on science and technology (revised, 1999) is prepared for a 25 year time frame with a provision for revision at 5 – year intervals. Its basic philosophy emphasizes Nigeria’s commitment to the creation of an independent, integrated and self sustaining economy. The policy declares that education shall emphasize science at all levels. (www.east-sym.org/documents/p3_Akpan_Continuum.pdf.undated). Meanwhile, the objectives of the federal government in the policy as it relates to education is ‘to re-orient the entire society towards scientific thinking in order to develop new technology and adapt existing ones to improve societal well-being and security’ (FGN, 1986). Aside the federal government national policy, state governments also have ministries of science and technology with science and technology policies that suits their local needs. This compliments government efforts at national level.

In order to aid the effective implementation of the national science and technology policies for the education sector, the National Policy on Science and Technology (1986) section 2:3 states the following strategies for the implementation of the objectives;

- i). Evolving programmes for the recognition, encouragement, development and promotion of scientific and technological talents at all levels

ii). Making it possible for the average child to have early contacts with the concepts and materials related to science and technology.

iii). Ensuring a sound foundation during the first six years of the 6-3-3-4 educational structure through:

a). entrenchment of science teaching in the primary school curriculum

b). provision of adequate teaching laboratory aids.

c). provision of well trained, well motivated science teachers.

d). introduction of gainful practical activities such as model making, handicrafts, gardening and farming.

The National Policy on Information Technology:

The policy was informed by the recognition that IT is the bedrock for national survival and development in a rapidly changing global environment. It was taken that a developing nation like Nigeria that aspires to participate effectively and become a key player in the emerging information age, needs to have in place a highly efficient information technology system driven by a vibrant national IT policy. The policy has as its mission statement;

“To make Nigeria an IT capable country in Africa and a key player in the Information society by the year 2005, using IT as the engine for sustainable development and global competitiveness” (FGN, 2001).

The mission statement also includes using IT for education, creation of wealth, poverty eradication, job creation and global competitiveness. This initiative triggered public awareness in science and technology and the introduction of technology education in schools. One of the policy objectives is to integrate IT into the mainstream of education and training.

From Theory to Practice: The Steps and the Challenges

Government of Nigeria joined global race by according due recognition to science and technology and demonstrating it in practical terms. There is the African Institute for Science and Technology (AIST) based in Abuja, Nigeria. The institute represents global effort to foster Sub-Saharan Africa's economic growth and development through promotion of excellence in science and engineering and their applications.

The institution in Nigeria is one of the four branches in Africa dedicated to academic excellence and offers instruction in science and engineering combined with teaching in the humanities and business programmes. It is set to produce outstanding scientists, engineers, entrepreneurs, and leaders who will continually create and adapt knowledge to transform local communities and improve the human condition across the African continent. (<http://www.nmiscienc.org/aist.html#top>). This is an additional effort that increases the awareness in science and technology and boosts the educational system in

Nigeria.

There is the National Space Science Research and Development Agency (NASRDA) that supervises the African Regional Center for Space Science and Technology Education (CSSTE) in Nigeria. The centre was inaugurated at Obafemi Awolowo University, Ile Ife in Nigeria in November 1998. The center was established to undertake training, research and development activities in space science and technology education for sustainable development for the benefit of Anglophone countries in Africa. (ARCSSTE-E Annual report – 2005). The centre collaborates with relevant educational agencies to develop the space science curriculum for schools. It also launches space clubs, creates fora for science enlightenment and popularization in schools and provides enabling environment to grow and nurture innovative science education programmes. The center organizes outreach programmes to increase public awareness to the benefit of space science and technology. Introducing students to space science education is a good avenue to create awareness and curiosity. The effort will provoke the interest of students in science while also exposing them to love science at early age.

Government of Nigeria set enrolment targets for science and non science programmes in conventional universities based on the ratio of 60:40%, 70:30% for polytechnics and 80:20% for federal universities of technologies. The Honourable Minister for Education in 2006 at the opening ceremony of the 22nd annual conference/ workshop of the Nigerian Institute of Science / Laboratory Technology held at Abuja declared that government in response to promoting science and technology education embarked on various initiatives to empower the youths through appropriate education in technology and science occupations through;

a). design of science and technology curricula that gives priority to the complete

development of human personality that is sensitive to perfection, order and beauty.

b). policy innovations like;

– the reversal of the federal technical college craft programme to full secondary education duration of six years.

– setting up an action plan, following the resolutions of the higher education summit in 2002, to review the policy and mandates of polytechnics and colleges of education to enable them award degrees.

– setting up plans to integrate entrepreneurial education into the scheme of technology education.

– introduction of post- HND programmes to enable holders of HND to qualify for professional registration and practice.

Source: <http://www.nislt.gov.ng/docs/Ministers%20paper.doc>

Policies when documented are fair and genuine but the implementation often encounter bottlenecks hence objectives and goals are eventually rarely met. Typically, problems are associated with educational policy and planning in Nigeria. Such include those of power relation at the directive stage of planning, poor preparation and costing, and weak evaluation of projects (Babalola, 2008), implementation challenges abound and they eat into the fabrics of the system, but the entire society is liable. With respect to the implementation of educational policies, Olujuwon (2002) identified areas

either not implemented or not satisfactorily implemented to evolve around the following; the development of national consciousness and unity, inter institutional cooperation, teaching and learning, areas of need and priority, open university, training of staff in methods and techniques of teaching and indifference on the part of government.

Studies have indicated the non implementation of Nigerian National policies (Ellah, 2004) which only leads to stagnation or retrogression. A lot of funds are pumped into policy planning and documentation but it is disheartening when the plans fail to yield through lack of implementation or bad implementation. Babalola (2008) associated supervisory and financial problems to reasons for failure in the implementation of education policies in Nigeria. He remarked, "The dilemma associated with shortage of funds during implementation of plans is how to determine which project should suffer from cost reduction. Research shows that education projects are always the victims of fiscal shortfalls in Nigeria"

From the foregoing, there is clear demonstration of governments' positive intentions for science and technology education having realized that it is the vehicle by which a nation can be lifted to attain scientific and technological sophistry. This is overwhelmingly but to pretend that there is no shortfall in enrolment and performance in science and technology education is deceptive. The problems and challenges with policy planning and implementation seem enormous.

In November 2, 2006, the Honourable Minister for Education at one of the official ceremonies in Abuja delivered the keynote address titled "science and technology for youth empowerment" specifically states as follows'

"Our education system is malfunctioning creating in particular problems of scientific and technological manpower production. The situation is so pronounced today that the nation faces crisis of scarcity of scientific and technological manpower. In essence, we are producing less and less of leaders of tomorrow: the managers, the entrepreneurial class, the teachers, the doctors, the policy makers, the law enforcement makers, the professionals. This is because the transition through the various levels of education is not in favour of technology and science career".

(<http://www.nislt.gov.ng/docs/Ministers%20paper.doc>)

Concerned educators in science and technology have indicated downward trend in the appreciation of science and technology education (ICASE, 2008). In Nigeria, 30% of secondary education students are studying science and technology subjects while only 16% of academic staff population in universities are in science and technology areas. The science: arts ratio in the federal universities in year 2000 was 57:43 as against the policy prescription of 60:40. In polytechnics, it was 46:54 as against the 70:30 policy. (www.east.sym.org/documents/p3_Akpan_STContinum.pdf.undated). Associations have devised means and strategies of proffering solutions (STAN, 1992).

The same concern is corroborated by the Honourable Minister of Education in November 2006 when he identified the challenges of science and technology education as those arising from historical stigma, low participation of students, scarcity of professionally trained technology and science teachers and the cost intensive nature of science and technology education. These are issues for stakeholders ranging from teachers, governmental and non- governmental organizations, curriculum developers, parents, industries, ministries, and school associations to research institutes.

Government is not irresponsible too to the decline in participation in science and technology education

programmes that seems to defy possible solution. The president in the headline of one of the Nigerian read newspaper THISDAY of March 3, 2008 states; "FG, W' bank to promote science education" , Mr president alluded that the Federal Government, in conjunction with World Bank, is ready to promote science and technical education at the nation's tertiary institutions. All these are steps taken to ameliorate the problem.

Some Laudable Moves (JETS and ICASE): Tips for Educators, Governments and Stakeholders on – the way forward

Schools and educators have for long taken measures to compliment the effort of government. One of such is the Junior Engineers Technicians and Scientists (JETS) which was introduced into the education system in Nigeria in 1988. The motive was to provide young people with assistance from committed and talented scientists and technologists in carrying out practical work, experimenting and developing products based on scientific and technological information and principles encountered in the classroom. (JETSPOC, 1988). The stated aims of JETS include; (1). fostering the interest of students in acquiring manipulative skills in science and technology (2). providing students with an increased awareness of the impact of science and technology, and so forth.

An evaluative study of JETS programme in Nigeria carried out by Agholor, (1994) revealed that JETS students expressed considerable enjoyment in science and technology and they considered the subjects to be important and reasonably easy. This reflects that establishing science clubs and societies is a worthwhile venture. This report is not current hence whether JETS is still very functional today is a question that we shall leave unanswered. But the club no doubt must be reactivated in the interest of development in science and technology education. It has direct link with the school system and with the students.

Another laudable effort is the role of the International Council for Associations for Science Education (ICASE). It is an umbrella organization forming a communicative network for science scholars, science societies, science institutes and other interested science groups or its sub- branches. The Science Teachers Association of Nigeria (STAN) is an integral part of this body. The ICASE constitution specifies the objectives as follows;

- To extend and enhance the quality of formal and non – formal science and technology education for all, with particular reference to the children and youth of the world.
- To provide and support activities and opportunities that will enhance formal and non-formal science and technology education throughout the world.
- To assist and support all members and other organizations throughout the world which are involved in formal and non formal science and technology education.
- To establish and maintain an international communication network for member organizations and their members involved in formal an non-formal science and technology education
- To encourage and support the establishment and development of professional science and technology organizations, especially teacher organizations in all countries.

At the ICASE world conference 2007, delegates noted the need to stage action to bridge gaps between science, technology and the public. The identified five key reasons for a global decline in the level of interest in science include;

- Difficulty in finding, training and retraining of well qualified science teachers
- Difficulty in keeping up with emerging science and changing teaching practice
- Public perceptions related to science
- Difficulty in maintaining a relevant science curriculum at all levels.

(Source: The Perth Journal 6).

Nigeria is not exempted from the above listed constraints. In fact some of them had earlier been identified in this paper. The conference of ICASE recommended the following to governments;

- to promote critical awareness of the contribution of science and technology to personal, social, economic and environmental well being through building partnerships with national stakeholders and the media.
- to initiate revisions of the curriculum for school science and technology that will increase student interest in and recognition of the roles of science and technology in society.
- to promote from the primary years onwards the career opportunities that stem from the study of science and technology.
- to recruit graduates into science and technology teaching and to value, support and retain them with appropriate rewards.
- to resource and promote continuous, effective and professional development for science and technology teachers in order to meet changing student needs and societal aspirations.
- to recognize and support the significant roles of teacher associations in building a quality professional learning community for science and technology.
- to resource the development of relevant and effective assessment processes so that learners have essential life skills, meet academic and vocational standards and personal aspirations.
- to engage in greater international cooperation to ensure the provision of well trained science and technology teachers to meet current and future challenges.
- to call on UNESCO to integrate its science and technology endeavour as fundamental to achieving educational, environmental, cultural, social and sustainable development goals.

Extracted from ICASE newsletter (February 2008).

The ICASE has provided global and factual perspectives that can halt the challenges facing science and technology education even in Nigeria. The key reasons highlighted by ICASE at the 2007 world

conference are germane and peculiar to Nigeria too, hence the recommendations above apply to stakeholders in the business of Nigerian science and technology education without any alterations. There is an urgent need to join hands to build a strong and formidable science and technology education network. In addition the following crucial suggestions would be useful in bringing revival to the system;

- Government should revitalize science and teacher education programmes across board
- Productive links with industries should be established
- Some employers have poor perceptions of university graduates in the area of science and technology based programmes on the idea that the higher institutions are not well equipped. In this regard, government should respond to the needs of the higher institutions.
- The curriculum should be reformed and targeted to be competency – based, interactive, problem-based and problem solving.
- Government and stakeholders should be sensitive to gender issues in science and technology and should strive to ameliorate the problems.
- Government should make adequate and sufficient financial allocations available to schools and agencies.
- Employers should endeavour to encourage on – the –job training so that their workers would be opportuned to update skills and knowledge.
- Educators should note the rapid changes taking place in science and technology and their applications and reflect such in the planning, teaching and learning of science and technology.
- Government can provide scholarships for students in science and technology disciplines and also reward institutions that meet the target of the science: arts enrolment policy.
- Teachers should be sensitive to new trends and techniques in science and technology education.
- Educators should not ignore the local environment. This will stimulate the learning of science and technology education.

Conclusion

Science and technology are avenues through which man interacts and explains the universe, seeks to understand the world and make it a better place. They are key drivers for socio-economic and educational transformations which must focus on innovation and invention. Unfortunately, these cannot be achieved if and when the required human resources are unavailable. Science and technology is the instrument that sustains advancement and there is a global race in which neither Nigeria nor any other country should lag.

All stakeholders should seek practicable and responsive systems that will pave way for the implementation of policies and entrenching reforms. Saint, Harnett and Strassner drew attention to the World Bank data in which, Nigeria though one of Africa's largest country, has only 15 scientists and

engineers engaged in research and development per million persons compared with the 168 in Brazil, 459 in China, 158 in India and 4,103 in the United States and expressed fear in the chance of Nigeria in participating in the emerging global knowledge economy (Saint, Hernet and Strassner, 2003). This is a strong indication that the challenges are not to be played down on, while the recommendations and suggestion require more urgent consideration.

References

ARCSSTE- African Regional Centre for Space Science and Technology Education-
Annual Report. 2005. OAU. Ile-Ife. Nigeria. Available;

<http://www.oauife.ed.ng/research/arcsstee/document/annual-report-2005.PDF>.

Agholor, R. N. (1994). Evaluation of JETS Programme in Nigeria. Unpublished Doctor
of Science Education Thesis. Science and Mathematics Education Centre. Curtin.

University of Technology. Perth. Australia.

Ajeyalemi, Duro. (2008). Curriculum Reforms in the Nigerian Educational System: How
Sustainable. In Development and Sustainability in Nigerian Educational System. Proceedings of the
2nd National Conference of the Institute of Education, Olabisi Onabanjo University. Ago Iwoye. Pp 1-7.

Babalola, J. B. (2008). Educational Policy and Planning in Nigeria: Problems and

Prospects. In Development and Sustainability in Nigerian Educational System. Proceedings of the 2nd
National Conference of the Institute of Education, Olabisi Onabanjo University. Ago Iwoye. Pp 8-26.

East_sym.org (undated). Perspectives from Nigeria on the Science and Technology

Continuum from School to University. Available;

http://www.east_sym.org/documents/P3Akpan_STSontinuum.pdf.

Ellah, I. (2004). Non Implementation of Educational Policies: an inhibition to Education

Process (an appraisal of National Policy on Educational Services in Nigeria). Journal of Technology
and Education in Nigeria. 9 (1), 47 – 52.

Federal Ministry of Education Science and Technology. (2001). National Policy on
Information and Technology. Abuja. FMST Press.

Federal Government of Nigeria. (1986). National Policy on Science and Technology.
FMST Press.

Federal Government of Nigeria. (2004). National Policy on Education. Abuja. NERDC.

Federal Government of Nigeria. F.G.N. (2006). Keynote address delivered by the

Honourable Minister for Education at the opening ceremony of the 22nd annual conference/ workshop of the Nigerian Institute of Science / Laboratory Technology held at Abuja titled "Science and Technology for youth Empowerment".

available at <http://www.nislt.gov.ng/docs/Ministers%20paper.doc>

Gusen, J & Olarinoye, R. (2007). The Politics and Policy of Information and

Communication Technology in Educational System in Nigeria. Proceeding of the 21st Annual Congress of the Academy of Education. Bauchi. Pp 155 – 171.

JETSPOC (1988). Annual Reports on JETS. Federal Ministry of Education. Lagos.

Nigeria.

NERDC. (2007). The 9 year Basic Education Curriculum (Structure, Content and

Strategy for Implementation); Nigeria's Experience in Educational reform. By

Obioma G. CEO, NERDC. Available;

<http://www.udesa.edu.ar/files/EscEdu.Godswill2Obioma.Nigeria.pdf>.

Nigerian Computer Society (NCS). (2007). NCS Aims and Objectives. Available at

<http://www.ncsnet.org/index2>.

nmiscience.org (undated). Nelson Mandela Institution: African Institute of Science and

Technology. Available; <http://www.nmiscience.org/aist.html>.

Olujuwon, T. (2002). Education in Nigeria: A futuristic Perspective. Centre for

Educational Service. Lagos. Nigeria. Available:

http://www.cds.uwa.edu.au/iced2002/publication/Tola_Olujuwon.pdf.

Saint. W, Hartnett T. A, Strassner E. (2003). Higher Education in Nigeria: A Status

Report. Higher Education Policy, 16, pp 259-281.

Science Teachers Association of Nigeria. (1992). Raising the Standard of Performance in

Public Examination in Science, Technology and Mathematics. STAN Position Paper 4, 1992.

The ICASSE Newsletter (February, 2008). A Publication of the International Council of

Associations for Science Education. Available; www.icaseonline.com.

The Perth Journal 6. A Glimse of ICASE World Conference 2007 (Part 6). Available;

<http://dkct.blogspot.com/2007/07/perth-journal-6.html>.

THISDAY. (2008). Federal Government of Nigeria. THISDAY, March 3, 2008.

VN:R_U [1.9.11_1134]