

THE CHALLENGES OF BIOLOGY EDUCATION AS AN INSTRUMENT FOR SKILL ACQUISITION IN BIOLOGY EDUCATION IN SECONDARY SCHOOLS IN NIGERIA.

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Abstract

Biology as a science subject is very important in the life of man. It is a field of study that enables man to understand himself and the entire environment where he lives. However, effective teaching and learning of the subject in Nigerian secondary schools is never without challenges. Today, more emphasis on teaching and learning of liberal art has shifted to the teaching and learning of science of which biology education is a part, yet not much has been achieved as a result of one challenge, or the other. Being a subject taught to large classes, there are certain challenges that would hinder its acquisition hence the paper looks at these challenges as they affect skill acquisition of the subject matter.

Abundant natural resources in form of crude oil, minerals, water, regular sunlight, wind, etc abound in Nigerian geographical zones. Skills to harness these natural resources are necessary for the development of this great nation. Biology therefore, as a branch of science that deals with the study of life, can in a number of ways contribute to the upliftment of Nigerian economy and so enhance the life of the citizenry. Biology is a branch of science that has been structured to equip the students with the knowledge of relevant concepts, scientific skills of natural phenomena and environment. Biology helps to inculcate science process skills and attitude in students. It helps to inculcate the

correct acquisition of knowledge, scientific attitudes, career and problem solving skills in students. Biology education, therefore, is an art of teaching and training and/or learning of biology in order to impart the right knowledge of biology to students. The role which biology education plays in skill acquisition and national development is quite appreciable today.

Considering biology education centuries ago, the major approach to teaching was quite different from what is obtainable today. In those days, facts were simply presented by the teacher as cannons which the learners were expected to absorb unchallenged. However, within the past 50 years or so, there has been a kind of modification or rather overhaul in the area of biology education. The notable areas in biology where critical contributions have been made include animal husbandry, genetic engineering, horticulture, tissue culture, mushroom cultivation etc. In some of the developed parts of the world, such as Japan, USA, Germany, France, China and Russia, the impact brought by the renewed attention to Biology Education has been highly perceptible. Even in some developing countries such as Brazil, India, South Africa, South Korea and Iran, the contributions of biology education to both physical and structural areas of national life have become manifest (Butterworth and Thwaites, 2005). Lapini (2001) emphasized that for a better skill acquisition to be enhanced through biology

education, more practical applications of instruments of science and technology are needed.

Biology Education for Skill Acquisition

Skill acquisition provides one with an opportunity to possess specific saleable skills and increases one's opportunity of becoming employable, especially by self. Today, employment in the form of white collar job, is no longer easy to come by and so many unemployed graduates roam the streets in search of non-existing jobs. As a result of lack of skill, they neither get the job nor employ themselves.

One of the national goals of primary education is to give the child an opportunity for developing manipulative skills that will enable him to effectively function in the society where he may find himself (FRN, 2004). To achieve this goal, biology education at the early stage of the child's education in secondary school is the answer. Adeyemi (1990) explained that for one to contribute immensely to the economic growth of a nation, he or she has to be self employed in a small industry sector. If learners are exposed to active classroom work, they will learn more effectively. Individuals with skills become better and more useful citizen both at home and in the society at large (Okocha, 2009). Butterworth and Thwaites (2005) were of the opinion that biology education is very crucial to improving the welfare of the individual and the society through the cultivation of basic scientific approach and developing necessary skills for survival. Biology education plays the role of developing manpower that will help the nation attain her development objectives and subsequently become self-reliant. It promotes the diversification of economy which is one of the indices for a strong economy. It also enables one to acquire relevant knowledge, abilities, skills and attitudes about natural phenomena. These in turn will enable one to live in a world driven by science and technology.

Some Areas through which Skill Acquisition can be acquired through Biology Education in Secondary Schools

According to Ihebereme (2010), skills acquisition in Nigerian secondary education level is meant to equip the students with a more practical and less theoretical knowledge on income generating skills. Skill acquisition means the process of acquiring or gaining effective knowledge in developing one's aptitude and ability in a specific field of endeavour. Biology as a subject in secondary school involves process skills used in discovering and acquiring of scientific knowledge. Biology therefore, as a branch of science that studies man and his environment offers occupational opportunities in the following areas:

1. In the Production of Ornamental Plants, Fruits, Vegetables

This provides job opportunities through horticultural activities. Horticulture is the science, art, technology and business involved in intensive plant cultivation for human use. It is practiced from individual level in a garden up to the activities of a multinational cooperation (Doyle and Kelleher, 2009). If students are exposed to such activities, they will learn how to produce such plants, domesticate them for use. A skill acquired in this direction will automatically enhance self-employment for the individual and also improve the nation's economy.

2. In the field of Orthodox and Traditional Medicine

Plants provide job opportunities. Today, the development of physical herbarium for medicinal, aromatic and pesticidal plants for species identification, and treatment of some stubborn diseases such as diabetics, arthritis, malaria, HIV/AIDS, etc is ongoing (Scharf, 2009). It is no longer a new thing at every nook

and cranny to see people with different products of plants advertising in one way or the other the efficacy of plants in treating diseases that ravage mankind. Through biology education, the skills involved in the production of such plants can be inculcated to the students during their school days in secondary school so that at graduation, the skills acquired can be gainfully employed by the learner. This will improve the learner and as well enhance economic development of the country.

3. In the field of Edible Mushroom Cultivation

Mushroom as an important fungus is a valuable health food which is low in calories, high in vegetable proteins, dextrin, iron, zinc, fibre, essential amino acids, vitamins and minerals such as copper that help the body to produce red blood cells (Landschool, 2006). Mushrooms provide a ready source of the above food materials for the vegetarians who do not get them from animal sources. Mushrooms have the legendry effect of increasing the body's adaptive abilities. Mushroom as well as sclerotia are part of the diet in convalescing individuals (Beyer, 1999).

Mushroom is income yielding and has the potential of replacing crude oil in our economy. Mushroom cultivation and export has the potential of revamping and sustaining the economy of Nigeria and boost the per capita income of Nigerians. Therefore, the materials such as rice straw, rice bran, calcium sulphate, sorghum, cotton waste, glucose which are used in the production of mushroom can be taught to students. The techniques involved in the combination of the materials above to produce edible mushroom can be imparted to the students during their secondary days so that on graduation, they can get themselves involved in producing edible mushroom both for sale and for their use. This will help them to be self employed in the absence of white collar jobs.

In plant propagation, the knowledge of biology education has been very useful. Different plant propagatory methods such as grafting, layering, marcotting, budding, cutting etc should at the early state of the child's education be imparted to the child. A student who has acquired these skills can be self employed at the end of his or her graduation from school. These skills should be taught practically to the students and not just theoretically in the classroom.

The knowledge or techniques involved in the construction of aquaria containing cosmetic fishes, water snakes, red fishes etc should also be inculcated in students while in school as the knowledge in this aspect can improve the student as well as enhance national development. An aquarium with any species of the animals stated above can fetch the student lots of money.

The Challenges of Skill Acquisition through Biology Education in Secondary Schools in Nigeria

It is quite unfortunate that despite the awareness of the role biology as a science of life and its role in national development, due attention needed in the subject for its effective teaching and learning, is still not adequate. This means that the conditions favourable to its functional teaching do not exist in most secondary schools in Nigeria. Some of the challenges facing skill acquisition in the subject under discussion are as follows:

1. Large Classes.

Biology is a science subject which every student likes to read. In senior secondary school curriculum, it is compulsory that a student should do at least one science subject and as such biology to many students is the option. This therefore, leads to its large class size more than any other science class. According to Ogwude (1998) a large class is a

class enough to require special effort on the teacher's part if the students are to be effectively engaged in learning process. Due to the fact that most biology classes are very large, the learning situation is most unfavourable for both teachers and students. Most of the time, the teacher – student ratio is more than the required ratio of 1:45 at most. This leads to a situation where the teacher hardly knows half of the members of the class. Today, we are talking of skill acquisition and for this to take place, students need to be engaged in an exercise while the teacher moves around directing them on what to do. Large class more than required hinders this objective.

2. Lack of qualified Teachers of Biology.

There is no doubt that the teacher is a key factor in ensuring effective teaching and learning in our schools. In most secondary schools in Nigeria, Omotunde (1985) observed that science subjects, which biology is a part, are poorly handled because of the scarcity of qualified teachers, which bear direct relevance to the pre and post independence emphasis on liberal arts. Skills acquisition and skills development are particularly very important today because globalization offers great promise to countries with abundant competitive skills, but imposes potentially dangerous risks on those without these industrial skills needed for national and global economy. To achieve optimal scientific and technological development, there is an urgent need to review and enrich the present biology curriculum content and methodology to meet the challenges of the present economic realities of the nation. Such a curriculum should be tailored towards meeting the needs of industries as well as towards good governance and administration for the various levels of the education system.

3. Provision of Adequate Infrastructure and Facilities in Schools.

These refer to those structures and facilities that enable teaching and learning to take

place effectively. They include laboratories, libraries, workshops, classrooms, equipment. The availability of all these should be of appropriate quantity, size and quality to meet the minimum standard for promoting meaningful teaching and learning. Unfortunately, today, these infrastructures and facilities for biology education in the country are grossly inadequate. Most of the laboratories and libraries are in short supply and ill-equipped (Mayer, 1978). Ndu, Asun and Aina (2001) noted that most of the secondary schools are not provided with the required and adequate instructional facilities, and do not have standard workshops, classrooms and laboratories and in schools where they exist, they are inadequate and obsolete.

4. Paying Attention to Theoretical Work than Practical Work.

This is a very serious challenge to skill acquisition in biology education in secondary schools in Nigeria. A teacher who is not well informed in his area of specialization, of course cannot deliver because one does not give what he does not have. In the secondary schools in Nigeria today, emphases are shifted to alternative to practical. This is like panadol is never panadol and so alternative to practical is not practical at all and as such should not be emphasized more than practical work. In some schools where practical is attempted, it has been reported that students are not exposed to it until barely one or two weeks to the examination and this is purely for passing of examination and not for skill acquisition purpose. This made Eze (2001) to emphasize that most of the secondary schools roll out secondary graduates in biology who never had any laboratory / workshop and field practical experience and because they are virtually hollow, they hardly can be self employed or be employed in the few existing industries.

5. Inadequate Funding

It is a well – known fact that for biology education to be properly handled and skill acquisition achieved in the subject, a lot of financial resources are required for the purchase of equipment, maintaining them and replacing them when they are bad or obsolete. Bolorunduro (1997) emphasized that lack of, or inadequate laboratory facilities, and teaching materials are a common feature in most of our secondary schools. According to him, this has made the teaching of science subjects especially biology a difficult task for the teachers of biology because it involves laboratory work of individual and group of experimentation/ demonstration. Dike (1995) pointed out that lack of laboratory equipment and insufficient practical materials are the order of the day in Nigerian secondary schools. For skill acquisition to be attained in the subject under discussion, infrastructural laboratory and teaching materials need to be adequately funded and where this is not done, skill acquisition in this subject area will continue to be a mirage.

6. Lack of Concentration

This is sequel to the challenge number one above. It is important to note that a situation where a learner is not actively involved in the learning process, that there is a loss of concentration . It must be borne in mind that for the mastery of skills for doing anything, full concentration on the subject / object of study is required. Biology is an actively packed subject requiring mastery of skills leading to proficiency in its use and any distraction during its teaching will definitely affect the internalization of practical acquisition needed in the subject. This is one of the reasons most students who studied the subject in secondary schools could not perform well. Lack of concentration therefore, poses a challenge to skill acquisition in the subject.

Conclusion

The importance of biology education in skill acquisition cannot be overemphasized. This is due to the fact that biology as a field of study remains the catalyst for skill acquisition to enhance national development. However, some bottle neck challenges such as large classes, inadequate supply of qualified teachers, lack of concentration etc stand as barriers to this objective. Not until these problems are removed, this laudable objectives cannot be met.

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