

## **Reforming Nigeria Science Education Curriculum: Challenges and Prospects**

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### **Abstract**

This paper looked at the Curriculum of Science in Nigeria in terms of what is the current Curriculum, what has not worked, what is working and what should be reformed. The paper also looked at the learning-teaching efficiency and the available resources, collaboration, and communication among lecturers as well as the characteristic responses from diversity of students groups. This paper also highlights the challenges of the present curriculum and the learning environment and its prospects.

### **Introduction**

Science education curriculum reform should be seen as an integral part of the dynamic process of educational development process and plans. In reforming Science Education Curriculum. It is important to consider the current curriculum, to find out what has not worked, what is working and what should be improved upon or reformed. Also, there is need to examine how efficient the learning-teaching process has been, students' learning outcomes and the learning environment, assessment and evaluation procedures, effective use of available resources and collaboration and communication among course lecturers as well as characteristic responses from diversity of students groups. Are these students motivated? Are they determined to make high grade?, Are they mature for their levels?

The curriculum of Science Education must be dynamic and move with the current developments all over the world. It therefore should be reviewed from time to time since this often changes in context and form which requires flexible techniques in pedagogy. The aim of any reform is to ensure that the programmes are always relevant to the nation's aspiration and meets current technological development. Any curriculum reform must consider the following issues. Is the curriculum still serves the society needs, aim and aspiration? What is the nature of the society? How is learning and teaching taking place in such

a society? The reform process must also examine the former curriculum if the learning opportunities that were intended to bring about certain changes such as students behaviour, assessment and evaluation of the extent to which the changes have been taking place will guide the reform plan process.

Curriculum reform is a cooperatively planed process which will fundamentally recast the education process as a whole; not just a spring clean of existing school syllabus and a revamping of teaching (Onwaka 2008; UNESCO, 2001). Many countries are redefining their priorities in order to compete effectively and profit maximally from the emerging global village. They appear to be a systematic shift from industrialization to technological development and advancement driven by a boost in knowledge and information. This changing scenario has impacted on education as global goals and priorities have emerged. Many countries are signatories to these new protocols and have followed them up with concrete actions.

### **Emerging Curriculum Issues and Nigerian Response**

There is the on-going educational issue which is to ensure that education is used to facilitate social and economic growth and development. These reform measures among others are related to curriculum reform include

- The adoption of a new curriculum structure at all levels;
- The preparation of the nation curriculum for the Integrated Childhood Care and Development (ICCD) and the on-going development of the care gave manual for the effective implementation of the ICCD curriculum;
- The planned review of the Senior Secondary School, curriculum to meet the demands of the envisaged vocational career realization;
- The plan to digitalized the school curriculum in order to facilitate use of ICT in learning and teaching (World Bank, 2006.; UNESCO, 2001).

### **The implication of these responses**

The planned reform at the levels of Science Education Curriculum should be guided by the following suggestions:

- Strengthening the curriculum contents of Chemistry, Physics, and Biology by drawing support from the new contents of basic Science in curricula in order to meet the demand of international curriculum emerging issues.
- Building upon the curriculum contents of Mathematics which should be systematically developed from what exists now at the upper and basic levels.
- Reviewing the contents of further Mathematics with a view to closing any gaps in its effective delivery as well as taking cognizance of the proposed re-

introduction of the Higher School Certificate Studies.

- Introducing entrepreneurial skill into the relevant carrier contents of STM in order to meet the set targets of post basic education and at the sametime maintaining a balance for the academic requirements of post basic education.
- Digitalizing the STM curricula specification which automates the various STM curricula;
- Creating digital templates for teaching and learning or where the expertise is not locally available, domestically existing digital templates and experts from other place that your aim covers what others have covered in the curriculum in focus.
- Establishing relevant digital infrastructure to house the applications of the digitized curricula (Obanya, 2002; Ajibola, 2008; Rock-man, 200).

### **Curriculum reforms and its Implications**

The implications of curriculum reform issues response highlighted above provide the back bone for identifying the gaps in the existing resources for STM curriculum implication at all levels, which means that

- Most Primary Schools which appear to be in a sorry state concerning effective equipment of Science and Technology Laboratories or resource rooms for learning science, technology and Mathematics, need to be reformed.
- Science and Technology Laboratories where equipments exist at all in the Junior and Primary, Senior Secondary Schools appear to be scantily equipped.
- There appear not to be any good Mathematics Laboratories or resource rooms at all education levels.
- The existing text books need reformation to suit the new STM curriculum at all levels education consequently the existing STM text books may be unable to meet the demands of the proposed restructuring of the post basic education level.
- The introduction of such subjects as Basic Technology and the infusion of entrepreneurial skills into the STM contents will render existing texts inadequate.
- Most teachers in their present state of computer knowledge deficiency may be charged with the responsibilities of teaching STM contents and they may not be able to cope with the new contents. In terms of gaps in teacher ICT capacity, it is important to note that: -

There has been cases that when Primary teachers were subjected to the same ICT tasks with the Primary 6 pupils, the pupils scored significantly higher points than the teachers (STAN, 2007).

- Most Mathematics teachers had difficulties coping with the further mathematics contents.
- It was difficult to have integrated science teachers therefore this resulted to teaching integrated sciences in separate components of Physics, Chemistry, Biology.
- Teachers continue to teach STM subjects through rote learning due to a combination of lack of resources and teacher poor training and preparation.
- It was becoming increasingly difficult to have qualified Physics teachers for the Senior Secondary Schools and tertiary institutions because of poor mathematics background and
- (f) the ICT infrastructure is inadequate to cope with the envisaged digitized curriculum and e-learning activities (Obanya, 2002).

### **Opportunities for generating resources for effective implementation of STM curriculum in the culture of reform**

The implications of the education reforms for STM education and the gaps in the existing resources for effective delivery of STM education offer opportunities for generating relevant and functional resources for STM education. Policy makers and stakeholders in the profession need to consider and address the following issues.

Explain in two (2) paragraphs. According to the following, issues must be address for proper reforming of the new STM curriculum.

- Establishing laboratories and or resources rooms for learning Basic Science and Technology at all levels of our educational systems;
- Reactivating and functionally equipping the STM laboratories at all levels of education;
- Establishing school or community based entrepreneurial skills workshops for upper basic and post basic education levels;
- Developing new relevant textual materials for Basic Science and Technology as well Basic Technology and Computer Science.
- Engaged discussions with private sector-led partners under the supervision of the Federal Ministry of Education to digitalise the basic education curriculum and domesticate it in the cultural context of Nigeria; This reform initiative will be piloted in some selected schools. This will eventually be extended to the post basic education level;

- Plans to establish LAN and WAN between the council headquarters, its six regional offices and all the Education Resource Centers (ERC) at the states and the FCT, so as to enable the exchange of curricula, textual and material information between the council and the ERC. On a long term plan it will be desirable to extend these resources to all the State Universal Basic Education Boards (SUBEB) and FCT SUBEB, States Ministry of Education and Local Government Education Authorities (LGEA);
- All stakeholders, state Ministry of Education, SUBEB should embark on procurement and installation of relevant ICT facilities and soft wares for STM education both in the schools and headquarters to compliment the efforts of the NERDC. This should be followed by the training of relevant staff in effective use of these resources.
- This capacity strengthening should cover various laboratory personnel in the modern techniques of strategic laboratory management. It is worthy to note that this critical mass of resources personnel is almost becoming extinct - reviewing the existing text books to be compliant with the new curricula specification of STM.
- Digitalizing the STM curricula at all levels and instituting the relevant infrastructure of derive-learning activities.
- Serving STM teacher should have their capacities strengthened in the restructured curriculum at all levels. This should be carried out first at the post basic level when the curriculum is reformed as planned which is presently out. All the stakeholders, states, ministry of education, SUBEB, should present the curriculum and implement the current curriculum. Furthermore teachers always work towards content coverage not curriculum objective achievement which makes educational outcome on satisfactorily and not bearably solve societal problems. The society has not got the real value for school graduates as they ought to hence incentives and remuneration are necessary for both the students and teachers, for effective performance in the implementation of curriculum hence need to reform the curriculum.

### **The way Forward for Curriculum Reform**

Teachers should be creative in their lesson plan and allow students to act as independent investigators and thinkers rather than "recipe receivers". The duty of lecturer in the learning environment is to be facilitators of knowledge in a student-centred classroom. The lecturers should devote time to modeling the skills and attitudes they expect to see in students as they collectively work in the

classroom. The lecturers should give the students activities that will foster critical thinking and make students begin to learn how to find answers to questions from several sources such as the internet, journals, libraries, parents, video-tapes, community members, and from other fellow students. This will make them knowledge seeking and not knowledge consumers.

Another way forward include, among other things, the idea that the curriculum should be organized in theme so that the method of instruction is thematic, whereby concepts and facts are integrated at all levels of instruction. The thematic approach should be adopted because it enables students to see how the parts of their whole discipline fit together logically and how the information they are learning is used to describe other phenomena (UBE, 2000). Another advantage of the thematic approach is that it is used to integrate the main subfields of a discipline. Also the mentoring approach can be used to integrate the young teachers who should be linked to mentors, so that such a mentor serves as a supervisor / adviser in many capacities for the young teacher. The learning and teaching environment should be that in which the practice should be hands-on, mind-on method of instruction for better training and preparation of teachers. Where thematic curriculum has been adopted, it will be good to allow it to run for a longer period so and to see the effect.

### **Prospects of Curriculum Reform**

The Nigerian Education Research and Development Council (NERDC) that has the statutory mandate for reviewing the existing text books should be received with the curricula specifications of STM. NERDC has commenced plans to accomplish this task with publishers and other professional stakeholders. The good news or prospects in this regards is that the NERDC in connection with the SUBEB and FCT, UBEB have trained serving STM teachers in April, 2007 using the new basic education curriculum. The NERDC has commenced exploratory actions on this major reform initiative of digitalizing the STM curriculum. For instance, the council has engaged in discussions with private sector-led partners under the supervision of the Federal Ministry of Education, to digitalize the basic education curriculum and demonstrate it in the cultural content of Nigeria. This reform initiative will be piloted in some selected schools. It will eventually be extended to the post basic education level. There is the plan to establish local area network (LAN) and wireless area network (WAN) between the council headquarters. Its six regional offices and all the education resources centres (ERC). These e-work stations are effective resources as they will drive e-learning in STM education. Mentoring is good for the mentor lights little candles that will

shine back to him in later years. The UBE curriculum and secondary thematic and other level are already doing something in that regards.

### **Conclusion**

In this paper, we have considered globally emerging issues in STM education curriculum reform and how these have informed the on going educational reform in Nigeria. NEEDS, which is the main driving reform force in Nigeria, has led to the redefinition of education goals and policies. This implies that, the curriculum which provides the upstream reform activity should be restructured at all levels. In particular, the restructuring process has just been completed at the basic and post basic education levels has just been released last week on June, 2010, plans are also on to carry out similar exercises at the tertiary education level and for teacher education training programmes. The restructured curriculum has far reaching implications for redefining the resources for delivering the e-facilities as well as on the plans to strengthen the capacity of STM teachers and associated personnel, for quality teaching and learning of STM in Nigeria.

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