

## PROBLEMS AND PROSPECTS OF EFFECTIVE TEACHING AND LEARNING OF PHYSICS EDUCATION IN NIGERIA

*Audu Akagu Isma'ila*  
*Department of Physics,*  
*Federal College of Education,*  
*Katsina.*

### **Abstract**

This paper presents the problems affecting teaching and learning in physics education along with the prospects in certain sectors of Nigerian economy. The paper revealed that the problems are mainly improper use of instructional materials, inadequacy of skilled and qualified human resources, inadequacy and the use of obsolete material resources and inappropriate teaching and learning environment. The paper also revealed the prospects/ opportunities as they exist in telecommunication, banking, education and other sectors of Nigerian economy.

Education is the totality of life experiences which starts at birth and ends at death. It is a process which involves developing knowledge and ability in learners for personal development and for societal enhancement. According to Oyedekum (2004), education involves teaching, training and learning in schools and colleges for the development of knowledge and skills so as to prepare individuals to live happily with themselves and with others in the society. Therefore, science education is seen as a concerted effort by man to understand and explore the universe in which he lives by way of systematic and organized observations, identification and descriptions, experimental and theoretical explanations of natural phenomenon.

Science education has been considered so much important to the development of any nation to the extent that Oyedekum (2004) stressed that any nation that denies science education to her youths does so at her own peril. Egunjobi (2012) stressed that inline with the policy objectives of the national policy on education (2004) that an activity-oriented discipline ought to be guided by methods that are purely resource-based and by competent, skilled and academically qualified personnel.

Therefore, physics education, which is entirely an activity-oriented discipline and whose concepts are somewhat exceptionally abstract to the ordinary mind, deserves urgent national attention towards providing remediation

to curb its high level of abstraction in order to facilitate and promote teaching and learning in this all-important discipline in view of its high prospects in the growing economy of Nigeria.

### **Challenges for Physics Education Resulting From Problems Associated With Instructional Materials in Teaching and Learning**

Instructional materials, according to Godwin (2004), are the material aids which both teachers and their students use for the purpose of ensuring effective teaching and learning in the classroom. They help to bring about effective communication of ideas, skills and knowledge to the learners. Onasanya (2007) stressed that instructional materials serve as sources of first-hand information to the learners. Similarly, Godwin (2004) also stressed that when instructional materials are skillfully employed, they not only keep the learners busy, but encourage active participation in the classroom teaching and learning process and according to Dogo (2010), instructional materials assist in simplifying teaching, motivating interest of the learners and facilitating quick understanding of abstract concepts. Therefore, one can say that with the use of instructional materials in teaching and learning, lessons in physics education may become so interesting, no matter how abstract the concepts may be, when they are simplified, practical and systematic through effective use of instructional

aids, as captured in the work of Akagu (2013), science students taught with instructional aids exhibit traits of academic excellence when compared with those taught without.

However, even as highly important to teaching and learning as instructional materials appear, their usefulness and purpose are sometimes rendered completely ineffective thereby posing great challenges to learning in physics education. The challenges are highlighted as follows:

#### **i. Availability of Adequate and Relevant Instructional Aids**

It is no doubt good for the instructional materials as aids to lessons in physics education to be available, but it is also good enough for them to be adequate and relevant to the topics so as to achieve the lessons objectives. For instance, it becomes cumbersome and ambiguous in the teaching of motion in mechanics if the teacher after having made the instruction aids physically present in order to appeal to the learners, but fails to ensure that they also appeal to the sense of motion, and more so when he fails to use the material aids to demonstrate motion while describing the objects of lesson: speed, velocity, acceleration, deceleration etc, and failed to describe the parameters when writing down the mathematical

expressions of the accompanying formula.

Similarly, the lesson objective on optics is completely defeated if there is no electricity to power the available material aids. In this case, the material aids may be adequate to the optics lessons, but they become highly irrelevant in the absence of electricity: seeing is believing, they say.

**ii. Difficulty in the Use of Instructional Materials and Manipulative Skills of the Teachers**

Onasanya (2007) posited that instructional materials, when they are difficult to use as aids to teaching and learning process, render their purpose completely useless resulting in great danger to learning in science-education. Therefore, in view of the dynamic nature of science-education, the present and future place of physics-education is highly endangered if its concepts are approached with methods and materials that are obsolete and outdated.

Where the available materials are both obsolete and difficult to be used as aids to teaching and learning, simplified models ought to be improvised by skillful, competent and qualified teachers. Akagu (2013) reported in his work that majority of Secondary School Science teachers have low skills of

improvisation and manipulation of the available scarce instructional materials to suit a specific purpose of science lesson. This is no doubt a great setback for physics education in recent times.

**iii. Monitoring the Learner's Learning Activities**

According to Timku and Mari (2010), it is not only enough to engage the learners in learning process through the use of instructional materials, but it is to effectively monitor their learning activities. For instance, the teacher ought to introduce to the students the necessary textbooks on a given subject and ensure that they use them accordingly, and after having given assignment and exercises to his students, the teacher ought to guide them through the necessary texts, mark and effect corrections to the students' mistakes. The instructional materials, no matter how adequate and relevant, cannot put themselves into use. The learners need assistance in the form of guidance on how to use the instructional aids effectively to facilitate and promote learning in physics education.

**iv. Availability of Adequate and Functioning Laboratory Materials and Equipment**

While theoretical lessons in physics education take place in the class room, the experimental lessons

take place in the laboratory. As earlier stated, science seeks knowledge through observations, experimentations and through theoretical evidences. Therefore, where the equipment and materials in the laboratory are obsolete, non-functioning or difficult to handle, or where they are not adequate or they are irrelevant, then learning in physics education becomes almost difficult and the objectives of most lessons become completely defeated since theories and practices go hand-in-hand for a common goal in a science education. At times practical sessions are designed to serve as verifications to the theoretical sessions in the class room.

Other accompanying challenges in the use of other learning resources in physics education include:

**(i) Inadequacy of Skilled and Qualified Human Resources**

Learning in physics is highly challenged partly due to lack of or inadequacy of qualified, skillful and experienced teachers, especially at the elementary levels. These problems have assumed larger dimensions in recent times to the extent that, with the level of difficulties and abstraction of the science concepts, learners are now scared away from learning in physics education. The shortage of competent, skillful and qualified human resources to cope with the

high demands of teaching in physics education has been some source of worries to all concerned.

**(ii) Poor Learning Environment**

According to Egunjobi (2012), learning environment comprises the class room and its location, the furniture and other teaching and learning materials within the vicinity where learning is taking place. Where all these are not properly and adequately provided, a thought provoking or initiating activities become difficult, and obviously this is a great setback to learning in physics education. Dogo (2010) posited that active learning cannot proceed conveniently in a non-conducive learning environment.

**Suggestions for the Enhancement of Classroom Instructions in Facilitating and Promoting Physics Education for All**

- (i) To support conventional classroom work and make teaching and learning in physics education much more vivid, ICT facilities are the veritable tools to be used. In this regard, Egunjobi (2012) opined that computer can be used in the design and development of the learning materials or to download relevant learning materials from internet which are suitable for specific learning objectives. Through the use of ICT for instance, scarce science textbooks, information from science

journals and magazine can be sought for, to facilitate learning in physics education.

- (ii) The use of multimedia to support classroom instructions could be other significant steps in facilitating and promoting effective learning process in physics education. This involves the use of combination of media such as Videos, Pictures, Sound motions, texts and animations to enhance instructional aids in the teaching and learning process. For instance, lessons on fields e.g. electric, magnetic or gravitational fields, become much more practical and interesting if animations of the objects of lessons are displayed alongside texts or sound motion for the learners to view, read and still listen to. This will greatly reduce the high level of abstraction, illusions and difficulties associated with physics concepts and ideas.

- (iii) The use of hypermedia, which is the switching from one element of media information to another in a swift procession, have been reported by Egunjobi (2012) to have overtaken the use of Videotapes or recorded tapes as instructional aids in sciences. Suitable information on physics education are readily available in the following forms:

- (a) IVD: Interactive Video Disc
- (b) CD-ROM: Compact Disc Read Only Memory
- (c) DVD: Digital Versatile Disc

- (d) DV-I: Compact Disc Interactive
- (e) Photo-CDs: Photographic Compact Disc

### **Prospects of Physics Education in the Growing Economy of Nigeria**

With adequate skilled and qualified manpower, adequate and relevant instructional materials to support conventional classroom instructions in the field of physics education, certainly the high level of abstractions, illusions and difficulties associated with the teaching and learning of its concepts and principles shall be greatly reduced and the learners shall become more motivated and encouraged to engage in further learning activities thereby acquiring advanced knowledge in physics education.

In this way, learners of or graduates of physics education shall be job-creators or job-trainers and contribute immensely to the growing economy of Nigeria. As high intellectuals in physics education, they shall be fit to take up positions of highly demanding responsibilities in almost all public and private establishments and shall be able to cope, with little or no supervision, in industries such as banks, telecommunication, engineering and construction companies, mining industries, and institutions of higher learning thereby contributing greatly to the growing economy of Nigeria.

### **Conclusion**

This paper discussed the challenges in physics education and revealed that those challenges resulted mainly from the associated problems with the use of instructional materials in teaching and learning, and from unskilled, incompetent and unqualified human resources. Way forward was suggested on how to enhance instructional aids to support the conventional classroom activities in the quest to ensure physics education for all and also to ensure greater prospect in the growing economy of Nigeria.

### **Recommendations**

In view of the challenges to physics education due to the problems associated with the use of instructional materials, unskilled and unqualified man-power as enumerated earlier on, this paper therefore recommends that government at all levels and other stake holders in education should strive harder to address the following items so as to ensure physics education for all in view of its prospects in the Nigerian economy as discussed earlier on:

- (i) Massive recruitment of competent, skilled, academically qualified and experienced staff for the job of teaching in physics education at all levels.
- (ii) Continual in service-training and opportunities for further studies for all academic staff in physics education at all levels.

- (iii) Attractive salaries, grant for research and other remunerations to motivate academic staff.
- (iv) Provision of adequate, relevant and functioning instructional materials for classroom work and laboratory experiments
- (v) Provision of ICT, multimedia and hypermedia infrastructure to enhance the quality of teaching and learning in physics education.

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