# RE-GENERATING SCIENCE AND TECHNOLOGY CURRICULA IMPLEMENTATION AT JUNIOR SECONDARY SCHOOL FOR SELF RELIANCE AND NATIONAL DEVELOPMENT

***Dr. Stephen Akomaye Adah***
*Department of Curriculum and Instructional Technology,*
*Cross River University of Technology,*
*Calabar.*

And

***Dr. James O. Ibe***
*Department of Curriculum and Instructional Technology,*
*Cross River University of Technology,*
*Calabar.*

## Abstract

The paper examines science and technology curricula implementation at the junior secondary schools in the context of self reliance and poverty eradication in Nigeria. This is rooted in the realization that today's world of work is driven not only by knowledge economy but also by job specific skill acquisitions. The paper articulate what is and what ought to be in the context of science and technology curricula implementation at the junior secondary school level to enable beneficiaries of the programme acquire the requisite skills that will enhance their job attainment and earnings, as well as general well-being of the society. The paper posits that thorough re-generation of the science and technology curricula implementation is imperative and a sine qua non for self-reliance, poverty eradication and national development.

The promotion of science and technology education has been a warmly embraced venture. Nigerian Educational System prioritized science and technology with policies that are favourably disposed to science and Technology Education. The national policy on Education (FRN, 2004) has made robust provision for science and Technology Education in the context of labour market demand. That special provision shall be made for technical and

vocational education with emphasis on the acquisition of practical skills, attitudes, understanding and knowledge relating to occupation in various sectors of economy in the world of work. The main features of the curricular activities shall be structured in foundation and trade modules and that each trade shall among other things comprise of: (i) workshop practice (ii) industrial training/production work and (iii)small business management and entrepreneurial training.

Again trainees on completing technical and vocational programmes as it is expected shall have three options namely:

i) Secure employment either at the end of the course or after completing one or more modules of employable skills.
ii) Set up their own business and become self-employed and be able to employ others.
iii) Pursue further education in advanced craft/technical programmes.

All of these provisions are rooted in the realization that one of the indices of global leadership is a nation's capacity to reduce extreme poverty and over dependence on other nations (Oyetunde and Umolu, 2009).

The National Policy on Education provides for the JSS 3 to be either terminal or a means to an end through the inculcation of skills in vocational education and practical training in job specific areas. Provision is equally made for technical education to develop the spirit of creativity, innovations and inventions among beneficiaries.

Unfortunately very little has been achieved in the implementation phase. There are still some serious lapses in the implementation of the science and technology curriculum particularly at the junior secondary level. Aviomoh (2004) and Osokoya (2008) contended that the absence of core technical teachers and trained craftsmen in schools is affecting technical education at all levels in Nigeria.

This, according to the authors has resulted in the JSS system not being able to attain its initial objectives of equipping the beneficiaries with job specific skills. In the same vein, Oyetunde and Umolu (2009) alerted that something need to be done to improve on the quality of education offered at the JSS level if we have to achieve the task of equipping the children with needed skills for life out of school.

They expressed their concern for the junior secondary education programme thus:

> "…. There is abundant evidence that the 3 years segment of JSS programme as it is offered in secondary schools is failing in the task of equipping children with requisite skills, ….. JSS Education, as it is now is a disservice to average Nigerian child who is a beneficiary because it gives a false impression that he has been equipped with skills for out of school life". (pp. 102)

A curriculum is adjudged effectively implemented only if the expectations, needs and aspirations of the people it is purposed to serve are met. The output indicator for measuring curriculum implementation is levels of competence in performance and service delivery of the output (students) using knowledge and skills acquired.

This paper therefore provides an insight into possible ways of implementing the science and technology curriculum at the junior secondary school levels to relate to the demands of the labour market and to make beneficiaries of the programme self-reliant.

**What is Curriculum and Curriculum Implementation?**

Curriculum is a structured series of learning experiences intended for the education of learners. To Onyike (1989), it is an educational programme of learning experience made available to the learner under the direction and supervision of the school so as to bring about desired changes in his behavior. The learning experiences may be overt or covert, mental or physical but goal-oriented.

Curriculum implementation is the practical and instructional phase of the curriculum process. Alexander and Saylor (2002) defined curriculum implementation as the actual engagement of learners with planned learning opportunities to enable them meets their needs and that of the society. It presupposes that the needs of the learners and the needs of the society are two areas in which issues of effective curriculum implementation could be examined. For instance, why does a society build schools? What should school do to make learners self-reliant and employable in the labour market? The issues raised in these questions could only be addressed through proper implementation of the school curriculum.

The major implementers of the curriculum are the teachers. They set up learning opportunities aimed at enabling learners acquire the desired knowledge, skills, attitudes and values. To implement a school curriculum, certain right decisions must be taken otherwise, the intentions of the curriculum developer would be far from realities.

**Ways of Re-generating Science and Technology Curricula at JSS Programme for Self-Reliance and Poverty Reduction**

A good curriculum plan can be marred at the implementation stage. To **avoid such unpleasant situation, certain issues must form the guiding principles on which the implementation of the curriculum is based. Some of the issues are raised in the following questions:**

a. What is the purpose of a programme or training for which students are admitted for?
b. How best can meaningful learning experiences be provided and achieved?
c. What are the impediments to achieving the expected learning experiences or skills?

d. How can these impediments be overcome.

**What is the Purpose of a Programme of Studies or Training?**

For any society to survive from generation to generation, it must educate its offspring. The education process involves handing over culture from one generation to another. Since it has been impracticable for single individual or parents to educate their children, societies consider schooling as the best option. Children of the same age range or group or ability are brought together in formal setting and made to pass through instructions that embody societal expectations of them. The embodiment of expectations constitutes the curriculum. It is expected that schools would teach the norms and values of the society, as equipment for the children's survival. It is the function of schools to help the children develop appropriate skills, abilities and competencies for high moral conduct, security and battle against poverty.

The issues to be addressed within the class should answer questions on what skills, abilities and competencies are socially appropriate and desirable in the society? What skills are required in combating hunger and poverty? What job specific skills that should be taught to make beneficiaries of the programme self reliant? Which group of ability level should be taught what? This last question is the basis for selection of curriculum contents at the different levels of our Educational System.

**How Best Can Meaningful Learning Experiences be Provided and Achieved?**

The needs of the learners and the needs of the society are two target areas in which issues on meaningful learning **should be anchored. For instance, why does a learner need to go to school? Why does a society build schools? What should schools do to make learners self-reliant and to eradicate poverty? All of these questions revolve around curriculum implementation process to reflect: current societal values, labour market demands, and job-specific skills. Curriculum implementation should not be anchored on needs** that no longer exist nor should it neglect new needs which are not being met (Ekpo, 2006).

How can the issues raised in these questions be addressed in implementing basic science and technology curriculum in JSS 3? Let us take skill acquisition which is a topic in the basic science curricula. The issues to be addressed in the classroom should enable students to see reasons for skill acquisition, appreciate human capacity in the context of taking risks, decision making, managing emergency, and survival strategy (NERDC, 2007). Job specific skills such as farming, basic computer literacy, painting, e-mail operation, photography, tailoring, desktop publishing, and internet browsing that are specified in the JSS curriculum must be presented and addressed beyond

textbook interpretation of the curriculum if the students are to truly acquire the requisite skills for self-reliance and poverty eradication.

Learning experience must emanate from performance-based standard which demands that teachers demonstrate actual knowledge, skills, creativity and enthusiasm to prepare students for the world of work. Experiences must be planned to provide a broad support and to enhance self-reliance and employability of beneficiaries of the programme.

**What are the Perceived Impediments to Implementing Basic Sciences and Technology Curriculum?**

A close look at any curriculum before, during and after its implementation should reveal a number of factors that tended to mar its success. The implementation of the basic science and technology curriculum is fraught with a lot of challenges among which are:

i) **Curriculum overload**: curriculum overload occurs because of the high number of subjects offered at junior secondary school level. Students are expected to study and offer 12 to 13 subjects. This notwithstanding, some global issues such as Family Life Education, Citizenship, Environmental Education, HIV/AIDs, and Drug Abuse are introduced as curriculum contents to be learnt by the students.
The issue is not only the large amount of knowledge, skills, attitudes and values to be presented to the learners, but the availability of time and resources for the implementation of these content areas. The non-coverage of the contents has left beneficiaries of the programme ill-equipped.

ii) **Large class size**: this is another issue in curriculum implementation. The national policy on Education (FRN, 2004) recommended 30 students per class but this has not been adhered to by the secondary school system. The number of students per class has always been above management capacity of teachers. Such condition makes teaching ineffective as teacher-students interaction would be minimal and without significant impact on the students.

iii) **Dearth of Instructional Materials**: Instructional materials are aids for effective teaching and learning. Nwoji (2004) referred to instructional materials as devices that facilitate the thinking and understanding of the learner. This definition, among other things recognizes the relevance of instructional materials in enhancing the acquisition of knowledge, competence and skills.

It is evident that no curriculum can be implemented effectively without due consideration of necessary equipment and materials. Teachers employ these materials in illustrating, explaining the content of a lesson and learners as well interact with them.

Dearth of instructional materials has characterized all levels of our school system particularly the secondary school

level. The junior secondary school programme requires a lot of machines, tools, craftmen and artisans which have never been available in our schools. This makes it difficult for beneficiaries of the JSS programme to acquire specialized skills in any area of human endeavior.

iv) **Teacher factor**: Teachers are the major stakeholders in curriculum implementation. Curriculum implementation cannot be effectively carried out if the teacher variables such as competence, availability, attitude, dedication and remuneration are faulty. No matter how lofty the Educational goals are, how relevant the curriculum is, teachers are major determinants of learning success.

The importance of qualified and competent teachers is recognized and stressed in the national policy on Education (FRN, 2004) where specialist teachers are recommended for particular subjects such as mathematics, science, physical-education, introductory technology, language Arts, Fine Arts, and Home Economics. It is evident that there is lack of teachers in these specialized areas in our secondary schools. Those available are sometimes ill-equipped and more often than not present text book interpretations of the curriculum to their students and tie them to the requirements of examinations. In this way, it becomes practically impossible for learners to create their own meanings of events within or beyond their immediate environment.

v) **Examination malpractice**:
Examination malpractice is one of the major curriculum implementation issues. It is a cankerworm that has eaten deep into the fabric of the society and has become so rampant among students, teachers and parents. The implication of this are:

i. Disparity in the set curriculum objectives and the attained objectives.
ii. Invalid and unreliable data supply to the school system.
iii. Laziness of learners as many would not want to work hard since collaboration is assured by teachers.
iv. Indiscipline in schools and the society as students do not bother about their academic work rather they engage themselves in social vices.

vi) **Evaluation:** A good evaluation of learning outcomes must focus on the cognitive, affective and psychomotorbehaviours. Evaluation data must be valid and reliable for them to be useful to the Educational system. Evaluation of learning outcomes at all levels employ the continuous assessment model, which if well implemented would help curb incidences of Examination Malpractice. It does appear that teachers are yet to grapple with the continuous Assessment skills. Most teachers still emphasize cognitive learning outcomes at the expense of both the

affective and psychomotor behaviours and they do continuous testing rather than continuous assessment. All these affect curriculum implementation.

vii) **Inadequate funding**: Poor funding has been a major challenge to policies implementation in the Education sector. Educational development process is expected to develop manpower, transmit valuable knowledge, inculcate desirable skills, attitudes and other educational performance features. This is contingent on availability of adequate resources. With adequate funding, recruitment of qualified teachers is guaranteed, instructional facilities are provided for effective implementation of the curriculum and teachers' welfare too would be properly addressed.

**Overcoming Impediments to Curriculum Implementation at the Junior Secondary Schools**

Emeh (2006) highlighted three capabilities for effective implementation of the junior secondary school curriculum. They are outlined thus:

i) **Input capability**: this consists of a clearly articulated programme or content on societal expectations and labour market demands, a clear policy framework emphasizing education for survival and self-reliance, a flow of fund not only from central authorities, but also from the industrial sectors, a training and re-training of teachers in the context of science and technology education for survival, self reliance and poverty eradication.

ii) **Process capability**: this includes methodology of teaching, classroom management, forms and patterns of communication, workshops, networking processes for exchanging information,industry-school nterface, and development of teaching strategies like analytical thinking and decision-making that will promote acquisition of intra-personal skills.

iii) **Feedback capability**: this is concerned with monitoring, evaluating, assessing, modifying the process and inputs that support the educational system. The feedback process validates the outputs of the school system in terms of skills, competence, attitudes, and knowledge supportive of education for human survival and self reliance.

**Conclusion**

Effective curriculum plementation is a major determinant of learning outcomes and skilled manpower development of any type and category is also contingent on effective curriculum implementation.

To this end, teachers' pedagogy training must be seriously improved at all facets of educational training since they are the principal actors in curriculum implementation. This, it is hoped will improve students' learning for optimal

performance in school tasks for self-reliance and National Development

**Recommendations**

For meaningful and effective implementation of the science and technology curriculum, the following recommendations are made:

i) The junior secondary school science and technology curricula should be modified to include measures that could guarantee development of appropriate skills for self-reliance and useful life out of school.

ii) Pedagogy training and re-training for teachers should be organized on regular basis to acquaint teachers with the knowledge and skills needed for self-reliance and poverty eradication.

iii) Functional training resources like the artisans and craftsmen should be employed and sent to secondary schools to enhance acquisition of job specific skills among beneficiaries of JSS Education programme.

iv) Appropriate working condition and facilities such as well equipped laboratories and workshops should be provided not only by government but also by non-governmental agencies to enhance the teaching of science and technology.

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