

# LEVELS OF PLANNING OF THE SENIOR SECONDARY SCHOOL BIOLOGY CURRICULUM

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## **Abstract**

**The purpose of this paper was to identify the Levels of Planning of the Senior Secondary School Biology Curriculum. Five levels of planning were identified and these include: contextual, managerial, conceptual, strategic and tactical. The contextual level involves decisions bordering on philosophy of education, educational ideology of the people, epistemology, sociological issues, and psychology of learning. The managerial level discussed the roles and responsibilities of the teachers and students. The conceptual level discussed how the concepts learned in biology are selected and arranged. The concepts were arranged as a subject matter, as a process and as a study of problems. The strategic level synthesized the three previous levels, analyzing personnel development, roles, resources and their optional use, translating values in the curriculum into specific policies. The tactical level entails all the strategies employed in achieving the curriculum objectives.**

## **Introduction**

The Senior Secondary School biology curriculum was derived from it draft developed by the Comparative Education study and Adaptation Centre (CESAC), University of Lagos, and presented to a national Critique Workshop in December, 1984. It was based on a project tested for many years in a number of schools located in different parts of the Federation (Federal Ministry of Education). Based on the experiences gathered over the years, a biology curriculum was proposed for the (6-3-3-4) system of Secondary Education and presented to the Joint Consultative Committee (J.C.C.) Reference Committee on Secondary Education in April, 1985, for sending and final recommendation to JCC plenary (Federal Ministry of Education, 1985).

Curriculum Planning is the translation of value judgements into practice. Curriculum Planning requires the knowledge and understanding of some conceptual frameworks, which underpin planning, and which reinforce the view that curriculum planning is not finite; it involves continual questioning of the aims and content of children's learning. One mechanism for translating such principles into practice is through the use of curriculum models.

All the curricula in use have different levels of planning. It is possible to identify five levels of curriculum planning models, which moves from the generals to the specific and from the abstract to the concrete classroom situation (Morriuson and Ridley, 1988). In this write up, I will identify five levels of planning of the present biology curriculum in use at the senior secondary level. Hie levels include; contextual, managerial, conceptual, strategic and tactical. It is hoped that this write-up will throw more light on the meaning of curriculum planning and the levels involved.

## **Level One: Contextual Level**

This level drew contexts from the followings; philosophical, ideological, epistemological, sociological, and psychological contexts of curriculum decisions.

## **Philosophical Context**

National Policy on Education, Published in 1977, is the first comprehensive document produced since the beginning of the Western type of schooling in Nigeria (Thakur, 1983). The Policy embodies in section I, a philosophy of Nigeria education.

As stated in the Policy, education is geared towards the realization of national goals of building a free, democratic, just and egalitarian society; a united, strong and self-reliant nation; a great and dynamic economy; and a land of bright and full opportunities for all citizens.

Nigeria's philosophy of education, therefore, is based on the integration of the individual into a sound and effective citizen of the nation at the primary, secondary and tertiary levels both inside and outside the formal school system.

The objective of the Biology Curriculum, which is on focus, has been derived from the National Policy on Education. The cardinal objectives of the curriculum are to prepare pupils to acquire:

1. Adequate Laboratory and Held skills in biology;
2. Meaningful and relevant knowledge in biology;
3. Ability to apply scientific knowledge to everyday life in matters of personal and community health and agriculture; and
4. Reasonable and functional scientific attitude.

### **Ideological Context**

Curriculum is value base (Morrison and Ridley, 19X8). Ideology or value is that system of beliefs which gives general direction to the educational policies of those who hold those beliefs (Scrimshaw, 19X3). Educational ideologies include; values, beliefs and assumptions about children Learning, leaching, knowledge and curriculum.

The biology curriculum was developed by referring to three clusters of educational ideologies, which emphasize (he individual child, knowledge and society. Progressivism, child centerlines, and Romanticism emphasize (he individual Learner. Ideologies in this group represent the developmental tradition in science. In them transmission of knowledge is secondary to discovery and following the child's impulses, needs and interest (Morrison and Ridley, 1988). Here, emphases are placed on Learning by doing and the child experiencing for himself.

The second cluster is Liberal humanism, which emphasize on knowledge. In this cluster, emphasis is less on a stratified than on a unified society with egalitarian principles at its care. Here, high biology culture is to be accessible to all through a common curriculum.

The third cluster is Democratic Socialism and Reconstructionism which emphasis reconstruction and radical change of the society. The society is to be changed after acquiring biology knowledge.

### **Epistemological Context**

While ideological contexts of the curriculum are fundamental to an understanding of primary practice, they arc allied clearly to epistemological contexts-concerns with knowledge, its forms and structures.

In the biology curriculum, there was a redress in the balance in education, which over-represents "knowing that" - inert ideas (White Head, 1932) - in favour of a greater emphasis on "knowing how"- processes. Teaching of the subject is in the realm of a process rather than a product view of knowledge, concentrating on skills of knowledge -getting rather than outcomes, e.g. inquiry skills and evaluation skills. Knowledge is to be tested rather than passively accepted (Bruner, 1970).

The biology curriculum is based on conceptual approach and it covers: concept of living, basic ecological concepts, plant and animal nutrition, conservation of matter/energy, variations and variability, evolution, anti genetic concepts (National Curriculum for Secondary Schools, 1985).

### **Sociological Context**

The curriculum of a school fulfils social function; it responds to social requirements and pressures for change. Thus, curriculum planning must look at characteristics and constraints of society to find purpose and direction.

The biology curriculum is intended to provide modern Biology courses as well as meet the needs of the society through relevance and functionality in its content, method, processes and application. The curriculum covers (he major concepts of nutrition, energy production, cell behaviour and ecology. Topics of direct relevance to the community include: ecological studies and principles; applied ecology; man and microbes, health and personal hygiene.

### **Psychological Context**

In general, curriculum planners needs to have a clear understanding of how learning takes place and how it can best be promoted through teaching and learning styles (Onwuka, 1985).

In planning the biology curriculum, the SPIRAL (or Concentric) approach to sequencing a science course was adopted, in the approach, the concept to be taught arc arranged in such a way that they run through the three years course; the concepts being discussed in greater depth as the course matures over the years. Some themes that recur in the curriculum are: From and function; ecological relationship; conservation of matter/energy and metabolism.

The curriculum is organised into live sections: topics, performance objectives, content, activity, and notes. This organisation provides maximum guide to the classroom teacher. It is assumed that one of the important reasons for stating performance objectives is that they will guide teachers in self-evaluation of their own teaching and achievement of their students. It is stated that teachers should note that the performance objectives presented in curriculum are not exhaustive, they should add new ones as deemed necessary, especially those performance objectives in the higher cognitive level, psychomotor and affective domains.

### **Level Two: Managerial Level**

This involves the effective use and organisation of a spectrum of resources to enable children's learning to be at its optimal level, from planning to implementation, outcomes, evaluation and curriculum change and development (Bush, 1986). To achieve the goal of this level, the biology curriculum has the following in-built into it:

#### ***Student independence and Responsibility***

Too much time is often spent supervising students in relation to personal needs and everyday housekeeping tasks (Good and Brophy, 1980) and interruptions for this purpose are a major source of discontinuity in academic activities. To minimize these problems, the curriculum specified the preparation of the classroom and the students so as to enable the students to handle most routine tasks on their own. This is achieved through giving of individual assignments or projects to students during practical lessons. Field trips are always recommended.

#### ***Supplies and Equipment***

The biology curriculum still emphasized, the obedience of the long known rules and regulations of the laboratory. In order to reduce managerial squabbles (e.g. students trying to borrow or take one another as supplies), teachers should keep, in a handy but safe place, a supply of commonly used materials and equipment that students are expected to bring on their own but occasionally lose or forget.

#### ***Group Structure***

Effective groups show, cohesiveness and positive attitudes. The new biology curriculum emphasized that teachers can promote group cohesiveness by arranging for co-operative experiences, minimizing competition, promoting pre-social behaviours and helping each member of the class to identify with class as a whole.

#### ***Teacher Image***

The biology curriculum shows that, teachers must establish themselves in the eyes of students as likeable, knowledgeable, respectable, credible, trustworthy, and generally attractive individuals. The teacher should enjoy teaching, including both the personal interaction and the instructional aspects. The teachers should know the students individually and be willing to help them. The teachers should teach the subject matter successfully, to all students and be prepared to help each individual progress as far as he or she can. The teachers must see themselves as resource persons. To this end, teachers always lead class discussions.

#### ***Preparedness on the part of the Teacher***

First, the successful teachers were well organized and prepared, both for teaching during lessons and for assigning and monitoring seatwork (Good and Brophy, 1980). A prepared teacher wasted little time in making transitions from one activity to another. It was in realization of this that performance objectives which enables the teachers to prepare for lessons ahead was included.

#### ***Maintaining Student Involvement***

The curriculum emphasized high involvement in lessons by arousing 'motivation directly and by holding students accountable for remaining attentive to what was going on (asking a lot of questions or otherwise getting students responses, being unpredictable in questioning patterns). It is expected that these differences will result in briskly paced lessons with student involvement.

### **Level Three: Conceptual Level**

Curriculum planning needs to decide its definition of the curriculum. The biology curriculum being discussed cannot be described as a subject, as a process, (i.e. a locus on skill teaching) or as the

study of problems.

This will become clearer when we critically examine the curriculum and give specific examples. The curriculum as subjects shows knowledge being expressed in disciplines like English, Mathematics, Science, and History. The Science curriculum from where the biology curriculum was chosen, showed knowledge as subjects and biology as one of the subjects. The curriculum as subjects represents more a secondary than a primary style. The biology curriculum being discussed is a senior secondary school biology curriculum.

The biology curriculum being discussed can also be described as a process because of the many and clearly identifiable processes in it. The identified process skills in the curriculum include, observation, identification, measurement, classification, inference, prediction, formulating hypothesis, making time and space relationships, organisation of data, recording, controlling variables, interpreting data, describing, raising questions, making operational definition and making conclusions. This is in line with the planning of the present day science curricula, which is process, based. The notion of a skill involves practice as well as direct instruction.

The biology curriculum under focus can also be described as the study of problems. This claim can be supported by the following examples. The curriculum has in its content, ecological problems and their solutions, conservation, pollution, and energy utilization. These are serious problems facing the world in the recent times.

With the above explanations, one can say correctly that the planners of the biology curriculum selected and combined the contents of curriculum as a subject, a process and the study of problems.

#### **Level Four: Strategic Level**

This level synthesizes the three previous levels, analysing personnel deployment, roles, resources and their optimal use, translating values and general organization of knowledge in the curriculum into specific policies at whole staff level.

The nature of the biology curriculum content was decided at this level. The consideration under this heading relates to the nature of biology as a discipline. Also problems associated with curriculum integration, specialization and differentiations were discussed.

At this level too, the decision on the relationship between the learner and the content was taken. The selections of the curriculum contents were made to balance the student need and subject. To this end, the contents were sequenced from simple to complex, general to specific taking into account the learner's own entry position. Recommendations relating to relevance, methods of grouping, structure, performance objectives and activities for both students and teachers were made here.

Other decisions made at this level include:

1. *Rationale:* A number of logically connected hypotheses derived from both a study of society and a knowledge of child and his relationship with society, together form the rationale for the subsequent selection and organization of the subject matter (Walton and Welton, 1976). The rationale for the biology curriculum was derived from the outcome of the 1969 National curriculum conference.
2. *Aims and Objectives:* The aim of the curriculum is to enable the student to acquire correct conceptions of "Living" by studying the biological characteristics of living organisms. The objectives of the curriculum were derived from the aim which include:
  - (i) Adequate laboratory and field skill in biology;
  - (ii) Meaningful and relevant knowledge in biology;
  - (iii) Ability to apply scientific knowledge to everyday life in matters of personal and community health and agriculture; and
  - (iv) Reasonable and functional scientific attitudes.
3. Timetable recommendations.
4. Resource recommendations.
5. Accommodation recommendations.
6. Staffing recommendations.

#### **Level Five: Tactical Level**

This level is informed by all four previous levels, and reciprocally informs them. At this level, the curriculum modelling process engages teacher's planning in the long term, medium term, day-today lesson stages.

The biology curriculum makes it possible for the teachers to prepare a scheme of work for the whole academic session. The scheme of work is further broken down into terms, weeks-and periods. At this level too, the teaching style, selection of teaching materials and equipment are within the powers of the teachers. The biology teacher, uses his wealth of experience to select teaching materials and equipment to carry out the recommended activities and hence achieve the set performance objectives. The curriculum empowers the teacher to state more performance objectives when the originally stated ones are inadequate.

At this level, the dual strategy to implement the curriculum is decided. All the resources at the disposal of the school, department are effectively managed to implement the curriculum. At this level, allocation of periods and time is made taking into account the number of teachers available, the school subject timetable is designed and plotted at this level. In the allocation of time to the subject, the volume of work to be covered and provision for practical lessons is given due consideration.

The decision on formative evaluation to find out the achievement of the students with the set performance objectives in mind is done at this level by the teacher. The decision on when and how biology practical are to be held is done by the teacher. The curriculum recommends a double period and once a week practical lesson. The biology teachers together with the students are to collect the materials and specimen for the practical lessons.

### **Conclusion**

The planners of the biology curriculum employed the Skilbeck's Rational Deductive curriculum development model. This model has five stages; situational analysis - Goal formation programme building interpretation and implementation - monitoring, feedback, assessment, reconstruction. The goal formation is equivalent to Tyler's objectives, programme building is the same as Tyler's content, Interpretation and implementation is the same as organisation while monitoring, feedback, assessment, and reconstruction is the same as Tyler's evaluation.

The rational deductive model of curriculum is centrally dominated (Skilbeck, 1976). The central task of the school is to interpret central directives to the satisfaction of the controller and control centre. Teachers act as functionaries and play very limited task in curriculum development. The situation analysis of the Nigerian educational system was done during the National Curriculum Conference held in Lagos in September, 1969. What was unique about the 1969 conference was the idea of involving a cross-section of people in curriculum reform. The conference was not concerned with preparing a national curriculum, nor was it expedited to recommend specific content and methodology. Rather, in its first phase it was to review old and identify new national goals for Nigerian education, bearing in mind the needs of youth and adults in the task of nation-building and national re-construction for social and economic well-being of the individual and the society (Fafunwa, 1984). The rationale for education was stated after the situation analysis. The rationale for biology curriculum was derived from the national rationale for education.

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