PAPER 6

ACTIVITY TECHNIQUES AND ITS IMPLICATIONS FOR SCIENCE CURRICULUM INNOVATION IN NIGERIA

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Abstract

This paper delved into the importance and implication of activity method in curriculum innovation. It surveyed various activity based approaches and correlated with curriculum. The specified activity based was project technique which was expounded to be learning strategies which assist the development of useful capabilities in the cognitive psychomotor and affective domains, the application of which complement overall curriculum objectives and sometimes lead to curriculum innovations. The phases of a project as an activity based were identified and the important though, complex nature of assessment in project work was highlighted. A discussion on curriculum innovation was illustrated with specific Science curriculum projects in the country. The paper, therefore, recommended that activity based method especially project techniques should be emphasized for the improvement and design of Science curriculum in Nigeria.

Introduction

The relevance of the Science curricula development is being considered in terms of the Nigerian environment, the Nigerian child, Nigeria's cultural heritage and the imperatives of technological progress. The mastery of a particular course of study and the interest which students show in Science subject depend to a large extent on the teaching – learning approach. Selecting one or more teaching methods for a particular lesson takes into consideration the nature of the students, characteristics of the school including available teaching aids, and the teacher's background. According to Faust (1977), there is no standard student and each student learns best using strategies and objectives that reflects his experiences, abilities, aptitudes and interest. Similarly, there is no standard teaching method. The various teaching methods overlap in definition and application; none being mutually exclusive although researchers often delineate several teaching strategies (Bennet et.al., (1976). Project technique is one of the many teaching learning style under the investigative or activity based. It is a method which is capable of improving learning through its diversity effect activity. It has the prerequisite characteristics for individualized instruction and therefore has high potential for making teaching-learning process challenging and rewarding.

This activity technique is at times misconstrued and hence wrongly applied. This paper attempt to elucidate the concept of activity vis-a-vis project, illustrate its classification, techniques and approaches, and then relate these to curriculum innovations.

Activity approach: what is it?

This is a student-centered approach, where the student has some control over the teaching process and directs more or less the instructional activities with the teacher providing adequate guidance.

This paper considered project approach as an example of activity technique. In the educational realm, project connotes a diversity of approaches, techniques and practices. Project is intended to help the student gain a more concrete understanding of an abstract or comprehensive idea. It can be done individually or in groups. Projects are productive activities that motivate and sustain the interest of the students and their desire in productive and useful activity. All worthwhile educational projects are usually based on a number of carefully identified objectives that serves to supplement and complement the objectives of the curriculum as a whole. By way of definition, a project is a learning activity which is characterized by:

(a) Its multi-dimensional approach to learning: A project involves more than one activity that enhances learning. It usually involves varieties of capability, namely intellectual skill, cognitive facility, motor skills, verbalizable information and attitude (Gagne, 1977).

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(b)   Its problem-solving orientation: A problem is usually identified and Scientific processes are often applied towards a resolution of the problem.

(c)   Being capable of more than one correct answer: A project usually involves a large number of variables hence its assessment is complicated and flexible, allowing for differing solutions.

Project has an integrating character of bringing into one, a number of teaching/learning practices and involves different subject disciplines in finding answers to problems. In a project work, we have divergent strategies such as concept learning, process approach and problem-solving. A naturalist perceives projects as permitting and encouraging the mutual development of the various types of human capabilities and coordinating the systematization of learning outcomes into useful patterns for overall educational benefits. A formal explanation of a project that acknowledges the complexity of the terminology was given by Deere (1974) who stated that a project may be described as:

> ...*a teaching-learning activity which requires the student to determine one or more of the following, his strategy, his resources, his target, which allows for a range of solutions rather than a unique answer ... (p.106).*

The above summarizes one principal view of curriculum project. It agrees with the concept of a project being a learning activity, carried out by an individual or a group in the accomplishment of curricula reforms. This type of curriculum projects are usually founded by Governments or private agencies for the purpose of initiating, following-up and accomplishing important curriculum innovations. The experience in the planning, designing and implementation of new curricular similarly effect changes in existing ones.

Activities (Projects): Its Place In Curriculum

Curriculum involves all of the objectives content, methodology and evaluation of education. According to Fafunwa (1979), "A good curriculum is the total environment in which education takes place...,(p.80). Whereas education according to Vaizey (1970)" is a process leading to the building up of the whole man; self reliant, creative and adaptable.

Considering a project as a teaching/learning activity which complements the curriculum, and a perspective of curriculum as a totality that is made up of the learner, the teacher, all of the subject matter, the teaching/ learning methods and the entire educational environment, both terms are mutually related. Fundamentally, projects foster education; promote self-reliance, encourage resourcefulness and assist creativity. From investigations, all educational projects have meaning in curriculum. For example, projects like building a solar water heating device and designing a new programme for first year NCE Chemistry students correlate in many respects. Both the project and curriculum share some features.
These include:

- Selection of appropriate strategies: these are either pre-knowledge of the strategies or there are methods of finding them out.
- Knowledge of academic content: one or more subject areas must be familiar.
- The learner and /or the teacher on one hand and the experts and their target group on the other.
- The matrix, that is, the total environment in which education takes place.
  These attributes of projects can be seen as characteristics of curriculum.

Project Approaches and Techniques (Activity Techniques)

Different interpretation is given to the word project but these is a point of congruence in the general usage. The central idea of a project is that it is a "teaching-learning activity". Some examples of projects are:

- **Subject Topic Project:** This is a project in a particular topic. Here the teacher identifies a topic on the basis of interest and attempts to attract the pupils' attention. He introduces the topic to the class, discusses it and encourages the pupils to investigate the subject further. The teacher gives them guidelines on how to explore the topic for some reasonable details through asking questions from their parents, elders and peers. He may encourage the mature pupils to make references in books and childrens' magazines, and to study actual specimen where available. Examples of such projects are; (a) the leaves of plants (b) fishes (c) colors and so on. Pupils will learn about information gathering, classification techniques, keen observation and become familiar with information recording and descriptive writing.
- **Project as Advance Organiser:** This is always use in an inter-disciplinary studies, in which a theme will be coined to act as a focal point to all the subjects involved. It can be used in the teaching

of Integrated Science and Social Studies when the inter-connectedness of phenomena is being stressed. The themes like water, air, energy and telephone, aspects of Biology, Chemistry and Physics are involved. Themes provide centres for the elucidation of the inter-relationships among the usual divisions in subjects. Also, a project work on urban transportation or minerals in Nigeria, provides a theme that brings out the relationship among History, Science and Geography.

- **Technological or Simulation Project:** This involves the development of a device or an artifact usually of Science. Here, students simulate experts in producing prototypes or constructing something new to them. Students assume the mantle of a designer or researcher. Examples are the design and construction of: (i) Solar water heater (ii) Production of alarm bell (iii) Transmitter. Technological Projects are usually oriented towards finding solutions to practical problems.

- **Research Type Project:** Here, students undertake a piece of personal research using scientific processes and procedures. These include: identification, keen observation, hypothesizing, careful and comprehensive data gathering, data analysis, experimentation, making inferences, extrapolations, data synthesis and recording, and evaluation. Research projects place greater emphasis on problems. Examples are: (i) an investigation into the attitudes of primary school pupils to the teaching of Science. (ii) breast feeding among Nigerian mothers.

- **Curriculum Project:** This is a project aim at improving existing subject programmed and are usually founded by government or private agencies. The initiation is often as a result of the identification of some lapses or insufficiency in aspects of curriculum in use. Usually, the project developers are a team of experts made up of subject specialists, educators, psychologists, teachers, etc.

Elements Phases of Project

There are four essential elements of any project. The first three are sequential while the fourth unit touches on all the others bearing direct relationship to their determination. The elements include: initiation, succession, termination and evaluation.

→ Usually one way but could be reversible

⟷ Two way assessment
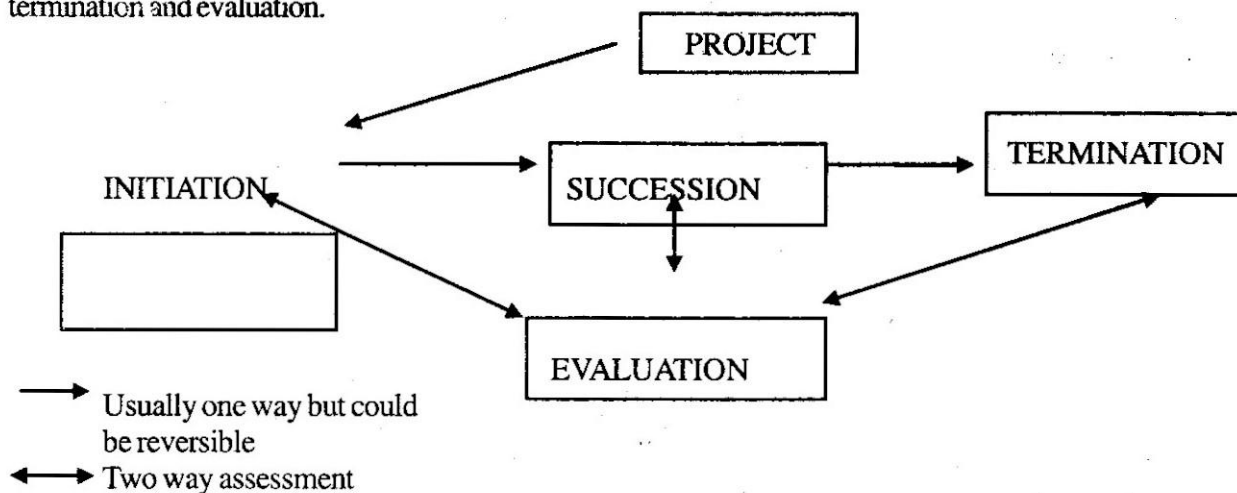
- **Initiation Stage:** This is where problems are identified and a specific one selected for investigation. Thereafter, project objectives are spelt out, strategies determined and resources earmarked.

- **Succession Stage:** This stage marked the purpose of commencement effort. It involves process, progress and continuity of the project. The stated objectives are re-examined critically and details of design are worked out. Information and data gathering endeavours are intensified, data analyzed, tools assembled, and step by step synthesis carried out with due attention to details. If it is a student project, the student will be interacting constantly with the teacher but if it is a subject project, designers will be interacting with pupils and teachers in actual classroom situation.

- **Termination:** Here the result or product of the project become manifest. A written report is usually prepared on the project. The project report and / or products are passed on for critical assessment in the final phase.

- **Evaluation:** Here, the terminated products will be subjected to critical analysis and examination. The objectives of the project will be used in determining how well the established goals have been achieved. Project evaluation requires sound judgement of the cognitive, psychomotor and affective

performances using a checklist of questions. Enough questions will be raised to cover all the aspects of the project and all the domains of learning.

Table I

Project Assessment Model

Grading Criteria	Participating schools or individuals or Group						
Schools	1	2	3	4	5	6	7
Knowledge/comprehension of concept and principle							
Effort/Perseverance							
Originality/Initiative							
Manipulative Skill							
Application							
Report/Record							
Total Score							

Score Scale: 0 1 2 3 4 5
Poor   Excellent

Table I is an assessment model used in assessing individual and group participation in project work. The score scale ranges from 0 to 5. Zero (0) indicates poor performance while 5 shows that the worker performed excellently under the given conditions. Depending on the particular type of project, other criteria such as planning, co-operation in teamwork, safety provisions and so on are included among the assessment criteria.

Curriculum Innovations

Curriculum innovation refers to change in both methodology and content of the subject matter. Such changes influence the essence and the method of performance of the learning activities. The change must be monitored and assessed to ensure that it is achieving the goals specified and that the effects of the change meet expectations of both the designers and users. Innovations in Science education curriculum is inevitable in order to meet man's needs.

Science Curriculum Projects

Several individuals, federal and state governments, educational organizations and agencies and the Science Teachers Associations of Nigeria (STAN) have contributed significantly to the Nigeria Curriculum innovation. STAN has spear headed a number of Science subjects including Primary Science.

Conclusion

Project approaches which is activity based is to complement and supplement the objectives of the school curriculum. Project is not only advantageous for fulfilling the goals of existing curriculas. It is a useful process for curriculum innovations. Projects approach is a useful educational strategy that should continually be applied in every level of education for knowledge acquisition, problem-solving, attitude modification and curriculum renewal.

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