LOCATING EVIDENCES OF EDUCATION FOR SUSTAINABLE DEVELOPMENT IN SUB-SAHARAN AFRICAN SCIENCE AND TECHNOLOGY EDUCATION CURRICULAR: A COMPARATIVE ANALYSIS OF NIGERIAN AND SOUTH AFRICA

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Abstract

This research explores the integration of Education for Sustainable Development in the Science and Technology School Curriculum Documents of the Sub-Saharan African giant nations (Nigeria and South Africa) through a comparative analysis. The paper supports that Sustainable Development is a key in a present-day Science and Technology school curricula, given the global economic, social, cultural and environmental imperatives. The study suggests that science and technology curriculum should be a critical transformative tool towards integrating and fostering Sustainable Development in developing countries.
Keywords: *education for sustainable development, sustainable development, Sub-Saharan Africa*.

Introduction

The (United Nations [UN], 1993) Rio de Janeiro Earth summit declaration (Agenda 21) is "a program of action for sustainable development worldwide and a comprehensive blueprint for action to be taken globally into the twenty-first century by Governments and non-governmental organizations, in every area in which human activity impacts on the environment" (p. 3). Hence Agenda 21 emphasized on the interconnectedness of the three dimensions (Society, Economy and Environment) of sustainable development (United Nation's World Economic and Social Survey [UNWESS], 2013). Furthermore, the United Nations 2005 to 2014 'Decade of Education for Sustainable Development' (UNESCO DESD, 2007) did not leave African Nations out of the idea to evaluate what had been achieved through education since the declaration of plans towards achieving Sustainable Development (SD). Rather, much attention needs to be paid towards developing countries including in Africa, if sustainability is a global goal. In this study, it was analysed the weaknesses and strengths of the South African and Nigerian intermediate phase Science and Technology curriculum, in functioning as instruments to actualizing Sustainable Development in these two contexts.

However, the study considered the inevitable nature of curriculum reforms that have occurred in the various educational systems especially in the post-colonial era, in a bid to create a worthwhile structure of teaching and learning content areas and pedagogy. Similarly, curriculum reforms depict pursuit for societal objectives such as knowledge, skills and values intended to impart on the learners, and to support inclusivity. Presently, South African Curriculum and Assessment Policy Statement (CAPS), was officially implemented in 2012. In the CAPS, intermediate phase curriculum, Natural Science and Technology are integrated into a single learning area. On the other hand, the Nigerian education system likewise South African, also experienced post-colonial curriculum reforms. The current National Policy on Education advocates for an inclusive education system which aims at achieving Millennium Development Goals (MDGs). In the Nigerian Junior Secondary School Level Basic Science and Basic Technology are offered in two separate learning areas.

Literature Review

In most developing countries, Insufficient food and water and lack of other basic amenities; population explosion are socio-economic challenges are eminent (UN WESS, 2013). South Africa is presently facing a huge challenge of unsustainability or lack of food, water, energy, and other socio-economic crises (Bormann & Gulati, 2014). Similarly, Oyedepo (2012), suggest that an alarming degree of the Nigerian population does not have access to electricity, food and water because of overpopulation, corruption and unsustainability. On the other hand, Jasper (2008) argues that in the past couple of decades have witnessed amazing rate of technological boom which perhaps creates environmental and economic concern, regardless of the context. Education for Sustainable Development involves inner transformations on the part of the major target groups such as young children in schools and teachers (Jaspar, 2008). The UNESCO (2012), suggests that sustainability can be achieved by making primary, secondary school teachers and school policy makers the target audiences.

In understanding the critical nature of the need for Sustainability in Science and Technology Education, we must embrace a paradigm shift towards "development that meets the needs of the present without compromising the ability of future generations to meet their own needs" (UNESCO, 2012, p. 5), Hence the emphasis lies on maintaining a balance between the three spheres (Society, Economy and Environment) and improving the quality of life (UNESCO, 2012).

South Africa as a nation has taken a great stance on Sustainable Development through its vision as it ''aspires to be a sustainable, economically prosperous and self-reliant nation by meeting the fundamental human needs of its people, by managing its limited ecological resources responsibly for current and future generations'' (Department of Environmental Affairs [DEA], 2008, p. 8). This vision is critical as most developing countries currently face huge ecological resource depletion. Nigeria as a nation has a distinct culture and diversity, hence the nature of education in Nigeria is relative to its historical and political evolution. The National Policy on Education (2013) aims at creating a holistic structure of education in Nigeria that accounts for all aspects of national development, through frequent review of the curriculum, to accommodate all the sociopolitical changes. The Nigerian nation proposes to address the issue of sustainable

development through its schooling curriculum policies. ‘‘School curriculum has been diversified to include courses that are predisposing to development issues’’ (Osuji, 2004, cited in Nnabuo & Anosike, 2012, p. 7). As a third world nation, Nigeria has complex environmental issues and unstainable practices. Therefore, the Science and Technology school curriculum can be used to address issues of the environment through environmental education and issues that pertain the society through education for sustainable development.

Educators have a call through the curriculum and classroom practices to train and produce learners/students who are creative thinkers and problem solvers. ‘‘The emerging global sustainability crisis demands an educational response that moves beyond mere ‘tinkering’ with classroom practices, towards technology education which embraces life cycle thinking and eco-innovation’’ (Elshof, 2008, p. 133). Modern Science and Technology education in developing countries must aim at equipping learners/students with opportunities to develop critical skills, knowledge, and attitude that will enable them to solve problems in their societies (Standards for technology literacy, 2000). There is therefore the need for consistent curriculum reforms to synchronize all aspects of the ever-changing society.

Methodology of Research

The research adopted a qualitative case study approach and uses a hermeneutic research design, which aim to understand and interpret phenomenon in an objective manner, by investigating a real-life context and generating empirical data from a range of different evidences or cases (Gilham 2000, Yin 2003, cited in Denzin & Lincoln 2004). Hermeneutics is applied to interpret written documents, events, situations and human practices (Crotty, 1998, cited in Zweck, Paterson and Pentland 2008). The curriculum documents were analyzed as the qualitative data source by relating the goals, philosophies, content coverage, recommended learning materials, tasks and activities to the UNESCO (2015) Agenda 2030 SD goals to make sense of the weaknesses and strengths. The focus on the intermediate phase Science and Technology curricular is because it is believed that the intermediate phase of the curriculum should offer learners/students with the basics of Science and Technology in schools. Hence, it was determined to investigate if ESD is integrated in the South African and Nigerian intermediate phase Science and Technology curricular and to understand what might have informed the integration or not. These two contexts (Countries) share similarities in various spheres of SD, especially in terms of Economy and Gross Domestic Product (GDP), Education, and sociocultural dynamics (Cilliers, Schünemann & Moyer, 2015). The knowledge of the above inquiry would enable a valuable contribution towards the current discusses on ESD in Africa.

Result of Research

The analysis revealed both examined contexts demonstrated awareness Sustainable Development (SD) goals in the intermediate Phase Science and Technology curriculum. Evidences of integration of ESD was deduced looking at the philosophy, content and topic sequence and SKVA. The South African CAPS curriculum through its

philosophy, proposed of actualizing some of the SD goals in several instances such as; ‘‘this curriculum aims to ensure that children acquire and apply knowledge and skills in ways that are meaningful to their own lives by promoting knowledge in local contexts, while being sensitive to global imperatives’’ (DBE, 2011, p. 4). Equally, the underlying philosophies of the Nigerian curriculum show sensitivity to basic literacy and numeracy in Science and Technology Curriculum.

Conclusions and Implication

The changing society calls for innovative teaching and learning strategy in Science and Technology education. Learners at the intermediate phase show optimum enthusiasm in knowledge development, hence imbibing the culture of Sustainability should be a natural flow of knowledge than hassle. Problem-based learning is recommended to uncover the natural creativity in children. ESD must be perceived as a transformative measure in Science and Technology curriculum as it plays a fundamental role in creating the moral values required to actualize sustainability in the society. Integration of Science and Technology subjects with social studies is also recommended for better comprehension of the concepts of SD. However, the political nature of school systems in Africa has always jeopardized the education and redefined the purposes of teaching profession.

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