

Emerging Issues on the Universal Basic Education Curriculum in Nigeria: Implications for the Science and Technology Component

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Abstract: The Universal Basic Education (UBE) which was formally launched in 1999 is an educational reform programme of the Federal Republic of Nigeria. The UBE is to provide a universal, free, compulsory and continuous 9 year education programme. In line with the programme, the Nigerian Educational Research and Development Council (NERDC) has developed a new 9 year Basic Education Curriculum for distribution to schools. This study examines the New National Curriculum for the Basic Education programme with emphasis on the implementation of Basic Science and Technology components. It highlights the main focus of the Basic Science and Technology Curriculum. Finally, the study discusses emerging issues and makes recommendations to ensure successful implementation of the Basic Education curriculum.

Key words: Universal basic education, curriculum, science, technology, emerging issues, Lagos

INTRODUCTION

Education has remained an instrument of change and national development. It is a social process and the medium for the acquisition of relevant knowledge, skills and attitudes for survival in a changing world. The strengthening of democratic institutions witnessed the world over including Nigeria and the rapid increase in globalization have become more prominent in the 21st century. Nations desire closer cooperation, improvement in the quality of life, respect for the rule of law and Human Rights and peaceful co-existence among communities and nations constitute global issues of concern.

In responding to these issues Nigeria has been part of the global deliberations on Education for All (EFA) which have been reflected in the national education policies and programmes. Notable among these policies are the National Economic Empowerment and Development Strategies (NEEDS) developed, adopted and implemented in 2004. NEEDS has four critical elements which are: value re-orientation, poverty eradication, wealth generation and job creation.

NEEDS is also anchored on the Millennium Development Goals (MDGS). Since education is the vehicle for cultural transmission and economic transformation, basic education must transform and empower people. Hence, the relevance of education in the actualization of NEEDS cannot be overemphasized. Thus, if education will be used to achieve the goals of NEEDS, its contents and processes of delivery should be reformed in the context of improving the quality of life and facilitating the cherished global values earlier mentioned.

The Universal Basic Education (UBE) programme, an educational reform programme of the Federal Government of Nigeria was introduced to serve as a catalyst for

achieving free, compulsory and universal 9 year education for all school age children irrespective of their socio-economic circumstance (Federal Government of Nigeria, 2006). The Universal Basic Education (UBE) programme was launched on 29th September 1999 by former president Olusegun Obasanjo in Sokoto, Sokoto state. UBE Act (2004) which was signed into Law in May, 2004 provided the legal framework for the programme and an indication of its effective take off.

The implementation started in July, 2005 with the appropriation of the UBE fund to the Universal Basic Education Commission (UBEC) and subsequent disbursement to states. The education programme is regarded as a reinforcement of the 6-3-3-4 policy on education rather than a new policy in itself. The New Basic Education curriculum was approved by the National Council of Education (NCE) in December 2005. There is no doubt that the curriculum is the bedrock of any educational reform of which the Universal Basic Education is not an exception.

In this study, the author examines the 9 year Basic Education curriculum with emphasis on the implementation of Basic Science and Technology components. It highlights the objectives, structure, contents and the mode of implementation of the Basic Science and Technology Curriculum. Finally, the study discusses emerging issues and makes recommendations for the implementation of the curriculum in the context of the Universal Basic Education Programme.

THE NEW 9 YEAR BASIC EDUCATION CURRICULUM

The philosophy of the 9 year Basic Education Curriculum as stipulated by the Nigeria Educational and

Table 1: Subjects which are taught in Basic Education Curriculum

Levels	Core/compulsory subjects	Elective subjects
Lower Basic (Primary 1-3)	English Studies One Nigerian Language (L1 or L2) Mathematics Basic Science and Technology Social Studies Creative and Cultural Arts (CCA) The religions (CRS and Islamic Studies) Physical and Health Education (PHE) Computer Studies ICT age	Agricultural Science Home Economics Arabic Language Must offer 1 elective but not >2
Middle Basic (Primary 4-6)	English Studies One Nigerian Language (L1 or L2) Mathematics Basic Science and Technology Social Studies Creative and Cultural Arts (CCA) The religions (CRS and Islamic Studies) Physical and Health Education (PHE) French Language Computer Studies ICT age	Agricultural Science Home Economics Arabic Language Business Studies Must offer 1 elective but not >3
Upper Basic (JS 1-3)	English Studies One Nigerian Language (L1 or L2) Mathematics Basic Science Social Studies Creative and Cultural Arts (CCA) The religions (CRS and Islamic Studies) Physical and Health Education (PHE) French Language Basic Technology Computer Studies (ICT age)	Agricultural Science Home Economics Arabic Language Business Studies Must offer 1 elective but not >3

Development Council is that every learner who has gone through the 9 years of basic education should have acquired appropriate levels of literacy, numeracy, manipulative, communicative and life-skills as well as the ethical, moral and civic values required for laying a solid foundation for life-long learning as a basis for scientific and reflective thinking.

In line with the philosophy, the 9 year Basic Education Curriculum was developed by the Nigeria Educational Research and Development Council (NERDC) from the primary and junior secondary curricula. The new curriculum has been approved by the Federal Government and the existing Primary and Junior Secondary Curricular have been reviewed to meet the needs of the pupils and students, respectively. It is also pertinent to highlight the three components of the curriculum according to the corresponding levels and the age of the pupils and students from primary 1-3, 4-6 and JS 1-3. The 9 years Basic Education Curriculum (Basic 1-9) has three components namely:

- Lower Basic Education Curriculum for primary 1-3 (age 6-8 years) Basic 1-3
- Middle Basic Education Curriculum for primary 4-6 (age 9-11) i.e., Basic 4-6
- Upper Basic Education Curriculum of Junior Secondary (JS) 1-3 (age 12-14) Basic 7-9

The framework of the Basic Education Curriculum reflects the following:

- The curriculum is designed to properly target pupils and students needs and interests to make provision for appropriate core and elective subjects for a well rounded education at the different age levels
- Implementation of the new 9 year Basic Education Curriculum will commence concurrently in primary 1 and JS1 in September 2008 nationwide. It is noteworthy that primary 2-6 and JS 2-3 in 2008/2009 school year will continue to use the present Primary and Junior Secondary Curricula. The old curricular will be gradually and systematically phased out
- The lower and Middle Basic Education Curricula (for primary 1-6) will be in full use by the year 2014 and the Upper Basic Education Curriculum (for JS 1-3) will be achieved by the year 2011
- Every child is expected to complete primary 6 before being placed in Junior Secondary (JS 1)

An overview of subjects to be taught in the Basic Education Curriculum is presented in the table. The three levels with the corresponding core subjects to be taught and the electives to be offered are shown in Table 1. The new areas of emphasis in the new 9 year Basic Education Curriculum are:

- Value reorientation
- Basic Science
- Basic Technology
- Computer Science
- Teaching of thinking

- Home Economics
- Agricultural Sciences
- Business Studies
- Civic Education
- French

In the 1999 implementation guidelines, 9 strategies to be aggressively pursued to facilitate the successful achievement of the UBE objectives included the following:

- Public enlightenment and social mobilization for full community involvement
- Data collection and analysis
- Manning, monitoring and evaluation
- Teachers: their recruitment, educational training, retraining, motivation
- Infrastructural facilities
- Enriched curricula
- Textbooks and instructional materials
- Improved funding and management of the entire process

BASIC SCIENCE AND TECHNOLOGY CURRICULUM

In the Nigerian education continuum, basic education as the foundation requires a sound knowledge of Science and Technology. This is not only because Science and Technology has a tremendous impact on all social institutions but also because science teaching is virtually non-existent in our primary schools (Danmole, 1998). The 9 years Basic Science and Technology Curriculum is a restructuring and re-alignment of the revised Core Curriculum for Primary Science and the Integrated Science of the Junior Secondary School currently in use.

In the selection of content, Globalization, Information and Communication Technology (ICT) and Entrepreneurship were three major issues considered to be crucial in the development of the child, important in nation worldwide and influencing the contemporary world of knowledge. In the aspiration for identification with contemporary development globally, it has become inevitable for Nigeria to incorporate relevant content into the school curriculum. Hence, four new areas approved for the Science and Technology Basic Education Curriculum are:

- Environmental Education
- Drug Abuse Education (DAE)
- Population and Family Life Education POP/FLEE
- Sexually Transmitted Infections (STIs) e.g., HIV/AIDS

These have been infused into every class of Basic 1-9 also Introductory Technology has been introduced at the lower and Middle Basic levels. The objectives of the new Basic Education Curriculum in Science and Technology are also spelt out thus to enable the learner:

- Develop interest in science and technology
- Apply their basic knowledge and skills in science and technology to meet societal needs
- Take advantage of the numerous career opportunities offered by the study of science and technology and
- Become prepared for further studies in science and technology

It is noteworthy that Basic Science and Technology offered at the lower and Middle Basic Education levels is separated at the Upper Basic Education level (JS1- JS3) to provide students with appropriate experiences in science and technology in order to achieve the objectives of the Science and Technology Curriculum. The overall goal is to ensure the development of survival strategies by learners to live effectively within the global community. Knowledge, skills and attitudinal requirements are addressed under these four themes:

- You and environment
- Living and non-living things
- You and technology
- You and energy.

This is to present a holistic picture of science and technology content to the pupils. At the Upper Basic level however, You and Technology was changed to Science and Development. The curriculum offering at the lower, Middle and Upper Basic levels are shown below:

- Basic Science and Technology (Lower level 1-3)
- Basic Science and Technology (Middle level 4-6)
- Basic Science (Upper level 7-9, JS 1-3)
- Basic Technology (Upper level 7-9, 1-3)

The Basic Science and Technology of the Lower, Middle Basic levels and the Basic Science and Basic Technology of the Upper Basic levels are Spiral Curricula. The latter entails the introduction of the topics right from the Lower Basic to the Upper Basic (Basic 1-9) levels (JS 1-3) showing a vertical relationship among the topics which are taught beginning from the simple to the complex from Basic 1 through to 9, respectively. The reason for this is not only to sustain the pupils and students interests in science but also to ensure the understanding of simpler topics before teaching complex ones in order to

promote meaningful learning. The activities prescribed for each topic in the teaching and learning process imply full participation of pupils and students. Thus, encouraging a child-centered teaching and activity oriented learning.

EMERGING ISSUES ON THE BASIC EDUCATION CURRICULUM

Curriculum is a course of study offered in school, college and other institutions, Longman Group (1987). In this definition, the focus is on subjects to be taught. Curriculum may be viewed as a set of learning experiences planned to influence learners to bring about the objectives of education.

Curriculum is also a structured plan of action that guides the process of education. The Basic Education curriculum which is a new one is different in many ways from that currently in use. The UBE has necessitated curriculum change and innovation as a result of the desire for the improvement and transformation of the educational system.

The Basic Science and Technology Curriculum component assumes a prominent position in the overall Curriculum because topics in science and technology constitute core or compulsory content of the curriculum from lower Basic through Middle to Upper Basic levels.

In the preceding paragraph the justification for selection of content, objectives, four new areas, content outline of the Basic Science and Technology Curriculum within the context of the Basic Education Curriculum have been highlighted. It would seem that the bane of any reform in Nigeria is not in the policy or curriculum offering but rather in the implementation of the programme. This perhaps is the aspect where significant lapses may occur in the achievement of the curriculum. A number of issues have emerged which have implications for the implementation of the curriculum. These are:

- Teachers understanding of the philosophy and objectives of basic science and technology curriculum
- Capacity building
- Quality of curriculum delivery
- Production and provision of instructional materials
- Enrolment and class size
- New areas of emphasis
- Mode of assessment and conduct of examination
- National common entrance examination and certification
- Monitoring, supervision and inspection, evaluation
- Infrastructural facilities

The emerging issues on the BE curriculum enumerated are discussed one after the other.

TEACHERS UNDERSTANDING OF THE PHILOSOPHY AND OBJECTIVES OF BASIC SCIENCE AND TECHNOLOGY CURRICULUM

Odubunmi observed that a teacher who does not understand the philosophy of a subject might find it difficult to teach the subject. This is a truism with respect to science teaching. Also, the objectives provide the direction for implementation of the curriculum.

Hence, it is pertinent to ensure that teachers understand the teaching requirement in the attainment of each of the objectives enumerated in the Basic Science and Technology Curriculum. Furthermore, it is not a new phenomenon that a large number of school teachers demonstrate ignorance of the objectives of science teaching especially at the primary schools level (Danmole, 1998).

CAPACITY BUILDING

The quality of teachers is a determinant of the quality of the educational system. Teachers constitute the human resource required for the facilitation of achievement of the objectives of the BE curriculum and its implementation. Since what teachers do in the classrooms and laboratories are largely dependent on what they know. Capacity building for teachers is imperative for the implementation of the new BE curriculum.

The training and retraining of teachers is necessary for them to enact reform-based curriculum such as that of the BE Programme. The capacity building process should be systematic and continuous through science workshops, seminars, enlightenment programmes on the reform, orientation courses and other useful educative activities.

This is because teachers themselves like the pupils and students require support to be effective in the delivery of the curriculum. Furthermore, curriculum materials such as teachers guides, handbooks and manuals should be designed to improve teacher quality as one potential vehicle towards supporting them.

Professional growth and development during service should be encouraged. The number of qualified teachers presently in the schools especially for science subjects is grossly inadequate for the Basic Education Curriculum. Nigerian teachers are ill-motivated and often of low morale. Presently, teachers under the umbrella of the Nigerian Union of Teachers (NUT) are on strike for improved salary. The recruitment of teachers cannot be overlooked especially in the new subject areas.

QUALITY OF CURRICULUM DELIVERY

The spiral curriculum requires child-centered and activity-oriented teaching/learning process. The use of different teaching methods and strategies to ensure students understanding of topics has become imperative. The guided discovery method of teaching which is encouraged in science teaching is time-consuming and requires planning and dedication on the part of the teacher. It is interesting to note that classroom activities which most teachers perceive as indicative of good teaching are still predominantly teacher-centred activities. New teaching techniques and strategies highly learner-centred such as concept mapping and cooperative learning should be taught to science teachers during capacity building. Process-base learning requires the utilization of instructional materials and science apparatus by science teachers in this new dispensation. Most importantly, students participation must be prominent in the methodology. New techniques such as concept mapping and cooperative learning should be taught to teachers to improve their teaching competencies. Effects of concept mapping technique on the performance of students in science subjects have been widely researched and documented empirically (Novak, 1990; Okebukola, 1991; Danmole and Adebayo, 2005). A cooperative learning technique is yet another that has the potentiality to bring about meaningful learning (Okebukola, 1984). There should be good presentation of relevant information by the teacher and the encouragement of interaction among pupils and students. Also, curricular and experiential knowledge possessed by the teacher with adequate display of such knowledge through involving students will result in meaningful learning.

PRODUCTION AND PROVISION OF TEXTBOOKS AND OTHER INSTRUCTIONAL MATERIALS

The information in the UBEC 2006 document is that free textbooks will be provided for four core subjects in primary schools and five core subjects in Junior Secondary Schools. These include Basic Science and Technology, Basic Science and Basic Technology in Basic 1-6 and Basic 7-9, respectively. The need for the provision of textual materials for pupils and students cannot be ignored. Many pupils and students come to school without books for a number of reasons, one of which is poverty. The production and provision of textual and other instructional materials should be a priority for quality delivery of the curriculum. Simple science apparatus and equipment should be part of the package in the provision of Government in the Basic Science and

Technology component of UBE Programme. It could be argued that teachers at these levels should improvise instructional materials. There is a limit to the extent of improvisation realizing that some equipment cannot be improvised. Besides, teachers and students require exposure and practical experience with standard and modern apparatus and equipment.

ENROLMENT AND CLASS SIZE

It should be expected that since the UBE is to be free and compulsory, the enrolment figure is bound to increase and result in large classes. Presently, the average class size is larger than what is stipulated in the National Policy on Education (Federal Republic of Nigeria, 2004). Large classes would hinder curriculum implementation because the quality of teaching will be poor due to inadequate teacher: student ratio. In addition, data on number of eligible children for the UBE is desirable. This will assist in determining the likely enrolment figure of pupils and students at the Lower, Middle and Upper Basic levels of the programme. The class size also has implication for the quality of teaching, assessment, use of instructional materials and ultimately quality of learning.

NEW AREAS OF EMPHASIS

The core subjects introduced into the curriculum such as Basic Science, Basic Technology, Computer Science, Science and Development, Information and Communication Technology (ICT) have necessitated the need for more science teachers with relevant competencies in these subjects. Computer literacy and ability to access the internet to match students' sources of information and modern ways of collecting information are desirable. The four new areas indicated in the UBEC document namely: Environmental Education (EE) Drug Abuse Education (DEE), Population and Family Life Education POP/FLE and Sexually Transmitted Infections STIs e.g., HIV/AIDS require new and update science knowledge, communication skills, pupil/student-friendly instruction to actualize the new areas. Thereby bringing about achievement of the objectives of the curriculum.

MODE OF ASSESSMENT AND CONDUCT OF EXAMINATION

The policy indicates that major mode of assessment will be school based or Continuous Assessment (CA) of learning outcome under the UBE programme to determine the child's progress from one level to the other. In addition, a Continuous Assessment Instrument has been

standardized and would be applied nationwide. The proposed instrument has to be available to all schools at the correct time for uniformity and objectivity of assessment without which the CA of different quality will result in serious disparity in the assessment of learning outcome in different schools. All forms of evaluation: diagnostic, formative, illuminative and summative should be utilized in the assessment procedures. Assessment should not be limited to the cognitive domain alone because science leads to acquisition of various skills, the effective and psychomotor domains too should be assessed. Thus, the mode of assessment and conduct of examination (the only one examination after Basic 1-9) must be effective and uncompromised in the successful implementation of the curriculum.

With respect to the conduct of examination leading to the award of Basic Education Certificate at the end of JS 3 (Basic 9), the policy stipulates that CA will constitute 60% of the overall student assessment while an external examination to be conducted by state Ministries of Education and Moderated by an approved body will constitute 40%. Danmole (1998) noted that Continuous Assessment (CA) requires adequate record keeping.

A child will repeat a level if he fails to satisfy certain conditions. The policy must be specific on what these conditions are. CA and external examination are the major mode of evaluating the curriculum. Assessment outcomes are also of great importance to teachers, parents, the schools, parent teachers association and other stakeholders because results will be used to take decisions on pupils and students academic progress. Indeed, assessment outcome are also important to Government as stakeholders in Education because it reflects the level of achievement of students and consequently that of the system.

NATIONAL COMMON ENTRANCE EXAMINATION AND CERTIFICATION

The examination for admission into JSS has been abolished (UBE Act, 2004) since 2006. Movement from the primary school level is dependent on CA which is not new in the Nigerian school system. However, its operation had been very haphazard, subjective and unreliable in our schools. Hence, adequate supervision of CA by the school and State Universal Basic Education Board (SUBEB) should be a priority. This is to ensure that the correct certificate is given to each pupil at the end of Basic 1-9.

MONITORING, SUPERVISION, INSPECTION AND EVALUATION

Supervision and Inspection are viewed as phases of administration that affect the achievement of the

objectives of an educational programme. Supervisory duties directly affect the curriculum which is the academic programme of the school hence the quality of instruction. Supervisory duties which rest on the school head or principal should be given the utmost attention. Several measures should be put in place to ensure thorough supervision of the proper use of the approved syllabus, scheme and record of work, the lesson plan, the time table and school laboratory.

Effective use of textbooks provided and supervision within the school administration such as staff meetings are also important. Inspection is carried out by the inspectorate unit of the Ministry of Education to evaluate science instruction and ensure that the desired result is being achieved.

Additionally, a science inspector should inspect the delivery of the Basic Science and Technology Curriculum. Inspection should be regular and continuous. Inspection is concerned with the curriculum in all its ramifications. Therefore, the four components of the Basic Education Curriculum must be subjected to inspection.

INFORMATION COMMUNICATION AND TECHNOLOGY

In service teachers who are the implementers of Basic Science and Technology curriculum are encouraged to be computer friendly and hence computer literate. They should learn how to access information from the internet. Information Communication Technology (ICT) is a global phenomenon without which the implementers of Basic Science and Technology may be handicapped in the delivery of the curriculum. ICT should be incorporated into all teacher education programmes (pre-training and post-training).

INFRASTRUCTURAL FACILITIES

The disarticulation of JSS from SSS in order to ensure the existence of two separate administrations in the existing secondary schools would not only require more qualified teachers, it would also entail the provision of additional infrastructures in the junior secondary school. There is the need for new laboratories especially if students had been sharing laboratories with the senior secondary school students. This would enable the exposure of J.S. (Basic 7-9) Students to practical laboratory experiences, acquisition of science process skills, scientific attitudes in their Basic Science and Technology subjects without any hindrance.

CONCLUSION

The Universal Basic Education programme no doubt is hinged on a sound philosophy has enriched curricular with laudable implementation strategies. Curriculum is the heart of any educational programme without which such programme will be in jeopardy. Emerging issues raised in this study are by no means exhaustible. The issue of funding cannot be over emphasized because it is the fuel for sustaining all the activities that will culminate in the successful implementation of the Basic Education Curriculum. Indeed, the functionality and sustainability of the total programme is highly dependent on funding.

The role of universities at this juncture should be highlighted. The justification for participation of higher institutions is based on the fact that quality of higher education requires a solid foundation. UBE is a national educational movement and all universities especially Faculties of Education are also stakeholders. UBE is a national learning experience therefore, universities as the apex of learning must be part of the reform. Their relevance can be felt through participation in the training and retraining of teachers, evaluation of the curriculum and collection of data for the Federal and State Governments on UBE. The holding of conferences such as the present one to deliberate on education issues is a laudable one. Participation in the Millennium Development Goals (MDGs) with respect to implementation of UBE is of paramount importance.

It is the hope that problems with previous education programmes such as the lack of political will inadequate funding, insufficient quantity and quality of teachers especially in the sciences will be given the required attention. The lack of adequate data to work with, lack of proper records and lack of managerial capacity should be tackled with utmost sincerity of purpose. The cooperation among the Federal and State Governments, UBEC, SUBEB, NTI, NERDC, Universities, Schools, Teachers, Parents and other stakeholders of Universal Basic Education (UBE) is imperative for implementation, functionality and sustainability of the programme.

RECOMMENDATIONS

- Government should embark on massive continuous orientation and training/programmes for in-service teachers towards the implementation of the UBE curriculum
- Government should ensure a survey of infrastructural facilities in the public schools and commence the process of renovation and building of new structures commenced with immediate effect

- Government should make copies of the New Basic Education curriculum available to primary and junior secondary schools to ensure adequate implementation of the curriculum
- Government should ensure that the NERDC produces adequate number of textbooks for students, teachers' guides and manuals for the schools
- Class size should be streamlined to correspond with the provision in the National Policy on Education for effective teaching
- The supervisory and inspectorate units of Ministries of Education should be empowered with adequate human and material resources to constantly inspect schools and ensure that curriculum delivery is adequate
- Government and schools should encourage and support Teachers membership of professional bodies such as Science Teachers' Association of Nigeria (STAN)
- There is need to incorporate Information, Communication Technology (ICT) into capacity building in the Sciences and Teachers Education programmes in Nigeria
- The Teachers' Registration Council should be responsible for the regulation standard and practice in the teaching profession
- Funding of research into different aspects of the Universal Basic Education curriculum has become desirable and imperative

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