

**CONTEMPORARY ISSUES IN
SCIENCE, TECHNOLOGY, ENGINEERING,
ARTS AND MATHEMATICS
TEACHER EDUCATION IN NIGERIA**

**A FESTSCHRIFT IN HONOUR OF
PROFESSOR ISAAC OLAKANMI
ABIMBOLA**



EDITED BY **Dr. Bello Ganiyu**
Prof. Mustapha Mohammed Tajordeen
Dr. Osokoya Mobolanle Modupe

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Department of Science Education,
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CHAPTER 33

RE-ENGINEER BIOLOGY TEACHER EDUCATION FOR THE ATTAINMENT OF SUSTAINABLE DEVELOPMENT GOALS IN NIGERIA

Hafsat Imam Alabi (Ph. D.)

Department of Science Education, Faculty of Education,
University of Ilorin, Ilorin, Nigeria

Abstract

The need for continual renewal of educational goals in meeting the changes in the society cannot be over-emphasised. The re-engineering of the goals of teacher education often create an awareness to why we need to take informed decision on how to live comfortably in the present generation without hampering the future generation. This paper therefore address the need to restructure biology teacher educational programs to meet the demand of the economy and for attainment of sustainable development goals. In doing this, the paper explored the concept of re-engineering biology teacher education, the goals of teacher education in Nigeria, the concept of sustainable development goals and how teachers' goal could be utilised to achieve sustainable goals, conclusion and recommendations.

Key words: Re-engineering, Teacher Education and Sustainable Development Goals

Introduction

Re engineering could be defined as the process of reshaping, reorganizing, remodeling or re -structuring of the process and product of education with a view of improving its standard in all ramifications. It entails reorganization, redesigning of policy, contents, curriculum and entire system of education with the intension of enriching it for effective and creative learning. Egun and Egun (2015) described re-engineering as the rethinking, radical redesign or renovation of concepts, policy, structure and strategies aimed at achieving dramatic improvements; and reflecting current changes in human and society developments. Re-engineering is been compelled by the need for educational reform, advancements in education, technologies integration, as well as the quest for globalisation of STEAM teacher education.

Sprawl (n.d.) supported the notion by itemising the following four reasons for embarking on re-engineering in education; these are changing educational needs, alternative learning opportunities, and availability of digital technology and enhancing human performance. Emergent of any or combinations of these factors call for the need to re-engineer its policy for effective and efficient educational system at all levels. Teacher education is one of such levels endowed with the responsibility of training teachers.

A teacher is someone who assists learners through what they need to know in an enabling environment. Teachers are often described as people who teach, monitor, model, mentor and create an enabling environment for learners in a school or formal

settings. Going by these role, one could see the prominent roles of teachers in the realisation of STEAM, educational and sustainable development goals. For this reason, there is the need to restructure biology teacher education which is an aspect of STEAM teacher education for better professionalism and easy implementation of the intended goals of sustainable development.

The Concept of Biology Teacher Education as a Segment of STEAM Teacher Education

Teacher education is a subset of tertiary education, concerned with the training and production of professionally trained teachers. The service of training teachers is usually embarked upon by the University of Education, Faculty of Education of Nigeria University, National Teacher Institute and at the Colleges of Education. In Nigeria context, teacher training is usually partitioned into four areas; these include the general education aspect, subject areas, professionally designed courses aspect (e.g. curriculum & instruction; guidance and counsellor; sociology of education among others and the practicum usually as peer or teaching practice depending on the number of students and task involved (Oyeleke, Akinyeye and Opeloye, 2013). Just like any other levels of education, teacher education is characterised by a number of goals that must be followed for its intended purposes, to be achieved. Some of these goals as highlighted in National Policy on Education (FRN, 2009, 2013) are :

1. provision of highly motivated, meticulous and efficient classroom teachers at all levels of education;
2. encouraging the spirit of enquiry and creativity in teachers;
3. assisting teachers to fit into social life of the community and the society at large and enhance their commitment to national goals; enhance teachers commitment to the teaching profession;
4. providing teachers with the intellectual and professional background adequate for their assignment and to make them adaptable to changing situations, and
5. enhancing teachers' commitment to the teaching profession.

The attainment of these goals depends greatly on the effective role of teachers in the implementation. The enthusiasm of the teachers towards the attainment of the goals despite the encountered constraints, the zeal and originality of teachers to know what to do at a point in time to assist the students to learn what they need to learn, the teachers ability to link the concepts meant for teaching to students social life outside the classroom and the realisation of the facts that knowledge is dynamic are likely to play a prominent role in ensuring the fulfilment of the goals. These are pointers to the significant role of teachers in educational setting.

The goals are meant to sensitise the users to the dynamic nature of knowledge and the need to adapt to changing situations in which we found ourselves, hence, the advocacy for the interdisciplinary or multidisciplinary approach which calls for the transition from Science, Technology, Engineering and Mathematics, i.e., STEM Teacher to STEAM

Teacher education, with the inclusion of 'Arts'. The STEAM resulted from the need to integrate several discipline to allow for globalization of ideas. The STEAM in this regards is with respect to Teacher education.

STEAM emphasises the need to reintegration the Art and STEM for the benefit of learning the artistic and STEM with the motive of increasing students' creativities and make them a global citizens (Engelman, 2015). STEAM Education Program Description (2015) described STEAM as a contextual curriculum where the subjects are coordinated to support each other under a formal educational setting of how science, technology, engineering, mathematics and arts relate to each other in reality. It is often described as an interesting tool of teaching and learning any concept at all level of education. STEAM strengthen the relationship among all fields of life and create cordial relationships between formal settings, local communities and outside world. This is to say that it looks inward and establishes the facts that all disciplines of the world have links and are connected in one way or the other to one another. STEAM is advocated by Rhode Island School of design and is characterised with objectives set to achieve. The objectives are research policy transformation in which Arts are design are placed at the center of the STEM, integration of Arts into the education; and employment of artists and designers that will drive the innovation.

Being up to date with regards to advancement in education, is one of the ways by which goal 3, i.e., able to fit into social life of the community and society, could be achieved. One of such advancement is the adoption of the Sustainable Development Goals, SDGs, into the Nigeria educational system. It is important to state that teachers are expected to be a lifelong learners and it is only through this that their relevancy and functionality could be recognized. This is one of the ways by which teacher prestige and respects might be retained

Sustainable Development Goals (SDGs)

Sustainable development describes a symbiotic relationship between environment, society and economy for the benefit of future generation. Shaker (2015) described sustainable development as enhancement of economic and social development as well as protection of environment for future generation. Wikipedia encyclopedia described it as the organizing principles for meeting human development goals and sustenance of resources of natural and eco-system upon which the economy and society depends. Sustainable development emanated from the Brundland Report of 1987 and emphasised how forest management and 21st century environmental constraints could be sustained (Shaker, 2015).

The 2030 agenda of sustainable development goals otherwise known as global goal was put forward on September, 2013 and its implementation across countries started in 2016. It composed of three components which are environment, society and economy. The sustainable development is often characterised with 17 goals as listed below.

1. Putting poverty into extinction;

- Putting an end to hunger of all forms;
- Promoting good health and wellbeing for all its citizens;
- Ensuring quality education for all at every level;
- Promoting gender equality among Nigeria citizens;
- Provision of clean water and proper sanitation;
- Safeguarding the provision of affordable and constant power supply for all;
- Promoting a sustained and inclusive decent work and encouraging economic growth in all fields;
- Promoting the establishment of infrastructures, industries and nurturing innovative ways of finding solutions to societal problems;
- Reducing all forms of inequalities in everything that we do;
- Sustaining cities and communities upon which the economy depend;
- Sustaining our cities and communities not only by being the users but also providers of facts i.e., promoting responsible consumption and production;
- Taking proactive action towards climatic issues and the environment;
- Conserving and sustaining the aquatic environment and organism associated with it;
- Protecting the interest of the life and resources associated with terrestrial environs;
- Maintaining peaceful coexistence among citizens, maintaining justice and order and strong institution at all level; and
- Collaborating for the accomplishment of the goals, partnership for the goals, (United Nation Development Programme, UNDP, n.d).

It is pertinent to mention that, one of the goals as teacher is to be committed to national goals as well as teaching profession; and being able to adapt to the changing society. One of the ways by which this could be implemented using sustainable development goals is by adhering to goals 4, 8, 9, 16 and 17. The quality of teacher education must not be toyed because it is at this level that teachers are being produced. Teachers on the other hand play a crucial role in determining the educational quality of a nation, as such, must not be left out in the 2030 agenda of sustainable development goals, if quality is truly to be achieved.

Goal 8, describes the need to put in place an inclusive, decent work and sustain economic growth in all fields as was obtained in the developed countries of the world. This is to say that, it is desirable that all professions be it teaching, nursing, medicine etc. are given equal recognition and prestige and are treated the same way with respect to salary, condition of service and their entitlements. This could further motivate teachers' dedication to duty, hence, sustaining their interest and their zeal towards their job. This will go a long way in ensuring that everybody is catered for, and smooth transition to sustained society could be easily achieved. Once member of the society are contented with their means of livelihood, there is every likelihood that they will be able to think for developments of all forms. Emergent of infrastructures like good road, electricity, water and building are evidence of development that could encouraged investors to cite their industries in community

and subsequent exposure to innovative ways of doing thing. Therefore, making it easy to switch to goal 9 of SDGs. This further sensitise us to how the goal of teacher education contribute to sustainable development realisation.

Goals 16 and 17 stress the need for collaborative, interdisciplinary approach to all fields of 'education. It often create the awareness of the need to relate what is taught in school to life outside school; and the need to design or package ones ideas and thought into something acceptable by the public. This ideology is what give rise to STEAM hence, the concept 'STEAM teacher education'. It is therefore desirable that educational policy are restructure to further re-emphasized the need to view the goals ,not as a disjointed theme but as one that rely on one another for effective implementation.

Conclusion

The need for realignment of the teacher educational policy for achieving sustainable goals was stressed. The paper also analysed how the goals of teacher education relate to sustainable development goals and what needs to be done to ensure its practicability.

Recommendation

1. Curriculum developer should restructure STEAM teacher education by incorporating Arts and design into the curriculum. Methods of implementation may also be included to serve as a guide for intending users.
2. Examination bodies like NABTEB, NECO and WAEC should also infused the arts and design to the STEAM to encourage strict compliance at the secondary school level.
3. National University Commission should include STEAM into their Basic Minimum Academic Standard (BMAS), and suggest ways by which it could implemented.
4. Workshop and seminars should be organized to popularize STEAM.
5. Text book authors should structure their instructional contents to reflect connectivity's among the STEAM

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