

TOWARDS A SUSTAINABLE NATION'S BUILDING: CHALLENGES OF PHYSICS TEACHERS IN THE CHANGING WORLD

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Abstract

The paper was a discourse on the relevance of Physics teachers on sustainability of nation's building especially in this 21st century of global technological growth. It highlighted the objectives of teaching Physics in the Secondary Schools in Nigeria. The teachers' attitude towards the subject was discussed and its implication on students' enrolment into science and science related courses in higher institutions of learning. The challenges of the teachers towards enhancing effective teaching and learning of Physics at the Secondary Schools were unveiled while possible solutions that could bring about positive changes in the teachers' activities for effective teaching and learning of Physics at the Secondary Schools capable of enhancing a sustainable nation's building were proffered.

Key words: Nation's building, Physics teacher, challenges, sustainable, changing world.

Introduction

The sustainability of any nation is majorly anchored on the degree of availability of her manpower. A nation that is well equipped with professional manpower is obliged to grow and be able to maintain a continuous development, otherwise referred to as sustainability of the nation's growth. Evidently, professionalism is a function of knowledge acquired in a specified field. From time to time, there is always a continuous global change in all spheres of human endeavours. Suffice to say however that it is the inputs of man that often effect the change. Of recent, the generic world focus is towards the technological growth of any nation. Every nation of the world is aspiring to develop their manpower in the field of technology. This is evident in the innovations of technology based outputs around such as in areas of communication, transportation, security, business and commerce, administration, among others.

The growth in technology is a function of the scientific knowledge of the nation. In other words, technology is the application of scientific skills into solving practical problems. Major among the science subjects that form the nucleus of technology is Physics. From the discourse, the

teaching and learning of Physics is germane to the growth and sustainability of a nation's building.

Objectives of Secondary School Physics

Physics is a science subject whose concepts, theories, experiments and observations are related as a means of exploring ideas. Thus, Physics involves formal definitions, concepts and laws (Adedayo, 2008). The National Policy on Education in Nigeria (NPE, 2007) stipulates that the overall philosophy of her education is geared towards self-realization, better human relationship, individual and national efficiency, effective citizenship, social, cultural, economic, political, scientific and technical progress for proper harmonization between the philosophy and the national objectives. The national education aims and objectives to which the philosophy is linked, among others, is the acquisition of appropriate skills, abilities and competences both mental and physical as equipment for the individual to live in and contribute to the development of his/her society.

In the overall national objectives are embedded two broad aims of secondary education. Being a function of education received between primary and tertiary levels, secondary school education is meant to:

- (a) prepare students for useful living within the society; and
- (b) prepare students to cope with higher institution.

To fulfill these aims, the aspect of Physics as a major science subject is documented in the national scheme designed for studying Physics at the secondary school level. These are to:

- (i) provide basic literacy in Physics for functional living in the society;
- (ii) acquire basic concepts and principles of physics as a preparation for further studies;
- (iii) acquire essential scientific skills and attitudes as a preparation for the technological application of physics; and
- (iv) stimulate enhanced creativity.

On this basis, the researcher aligns with Ogunleye (1998) who highlighted some objectives of teaching physics in secondary schools to include:

- development in students certain cognitive skills such as developing critical thinking, manipulating ability, communicating ability and organization ability;
- making students use scientific tools, equipment's, terms and expressions with accuracy and understanding;
- giving students a place and role through physics applications and inter-relationship in science, engineering, medicine, social science and other fields of human endeavour;
- giving students understanding of the principles, theories and laws of physics and its applications to problem-solving situations within and outside the academic sphere.

Thus, for any nation to grow and sustain her technological growth, the acquisition of basic concepts and principles of physics is indispensable.

Teachers' attitude to Physics Pedagogy

The attitude of teachers to the teaching of physics seems not favourable. Majority of physics teachers felt unfulfilled finding themselves in the classroom with all the tasks involved in the study of physics. This is noticeable in the following aspects of the teachers' impressions:

1. Attitude to teaching profession: The issues surrounding teaching generally as a profession are not encouraging to the teachers, including those teaching physics. They handle the job with levity since they are not motivated on the job. On these bases, many periods are skipped while the classes attended are not adequately prepared for. The resultant effect is that the teaching learning encounters in such situations are not effective. No much learning would take place.

2. Threat of mathematical skills involved:

Physics is a science subject which by nature involves lots of mathematical drills and skills. There is rarely a topic in physics without its accompanied aspect of calculation. It is unfortunate however that this very much needed skill is a threat not to students alone, but to the teachers alike (Lassa, 1984, Adedayo, 2008). It was opined by Owolabi (2003) that the negative attitude to mathematical activities could be as a result of such factors as sex dichotomy, hereditary, environmental, orientation, subject teacher and the pedagogical method of the teacher. Experience of the researcher of this study on interaction with other colleagues while teaching in the secondary school showed that some Physics teachers often brush over the calculation aspect of any topic that seemed to prove difficult. As a result of this, teachers who are mathematical phobia may not be favourably disposed to teach physics.

3. Inappropriate teaching methods:

Physics is a science subject that is primarily concerned with the qualitative and quantitative description of the properties of the properties and behaviour of matters (Akinwumi, 1986, Adedayo, 2014). The instructional method adopted by the teacher therefore needed to be appropriate if students would comprehend the concepts being passed to them in the classroom. It is imperative of physics teacher to adopt a systematic approach in teaching, such that would enable students to progress from concrete operations to

generalization and use of symbols. The desire of the teacher to present the best to the students is desirable. The common practice in the secondary schools is that the teachers' methods of instruction are more of teaching and lecturing. This rubs the students of active participation in the teaching and learning process. The teachers' mode of explanation often makes the concepts difficult for the students to comprehend. The resultant effect is that the learners summarily conclude that the subject is too tough for them and eventually cultivate negative impression about the subject.

4. Practical aspect difficulty: It is pathetic to discover that majority of physics teachers are threatened when it comes to practical aspect of physics. This is due to the fact that they are not competent in practical physics. As a result, the practical classes are avoided and deferred till very close time to the students' certificate examination. Consequently, the students performed poorly in their external examinations.

5. Teacher – Students relationship: The attitudes of most secondary school physics teachers scare students and often peels them off from the subject. Instead of being friendly with the students to create their interest in the subject they teach, they are rather hostile and unapproachable for the students. This discourages the students to interact with such teachers and consequently loose interest in both the teachers and the subject. The students invariably become frustrated, discouraged and imbibe wrong perception about physics. It is disheartening to note that some of the teachers who interact with the students are not doing so honestly but due to some hidden agenda. For instance, a male teacher may be dating the female students and thereby having illicit affairs with them. Other reason for closer interaction with the students may be due to an obligation that may be required from the students. In such cases, the relationship is not healthy and unprofessional. The students could not link such interaction to teaching-learning process but merely a social interaction.

Challenges of Physics Teachers for Efficiency

i. Job satisfaction: The efficiency of any staff on a job anchored majorly on the satisfaction such staff has on the job. The experience of

the physics teachers on the job seems not commensurate with the hard time and energy expended by the teachers while studying the subject in school. While many of their friends and colleagues did not offer physics because of the tasks involved in it, they resolutely decided to pursue it with high expectation that they would reap the fruits of their labour. The teaching terrain they find themselves seems not yielding their expected dividends; so they are discouraged and not satisfied with teaching physics. No wonder most of the physics teachers in the secondary schools are job seekers for better pasture. A research report on whether or not professionalization of teaching has increased the teachers' status and morale by Emoruwa & Olugbeko (2011) revealed a negative result. In their outcomes, 61% of the teachers agreed that government does not give them much listening ears and 74% complained that the benefits given to civil servants are not extended to them. Undoubtedly, this would cause inferiority complex on the part of the teachers since they are treated as second class citizens even though they are holding the same certificates with their counterparts in the civil service. It is highly demoralizing.

ii. Teachers' Education programme: Much as there are many institutions for training would be teachers, the adequacy of their programme to the meet the current educational challenges seems doubting. Most of the institution still embark on their old curriculum for training their students, not being cognizance of the fact that the present generation educational demands are technological driven, and more importantly, the 21st century pedagogical approaches.

iii. Government inconsistent policies: The incessant change in educational policies as designed by the government has been a challenge to effective teaching and learning physics. In a situation whereby a programme is being run and the government just come up with a new policies, which by implication, bidding on everyone in the system, truncates the existing programme.

iv. Students' unreadiness for physics: Indication from the students' attitudes towards the study of physics showed that the

level of students' preparedness is low. Most of the students perceived their physics teachers as being too tough and unapproachable because of the nature of the concepts in physics. This view is at variance to the outcome of Ofodu's (2008) study that students perceived their English Language teachers as experts and have firm grip of the subject. However, the mathematical skills involved in physics made its teaching tough in the view of the students and therefore are not voluntarily willing to attend physics classes.

- v. Lack of appropriate facilities:** The importance of instructional facilities at enhancing effective learning cannot overemphasize. Perhaps, this is in line with Ogunleye (1999) and Ayodele's (2009) assertion that poor performance of students in science related subjects, physics inclusive, was due to bad school environment among others.
- vi. Curriculum problem:** The current physics curriculum in the secondary schools in Nigeria is overloaded with contents such that may not be covered within the stipulated period. This poses a high demand on the teachers making them to work tirelessly at ensuring that at least a high percentage of the contents are taught before the time laps.
- vii. Lack of Motivation by the Government:** The response of the government to educational demands has not been encouraging, which by extension, the materials required for physics teaching and learning process. It is shameful to report the meager amount assigned as science allowance as being paid by the government. Even, if there is an accident in the laboratory, such amount cannot convey the teacher to the closest clinic, talk less of treatment.
- viii. Inadequate Infrastructure in Schools:** Most of the schools are faced with shortage of needed infrastructure capable of engendering effective teaching and learning. In many schools, a classroom is converted to the laboratory which is used for all the science subjects. In such a case, the basic physics laboratory apparatus and equipment could not be available for the teacher and students' use.
- ix. Lack of pedagogical Skills:** The skill to be displayed by any teacher is a function of the teacher's academic qualification and years of teaching experience. Fuller & Alexander (2004) and Ayodele (2009) reported that students taught by more qualified teachers in terms of academic credentials performed significantly better than students of less qualified teachers. Also, Ayodele (2011) submitted that there is positive correlation between years of teaching experience and overall performance of students. Thus, students of experienced teachers would attain significantly higher levels of academic achievement than students of inexperienced teachers.
- x. Overcrowded Classroom:** Research reports on the influence of class size on the academic performance of students have consistently revealed that smaller class size is more beneficial for academic achievement of students (Fabunmi, Brai-Abu & Adeniji, 2007; Ayodele, 2011).
- xi. Overloaded Examinations Syllabi:** The desire to meet the required technological demands of the present age has led to incorporating more needed concepts into the curriculum, thereby swelling up the syllabus of all the examination bodies (Adedayo, 2014). The resultant effect is expansion of coverage area for the teachers. This requires more efforts and extra activities on the part of the teacher.
- xii. Heavy teaching load due to insufficient qualified teachers:** As a result of insufficient qualified physics teachers, the few available teachers are overloaded with work. In such a situation, they are not able to cover the already overloaded syllabus in their hands, talkless of marking students' assignments, giving them feedback and making corrections.
- xiii. Lack of provision for educational needs of Students by parents:** Poor economy of the parents could hinder such from procuring the needed textbooks, graph book and such other materials that their ward may require

for effective learning. In such a case, whatever effort put in by the teacher may not be productive, hence, renders his efforts futile.

xiv. Non-responsive of the teachers to Curriculum Innovation: Much as curriculum change and innovation is desirable for up-to-date and useful curriculum, the response of teachers has always been cold towards it. Generally, change is one of the phenomena that man do not desire, even though it is imperative in most cases, curriculum inclusive. The success of curriculum reform depends majorly on one part, whether teachers are valued and acknowledged in the process and whether the teachers understand the innovation put in place (Amadi & Nnodim, 2011).

xv. Quest for wealth: The desire to be wealthy by everybody nowadays has decimated the zeal and diligence of teachers, who are not compensated in commensurate to their job performance. On this basis, many physics teachers are weary in discharging their statutory teaching in full.

Suggested Way Forward

Realising the significance of physics concepts to the technological growth of our world, it is imperative of all the stakeholders of physics teaching-learning enterprise to articulate their potentials and resources towards improving the teaching and learning of physics, especially at the secondary school level which equip the students with the fundamental principles embedded in the subject. In order to achieve this herculean task, the following steps are suggested:

- a. The physics teachers should put up an attitude that would enhance improved teaching and learning of the subject. They should endeavour to attend their classes without being weary for whatever reason.
- b. Appropriate method should be employed by the teacher in teaching physics, capable of enhancing effective learning.
- c. Collaborative teaching is encouraged among physics teachers to tackle any topic that may prove naughty to any teacher, be it calculation or practical aspect.

- d. The teacher should create a healthy relationship with the students, aimed at developing the interest to study physics in them, and not based on unprofessional vices.
- e. Government should maintain a consistent curriculum, and if need be for any innovation, the teachers who are the implementers of the curriculum should be carried along.
- f. Government should adequately provide the necessary materials for teaching physics, being infrastructure, human and material resources.
- g. The allowances accruing to the physics teachers should be jacked up to encourage the teachers. In fact, the allowance should be a certain percentage of the basic salary of the teachers.
- h. The curriculum for training potential physics teachers should be reviewed to meet up with the 21st century world of digitalization.
- i. Parents should be alert to their responsibility of providing the needed materials for their children and wards.
- j. The teacher should consider their job as a calling, a profession to be protected through diligence and integrity.

Conclusion

Physics as a subject is central to societal growth and development. This would be achieved when it is effectively taught by the teachers and learnt by the students. However, attitudes of the teachers seem not encouraging and worst still, they are being faced with avalanche of challenges which incapacitate their dedication and output in their statutory roles of impacting on the learners. Teachers' attitude should be such that could engender effective teaching and learning of the subject. The suggested actions should be taken into consideration so that the building of nation technological development can be sustained.

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