

## Quality and Functional Physics Education as a Means for National Transformation

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### Abstract

Education is described as the development of desirable qualities in people. Quality education is fundamental to National Transformation because it depends on literate and skilled citizenry. This paper examines the study of physics as crucial for any nation that wants to maintain its leads among the community of nations and as tools for National Transformation. Obviously the Nation as well as the Education sector is faced with various challenges, ranging from conflicts, strikes, instability, corruption, lack of motivation for teaching personnel and inadequate funding among others. Quality and functional physics Education is an education that is effective, efficient, sustainable and relevant to the evolving individual and societal needs, and ensures equality among the citizens is directly needed for a turn around. Also it can provide knowledge and skills which produce values and attitude that offer a basis for transforming conflict itself. This work employs the use of secondary sources of data and content analysis and also comes up with suggestions that there is absolute need for Governments at all levels to be committed to the implementation of educational policies especially physics education, for without physics, the technological culture of the citizens cannot be firmly rooted. Collaboration between the Federal, States, Local Governments and relevant educational bodies should also be strengthened.

### I. INTRODUCTION

The basic principle of education in Nigeria is the equipping of every citizen with such knowledge, skills, attitudes, and values as to enable him/her to derive maximum benefits from his/her membership in a society, lead a fulfilling life and contribute to the development and welfare of the society. Recently in the spirit of promoting basic education and 'education for all' there was a plan to provide every child with nine year schooling up to the junior secondary school level (World Data on Education, 2010). Education is universally acknowledged to benefit individuals and promote National Development. Education therefore is an agent of change and transformation. It transforms an individual or society from primitive way of life of the Dark Age to modern society of today which is full of scientific and technological inventions. Nigeria today is in the process of national reconstruction and functional physics education is the bed rock of national reconstruction. In recognition of the relevance of education for national development, the National Policy on Education (NPE, 2004:6), stated that "education is an instrument for national development"

It is pertinent to note that among the many challenges of National Transformation, Education remains the 'key agent' for the desired transformation. It follows logically that National

Transformation must start with education. The National Education aims and objectives for all levels of education, according to World Data on Education, 2010 are:

- i. The inculcation of national consciousness and national unity
- ii. The inculcation of correct types of values and attitudes for survival of the individual and Nigerian society and
- iii. Training for understanding the world around.

The basic challenge to achieve these aims is for the nation to raise the quality and standard of education to international comparative levels and also for every Nigerian child to have the opportunity to acquire quality education in the environment that is conducive for learning. Peace is necessary for national transformation. Transformation is the process of becoming ready and willing to expand one's view on what is possible for oneself, one's organization and one's society. It is the process of engaging in a programme of profound growth, of developing a deep commitment to taking effective and urgent actions to realize one's vision and dreams (Assisi, 2012). Peace entails not just the absence of direct violence and conflict but also the presence and promotion of social justice.

Education plays a significant role in ensuring peace. Education that gives hope and

possibilities for the future through an improved quality of life is essential to building and maintaining peace. Also the provision of such will entail fewer opportunities and motivations to engage in conflict hence a transformed nation. In order to achieve the laudable national transformation, a functional science and physics education in particular must be put in place. This is because functional physics education would produce advanced scientific technological and cultural humanistic knowledge on the bases of which Nigeria would be transformed into a timely human society that satisfies adequately the material, moral, social and cultural means of her people.

Kofi Anan the UN Secretary General has been quick to point out the ongoing tragedies throughout the developing world that are directly tied to disease, poverty and the degradation of the environment. He is also quick to point out that, the lack of access to physics education and other sciences as well as technology is attributed to many of these problems.

The study of physics is crucial for any nation that wants to maintain its leads among the community of nations. In fact, the technological potentials of any nation could be more accurately gauged by the quality of its physics education, for without physics, the technological culture of her citizens cannot be firmly rooted (Ogunleye, 2001). The role of physics education in our modern world, is more important than in any other time in history.

## II. CONCEPTUAL CLARIFICATIONS

**Quality Education:** Barnett, (2006) describes education as the 'development of desirable qualities in people'. Of course there is no agreement about the end of 'desirable qualities'. The guiding principle of education in Nigeria according to (World Data on Education, 2010), is the equipping of the every citizen with knowledge, skills, attitudes and values as to enable him/her derive maximum benefits from his/her membership in society, lead a fulfilling life and contribute to the development and welfare of the community.

The concept of 'quality' in education is elusive and frequently used but never defined as argued by Sayed, (1997); he highlights what he calls the value bases of any framework for education quality. Drawing from Bunting's (1993) work, he declares that quality in education does have a common bottom line and that is defined by the goals and values which underpin essentially human activities. The basic understanding here is not to reduce education to a technical activity that is static and unaffected by contextual and contingent circumstances.

There are two dominant views within quality discourse which are:

- The economist view. which views education as using quantitative measurement outputs as a measure of quality, example: enrolment ratio and retention rates, rates of return of investment on education in terms of earning and cognitive achievement as measured in National or International tests.
- The other view is the progressive /humanist tradition which tends to place more emphasis on the educational process.

Different authors have given recurrent references to various components of educational quality that can be taken to form useful analytical framework for the concept. These components are identified as:

**Effectiveness:** This refers to the degree to which the objectives of education system are being achieved (Hawes and Stephens 1990). It is conventional to distinguish between internal and external effectiveness. External effectiveness refers to the degree to which educational system meets the needs of the people in the society as a whole. Internal effectiveness is most properly applied to the functioning of institutions and appears primarily in the vast literature on school. A broader consideration of effectiveness will include considerations of personal fulfillment at the level of the individual and issues such as social cohesion, participation human rights with respect to Nation States (Chitty, 2002 & Delamonica, 2004) in (Barnett 2006).

**Efficiency:** This refers to the ratio of outputs to inputs. That is efficiency measures the extent to which we make best use of inputs to achieve our educational goals. The inputs may be measured in monetary terms or in non-monetary terms. There is external efficiency of system which is the ratio of monetary outputs to monetary inputs and appears in the well-known calculation of the personal and social rates of return to education (World Bank. 1990) in (Barnett, 2006). Technical efficiency on the other hand refers to the organization of available resources in such a way that maximum feasible output is produced and operates with non-monetary measures such as number of teachers, examination results, classroom facilities etc (Windham, 1988 in Barnett, 2006). To point out the notion of quality more boldly is to adopt the position that 'the most you can get is what you pay for'.

**Relevance:** The concept of relevance of education takes us to the central question of the purpose of education, the relationship between education and development. The purpose of education is for individuals so be able to achieve knowledge, skills,

values and attitudes and be able to translate it into benefit, leading to a fulfilled life and contribute to the welfare their community.

**Sustainability:** Quality education emerges in the context of the obligation to establish and to sustain the condition for each and every individual irrespective of gender, ethnicity, race or regional location, to achieve valued outcomes. A suggested aim for quality education is given as 'building human capacity not only for employability, but for broader lifelong learning as well as for adaptive for coping and adapting to livelihood strategies in a fast moving and complicated world'.

**National Transformation:** This refers to a change from one situation to a better one, a total departure from the old order to a new one. It is deliberate and requires action. It can take place when people's values undergo orientation in terms of their beliefs.

### III. CURRENT PROBLEMS AND CHALLENGES OF PHYSICS EDUCATION IN NIGERIA

One big challenge in our nation is the issue of violence, unrest and armed conflict. A major causal factor as identified in this paper is the lack of quality education and other factors as outlined lined by Gates, (2002) which include the following: poverty, lack of economic opportunities and low level of economic development, previous history of conflicts, dominance of one ethnic community over another and political instability. Other factors are insecurity, inequality, private incentive and perceptions.

The current problems of education in Nigeria can be summarized as follows:

- The issue of responsibility and control of the society's education, conflict between the Federal, States and Local Governments (Castle, 1972).
- The prevalence of multiple systems of education in Nigeria
- Corruption in government and the education sector
- Strikes and unrests, poor remuneration and poor working conditions for staff.
- Poor school enrolment/admission policies
- Science laboratories are not well equipped where they exist, teaching resources are inadequate or even not available
- Inadequate classroom/accommodation
- Poorly equipped libraries

- Inadequate/incompetent physics and science teachers.
- Too much emphasis on certificate and not skill acquisition and development
- Non training and retraining of teachers
- Examination malpractice and crime. (Sulaiman, 2001)

### IV. FUNCTIONAL PHYSICS EDUCATION AS A MEANS FOR NATIONAL TRANSFORMATION

Physics is the study of matter (science of energy and their interactions). It is an international enterprise which plays a key role in the future of the progress of mankind. The support of physics education and research in the national transformation is important because of the following:-

1. Physics is an exciting intellectual adventure that inspires young people and expands the frontiers of our knowledge about nature.
2. Physics generates fundamental knowledge needed for the future technological advances that will continue drive the economic engines of the world.
3. Physics contributes to the technological infrastructure and provides trained personnel needed to take advantage of scientific advances and discoveries.
4. Physics is an important element in the education of chemists, engineers and computer scientists, as well as practitioners of other physical and biomedical science.
5. Physics extends and enhances our understanding of other disciplines, such as the earth, agricultural, chemical, biological and environmental sciences, plus astrophysics and cosmology- subjects of substantial importance to all peoples of the world.
6. Physics improves the quality of life by providing the basic understanding necessary for developing new instrumentation and techniques for medical applications, such as computer tomography, magnetic resonance imaging, positron emission tomography, ultrasonic imaging and laser surgery. (Trisma, E.A, Josiah, M.M, and Tersee J. Ikyumber, 2010)

### V. CONCLUSION

The World Bank, (1999), points out that the success of any education is hinged on proper planning, efficient administration, and policy stability, motivation of staff and adequate funding of the educational system. Physics is an essential part of the educational system and of an advanced society. We therefore urge all governments to seek advice from physicists and other scientists on matters

of science policy, and to be supportive of the science of physics. This support can take many forms such as:-

- a. National progress to improve physics teaching at all levels of the education system.
- b. Building and maintaining strong departments in Universities (and other academic institutions) with opportunities for grants to support research.
- c. Scholarship and fellowships for both undergraduates and graduate students studying physics.
- d. Adequate funding for national laboratories and the formation of new ones as appropriate.
- e. Funding and facilitating international activities and collaborations.

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