

Quality and Access to Science and Biology Teacher Education in Nigeria: The Journey So Far

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Article DOI: 10.48028/iiprds/ijasesi.v5.i1.14

Abstract

Science and biology teacher education form the central position in scientific and technological development in any given nation with Nigeria inclusive. Teacher education therefore drives the process of training biology teachers who will teach biology in all the levels of education. Science and biology teacher education therefore needs proper quality and access to achieve the developmental process toward the success in our educational system. The paper, therefore, is aimed at considering concepts and meaning of access quality biology education, biology teacher education, and government efforts to promote access to teacher education and challenges. The paper concluded that free education for all should be introduced immediately and the first priority of ministry of education should be offering training to teachers with special reference to science education at all levels.

Keywords: *Access, Quality, Science education, Teacher education*

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Background to the Study

Teacher education is recognized as the keystone to national development. Today there is changing speedily due the development of science and technology. This change has also created impact in the school and educational system. The curriculum becomes more complex and demanding while teachers' roles including implementation of curricula have equally been more demanding than ever before. The implication is that, if Nigeria society is to compete favorably with other nations and adapt to global changes, then, there must be quality and access education and the teachers are the major actors in the delivery. In line with this, the Federal Republic of Nigeria (FRN, 2004) stated that, since no education system may rise above the quality of it teaches, teacher education and access shall continue to be given major emphasis in educational development (p.39). Udida (2010) posited that, in order to achieve qualitative education, teachers must be trained efficiently which will turn solid foundation in the lives of Nigerian citizens in various institutions of learning. This assertion demands a new directional view of the process of teacher's education for qualities and access.

Like other areas of teacher education, Biology teacher education has its tradition of tradition of training biology teachers in all levels of education. Udo, Okon and Ogbe (2015) in Okon & Ushie (2020) opined that, science teachers with biology inclusive need to be trained in order to work effectively toward the success in our educational system. The modern biology teachers are made though well graded and sequential training over a defined period of time. Hence, the training of biology is a necessity of the higher institution of learning. Oladejo, Olusunde, Ojebisi, & Isola, (2011) stress the need for well-planned training programme for science teachers to improve and update their experiences. This is so because biology teaches educate students in fundamentals of biology which lead to acquisition of knowledge and related discipline such as medicine, environmental science, health science to mention but a few.

The work of Effiong and Igiri (2020) highlights reluctance to adopt new methods due to lack of time, over reliance on textbooks and insufficient use of alternative teaching strategies amongst others as emerging issues to quality teaching of science. Biology and science teachers are faced with the challenges of insufficient training, heavy teaching loads, lack of clear role in conducting research, personal busyness, lack of knowledge, lack of time, lack of interest, lack of laboratory and equipment. This paper is significant as it will address the above challenges as well as inculcate scientific attitude and scientific temper in teachers and students so as to understand the prevailing situation, perceive the problems and work scientifically to resolve them.

Literature Review

Concept of Quality

According to Webster's international dictionary of the English language (1986) the word quality can be defined differently as;

- 1 Peculiar and essential character of a thing.
- 2 Degree of excellence
- 3 The degree of conformity to standard as a product of workmanship.
- 4 An attribute that is obtained after a certain level have been reached.

- 5 Merit or superiority because of a combination of good characteristic.
- 6 Inherent or enduring good trait that make one what superior.

From the above definitions, it can be seen that, quality in the positive sense deals with the good characteristics or traits of a thing that promotes excellence or superiority. In other words, quality is the degree to which a set of inherent characteristics of the object satisfies a set of requirements. Therefore, the quality of an object is determined by comparing a predetermined set of characteristics against a set of requirements. If these requirements conform to the requirements, high quality is achieved, but if those characteristics do not conform, a low or poor quality is achieved.

Meaning of Quality Biology Education

Quality education with biology inclusive is one that provides all learners with capabilities to become economically productive, develop sustainable livelihood, contribute to peaceful democratic societies and enhance individual wellbeing. The learning outcome that is required varies according to context but at the end of basic education cycle must include threshold levels of literacy and numeracy, basic scientific knowledge and life skills including awareness and prevention of disease, capacity development to improve the quality of teachers and other education stakeholders is crucial throughout this process.

Biology Teacher Education

Teachers at all levels of educational system and disciplines are very important and serve as the hub in the overall development of the nation. Hence, biology teacher education involves the techniques and strategies designed and designed to equip the preservice biology teachers and practicing biology teachers with the skills and knowledge required for the institutional and associated activities.

Wakpoda & Urien (2011) opined that teacher education (including biology) revolves around the policies and procedures designed to equip prospective teachers with the knowledge, attitude, skills and behaviors required in the performance of effective duties in the classroom. Okoi (2006) in Okon and Ushie (2020) averred that the university graduates of biology education (combined degrees) biology, geology or botany are well grounded in the subject content, that, the problems such graduate are likely to have been how to reach the content, therefore the more the training the teacher obtains in education, the more effective the business of teaching and learning outcomes. It is therefore imperative for a biology teacher to be grounded in the subject matter with formal training in teaching strategies.

In recognizing the needs of biology teacher education, Ryder (1987) and Udofot (2005) in Okon and Ushie (2020) stated that the most persistent problem facing Nigeria is that of improving the qualities of her teacher education to meet the expansion needs of the school system. From the above discussion, quality education deals with issues of relevant validity, functionalism, excellence and efficiency in the achievement of the education goals and priorities.

Meaning of Access Education

Access to education is the ability of all people to have equal opportunity in education, regardless of their social class, race, gender, sexuality, ethnic background or physical and mental disabilities. Access to education encourages a variety of pedagogical approaches to accomplish the dissemination of knowledge across the diversity of social, cultural, economic, national and biological background. (wekipedia). According to federal Government of Nigeria (FGN 2003), access to education implies making it possible for everyone who is entitled to education to receive it. For this to be possible, enough classroom, laboratories and instructional materials should be provided for everyone. It also means that the obstacle that prevents anyone from taking advantage of the opportunities should be removed. Another definition by UNESCO (2015) puts “access to tertiary education” To mean ensuring equitable access to tertiary institutions based on merit, capacity affords and perseverance. However, this definition takes place at anytime with due recognition to previously acquired skill through opportunities for adults retraining for the work force.

The national policy on education (2004) states the national goals and philosophy of education to include;

1. A land full of bright opportunities for all citizens.
2. Every Nigerian child shall have a right to equal educational opportunities irrespective of any unimagined disabilities each according to his or her ability.
3. Provision of equal access to education opportunities for all citizens of the country at the primary, secondary and tertiary levels both inside and outside the formal school system.

From the above assertion, it is imperative to note that access and quality to education is everyone's right.

Government efforts to promote access to teacher education; *the journey so far.*

The federal governments in an attempt to promote access to teacher education have made several efforts to overcome this. These include;

- 1 The granting of license to private individuals, organizations and voluntary agencies to establish private universities and colleges of education. In fact, between 1999 to 2006 twenty-four private universities have been established (Guadian 2006). Recently, more universities and colleges of education have been granted licenses to operate.
- 2 The establishment of the National Open University of Nigeria (NOUN). Another bold attempt by the federal government to ensure the promotion and even provision of access to teacher education in the establishment of the National Open University system. This will cater for the educational needs of the people aspiring for university education.
- 3 The establishment of education Tertiary Education Trust Found (TETFUND). The role of government in promoting access to teacher education cannot be over emphasized. TETFUND has over the years made provision for instructional materials such as computer accessories, buildings and classroom equipments to mention but a few. Of course, admission and accreditation are based on facilities on ground.
- 4 The establishment of National Teachers Institute (NTI) the NTI Kaduna was

established by the Federal Government in 1976 as an institution to train teachers through the distance learning system. There was a felt need to establish institution outside other conventional institutions so that teachers and students can could up grade themselves educationally and profertionally while in school or on the jobs.

- 5 The launching of the Universal Primary Education (UPE) programme. This was based on the standpoint of increasing access to teacher education in Nigeria. This action remarkably increased the population of pupil in schools.
- 6 The Universal Basic Education (UBE) progromme.

The UBE Act (2004) provides that; “Basic education means early childhood care and education and nine years of formal school” government has long embanked on the universalization of basic education in Nigeria. It is important to note that UBE scheme was launched on 30th September, 1999 in Sokoto state. The scheme was an interventionist programme for promoting an unfettered access, equality as well as ensuring that every entitled to receive education does so for both individual and national development.

Challenges to access and qualitative teacher education

There are certain challenges that need to be closely looked at if meaningful access to qualitative education is to be achieved. The following facts are too discernible from the existing educational system.

- 1 At the primary level there is no government involvement in supervision and funding. Children between age 2and 5 years who should be at the primary level are about 16 million but only one million are in school, representing 6.25%.
- 2 At the secondary level involving children between 7 and 12, only 6.5million representing 17.1% and out of 24million that should be in school, thus 17.5 representing 72.9% are not schooling.
- 3 At the tertiary level involving 18 and 25 years of the estimated total of 17.7million, only 1.5million representing 8.7% are currently enrolled as students.
- 4 The system does not make room for quaternary sub-sector of the educational system with estimated total of 1 representing 8.5%

This implies that a total of over 56.7 million representing 73.1% f school age population are out of school. The information age requires an educated populace. The literary engineers and scientist per million in China and Japan for instance is 4,500, while in Nigeria it is about 15o. in 2005 only 148,323 candidates were admitted into the universities out of the 858,000 eligible applicants. Clearly, the existing education system cannot accommodate the total number of qualified candidates. If the existing system is restricted, the intake rate can be quadrupled. Therefore, there is an urgent need for the Nigerian people to have an increase access to education in other develop.

This can be achieved by double intake with two sections which simply means;

1. Having two serious per day; that is morning and afternoon sections.
2. Having two batches per year; that is (a) 1st batch of 26 weeks followed by a second 2nd batch of another 26 weeks per year.

This means that the current admission rate of 17.05% can be quadrupled to 68.2 immediately. The immediate consequence of this proposal is to reduce the level of people out of school from 56million to less than 25million. With sustain practice; the population of students out of school will be mopped up within three years subsequently there will be more places available at all levels of the nations educational system. Hence the enrolment rate will drop with the consequence of having more manageable sizes of classes instead of the present population explosion in the nation's educational system. The present system of admission and teaching can be restructured to double/quadruple intakes, with 23 weeks lectures followed by a vacation work study thereafter. Doubling intakes (teaching two batches in one year) would allow 30,000 at the same time. Quadrupling intakes (i.e. a double intake taught parallel in the morning and in the evening/afternoon would yield 60,000 places. In 5 years, 75 universities using a double intake would be training 1.5million students with no additional teaching of capital cost. Quadrupling will require minimal capital about 10% of annual recurrent) but with extra recurrent cost (18,000 to 20,000 new teachers and auxiliary staff for the expanded number of students. A similar quadrupling in the single intake system will require 72,000 to 80,000 new teachers. The double intakes system would also be applied to colleges of education and polytechnics, with 1million students at present. The cost of sustaining teachers in the English system would be N108-N20billion but N36-40billion in te quadruple intake system approximately. The new system will remove ethnicity from admission, reward and merits while taking care of the disadvantages and also promote gender inequality. Proper implementation of this proposal will involve changes in academic calendar and pattern of examination as well as increase the number of academic staff and improvement of facilities among others. For proper access to education, Nigeria should explore a possibility of introducing changes in the inherited educational system preferring changes which can be accomplished at zero minimum cost.

The Federal Character Policy

The federal character policy has to do with how far and equal representation could be given to various components of the units and communal groups in this country's educational institutions, agencies and positions of power, status and influence. The quota system was introduced in an attempt to produce equal opportunity to candidate to be admitted into the university but this has been greatly abused. The quota system which comprises important elements such as academic merit, which is determined by UME scopes and this is allotted 45% merit and the second element is educationally less developed states with 20%; catchment areas with 25% and 10% to the discretion of the vice chancellor (NUC 1999). The quota system portrays that a candidate from southern state UME score of 137 does not discriminate against any gender.

Conclusion

It is crystal clear that inadequate funding, teaching of large classes, poor training and retraining programs, inadequate laboratories, shortage of instructional materials, poor motivation, unconducive environment and inadequate infrastructural facilities, ineffective supervision, poor curriculum development, federal character policy are responsible for the poor quality and access to the teaching of biology and science education.

Recommendations

1. Free education for all should be introduced immediately by the government at all levels of education.
2. There should be regular training and retraining of teachers.
3. Special reference should be given to science teachers at all levels.
4. Incentives should be given to biology and other science teachers as a way of encouragement. This will spur their interest in the teaching of science.
5. The discriminatory federal character policy should be eradicated.
6. Equipment and functional laboratories should be provided by the government.

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