ASSOCIATING BIOLOGICAL CONCEPTS WITH SOCIO-CULTURAL PRACTICES: A STRATEGY FOR EFFECTIVE BIOLOGY TEACHING IN SECONDARY SCHOOLS

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ABSTRACT

Biology teachers have for long been on the elusive search for a teaching strategy that would foster an effective teaching and learning of the subject so as to improve students' performance in public examinations. Several strategies including individualized learning, cooperative mixed ability grouping, demonstration and humanistic approaches have been suggested as the possible panacea. But the problem of student mastery of subject content remains poor. This paper presents the association of biological concepts with socio-cultural practices obtainable from the learners environment as an additional teaching strategy that would enhance the attainment of instructional goals in the secondary school biology.

BACKGROUND

Biology is a core subject needed for overall development of man. The teaching of the subject requires well-motivated and professionally competent teachers, adequately stocked laboratories and properly articulated teaching syllabus. However, biology, which happens to be the choice of almost every SSCE candidate has witnessed a serious decline in students' performance in the final year external examinations (STAN,1992) . Although accusing fingers are always pointed towards the defenseless teachers, (most of whom are on the job for lack of viable jobs), government and its agencies has continued to pay lip service to proper funding of education.

APPROACHES TO EFFECTIVE BIOLOGY TEACHING

With an overloaded teaching syllabus (STAN 1992), overcrowded classes (Okebukola, 1984), laboratories without equipment and classrooms in state of despair (Ukpene, 1997), the biology teacher faces serious challenges of turning around the dismal performance of students in public examinations.

Some of these challenges are evident from the numerous instructional strategies so far advocated for the effective teaching and learning of this subject. Okebukola, (1984), Brewton, (2001), favour the mixed ability cooperative learning groups. Here, it is postulated that in response to large class sizes, the teacher should make the few learning materials available to the students to work in mixed ability cooperative learning groups, rather than

resorting to demonstrations on the basis that the materials available cannot go round all the students. Demonstrations often transform the students into passive learners who "see" science but are not "doing" science.

Akinmoyewa (1984). observes that the traditional lecturing method guarantees about 50% comprehension. produces poor examination marks and failed to effectively handle differing students prior knowledge. To him. a learning strategy which is learner centred. where learners work at their own pace through self-instruction with little or no teacher's guidance is preferred. Plausible as it seems. self instruction may not achieve the educational goals in most Nigerian Schools because Libraries and Laboratories which ought to facilitate self instruction are mere empty halls (where any are available) or are poorly equipped. Another strategy which allows for flexibility and inventiveness is the individualization of instruction. Oriaifo (1983). who favours this method claims that it specifies to the students clearly written objectives towards which they work. permitting them to work on a variety of objectives at their own pace. Although the strategy may facilitate the quick acquisition of laboratory skills and mastery of projects. it is difficult to successfully attain instructional goals through it especially where the class size is large and the learning materials are limited.

The humanistic approach to teaching and learning tends to favour the adaptation of classroom instruction to the children's interest. needs and academic background (Aguele. 1990). Here. the child is considered as an individual with differing characteristics and needs which are brought into play in the teaching learning process. hence individualization of concepts is also advocated. The effectiveness of individualization method of teaching and learning is also supported by Tawari (1986).

THE WAY FORWARD

The use of laboratory activities is indispensable to the effective teaching of biology (Ango and Sila, 1986). It is crucial to note that proper understanding of biology practicals depends on how much one understands the theoretical work. For a proper understanding of biological concepts a "down-to-earth" strategy of teaching the subject is desirable. This paper advocates the association of biological concepts to socio-cultural practices obtainable from the learner's environment. Apart from minimizing the hiccups in understanding the instructions, it also removes the abstract posture posed by most biological concepts and principles. Although the cultural attributes may not perfectly fit the biological processes, areas of relevance and limitations have to be pointed out by the teacher. A lesson on the action of enzymes, which are organic catalyst, can be built around the action of potash which fastens the softening of beans during cooking. Although the potash is irretrievable at the end of cooking, the enzymes remain chemically unchanged at the end of the reaction.

The bilobed and quadri-lobed kolanuts can be used to explain the early stages of cleavage or the end product of mitosis and meiosis respectively. However chances for differing genetic composition in meiotic daughter cells should be stressed. Also the pressure system which facilitates the pumping of water from treatment plants to homes and then sewers and from the sewers back to the treatment plant for re-cycling could form the basis for the pumping action of the heart which circulates blood from the arteries, capillaries, venules, veins to the body and then from the body back to the heart for re-oxygenation in the lungs.

Instruction on respiration should be seen and explained as a chemical process which produces energy in the form of heat. Here reference should be made to burning but the areas of contrast should be highlighted. Heredity and variation are common aspects of genetics which students find very confusing and sometimes difficult to understand. Here the students can form the learning materials for instructions. Okpala (1991), suggests that in teaching certain aspects of variation, students could be asked to roll their tongues, invariably they will look at themselves and know those who can roll and those who cannot roll their tongues. They may also be asked to trace the foot of each leg in a paper and then male and female students' tracing will be compared. The class may use stamp pad to examine differences in finger prints. Local beads on strings called "Jigida" worn by adolescent females in some traditional societies, or the rosary could be used to discuss the location of genes on the chromosomes as well as in a lesson on linkages of genes.

On cell behaviour in its environment, use a loaf of bread dipped in water for a few seconds and it eventually swells to illustrate turgidity in plant cells. A piece of meat which shrinks in size when fried in hot oil can be used to illustrate plasmolysis, while a balloon can be filled with hot air from the lungs to illustrate haemolysis. Prolong the inflation of the balloon until it bursts to show what happens to a red blood cell in a hypotonic environment for a prolonged period of time.

CONCLUSION

It is evident that the lecture method, which ensures adequate coverage of the syllabus, produces average comprehension and encourages rote learning. Learning by

association or demonstration of concepts with variables obtainable from our immediate socio-cultural practices would break several barriers that tend to cause "roadblocks" in the understanding of most biological concepts. Furthermore, it will make easy understanding of practical biology. It is therefore pertinent that teachers familiarise with the cultural elements of their host environment so as to adequately select relevant practices that could elicit desirable behavioural outcomes among the learners.

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