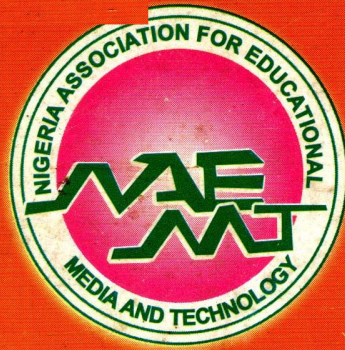
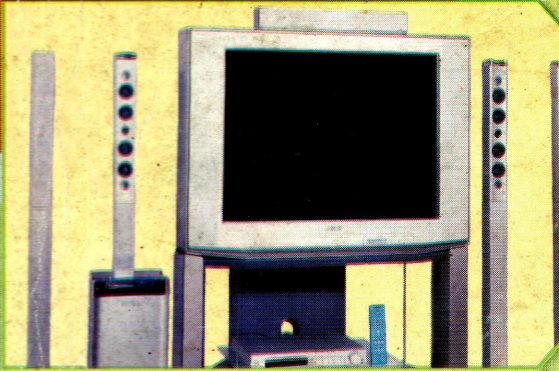
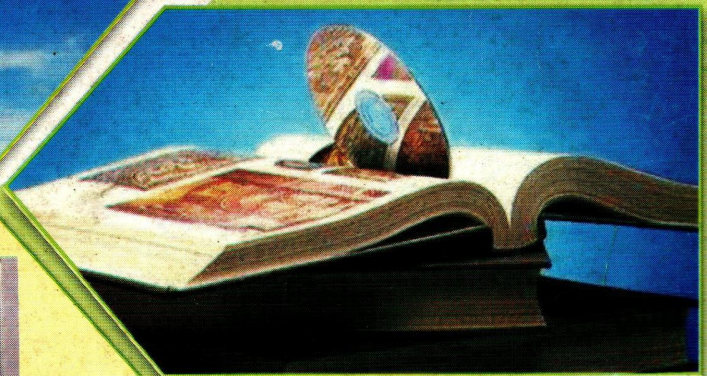


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Emerging Issues on Implementation of National Policy on Education and ICTs Integration in Science Education

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Introduction

It is stated in the National Policy on Education that a nation's policy on education is government's way of realizing that part of the national goals which can be achieved using education as a tool. Education in Nigeria is seen as an instrument "par excellence" for effecting national development (Federal Republic of Nigeria (FRN, 2004). Consequently, the National Policy on Education with respect to science education in Nigeria stated among other things that: Science education shall emphasize the teaching and learning of science process and principle. This will lead to fundamental and applied research in the sciences at all levels of education

The goals of science education shall be to: Cultivate inquiring, knowing and rational mind for the conduct of life and democracy; Produce scientists for national development; Service studies in technology and the cause of technological development; and Provide knowledge and understanding of the complexity of the physical world, the forms and the conduct of life.

Science and technology according to (Akpan, 2008) have become crucial factors for sustainable national development worldwide that have contributed immensely to the material progress of nations. It has been observed that one of the challenges of Education for development include the use of ICT provided the necessary organizational and policy changes can be implemented to make the technologies effective (UNESCO in Okonkwo and Adakole, 2009). Any plan therefore, that can help in the implementation of the nation's policy on education generally and science education in particular is highly appreciated.

Integration of information and communication technologies (ICTs) will help to implement the nation's policy on both education and science education that has been grossly inefficient.

Information and Communication Technologies (ICTs) integration stands the best chance for this implementation through its integration in science education. Information and Communication Technologies (ICTs) is a powerful technology in recent times that can promote the study of science education. It is now the most valuable commodity in the world and the job of accumulating, interpreting, packaging and transferring knowledge is the world's largest industry (Joyner, 2006). According to Ugwu (2008), ICT has through its personal and general roles transformed the world into a global village. It is a tool for global competitiveness and also a platform for skill acquisition as the world begins to experience a revolution with emphasis on knowledge-based economy rather than industrial finite resource economy as in the case of Nigeria (Modabelu & Onyali, 2008).

International competitiveness is increasingly being defined in terms of ability to access, learn, adapt, utilize and innovate from available technology. Being a platform for skills acquisition, it becomes very glaring that integration of ICTs in science education will in no small measure enrich and enhance implementation of the policy statements on science education; hence, the focal interest of this study becomes very imperative.

Science Education and Policy Implementation in Nigeria

Science education has been recognized worldwide as the bedrock for scientific and technological accomplishments. The Federal Government has recognized this fact and specified the goals of science education in its national policy (FRN, 2004) to include making special provisions and incentives 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. Also government shall popularize the study of the sciences and the production of adequate number of scientists to inspire and support national development (FRN, 2004). Since the formulation of the national policy on education, several legislations have been enacted to enforce the policy and parastatals and organizations have been formed to manage various

activities (Akpan, 2008). One important legislation is the education (National Minimum Standards and Establishment of Institutions) with specified authorities empowered to prescribe minimum standards at all levels of science, technical and vocational education.

The goals of science education as spelt out in the National policy are still far from being achieved. The problems militating against science education as documented by Okoye (2002) in Akpan (2008) includes among other things poor implementation procedure, scanty research reports on the performance of the program for implementation, lack of proper monitoring and feedback mechanisms and general lack of reinforcing home environments that reinforces students interest in science. These and even more, retard the growth of science education and invariably the implementation of the policies.

Adikwu (2009) submitted that the promotion of science and technology education is a warmly embraced venture. Science and technology have been prioritized in Nigerian educational system with policies that are favourably disposed to science and technology (Alebiosu and Ifamuyinwa, 2008). There is national policy on education and national policy on science and technology with good provisions for science and technology. But implementation of these policies is poor (Ellah, 2004 in Adikwu, 2009). Another policy is that of Information Technology. Akpan (2008) revealed that it is a felt need that Nigeria, as a developing country, that must participate effectively and ensure a key position in the emerging Information Age, requires an effective and efficient IT system organized by an appropriate policy on Information Technology

This policy is to make Nigeria an IT – capable country in Africa and a key player in the Information Society by using Information Technology as the engine of sustainable development and global competitiveness. The policy is anchored on the advancement of Information Technology through research and development that should among other things guarantee that the country benefits maximally and contributes meaningfully by providing the global solutions to the challenges of the Information age. According to Adikwu (2009) government has elucidated different educational policies that can help to move the system forward and also attempts have recently been made to strengthen some policies or block certain loopholes. One of the problems associated with educational policy and planning in Nigeria is that of implementation challenges and this eat into the fabrics of the system (Babalola 2008 in Alebiosu & Ifamuyinwa 2008). Identified areas that are either not implemented or not satisfactorily implemented like the development of national consciousness and unity and teaching and learning among others have indicated the non-implementation of Nigerian national policies (Ellah, 2004 in Alebiosu & Ifamuyinwa 2008) and this leads to stagnation or retrogression. According to Okebukola (2009), the gap between policy prescription and practice has remained wide. The three factors contributing to this gap according to Okebukola include, weak monitoring and evaluation mechanism, low financial input into the system and poor motivation and low morale for operators of the system.

In view of the changing and expanding educational challenges, there is need for a strong drive to create an environment for improvement on policy implementation having realized its role in achieving the national goals using education. It becomes necessary therefore, that a new world order that is information-technology driven be integrated in science education to enhance policy implementation in our educational system.

ICTs Integration and Science Education in Nigeria

In recognition of the role of ICT in advancing knowledge and skills in the modern world, there is urgent need to integrate ICT into education in Nigeria (FRN, 2004) especially science education. ICT offers access to information globally thereby creating enabling environment for development in science and technology. Curricular changes are moving towards the integration of ICTs in the teaching of science education due to emerging societal issues and values. Many science course contents are gearing towards an appreciation of the adaptability and integration of ICTs in improving the quality and quantity of classroom teaching and learning and bringing to relevance science challenges to meeting societal changes and needs. The 9-year basic education curriculum is targeted at improving relevance, quality and efficiency in education, reducing school drop out rate and promoting the acquisition of functional literacy, numeracy, life skills and values for life long education and useful living (NERDC, 2007 in Alebiosu & Ifamuyinwa 2008). It lays emphasis on communication and entrepreneurial skills. At the middle (primary 4-6) and upper (Junior secondary 1-3) classes, computer studies and ICT are compulsory. The

program stresses that instructional strategies that are activity-based and ICT driven will be adopted (NERDC, 2007 in Alebiosu & Ifamuyiwa, 2008). This is the effort made so far but these are not yet fully implemented so as to help solve societal challenges and develop students problem solving skills.

The Way Forward

The superiority of ICT-based science education over its traditional form is needed to integrate various activities, increase range of services offered, provide access to unlimited information from different sources provide round the clock access to users. The following strategies will therefore help to integrate ICT in science education.

1. **Creation of ICT hardware/software:** As science education is designed to facilitate the growth of scientific knowledge and technological innovation, it is believed that through the development of intellectual and creative potentials, science educators should be encouraged to introduce into the new curricula integration- interactive ICT hardware or software into the teaching of science education at all levels of education. There should be ICT software programmes that can provide creative science tools for expanding students current scientific knowledge and practices for innovations. This could be carefully implemented in subject contents to enrich students knowledge, skills for research, carry out experiments, do documentation, carry out analysis of data and develop ICT skills for classroom assignments and exploring new opportunities for creating psycho-pedagogical environments in schools.
2. **Review of science education curriculum:** There is need for the review of science education curriculum to include and reflect ICTs activities and programs. To this effect, the national policy on education should include and place emphasis on the provision of practical science and technology activities.
3. **ICT packages should be developed for simulation processes in carrying out experiments in virtual laboratories.** These packages will help in presentation of information in diverse ways through different forms like text, pictures, tables, graph and charts.
4. **Sending science teachers on ICT training.** A period should be mapped out for 3-9 months industrial training on the use of ICT packages in the teaching of sciences and in the handling and maintenance of ICT materials. Government should provide ICT centres for such training activities which should be certificated at the end. This will go a long way in stemming the tide of poverty and growing unemployment problems and help in the development of science and technology for sustainable national development. This will also help in the development of science and technology for sustainable national development. Such trainings will open doors for students self employment during holidays and in engaging in small and medium enterprises for self- sustenance. This will also become a window of opportunity to enhance and facilitate learning for students who may not have opportunity to further their education.

Implication for Stakeholders

Teachers should be made to be ICT compliant as this will make lesson delivery easier, faster and innovative and give relevance to different subject concepts.

Training centres having full equipped ICT studios and facilities should be set up for equipping teachers and students with needed competencies and skills to be able to face challenges in a global competitive and changing world.

Computer application should be inculcated in various school curricula at all levels of our education.

Private-Public partnership initiative should be encouraged to promote a faster and reliable integration of ICT software and hardware programs into school science-based subjects.

Professionally qualified personnels should be integrated as part of teaching staff from industries, labour markets, oil and gas sectors for effective adaptation of usable ICT programs. In-service training for teachers should be encouraged so that they acquire competency in handling and manipulating ICT tools to impart adequate knowledge to students during classroom interaction:

Providing infrastructure for ICT-based resource materials in each school at every level of education.

Conclusion

The effective power of ICT in providing necessary information among students and teachers for knowledge and skill impartation in living responsive and productive life cannot be overemphasized. A knowledge-based and skill acquisition technology will help bridge the gap and bring about the realization of the national goals and objectives in the implementation of national policy on education. The Nigeria education sector is facing uphill challenges that needs to be adequately addressed. For the country to effectively participate and realize its vision 2020 agenda and meet its millennial development challenges, researches must be undertaken to improve its quality of education through the infusion of ICT in every facet of its curricula development and implementation.

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