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Teachers' Involvement and Role in Climate Change Curriculum Development and Implementation in Nigerian Secondary Educational System

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Abstract

The teacher has become the focus of attention in modern world because of his unique roles in the society. It is daily becoming increasingly clear that no nation can rise or develop without the right caliber of teachers. Curriculum is an indispensable instrument in any educational programme. It has often been contended that its fundamental nature derives from the fact that it is the very foundation for any education system. There is a strong desire for climate change issues to be taught as cross-cutting themes across disciplines, which would require considerable wide-scale developments in curricula. This position paper therefore considered the whole web of issues surrounding the teachers' involvement and the role played in climate change curriculum development and implementation in Nigerian secondary educational system. The paper recommended amongst others that teachers should be informed, trained and involved in the process of climate change curriculum development and implementation. Most reforms should be initiated from the grassroots, bottom-up, particularly by teachers who are on the field and know what and where a change is needed. Curriculum emerging through this process will be more acceptable.

Keywords

teachers' involvement, climate change, curriculum development, implementation, educational system

1. Introduction

This position paper captures the theoretical and conceptual issues revolving around teachers' involvement and role in climate change curriculum development and implementation in Nigerian secondary educational system. The approach adopted therefore is not empirical.

The teacher has become the focus of attention in modern world because of his unique roles in the society. It is daily becoming increasingly clear that no nation can rise or develop without the right caliber of teachers (FGN, 2004). Curriculum is an indispensable instrument in any educational programme. It has often been contended that its fundamental nature derives from the fact that it is the

very foundation for any education system.

Climate change will affect large parts of the country over very long periods of time (several decades). Therefore it is imperative that the younger and future generations are made aware of the problem (and solutions) of the climate change impacts by getting such knowledge incorporated into school curriculum at both secondary as well as primary levels.

It has become imperative therefore to incorporate climate change impacts and adaptation into school curriculum.

Issues of climate change should be infused into the curricula of secondary schools as a matter of urgency (Chakeredza et al., 2009). There is a growing need for evidence based scientific data on African experiences to be infused into the curricula to serve the African specific problems. The curricula can be handled as a separate subject or infused and integrated into the various existing courses.

Changes to the curriculum are occurring at all levels. Time after time in expert workshops on capacity development and/or sustainability, there is a call for developments in educational curricula. For example, at the 5th World Water Forum in Istanbul, Topic 6.1 on Education and Capacity Development Strategies called for water to be made "part of the general educational curriculum". In addition, one of the regional water and education workshops preceding the UNESCO 2009 World Conference on Education for Sustainable Development, recommended the restructuring of universities to allow for more interdisciplinary teaching and research (Hare, Stadie, & Moraht, 2010)

There is a strong desire for climate change issues to be taught as cross-cutting themes across disciplines, which would require considerable wide-scale developments in curricula.

Teachers can be supported in making such changes by providing teaching material necessary for different disciplinary faculties to teach students about climate change and sustainability issues relevant to their standard courses.

Schools have a particular responsibility for generating and diffusing knowledge into the economy and creating opportunities for innovation. However, achieving such links will require adjustments in the way that Nigerian schools "function". One of such adjustments is the call for change in the curriculum to accommodate issues of climate change so as to clearly understand the phenomenon and at the same time build the required capacity to adapt to the change (Okey & Ndum, 2012).

2. Conceptual Underpinnings

2.1 Climate Change and its Impact

Climate change is a planetary phenomenon. The scale and complexity of the underlying challenges of adaptation, vulnerability, mitigation and sustainability is such that the traditional disciplinary epistemological frameworks may appear to be inadequate to develop the conceptual, methodological and analytical tools necessary to understand developments in a range of interdependent knowledge domains.

According to Ozor (2009), climate change refers to any change in climate over time, whether due to natural variability or as a result of human activity and is widely recognized as the most serious environmental threat facing our planet today. Climate change describes changes in the variability or average state of the atmosphere overtime scales ranging from decades to millions of years.

Climate change manifests in a number of ways. They include: changes in average climatic conditions—some regions may become drier or wetter on average; changes in climate variability—rainfall events may become more erratic in some regions; changes in the frequency and magnitude of extreme weather events and changes in sea levels.

The single human activity that is most likely to have a large impact on the climate is the burning of "fossil fuels" such as coal, oil and gas. These fuels contain carbon. Burning them makes carbon dioxide gas. In addition, deforestation and de-vegetation remains an important potential factor in climate change.

Even if efforts to reduce greenhouses gas (GHG) emissions are successful, it is no longer possible to avoid some degree of global warming and climate change. The primary direct effects of climate change are an increase of droughts and floods, more seasonal peaks in river flow, and a higher probability of stronger tropical storms. Countries in Sub-Saharan Africa, including Nigeria, are likely to suffer the most because of their geographical location, low incomes, and low institutional capacity, as well as their greater reliance on climate-sensitive renewable natural resources sectors like agriculture.

Adaptation to climate risks and change therefore is increasingly important in developing countries. Building up resilience to increasing climate variability is the most significant climate challenge facing all countries, including Nigeria. Countries will need to factor climate risks and climate change adaptation into their developing planning, and consider the range of interventions that will increase their resilience to climate change (Eboh, 2009).

The challenge of climate change adaptation is no longer a question of "if", but that of "how" countries should adapt. According to an assessment by the IGAD Climate Prediction and Applications Centre (ICPAC), "we must adapt or die" (Ogallo, 2009). With the science of climate change now becoming increasingly clear, sustainability is turning more and more into an issue for education (Institute of Education, IOE, 2009). University education provides leadership in research, training and innovation responsible for sustainable development of any nation.

Several studies have confirmed that Africa is "highly vulnerable" to the impacts of climate change because of factors such as widespread poverty, recurrent droughts, floods, inequitable land distribution, poor social and economic infrastructure, and the over-dependence on natural resources that are climate sensitive sectors such as rain-fed agriculture, forestry and water resources (IPCC, 2001, pp. 489-491; Slingo, 2005; FAO, 2003; Parry, 2004; Elasha, 2006; Schneide, 2006; Ben, 2005; Orindi & Murray, 2005). Large-scale events such as the ongoing drought in the Horn of Africa, the 1998 floods in East Africa and the 1997/8 and 2000 floods in Mozambique, illustrate ways in which many communities are already suffering from the less predictable and more extreme weather patterns.

It is well established that climate change impacts in most parts of arid and semi-arid Africa have increased the degree of inter-annual rainfall variability. It is therefore, not surprising that most of the continent is prone to extreme events such as droughts and floods with far reaching socio-economic devastations that include damage to infrastructure, loss of life, mass migration of people and animals, poor crop yields, food shortages, famine, malnutrition, and many other socio-economic miseries (Indeje, 2000).

3. Curriculum Development and Implementation

Curriculum development is the mapping out of what ought to be covered, within a stipulated period and at a certain level of education. It involves the why, what and how of education. Other considerations in curriculum development include education for whom, by who and where? All these questions border on the objectives, the content, the method, required resources and evaluation.

They constitute the curriculum. Curriculum development calls for considerations of the learner, and his characteristics, the teacher who is the actual implementer of the curriculum, the environmental factors, which include the social, economic, political and educational values of the programme.

From the above, it is evident that curriculum development specifies what is to be achieved, how to achieve what, who should achieve what, and how to achieve it so as to produce functional members of the society. Indeed curriculum development deals with the vision and mission of school programmes (Okey & Ndum, 2012).

Those having to implement the educational changes taking place are the teachers within the public education system who have to adopt new ideologies and implement them in their teaching, since it is the teachers who are responsible for passing on the changes through their teaching to their students (i.e. the future citizens the governments are concerned to educate). This double demand (teachers having to change their teaching ideologies and then pass on those ideologies through their teaching to their students who also have to change) puts teachers under strain where the changes involved represent a major shift in beliefs and practices, and can threaten successful implementation unless necessary logistical and professional conditions are met. Such reforms, which are essentially attempting to introduce the notion of deconcentration into national systems, are unlikely to be sustained unless certain conditions are met. The potential problem lies in the fact that teachers are not only being asked to change their roles and take on increased responsibility, but they are also being asked to change previously held attitudes and beliefs (Kennedy & Kennedy, 1996 forthcoming). They therefore require support in two dimensions, referring both to the new curriculum and to their role within it. They require information/knowledge both about the background to the new curriculum (which would include information about the approach and the design) and about how they will be expected to manage it, taking on responsibilities for example for designing materials themselves that they may not have had before. They require training in the skills required and they require the physical resources to implement the changes. In addition they will need time to take on the new ideas and space to try them out and

adapt them to their situation. Time and space are important as teachers adjust their attitudes and beliefs and move through the psychological processes associated with change. These may be more or less stressful depending on the psychological "distance" between the old and the new practices.

This denial of the potential role of the teacher as a curriculum creator (rather than simple transmitter) may stem from a view of knowledge as a fixed, static, body of content that is so obviously important that the role of the teacher can only ever be to absorb and then to inculcate that knowledge in young people. The absence of any attempt to engage in a conversation about what kind of knowledge is important belies an *a priori* assumption that what it is important to teach is already known, and agreed upon. As such, any genuine recognition that teachers could be curators or creators, rather than merely organizers, of knowledge, is missing from government analysis for what makes a quality teacher. Hence, support for teachers to develop into professionals creating and mediating knowledge is likely to be absent, despite the rhetoric of curriculum freedom (Thomas, 2011).

4. Teachers' Role and Involvement

Teachers having the understanding of the impacts of climate change are capable of developing effective adaptation responses to climate change through generation of "climate knowledge" from the academic to the student (the individual being tutored) research involves the process of undertaking scientific or social science investigation or enquiry and publishing the results thereof community engagement provides an opportunity for transmitting and applying the knowledge generated through these processes. Providing locally relevant "climate knowledge" is critical in the Nigerian context.

Climate change teaching and learning focuses on developing the conceptual, methodological and analytical tools necessary to understand developments in a range of climate change issues (Kotecha, 2010). This involves integration of climate change and adaptation concerns in curriculum development or curriculum re-orientation, development of new or specialised programmes and, establishment of joint programmes and student exchange programmes to enhance innovations in teaching. Provision of locally relevant training based on local circumstances, experiences and context is key.

Sanni et al. (2010) summarised the items being incorporated within the climate change teaching and learning component for effectiveness: training targeted on future experts, agriculturists, students and relevant stakeholders, teaching basic concepts of climate change and adaptation in seminars, conferences and workshops, institutions liaising with international experts (especially IPCC and UNEP) to provide training on the methods and tools for assessing vulnerability and adaptation and constructing scenarios of climate and socioeconomic conditions, encouraging trained students to participate actively in field works, like introducing them to local farmers and communities that are vulnerable to climate change impacts, setting up of experimental farms where documented adaptation techniques can be tested (Makungwa, 2010).

Researches have, however, revealed the neglect or non-involvement of teachers in curricula innovations. Carl (2002) and Gauteng Department of Education (1996) affirmed that the "voice" of the teacher is to

a large extent ignored or not heard. In a study, Yigzaw (1981) in Oloruntegbe (2011) indicated that 85% of the 110 subjects stated that they had not been involved in the development of curricula. That even at implementation 63% reported that the most serious problem in this area was that materials were usually not sent on time or that they were not informed of the innovations beforehand. While teachers were recognized as sole implementers of curricula change, many times they received little or no orientation on innovations. One can see why teachers resist or are reluctant or slow to implement innovations. Schnidt and Pramwat (2006) share the view.

Most curricula innovations in Africa and a few other parts of the world are initiated "top-down" (Beswick, 2009), through "power coercive" or "unilateral administrative decisions" and externally imposed in utter negligence of the much powerfully-embraced "grassroots" or the "normative re-educative", "rational-empirical" or "bottom-up approach" as suggested by Beswick. This further informs the reasons for teachers' reluctance.

Issues of climate change curriculum development and implementation are complex and part of the complexity is teachers' attitudes in the implementation of change. Cohen and Hills (2001) equally maintained that the sustainability of reform initiatives relies on teachers maintaining alignment with the intent of the initiative. Curriculum implementation can only be successful if teachers and communities are involved in the development and implementation of curriculum and structural changes. In spite of the trump-case clamor for teachers' involvement, many teachers are unsure of the roles they should play in curriculum development. Many, especially the older teachers are comfortable with "routines". They teach the same topics the same way using the same materials year in year out (getting the same result anyway), even when there is a new curriculum mandate. Cohen and Hills (2001) again noted that "Expecting teachers to embrace new instructional approaches without sufficient training and information on why such change are necessary, or warranted, often result in inadequate adoption of the curriculum mandate". Massive training is required to redress the lack of teachers' involvement in curriculum development and reduce their anxiety during the introduction of new curriculum in climate change.

According to Oloruntegbe (2011), the curricula operated in Nigerian secondary educational systems are a popular one developed centrally by the Nigerian Educational Research and Development Council (NERDC). They are purchased by the federal and state Ministries of Education and distributed to schools. If the teachers in Unity Schools owned by the Federal Government were involved in the development and implementation training the same cannot be said of the state secondary schools which are far greater in number and higher students' enrolment. .

Besides NERDC, there are other agencies such as Nigerian Union of Teachers, All Nigerian Conference of Principals of Secondary Schools (ANCOPSS), Nigerian Teachers Registration Council (TRCN), Millennium Development Goal Project (MDG Project) in collaboration with State Ministries of Education and National Teachers Institute (NTI), subject associations like the Science Teachers Association of Nigeria (STAN), Mathematics Association of Nigeria (MAN), Social Science

Association of Nigeria (SOSAN) and others that have variously engaged in curriculum development, implementation and change with teachers' development as a central focus. For instance, the ANCOPSS has its own amorphous and simplified version of the national curricula circulated to schools. Whatever the goal of such effort is, the fact remains that only the principals of schools have input in it. It is still top-down approach in a little way because even the Vice-Principals do not attend its meeting and conference not to talk of the bulk of classroom teachers who implement the version.

Oloruntegbe (2011), in a study designed to investigate Nigerian science teachers' involvement, commitment and innovativeness in curriculum development, implementation and change. 95% of the respondents agreed that teachers should be involved in curriculum development, but only very few (38%) claimed that they were ever involved. This few were involved through seminars meant to introduce the curriculum to them.

The roles of teachers have been situated along major development indices that resonate between classrooms and the larger community. These roles have been described variously as "critical connections, extended professional, principal role-players, sole implementor, researchers, trainers and curriculum workers" (Carl, 2002).

While curriculum specialists, administrators and outside educational companies spend countless hours developing curriculum, it is the teachers who know best what the curriculum should look like. After all, they work directly with the students meant to benefit from the curriculum. In order to create a strong curriculum, teachers must play an integral role in every step of the process.

4.1 Planning

Teachers know their students' needs better than others involved in the curriculum process. While state or federal standards often dictate the skills covered by the curriculum, a teacher can provide insight into the types of materials, activities and specific skills that need to be included. Teachers from multiple grade-levels may collaborate to identify skills students need at each level and ensure that the curriculum adequately prepares students to advance to the next grade-level and to meet the standards.

4.2 Creation

Because teachers must use the curriculum, they should have input in its creation. A teacher can gauge whether an activity will fit into a specified time frame and whether it will engage students. If multiple teachers will use the curriculum, allow as many of them as possible to provide input during the creation stage. As teachers provide input, they will gain ownership in the final product and feel more confident that the curriculum was created with their concerns and the needs of their particular students in mind.

4.3 Implementation

Teachers must implement the curriculum in their own classrooms, sticking to the plan that has taken so much time, careful planning and effort to create. When a teacher fails to properly implement a strong curriculum, she risks not covering standards or failing to implement effective practices in the classroom. That does not mean a teacher cannot make minor changes. In fact, a strong curriculum is designed to allow a teacher to be flexible and to insert a few personalized components or choose from among a

selection of activities.

4.4 Reflection

Reflecting on a curriculum allows teachers and others involved in the process to find any weaknesses in the curriculum and attempt to make it better. Teachers reflect on curriculum in multiple ways, such as keeping a journal as they implement the curriculum, giving students surveys and reviewing the results or analyzing assessment data and individual student performance. Not only can reflection serve to improve a specific curriculum, it may guide the creation of new curriculum (Zeiger, 2000).

Above all, teachers carry out activities in curriculum design when they write curricular goals and objectives, select subject matter (content), choose materials, identify resources in the school and community, sequence or re-sequence the subject matter, decide on the scope of the topics or course, revise the content, decide on types of instructional plans to use, construct the plans, try out new programs, create developmental and remedial programs in reading or other subject matter, seek ways to provide for all kinds of individual differences in the classroom, incorporate content mandated by levels above the classroom, and develop their own curricular materials. Teachers have the responsibility of evaluating both the curriculum and instruction.

5. Conclusion

This paper concludes that Nigerian teachers are seldom involved in the process of curriculum development and implementation in climate change. This may have accounted for the reluctance in implementing the national curriculum. Curriculum reforms in this part of the world has for a long time been subject-specific and examination-driven. Preparing students for examination and teaching to test seem to gain more attention than implementing the all-inclusive curriculum meant for the overall development of the child. The Nigerian teachers therefore must be as dynamic as the society and the curriculum as well. This is very necessary for functionality, relevancy, efficiency and fulfillment of educational aims and goals as stated in the National Policy on Education. The dynamism of Nigerian teachers lies major on their interest in self-improvement and re-training programme.

6. Recommendations

This paper recommends as follows:

- Teachers should be informed, trained and involved in the process of curriculum development. Most reforms should be initiated from the grassroots, bottom-up, particularly by teachers who are on the field and know what and where a change is needed. Curriculum emerging through this process will be more acceptable.
- Some teachers may well not be antagonistic to the ideas behind the reform, but that they need support through provision of training, so that they may gain the knowledge and skills required to implement the new curriculum in climate change.

• Teacher selection should be framed around a more holistic set of criteria than just formal academic qualifications: to include recognition of interpersonal skills, negotiating skills, ability to interact with people from diverse backgrounds.

• Government will need to monitor the different emergent curriculum offers provided, in relation to effectiveness. We would advocate that such consideration include the curriculum's role in promoting engagement and local cohesion and agency. The respective roles of teachers are considered in developing curriculum offers, and in their evaluation.

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