23

Towards an Effective Evaluation of Science Education Curriculum in Nigeria

By

TANIMU N. MUNDI
Department of Integrated Science,
FCT College of Education,
Zuba.

Abstract

The paper examined the concept of evaluation and discussed both the formative and summative evaluation. It also identified some factors that could enhance effective science curriculum development and evaluation in Nigeria. Such factors include provision of adequate time, adherence to the provision of the National Policy on Education, adequate provision and management of funds to the education sector, etc. Some recommendations on how science curriculum development and evaluation aimed at enhancing quality science education in Nigeria were proffered. Conclusion was drawn to the effect that effective evaluation of our science education will enable us make Nigeria on the whole a better place particularly in terms of acquisition and transfer of knowledge of science.

National development today is directly related to the nation's achievement in science and hence the development of our science education is an important instrument for fulfilling our current educational policy. The National Policy on Education (NPE) had been and is a bold attempt at restructuring our educational system for achieving a sustainable national development. For the national policy on education to be workable or for it to be implemented, it has to be translated into curriculum. Consequently, the first most crucial outcome of the policy on the new system of education is the curriculum (Akpan, 1999).

What is Curriculum

The word curriculum is derived from the Latin word 'Currie' which means to run a course. It is a planned or guided learning outcome that is systematically carried out under the auspices of the school. Onwuka (1996) defined curriculum as the total experiences which the school deals with in educating young people. Ugwu (2008) saw curriculum as all the experiences/ activities (co- curricular activities) provided under

the auspices of the school to bring about positive change in the learner. She therefore defined science curriculum as all the experiences in science provided by the school for the achievement of the goal of science education in the learner.

Concept of Evaluation

Evaluation is a process used to find out how far learning experiences developed and organized are actually producing the desired results (Gbamanja, 2002). Evaluation for Harbor- Peter (1999) is a systematic process of determining the extent to which students achieve set instructional objectives. According to Taba (1962) in Piwuna (2002) curriculum evaluation entails collecting and providing information and drawing evidence on the basis of which decisions can be taken about the feasibility, effectiveness and educational volume of curriculum.

Bob (2012) explained that what is inherent in the idea of curriculum evaluation is ''value''. When we evaluate, we are engaging in some processes that is designed to provide information that will help us make valued judgments about a given situation. A situation is an umbrella term that considers such ideas as objectives, goals, standards, procedures, etc. When we evaluate, we are saying that the process will yield information regarding worthiness, appropriateness or inappropriateness, rightness or wrongness, relevance or irrelevance, legality or illegality, etc of something for which a reliable measurement or assessment has been made. We evaluate every day. Teachers particularly, are constantly evaluating students, and such evaluations are usually done in the context of comparisons between what was intended (leaning progress , behaviour) and what was obtained.

Evaluation can therefore be seen as the process of finding out whether identified educational objectives are being achieved or not, with respect to both the learner and the curriculum. It involves research in the form of collecting data, interpreting data, etc. However, the concept of evaluation as it relate to education involves more than instructional feedback monitor. All the component programme, personnel, materials and instructional methods engaged in the process are also evaluated for their appropriateness and functionality. Evaluation can be in the form of programme evaluation, curriculum evaluation, textbook evaluation, teacher effectiveness evaluation, evaluation of administrative climate, evaluation of school/ classroom environment and instructional evaluation (Nzewi, 2007). Evaluation basically can be categorized into two, namely, formative evaluation and summative evaluation.

Formative Evaluation

Formative evaluation is used during the construction of curriculum materials. It is generally concerned with undertaking research geared towards producing information which will help the curriculum developer to improve on his strategy of producing a curriculum. It involves the collection and interpretation of information about the quality of the curriculum and the materials to be used for achieving the curriculum objectives. This is mostly at the trial stage and could sometimes lead to decision to revise a part or whole of the curriculum in terms of the curriculum objectives, instructional technique, instructional material identification and usage, etc,.

Formative evaluators usually work hand in hand with the curriculum developers until they all reach a consensus on the operational definitions of the goals and objectives of the programme, method of instruction, material identification and usage, instructional technique to be adopted, etc, before the curriculum developers can develop the curriculum.

Summative Evaluation

This is a whole scale evaluation done at the end of developing a programme with the aim of summing up the effect of the whole programme to identify the overall impact. It involves determining the overall effect of a curriculum after its implementation. It is carried out when the programme or curriculum have been fully developed and put into operation at various levels. At this stage both the curriculum developer and the formative evaluator have approved and are satisfied of its workability. The results are passed on to policy makers who have the responsibility of deciding whether or not the curriculum is being effectively implemented and whether or not to continue to fund the curriculum.

While the formative evaluators work hand in hand with the curriculum developers, the summative evaluator works independently of the two. Formative and summative evaluation could be equated to a housewife and her husband. The wife prepares the meal, tastes it in the process and became convince that she has done it well. This could be regarded as the formative evaluation stage. When the husband takes the meal and passes a judgment as to the goodness or otherwise of the meal, summative evaluation could be said to occur.

Effective Evaluation of Science Curriculum in Nigeria

(a) Adherence to the Provision of the National Policy on Education

The Government of the Federal Republic of Nigeria (FRN, 2004) recommended that continuous assessment (CA) should be the mode of assessment at all levels of education in Nigeria. Continues assessment should be used as mechanism whereby the final grading of a student in the cognitive, affective and psychomotor

domains of behaviour systematically takes account of all his performances during a given period of schooling. It is therefore expected that all the dimensions and domains of instructional objectives be assessed and the result used in determining a learners progression. The dominant method of evaluation has remained the use of test. CA has been reduced to continuous testing objectives. This relegation is both in teaching and evaluation hence causing learners to receive lopsided, non- balanced and socially irrelevant education (Nzewi, 2007). Another issue is the assessment of practical work carried out by the students particularly in assessment of science practical or related activities. Most teachers only provide marks for the final answers of practical works without assessing other aspects that had to do with how materials are handled, cleanliness of working environment, students conduct during practical, etc,.

(b) Provision of Qualified Curriculum Planners

Educational evaluation is a very significant aspect of any nation as any related problem is likely to have ripple effects on other sectors. For this reason, science curriculum evaluation requires some level of specialization. For example in designing a curriculum, a curriculum developer is required to work hand in hand with the formative evaluator to carry out the formative stage of curriculum evaluation. Also, a specialist in the area of summative evaluation undertakes the summative evaluation aspect of the curriculum. Such distinct specialization in the area of curriculum evaluation is not available or practiced in Nigeria. The situation we currently have is that of any person undertaking virtually all the forms of curriculum evaluation in science, regardless of the grave implication such would have on the nation. Little wonder then that we have been experiencing enormous challenges with our curriculum. In this light, Ogunkunle and Mbelede (2008) lamented that most departments of research and statistics in the schools board, see their job in terms of mere collection of data, analyzing the data and computing into qualitative education plans which are then handed down to government officials for implementation.

c) Policy Makers

Nigeria could be said to grave leaders who engage in 'policy prostitution'. Virtually any government that comes to power wants to have certain educational policy associated with them. Consequently, any policy that may be in place prior to their arrival is either completely abandoned or changed. For example, the UPE programme lunched in 1976 could not be sustained for long time. The current 9-3-4 system of education is a baby of the 6-3-3-4 system of education. Yet, the content still largely remains the same. This policy somersaulting is not likely to lead us far unless we are ready to abandon 'policy prostitution'. In a related situation, Ugwu (2008) observed that some of our policy makers are often suspicious of any technique of innovation for fear that such may make them redundant. This is very true especially where some policy makers resist change at a time when such changes are desirable.

d) Provision of Adequate Time

Curriculum development and implementation requires a lot of time which of course, must be estimated, planned for and implemented. For example, it takes time to undertake both the formative and summative stages of curriculum evaluation. Most curriculum development in science is followed with the development of instructional materials, training of teachers and this requires some time to achieve. However Ogunkunle and Mbelede (2008) explained that the constraint of time is contributing to why the curriculum published by Nigerian Educational Research and Development Council (NERDC) could not be implemented in most school. Adequate time is required for effective training of teachers before the introduction of a new curriculum. This is not the practice in Nigeria as curriculum is abruptly introduced without training of the teachers that will implement it or without the provision of requisite teaching and learning materials for implementing it. This has resulted in teachers spending so much time trying to understand the curriculum rather than doing the actual teaching. This situation is true as it affects teaching and learning materials for the new curriculum as most of these materials are hardly made available before the introduction of a new curriculum.

Another major problem here is the fact that despite the introduction of the new basic education curriculum and senior secondary school curriculum both the universities, polytechnics and the colleges of education have not made any changes in their curriculum for teachers-in-training that will teach the new curriculum introduced by the NERDC. What?

e) Adequate Provision and Proper Management of Funds

Science curriculum evaluation requires a lot of funds to undertake. It is a common knowledge that our planning ability is not in doubt, what is in doubt however, is our ability to implement. This is mostly as a result of funding and / or corruption. Akpan (1999) commented that despite the very elaborate programmes of action approved by government to implement the National Policy on Education (NPE), our implementation phase has suffered a very serious set-back. For example, during the implementation of UPE in 1976, detailed calculations of the resources needed were made and attempts to execute all the programmes started. The first problem was that the figures were wrong and infrastructures were either poorly built or not constructed at all; in both cases however, funds made available for such projects were expended all the same. At the end of the day, he said, so much money was spent to achieve so little, with a lot that needed to be done but the funds had dried up. This had consequently adversely affected the implementation of the junior secondary school (JSS) phase. Science subjects with their grave demand for both human and material resources is worst hit as resources that would otherwise be used to overcome these challenges are

lost to serious abuse of various nature. This is true because science to a very great extent require the use of specialized materials from various sources for its teaching.

Heavy spending on education is not synonymous with investing in education. When spending in education, so much is expended on things that do not add value to the teaching /learning process, i.e both the teacher and learner do not derive much benefit from what is said to be spent. However, an investment in education implies planning and allocating resources in an appropriate manner in which both the Learner and the teacher directly benefit.

f) Provision of Qualified Personnel

It is a fact that no educational system can rise above the quality of its teachers. This implies that the teacher is indispensable in the teaching/ learning process and also in the evaluative process. In this light, Lassa (1996) explained that the teacher is the mediator of the learning process, the facilitator of learning skills, the co-coordinator of learning sequence and the assessor of the entire educational development.

At almost all the levels of our educational system, most of the teachers are not qualified to handle the area of science they teach. Aguokobuo (2002) mentioned that, most of our teachers are not trained in the pedagogy of education; hence there is too much theory than practice in their teaching. This will obviously affect both the process and the product of science curriculum evaluation carried out by such unqualified teachers. Science teaching require some specialized skills which to a very large extent are lacking mostly because people with such skills are either in short supply or that employers mischievously choose to engage the services of those they could 'manage' thereby relegating quality to the background. Obanya (2012) explained that quality in education is an apt illustration of whatever you sow is what you will reap. According to him, quality input (funding, facilities, teachers and administrators) if sown into the system, would likely engender quality process (teaching/learning process, school management style and special attention given to learners' needs). This will as a result determine the quality of learning outcomes (performance in assessment test and positive attitude and value transformation). Similarly, Nwagu (1985) found that teachers make and use poor quality assessment instruments. If assessment instruments are poorly constructed it is very obvious that the outcome will also be very poor. This outcome will certainly have a ripple effect on our educational system and the whole society since no educational system can rise above the quality of its teachers.

g) Availability of Standardized Evaluation Instruments

Nzewi (2007) stated that there are very few standardized test and other evaluation instruments in the market meant for teachers. While in some developed countries, there are so many test and assessment scales on all subjects and behavior

traits that teachers can make reference to, in Nigeria however, only few are available of which most teachers are not aware of.

Conclusion

The challenges of managing education in Nigeria are enormous. Some of these challenges are very difficult but they are not impossible to overcome. Effective evaluation of our science education programmes will enable us identify BN areas of our strength as well as our weaknesses and this will enable us undertake appropriate measures to either correct or strengthen them. With our effective
curriculum evaluation procedure in place, it is hoped that Nigeria as a nation will grow from strength to strength in the pursuit of scientific and technological greatness.

Recommendations

1. Assessment should not be only based on the cognitive domain but should be made in such a way that both the cognitive, affective and the psychomotor domains are encouraged. The result of such assessment should be considered in the promotion or certification of students. The current system where a student who may be rated socially irresponsible receives academic prize and awards based on his brilliant achievement at written test and examinations is not good enough.
2. More science teachers should be recruited to make both teaching and CA work relatively easier since the real work that has to do with CA is extremely difficult.
3. Experts in evaluation instrument development should be trained and commissioned for mass production and validation of instruments of various types for use in evaluation of instruction.
4. In- service training, workshops and seminars should be organized for science teachers to equip them with the various mode of evaluation in both the cognitive, affective and psychomotor domains objectives.
5. Policy makers should be able to observe some level of continuity in the implementation of some policies. A situation where everybody that is in position of authority wants to be identified with certain policy, thereby changing the one in operation does not augur well. However our policy makers should not shy away from undertaking or effecting a change that is obviously necessary for the fear of losing their job.
6. There is the need for moral orientation where corruption will be regarded as an exception rather than the norm. A situation where individuals who steal public funds are given awards by universities and our traditional institutions can only but lead us backward and retard our development as a nation.
7. There is the need for appropriate funding of our educational institutions such that the process of evaluation can be easily executed. Government at all levels

needs to adhere to the United Nations benchmark of 26% of budgetary provisions meant for education. The private sector could be very useful if they decide to undertake a project or another in our educational institutions. Proper investment in education should be made rather than spending that does not add value to education

References

Agunkunle, A.R. & Mbelede, N.G. (2008). Problems and prospects of STM Curriculum Delivery in Nigerian *Schools proceedings of the 49th annual Conference of STAN 27-30.* HEBN Publishers Plc.

Aguokogbuo, C.N. (2002). Problems and Prospects of Secondary School Curriculum in Nigeria. *Nigeria Journal of Curriculum Studies* 9(2)92-97.

Akpan, B.B. (1996). Towards Reduction in the Content of our Primary and Secondary Science Curricula .*Journal of STAN,* 31(1 & 2), 1-6.

Akpan, B.B. (1999). *Perspective on Education and Science Teaching: From the eye of Udogie Ivowi.* Abuja; Foremost Educational service Ltd.

Bob, K. (2012). *Measurement and Evaluation in Education.* Retrieved 10/01/2012 from http://www.adprima.com/maesurement.htm

Federal Republic of Nigeria (2004). *National Policy on Education.* Lagos: NERDC Press.

Harbor- Peters V.F. (1999). *Noteworthy Hints in Measurement and Evaluation*. Nsuka: Hallmark Publishers.

Lassa, P.N. (1997). *Vision and Mission of Teacher Education*. Lead paper Presented at the National Conference on Vision and Mission of Education in Nigeria, Organized by NCCR, NTI Centre Kaduna, 21st – 25th July.

Nwagbo, C. (2008). Science Technology and Mathematics (STM) Curriculum Development Focus on Problems and Prospects of Biology Curriculum Delivery. *Proceedings of the 49th Annual Conference of STAN*. HEBN Publishers Plc, 77-81.

Nwagu, E.K.N. (1985). *Content Validity of Teacher- Made Tests used in Secondary School Geography Instruction in Anambra State*. Unpublished M.Ed. Project. University of Nigeria Nsukka.

Nzewi, U.M. (2007). *Evaluation of Teaching and Learning in Secondary School in Nigeria.* Retrieved on 02/06/2011 from www.unn.edu.ng.

Obanya, P. (2012). *Secondary Education What We Failed to Do and What We Must Do.* Paper Presented at the Nigeria Academy of Education Annual Seminar, Abuja, May, 05.

Onwuka, U. (1996). *Curriculum Development for Africa.* Onitsha: Africana-Feb. Publishers.

Piwuna, C. (2012*). Curriculum Evaluation.* In T.O Oyetunde, C. Piwuna (Eds) *Curriculum and Instruction-Insight & Strategies for Effective Teaching. Jos, LECAPS Publishers.*

Ugwu, N.A. (2008). Current Issues on Implementation of Senior Secondary School Science Curriculum in Nigeria. *Proceedings of the 49th Annual Conference of STAN.* HEBN Publishers Plc, 77-81.