
Adopting Mastery Learning For Effective Curriculum Globalization In Secondary School Biology: A Strategy For National Growth And Productivity Through Science

By

PATRICK C. CHIKOBI (Ph.D)

*Dept. of Biology,
Nwafor Orizu College of Education,
Nsugbe.*

LAWRENCE U. EZEANI (Ph.D)

*Dept. of Curriculum & Instructional Technology,
Nwafor Orizu College of Education,
Nsugbe*

KATE O. EZEGBA

*Dept. of Curriculum & Instructional Technology,
Nwafor Orizu College of Education,
Nsugbe*

Introduction

Curriculum globalization is an important innovation in the education industry across the universe. The globalization of curriculum can be viewed from different perspectives, each of which holds for the concept of globalization. The perspectives include the following:

- **Enrichment of curriculum:-** this will entail increasing content to make the curriculum in a discipline comprehensive in subject-matter, instructional objectives and strategies;
- **Awareness of curriculum:-** this will entail publicizing the curriculum to the awareness of the public across the globe;
- **Universalization of curriculum:-** this will entail making the curriculum in a discipline uniform across the globe;
- **Equity of curriculum:-** this will entail generalization of curriculum in a discipline for everybody without any bias of demographic variables like gender, race, social class.

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Innovations are new ideas and methods of doing things. Hornby, Gatenby and Wakefield (1963), see it as making changes, introducing new things.

Many innovations have been put up in education across the globe since the ages and in recent times. A number of these innovations have stood the test of time to date. This is partly because there is consistent need for them and partly because they are properly implemented. On the other hand, many innovations have been discarded partly for reasons of loss of desirability and partly for reasons of poor implementation (Okeke, 1981).

In the Nigerian secondary school education system innovations in the new millennium would include the use of extensive practical exercises in teaching the sciences like biology. Such an innovation is a desirable one since biology as a science subject should be activity-oriented and experienced (Abdulahi, 1984; Pwol, 1984; Ivowi, 1990). Also Bajah (1997) remarks that we must all now begin to think science, act science and sing science. There is therefore need to beget the innovation, and nurse it by guiding its implementation through the use of proper operational strategies

The Enabling Strategies for Extensive Practicals

Strategies as feasible techniques of achieving results abound for carrying out extensive practical work in the biology curriculum of Nigerian Secondary School system. Such feasible techniques include the following:-

Employment of Sufficient Personnel:-Ability of the education system to embark on extensive practical classes as a strategy for teaching biology requires the services of enough man-power; veteran biology teachers and laboratory assistants/attendants. Maduabum (1984) observed that since qualitative science education is a major tool for national development and productivity it presupposes that the right caliber of teachers (supported by auxiliary laboratory personnel) is necessary for a sound foundation in science which is geared towards a scientific and technological take-off.

Teachers are directly responsible for curriculum implementation, and they are remarkable in the educative process (Emeruwa, 1981). Unfortunately, Pwol (1984) observed that the average science teacher has the problems of what to do, how to do it, and where to start, as soon as the ideal patterns of conditions under which he/she was brought up in training are no more there. Team teaching would help in this situation. Aniodoh (1984), projected team teaching as an approach to enhancing secondary school chemistry learning in Nigeria. Inexperienced teachers would improve their professional competencies from their experienced colleagues in the course of team teaching.

Sufficient numbers of qualified biology teachers in a school to make for team teaching shall enhance the result-effectiveness of practical exercises. The current situation whereby some secondary schools in Nigeria are without even one qualified biology teacher is despicable. In such schools teachers who obtained their professional qualifications in disciplines other than biology are assigned to teach this all important science (Okafor, 1993; Maduabum, 1982). That is quackery in teaching and should be

avoided. Sufficient numbers of professionally qualified biology teachers should be employed and deployed as required.

Further more the service of laboratory assistant/attendants in secondary schools in Nigeria is almost phased out. The situation is deplorable to biology teaching in particular and should be re-addressed. They are important assets to the science teacher.

Creation of Awareness

One of the most basic requirements for implementation of any innovation is avoidance of ignorance. All persons and groups of persons who directly or indirectly are needed for implementation of the innovation should be made to know that the innovation is on course. They should also be well informed about the need for the innovation. Ordinarily, people are reluctant to change practice. (Okeke 1981).

A cursory look at the teaching of biology in Nigerian secondary schools today suggests that many biology teachers and school principals lack the afore-mentioned awareness. Many a time practical biology is begun in the students' final year, a few months (or weeks) to commencement of their Senior Secondary School Certificate Examination (SSCE). Little wonder students' performance in biology at the SSCE has persistently been unsatisfactory in recent time (Chikobi, 1997; Okafor, 1993, WAEC, 1992; STAN, 1992). Igwe (1990) also noted the same unsatisfactory performance by students in the sciences, generally.

Frequent Improvement of Personnel Competency :- When the required man-power is procured and the worker is adequately informed about the task at hand, he/she brings to bear in action his/her relevant competencies for achievement of the set goals. The competencies of teachers (and of laboratory assistants/attendants) are the basis of their performance and effectiveness, as is the case for every other worker. Accordingly, the requisite competencies of a worker should be frequently refreshed and improved on through consistent retraining. Aghenta in Igwebuikwe (1984) recommended that refresher courses through in-service training should be mandatory for science teachers after five years of pre-service training. Afemikhe (1982), had observed poor attendance of teachers at workshops and seminars/refresher courses, and which he noted contributes to low students-achievement.

Professional competencies desirable of biology teachers for effective conduct of biology practices in Nigerian secondary schools of the contemporary era are numerous. They include ability to evaluate both the process and product of students' work (Chikobi, 1997). For desirable competencies of laboratory assistants, and attendants, Akpan (1981) identified ability to perform in many areas which include general laboratory procedures. The competencies desirable of the biology teacher, and of the laboratory assistant/attendant should be properly developed and nursed through frequent refresher programmes.

Motivation of Personnel:- Teachers are the most important factors in the implementation of any educational innovation, and in fact of any teaching-learning

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programme. Emeruwa (1981), remarked that teachers are directly responsible for curriculum implementation. On the other hand, motivation as means of energization, sustenance and direction of behaviour towards a goal (Clifford, 1981) provides interest and urges one on as is desirable. Accordingly, biology teachers have to be adequately motivated to commit themselves selflessly to the philosophy of the innovation-for both the globalization of curriculum and the introduction of extensive practical work.

Motivation of the biology teacher (and of his/her auxiliary laboratory staff- the laboratory assistants/attendants) could be in terms of improved conditions of service, as may include hazard-allowances. On the contrary, and regrettably, science teachers' allowance (as meager as it is) has been tactfully stopped in many states of the country, including Anambra State. This is a retrogressive move in science education, and yawns for review.

Adequate Provision of Facilities: Different kinds of facilities are essential for carrying out educational programmes, and innovations. These include infrastructure, equipment and instructional materials. (Pwol, 1984; Okebukola; 1984; Chikobi, 1997).

Enabling facilities for extensive practical exercises in biology include conducive laboratory buildings, efficient laboratory equipment and sufficient instructional materials. A rich natural environment is also an asset, example for studies in ecology and evolution as well as for sourcing local laboratory materials.

The enabling facilities for implementation of extensive biology practical work in Nigeria secondary schools can be effectively provided, even on a slim budget. It is disheartening to recollect an observation of Abdulahi (1984) that there are no laboratories of any kind in many schools and no equipment. A situation like that should be addressed with dispatch.

Adequate Provision of Funds:- Extensive practical work involves rapid exhaustion of perishable things, damaging of fragile ones and spoiling of the durable ones. Accordingly, enough money is regularly required to replenish exhausted and damaged things, as well as for repair of spoilt ones. In biology perishable things include reagents for food tests. Fragile things include test tubes, and durable ones include microtones. Desks, and the laboratory building are also subject to dilapidation and repair.

The requisite funds for execution of the innovation of curriculum globalization with extensive practical exercises in biology can be sourced from diverse quarters-from statutory institutions and organization as well as from philanthropic individuals and groups. The cost of procurement and repair of equipment and materials can be ameliorated through personnel resourcefulness. Usman in Balogun (1982) informed that Nigeria's Federal Science Equipment Centre acquires competence in the repair, maintenance and improvisation of science equipment.

Akusoba (1985), noted that improvisation includes construction of simple equipment and careful selection of commonly available materials for easy teaching and learning. All the same, provision of funds for procurement and maintenance of needed teaching-learning materials and equipment should not be evaded under the guise of call

for personnel resourcefulness. Pertinent to note, too, is need for scrupulousness and propriety in management of available funds.

Allocation of Sufficient Time:- Long time period is essential for extensive practical exercise in biology, as in every science discipline. In many secondary schools in Nigeria biology is taught three times in a week in a class stream, with each lesson lasting 45 minutes (Girls Secondary School Umuawulu-GSSU, 1997). Two out of the three lesson periods are held as a block-time (double period) and meant to be used for practical exercises.

The 90 minutes duration of the block time is sufficient for meaningful practical work. Unfortunately, however, teachers usually use it for routine theoretical chalk-board teaching. Such teachers reserve practical exercises for the later days of the students' stay in school. On some occasions the block time is usurped by unforeseen events, which often disrupt school lesson time table, without the commensurate compensation in later time.

As much as possible, the block time should always be used for practical lessons. Any usurpation of it, at any time and by any event should be made up for as soon as it is feasible.

Securing Students' Commitment:- Students should be encouraged to help in sourcing local materials for the practical lessons. Also varied forms of interest-sustaining techniques should be used to get them committed to the rigours and boredom of extensive practical classes.

Students should be helped to improve on their reading habits to meet with the challenges of the innovation, with regard to curriculum globalization and extensive practical classes. Sufficient library materials on practical biology should be available for students use. No one book will furnish all the needed information. A vibrant library in this respect is therefore essential. Chikobi (1997) projected as a laudable teacher-trait ability to direct biology students properly on use of the library and wide sourcing of knowledge/information in, and out of school. The commitment of students to the philosophy and demands of the innovation would be easily secured by explaining the rationale to them properly.

Remarks

May it be remarked that in the interest of the innovation of curriculum globalization with the introduction of extensive practical lessons what the teachers must do are many, and what they must not do are also many. Some of what they **must** do have been discussed and what they must generally not do include the following:-

- Ignoring students' malpractices.
- Ignoring students' achievements.
- Reinforcing students too often.
- Encouraging students to always reason alike.
- Maintaining a single posture in class.

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- Explaining a point the same way every time.
- Making note for students always.
- Grading students' work by intuition.
- Intimidating assertive students.

Summary

In summary the innovation of curriculum globalization with extensive practical learning experiences in biology teaching in Nigerian secondary schools is desirable. It is integral to the contemporary 6-3-3-4 education system of the 9-3-4 education reform. The strategies for achieving effective implementation of extensive practical exercises in course of biology curriculum globalization include those of personnel sufficiency, awareness creation, competency improvement, fund provision, personnel motivation, facility provision, time sufficiency and student commitment. Practical training and experience are essential for entrepreneurship and hence foster national growth and productivity.

Conclusion

Secondary School biology curriculum requires globalization for facilitation of growth and productivity of the Nigerian nation. The said globalization of curriculum demands introduction of extensive practical exercises for satisfactory acquisition of science process skills and scientific attitude through laboratory and field experiences. Science process skills are the procedures of science while scientific attitudes are the characteristic behaviours of scientists.

Recommendation

The authors consequent upon their submissions in the paper recommended as follow:

- Effective globalization of the secondary school biology curriculum.
- Adoption of extensive practical exercises in the secondary school biology curriculum
- Implementation of the enabling strategies for effective extensive practical exercises in secondary school biology curriculum
- Observing of the remarks on what the teachers must not do, as they do those which they should do.

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