

# RE-ENGINEERING BASIC SCIENCE FOR SELF PRODUCTIVITY: AN ACTIVITY BASED APPROACH

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## Abstract

*Basic Science Teaching in Nigerian schools have for a long time been chalk and talk kind of learning, a situation where students see science as a body of knowledge which could be learnt through books, ignoring the fact that science is also a process of inquiry targeted at improving the lots of the society. In view of the high unemployment and poverty levels in the country which could be attributed to the collapse of our educational institutions. Educational policies are now recently being channeled through coherent sequences of courses so that pupils achieve both academic and occupational competences. This paper points out the activity based approach as one of the ways of re-engineering science teaching towards self-productivity and youth empowerment in Nigeria*

Science teaching in Nigeria schools has its roots anchored in the famous Endicott House conference of Britain in which Nigeria fully participated, that was in the late fifties. But not until September 1968 when a curriculum conference was held in Lagos that attempts were made by various bodies at developing science curriculum materials in form of syllabus, course outlines, pupil text, teachers and students workbooks.

The last one and half decades have seen considerable effort by curriculum planners and teachers to encourage teachers engage students in activities during science lessons and relate science to environmental challenges. This has occurred for a number of reasons: firstly, there is a need for activities which encourage pupils to see physical sciences as real and not abstract. Secondly, pupils are now perceived to a much greater extent than before as playing an active role in the learning process. Thirdly, employers of labour have criticized schools that they turn out students who lack problem – solving abilities, higher order thinking and employability skills all crucial for work in a global economy. An activity is defined as process that an organism carries out or participates in by virtue of his being alive. In education it specifically refers to the process that actually or potentially involves mental functions it is designed to stimulate learning by first hand experience, inquiry, experimentation, observation and discussion (Martin and Ajagun 1993). There are a wide range of practical activities which the teacher can engage students in during a science lesson or outside classroom environment; these were classified under four main headings by Woolnough and Allsop (1985), thus:

- Activity for developing experimental skills and techniques

## ***Pristine***

- Activities for motivational purpose
- Activities for developing problem – solving skills i.e. pupils behaving as research scientists investigating and exploring their environment
- Activities concerned with gaining better understanding of the theoretical aspect of the lesson taught.

The activity based teaching methods has a potential of triggering the innate creativity of students when properly utilized. Skills and knowledge acquired could be further harnessed in future for productive purpose; employment and job placement.

## **What is Basic Science?**

Basic science is the integrated science taught to students in the junior secondary one (J.S.1) to junior secondary three (J.S.3). According to the Universal Basic Education Scheme (UBE) by the time a student completes JS3 he or she must have gone through 9 years of compulsory education and would be expected to have acquired basic skills that could be developed in related vocations.

## **Focus of Activity Approach in Basic Science Teaching**

The focus of activity approach in basic science at all levels should involve a process of acquisition of scientific and vocational skills that could make its recipient employable or self reliant. Specifically activity approach in basic science shall:

- appraise the area of need of the society in scientific and vocational skills, this will be in line with the vision 202020
- design and adopt an activity curriculum for contemporary sciences where it does not exist or redesigning existing ones.
- train ideal artisans or technicians whose work relate to science e.g electrician, battery charger, mechanic etc. their role is to go round schools to demonstrate to pupils practical and vocational skills in their profession and encourage them in the use of such skills.
- the collaboration of teachers and vocational artisans to work together to develop integrated curriculum.
- urge schools to use activity approach, prepare clusters of related carrier paths and encourage students along such paths.

## **Objectives of Activity Approach in Basic Science**

The objectives of activity approach would to:

- i. Provide pre-vocational skills for future training in science and technology.
- ii. Provide basic science literacy in everyday living.
- iii. Give training and impact the necessary skills leading to the production of craftsmen, technicians and other semi-skilled personnel who will be enterprising and self reliant.
- iv. Develop, apply, evaluate and advance approaches to strengthen students' basic competences in mathematics, science, critical thinking and problem solving ability.

- v. Make students employable in a depressed economy.

### **Using Activity Approach in Basic Science Teaching.**

Activity approach in basic science teaching can be a vital tool for capacity building if advanced from two fronts.

The first is on the acquisition of knowledge and skills through formal institution. This involves the normal classroom activities in science and mathematics, students are taught based on the activity approach as recommended by Science Teachers Association of Nigeria (STAN). At the junior secondary school levels the formal instruction should cover three areas where pupils can gain scientific knowledge and skills.

- i. Exercise: This is designed to develop the scientific skills of observation measurement, manipulation of equipment etc.
- ii. Investigations: are designed to give pupils practice and consequently the opportunity to develop competence in using the scientific approach to problem – solving.
- iii. Experience: are aimed at enabling students get a feel of the phenomena being studied.

The second areas involves the use of knowledge and skills acquired in the classroom, laboratory etc to solve human and environmental problem. This has become a sore thumb in our educational system. According to Odu (a997), the need for adaptation of scientific knowledge and skills prompted the introduction of introductory technology and Junior Engineers, Technicians and Scientist (JETS) in junior secondary schools in the eightys (80s) it is about three decades now and no result has been achieved, for success to be recorded on this area the following suggestions have been made.

### **The use of Resource Personnel**

Resource persons used need not b professionals. Ideal artisans, technicians for example bricklayers, electricians battery chargers etc may be invited to demonstrate a skill or explain certain things to the pupils. Their role is to provide links between knowledge and skills acquired in the classroom and how they can be applied to solve human and environmental problems.

### **The use of Field Trips**

Educational trips could be made to places around where knowledge and skills are transferred into practical uses, places like local soap manufacturing industries, mechanic workshops iron smelting company, building construction site etc. this will reinforce students, knowledge and enhance creativity.

### **The use of Supervised Apprenticeship**

Students could also be sent on apprenticeship for a fixed period of time. The places students are sent need not be an established industry or organization. It could be a

place easily assessable within the immediate environment, places where local vocational activities take place for example, wood or metal workshop, blacksmithing workshop etc.

### **Creation of Occupational School**

Occupational school can also be created where teachers usually belong to occupational cluster rather than conventional academic subjects. A school where the curriculum stems on practical activities of skills and knowledge. Here the students are encouraged to think about occupation early in their basic school career. The career path offer opportunities for contact with relevant local industry or organization and with educators at post secondary institutions.

### **Challenges of Using Activity Approach in Basic Science Teaching**

One of the major problems of activity based teaching is the non-availability of laboratory and scientific equipment; improvisation is one way of getting out of this problem. It is the act of producing alternative apparatus and materials for effective teaching (Muhammed and Muhammad 2007). A teacher who improvises is a burden bearer, he is able to manipulate the flora, fauna and the physical environment to enhance his teaching.

Another problem is that of the over bloated classroom, this does not pave way for learning, Dogara (1993) noted that most of our public junior secondary schools have classrooms with population average of sixty (60) per class. This does not provide insensitive to the teacher who wants to employ activity based approach in science teaching.

Funding is another challenge to the activity approach to science teaching as some of the activities carried out in science require funds to drive them to a realistic level of achievement. The current situation of funding of science in schools leaves much to be desired.

The table below compares Nigeria with other countries in terms of amount expended on science teaching.

**Table 1: Expenditure on Science, Engineering, Research and Experimental Development.**

S/NO	COUNTRY	% OF GROUP
1.	Nigeria	0.1
2.	Benin	0.7
3.	Mauryus	0.3
4.	Cuba	0.8
5.	Argentina	0.4
6.	Chile	0.5
7.	India	0.9
8.	Japan	2.8
9.	France	2.3
10.	U.K	2.0

Nigerian government should as a matter of urgency deploy more resources to the teaching of science and technology so that the impact can be felt in schools. Lastly science teachers need to undergo regular training in an attempt to put the basic requirement learnt in to practice. Along side this is the issue of improving the condition of service of science teachers. All these will go a long way in improving the teaching and learning that goes on in our schools.

## **Conclusion**

We are all familiar with the famous Chinese proverbs.

I hear and forget

I see and I remember

I do and I understand

This has been quoted frequently in the past 30 years as a justification for activity based approach to science teaching. However, activity approaches could be as boring and meaningless as any other techniques if it is not based on the needs and aspiration of the society. Also activity should be planned so as to meet the students experience of success in an action thereby building self esteem, self-confidence and self productivity.

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