ENHANCING QUALITY BIOLOGY TEACHING IN SECONDARY SCHOOLS: A FOUNDATION FOR SELF-EMPLOYMENT

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Abstract
The paper discussed ensuring quality biology teaching in secondary schools as a foundation for self-employment. It ramifies through the meaning of education, biology teaching, quality education and certification. Relevant employments that the biology graduates can delve into such as crop farming, poultry and piggery were discussed. It suggested way forward which include Context, Input, Process and Product (CIPP) Model for Quality Education. Commensurate incentive should be given to biology education graduates so that they will be effective. This will help the students and staff dispense their duties efficiently. Biology education graduates need a systematic and formal introduction to the complexities of teaching biology in order to provide a basis for their actions and reactions. A nationally structured programme of continuing professional development should be provided as an entitlement for all biology teachers in employment. Teachers should be rewarded with regular salary increments and sponsorship to participate in teaching-related workshops and training programmes.

Keywords: Quality biology teaching, foundations for self-employment, employability

Introduction
Education is a universal phenomenon which allows all human societies to develop the prerequisite knowledge, experience and skills for their preservation and growth. It is a tool for imparting knowledge, a process by which an individual acquires the physical, social, intellectual and moral comprehension required to function effectively and become a useful member of his/her society. It is an effective tool for effecting national development Federal Republic of Nigeria (FRN, 2004), as well as for individual socio-economic development such as poverty reduction.

Even if education means reading books, journals, abstracts, courseware, mimeographs, magazines, newspapers, notes and handouts, not all who read these materials acquire the expected knowledge and skills. Indeed, education involves being exposed to instruction, teaching, coaching, training, practice, correction and discipline; nevertheless, going through them all still does not guarantee that education has properly taken place (Joshua, 2014). Though education means passing tests, quizzes, assignments, classwork, practical assessments, exercises, examinations and home works, not all those who pass these assessments are educated. Education is thus much more than taking a long list of courses, accumulating certificates, offering of ‘best’ majors or minors in school and going into a ‘lucrative’ vocational or professional specializations. While Fogila (2004) quoted De Montaigne (1533-1592) as seeing education as what the graduate takes away from school i.e. what is left in them after schooling, (Albert)
Einstein (2012) defined education as *what remains after one has forgotten everything he learned in school.* This can only be achieved with quality education.

There are some who argue that the threshold of quality education is not by focusing only on literary and numeracy, but United Nations (UN) in her Sustainable Development Goals (SDGs) also recognizes that this definition is insufficient and outdated. Education is not simply a delivery system, rather it is a system designed to help all children reach their full potential in society as productive citizens. That is education that is productive. Education must fully assume its central role in helping people to forge just, peaceful and tolerant society. The meaning of a quality education is one that pedagogically and chronologically serves and educates the students in becoming sound, active and productive members of the society.

To many people, quality education is an ideal which cannot be attained. For education to be qualitative, it must provide opportunities for all learners to become *economically productive, develop sustainable livelihoods, contribute to peaceful and democratic societies and enhance individual well-being.*

UNICEF (2016) has defined quality education as one that makes a good provision for these five elements:

i. the learner's outside experiences,

ii. learning environment,

iii. content of education,

iv. learning processes, and

v. education outcomes.

It should then be understood that these five elements, which must be for everyone cannot come by wishful thinking, but by deliberate, intelligent, consistent and total commitment of all stakeholders. Charles (2016) indicated that quality education grants us the ability to fight the war on ignorance and poverty. Issues of ignorance and poverty are still rife with Nigerians in rural and urban places. Unemployment has further compounded the problem of poverty. Wokler (2014) quoted J. J. Rousseau, the popular philosopher as saying:

*I will note that for the longest time there has been nothing but a cry against the established practice without anyone taking it upon himself to propose a better one. The literature and the learning of our age tend much more to destruction than to edification*.

Guided by Rousseau’s position therefore, this paper aims to propose an improvement in the quality of education rather than cry against the established practice in the matter of quality education. The Cambridge Dictionary defines certification as the process of earning an official document, or the act of providing an official document, as proof that something has happened or been done. When an individual is awarded a certificate, it indicates that such a person has specific knowledge or skill in science teaching. By implication, such persons are qualified to engage in the vocation described or captured in the certificate issued to them.

It is imperative that certificates are earned through the acquisition of knowledge and skills, participating in classes, practical sessions, submission of assignments, going on educational tours, studying, writing of tests and sitting for as well as passing examinations. Apparently, no one holding a certificate could do well and successfully represent what it stands for without properly going through these processes.
Institutes of education therefore award certificates after exposing learners to experiences considered necessary and sufficient for those admitted for different programmes. Certification is contingent on satisfying minimum conditions by all learners starting from basic education up to tertiary level. Some other bodies however award certificates which remain the documentary evidence of success in tests to which they have exposed candidates at particular levels. Established by law, West African Examinations Council (WAEC), National Examinations Council (NECO), National Board for Technical Education (NABTEB), National Teachers Institute (NTI) and other professional bodies conduct only examinations leading to the award of recognized certificates. Whether they are awarded by institutions of learning or examination bodies therefore, a certificate is a document which proves that expected knowledge and skills have been acquired.

Certificates have traditionally served the following purposes:

- Evidence of completion of a course of study.
- Success in prescribed examinations.
- Possession of knowledge and skills.
- Eligibility to engage in vocational and professional practice.
- Prerequisite for admission.

The importance of quality teaching of biology to ensure foundations for self-employment cannot be overemphasized. There are several instructional and leaving strategies involved in teaching the students. The processes and ideas of science are of great importance to everybody in three ways. The first is in their personal lives, for example so that they can validly identify the components of a healthy lifestyle. The second is in their civic lives, so they can take an informed part in social decisions. The third is in their economic lives, where they need to be able to respond positively to changes in the science-related aspects of their employments. If the major purpose of science education is to increase the flow of specialist scientists, technologists and engineers, it could be argued that young people with special talent in science should be identified as early as possible and provided with a separate, specialized and highly focused science education. Such people who share the general need for a broad science education should not be cut off from it.

In any case, there are no valid and reliable ways in which such young people may be identified. Some who show early promise subsequently fade, whilst the talents of others emerge later on. Young people who show appetite for a broad-based education with proven interest in science should be encouraged. They would resist any attempt to foreclose their choices.

We believe that the best way forward is to provide the highest grade of ‘science education for citizenship’ for all students. If education is sufficiently, motivating, challenging and interesting, genuine, high achievement will become more widespread and will become apparent through students’ creativity, lateral thinking. Young people who demonstrate such achievement should be increasingly motivated to follow science-related careers.

There must be a greater recognition of what students bring to their studies and how different teaching methods can be engaged to improve learning. The diversity in students’ learning strategies must be met by the use of the suitable teaching methods. The curriculum must be closely matched to the purposes of science education for citizenship. The assessment of what has been learned must be closely matched to
the purposes of the curriculum. Central to all these aims, the supply, development and retention of high quality teachers must be actively pursued.

**Employability**

Practical in Biology class should enable the students to be able to dwell into areas such as:

1. Animal Husbandry: Many of biology students attended classes where topics on reproduction, excretion and structure of animals were taught which can make them to develop interest in professions such as animal husbandry. With very little practical training on rearing of animals, graduates of biology and biology education can start keeping goats, sheep and cows.

2. The study in plants may enable them to take up a profession like crop production and protection. This is because the graduates have a broad based knowledge of plants. The biology graduates will be able to plant all sorts of crops and protect them as required.

3. The knowledge on the study of fish during the study of biology as undergraduate provides enough background for a biology graduate to be a fish farmer. Structure, types, characteristics and feeding patterns of the fish must have been studied in details by the biology graduates.

4. Biology graduates must have been exposed to study of Aves or birds. They should have carried out practical works on birds, which is a bedrock for stimulating interest in poultry work as they are not likely to be afraid of birds by the time they leave the school.

Other professions or areas of knowledge which biology graduates exposures are related are: climate change, biotechnology, medicine, pharmacy, physiotherapy, demography and veterinary medicine. Also, certificated biology graduates should be able to develop themselves to become specialists in their field and other biology-related fields.

**Conclusion**

It is evident that enhancing quality biology teaching in secondary schools: a foundation for self-employment will be attained if the stake holders in education put into use, monitor and evaluate the suggestions put forth in this article. The teachers who are the dispenser and guide to the knowledge should be made to remote, implement and achieve the quality of biology education. This will improve substantially the quality of certification and thus transform it to employability.

**The Way Forward**

Stufflebeam’s (2003) Context, Input, Process and Product (CIPP) Model for Quality Education is hereby adapted. This should guide the management, curriculum planner and biology teachers in the training of biology student-teachers.
CIPP Model for Quality Education (Adapted)

<table>
<thead>
<tr>
<th>Context</th>
<th>Input</th>
<th>Process</th>
<th>Product</th>
</tr>
</thead>
<tbody>
<tr>
<td>*Establishment</td>
<td>Building:  - classrooms, laboratories, workshops, libraries, halls, toilets,</td>
<td>Opportunities to learn -Instruction, training, coaching, discipline</td>
<td>Graduates/Results Certificates</td>
</tr>
<tr>
<td>*Standards</td>
<td>Facilities and utilities: -potable water, power, access road</td>
<td>-diversification of the work in the laboratories</td>
<td>Contributions to development – invention, business success</td>
</tr>
<tr>
<td>*Environment</td>
<td>Personnel: -Qualified Biology teachers, non-teaching staff, Funding and sources</td>
<td>Practical:</td>
<td></td>
</tr>
<tr>
<td>*Location</td>
<td>Curriculum: -Instructional Resources/ Materials</td>
<td></td>
<td></td>
</tr>
<tr>
<td>*Admission</td>
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The author has identified ways in which science education could be strengthened in the light of the model. Also, identified are some avenues for additional research that must be explored if the process of ensuring quality biology teaching. These include:

The provision of high quality biology education for all students should continue to be energetically addressed using CIPP model. This will help more students to see the intrinsic worth of a career in biology education and related fields.

- Every incentive should be given to biology education graduates to become school head: This will help the students and staff dispense their duties efficiently.
- Biology education graduates need a systematic and formal introduction to the complexities of teaching biology in order to provide a basis for their actions and reflections.
- A national structured programme of continuing professional development should be provided as an entitlement for all biology teachers in employment. The successful completion of stages in this programme should be recognized by incentives such as salary increments and teaching-related sabbatical leave.
- Increased delegation of significant curriculum decision-taking to schools would enable teachers to see their profession as an enterprise in which they can exercise their creativity.
- Systematic scholarship is needed into the relationship between the purpose of the science curriculum and the content of that curriculum to enable the biology education graduates diversify.
- Research is needed to establish clear links between curriculum goals, the assessment of methods used and intending profession to enable pragmatic certification in biology education.
- Valid and reliable items that can be used in both the formative and the summative assessments of the whole range of knowledge and skills that the biology education students’ encounters should be developed.
- More research and development in the area of teacher education are needed on how to increase students’ engagement in science education. Priorities include classroom organization, a changed
approach to written work and an increased focus on the on-task talk that is part of the core of learning science. There should be a strong emphasis on assessment for learning for professional engagement.

- Systematic efforts must be made to increase the use of out-of-school activities in the learning of science. In addition, we must know more about the value of different contexts and types of experience. The experience should be society-relevant.
- Much more must be found out about how the gender and cultural backgrounds of students interact with their learning of biology education in schools. Unless this is done, it is very likely that biology that will continue to be rejected by many students who are even capable of taking up the profession in the society.
- Strategies for linking research, policy formation, and classroom practice and teacher education must be developed to enable graduate be in their choice of employment.

References
Joshua, O. O. (2014). Teacher quality and student academic achievement in basic technology in junior secondary schools in south west, Nigeria. Journal of Educational and Socio Research, MCSER, Italy Vol 4, (3)