

CHAPTER 3

Mainstreaming Environment and Sustainability in Pupils' Perception: Challenge for Tertiary Education in Kenya

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3.1 Introduction

Education is acknowledged as the vehicle by which humanity establishes conceptual understanding. All levels of education (primary to Tertiary) are inter-linked in a casual chain like pattern, with the preceding laying the foundation for the proceeding. Tertiary education (all learning levels after secondary education, including university education) in particular, has a catalytic role for the building of a learning society through:

- ⊙ Conducting the scholarly research necessary to generate the new knowledge needed,
- ⊙ Training leaders and teachers of tomorrow and,
- ⊙ Communicating the needed knowledge, values, attitudes and skills to decision makers in particular and the public at large so as to empower them to bring about changes required to achieve sustainability (Copernicus-Campus, 2001). Calder and Clugston, (2006) equally concur that Education is critical for promoting Sustainable development and improving the understanding capacity of people to address environmental and development issues amicably.

The concept "perception" is taken in this paper to mean "understanding." The perception of environment is therefore regarded as similar to the understanding of the concept of environment. Understanding is a psychological process that relates an abstract such as a person with another object whereby one who understands a concept reacts appropriately to the same (Wikipedia, 2006). This premise implies that understanding the concept of environment is a pre-requisite to appropriate reaction within the environment. One that understands the concept of environment obeys the commands given by the environment. This is because understanding is the awareness of the connectedness of the concerned information in a concept, which allows one to put his/her knowledge into action (Reddy, 2006). However,

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tertiary education can achieve its worth only if its impact is factored and felt in the preceding levels of education such as primary. Further, it should bear its influence early in life in order that consistency in knowledge throughout is attained. This chapter argues that this link to lower levels is weak or non-existent in the Kenyan system as evidenced by pupils' perception of the concept of environment. The challenge to education policy makers and implementers is to reverse this trend so that the country can start to produce a generation that is environment and sustainability conscious.

3.2 The Learners' Perception of the Concept of Environment

The understanding of curricular concepts is very important for knowledge acquisition with respect to the environment. Since the teaching of environmental concepts, integrated in various core subjects in Kenya's school curriculum, has taken long and yet the environmental deterioration continues to mount, it is possible that the products (learners) of this curriculum have failed to comprehend the meaning of the concept of environment (Kawa, 1991; Okwemba, 2002). A study was therefore designed to investigate the Standard Seven learners' understanding of the concept of environment as outlined in their Science course. The main objective of the study was to determine the Standard Seven learners' prior knowledge of the concept of the Environment before formal teaching on the same; the sources of the learners' prior knowledge; and the impact of such prior knowledge on their understanding of the concept when it is formally taught in Science course.

On the learners' prior knowledge on the concept of Environment, they responded in five different ways when the question on the definition of Environment was posed to them as shown in Table 1.

Table 1: Learners' responses in respect of the definition of the concept of Environment

Definition/Learners' responses	Number of Learners	
	Absolute	Percentage %
Association of an organism with its surrounding that affects its life.	5	3
Mentioning words such as "surrounding" or "area."	21	15
Mentioning a specific component of an environment, for example, trees, water, air, soil or buildings.	76	53
I don't know	39	27
No response	3	2
Total	144	100

Three percent (3%) of the learners interviewed defined the term environment as the association of an organism with its surrounding that affects its life. This implies that such organism is a part of the associates and therefore does not necessarily have perceived dominion over the others. Such a definition expresses the concept of environment as a relationship between the organism and its surrounding structures that have an effect on its life. Fifteen percent (15%) of the learners described the concept of environment by the use of words 'surrounding' and 'area'. Such words reflect a place and do not take into account the individual organisms within. For example, some of them expressed that "Environment is the surrounding of an organism." Such a definition is limited to the structures surrounding the organism and fails to relate the same to the concerned organism.

Fifty three percent (53%) of the learners expressed that environment meant a specified component or unit of the wider environment, namely; air, soil, trees or water. In their specific assertions, some had the following definitions: "Environment is the soil where crops are grown; trees where people get timber or air we breathe." Such an expression on the concept of environment is similar to Fiedeldey's (1998) findings in his study on "Cybernetic Analysis on Trans-cultural Data" on human perceptions on environmental changes, where he notes that many cultural perceptions indicate the physical aspects of the environment such as trees, soil, and water and out rightly excludes humanity. Such definitions restrict the concept of environment to a specified constituent of the same and therefore lack the wholesomeness of environment with its units such as land, air, water, plants and animals, as it should be. With this understanding, pollution of water or destruction of trees is understood to mean pollution of environment or destruction of environment, respectively. Water and plants that form part of environment are therefore regarded as independent environments. The remaining 29% of learners' include those who expressed that 'they did not know' the meaning of the concept of environment and those who had no response at all. All these indicate that the prior knowledge of the learners on the concept of environment before formal teaching of the topic in Science curriculum is that Environment is made up of one cited component of wider environment such as trees, water, soil or a building.

On the sources of learners' prior knowledge, the teachers' responses indicated that the school system introduces the concept of environment through discrete environmental issues such as pollution of water and conservation of soil to the target learners in lower classes and in subjects such as Social Studies and Agriculture. The teaching of such issues is done in isolation as opposed to an integrated approach, which makes the learners perceive the concepts such as soil, water and vegetation as independent environments. The class discussion on concepts like conservation and pollution is done in reference to soil, water, forests and animals and therefore when learners are challenged to define the concept of environment they often get tempted to take environment to mean soil, water, forests or animals. The school curriculum implementation process therefore contributes to the observed learners' prior knowledge and, by extension, mindset.

Similarly, it has been noted that both the Gusii and Luo communities, from which the respondent learners were drawn, understand the concept of environment from resource provision perspective (Otewa, 2006). For example, land is understood to provide food; hills and forests provide herbs for medical care; and water bases (rivers, lakes and wells) provide water for various uses. The providers of such natural resources like water are taken as environments. The communities therefore perceive land, rivers and forests as independent environments that provide their needs in their respective localities. From the foregoing observations, it is apparent that the sources of learners' prior knowledge are both the perception of the environment by the indigenous knowledge of the communities they come from (home/cultural influence) and the mode of curriculum implementation on environmental concepts infused in the school curriculum (School influence). The question on the definition of Environment was posed to the same learners, six months later after the formal teaching of the integrated environmental concepts into the Science course and their responses were as outlined in Table 2 below

Table 2: Learners' responses in respect of the definition of Environment before and after their instruction on "Our Environment"

Responses on Definition of Environment	Number of Learners			
	Before instruction		After instruction	
	Absolute	%	Absolute	%
Association of an organism with its surrounding that affects its life.	5	3	23	16
Mentioning words such as "surrounding" or "area."	21	15	38	26
Mentioning specific component of the environment, for example trees, animals, air or water.	76	53	65	46
I don't know	39	27	17	12
No response	3	2	1	1
Total	144	100	144	100

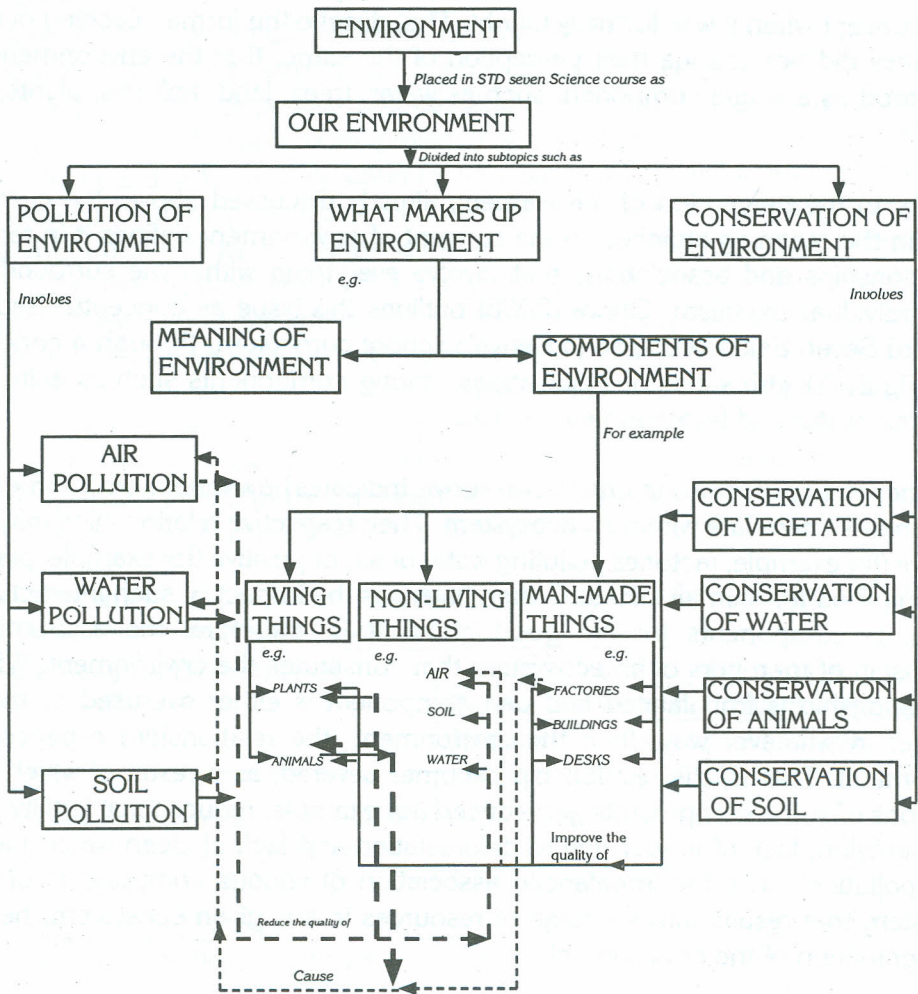
Two basic observations are made. First, that the pattern of distribution before and after the teaching of the topic has remained the same. Secondly, the majority of the learners, 53% (before) and 46% (after), indicated that the term environment meant a specified component of wider environment such as water, animals or air. The word "majority" is used to reflect the comparative number of learners giving a particular response, where more learners than any other give the referred response. This implies that majority of learners before and after the teaching of the infused environmental concepts in Science still had the same understanding of the term environment. This therefore indicates that the learners prior knowledge that is based on their communities' cultural perception on the same and the school curriculum implementation of the environmental concepts, impacted on their understanding

of the concept when it was formally taught. That despite the formal teaching of the topic, they did not change their perception of the same; that the environment is understood as a single component such as water, trees, land, animals, plants, or air.

Contrary to the perception of the learners, already discussed above, the current trends in the meaning attached to the concept of environment defines it in terms of relationships and associations that involve everything within the surrounding of an individual organism. Otewa (2006) outlines this issue as conceptualised in Standard Seven Science course in Kenya's school curriculum, through a concept map (Figure 1) with series of associations among components such as animals, plants, air, water and human-made entities.

The concept map of environment, shown above, indicates how various environmental components interrelate within an ecosystem. Their respective relationships may be negative (for example, factories polluting water or air) or positive (for example, plants providing food for animals). Nature often balances the impact of such interactions among its components for the good of all. It is, therefore, the association/relationship of members of an ecosystem that constitutes the environment. When the relationship is imbalanced and one component is either overused or made to suffer in whatever way, then the environment (the relationship) experiences deterioration. That is, the relationship becomes severed, as a result of which the provisions of some components get reduced (for example, reduced soil fertility due to soil erosion; lack of timber due to deforestation and lack of clean water due to water pollution). It is the imbalanced association of various components of the ecosystem that results into shortage of resources in any given ecosystem, hence the degradation of the environment

As already discussed in volume one of this series (Waswa, et al., 2006) and elsewhere, the concept of Environment can be both complicated and simple. For young minds, using varied definitions or schools of thought will only add to confusion, hence the need to standardise concepts for that level.



Key

1. —————> Association of ideas within the concept of environment, for example
 A —————> B. Idea B is a broad example of idea 'A'. An Example in the above figure 1 is Components of environment (A) has such an example like living things (B).
2. - - - - -> Association of ideas between the conservation of environment and the components of the environment, for example conservation of water - - - - -> animals.
3. - - - - -> Association of pollution of the environment and the components of the environment, for example factories - - - - -> water pollution.
4. - - - - -> Association of pollution of the environment and the components of the environment, for example soil pollution - - - - -> plants.

Figure1: The Concept Map of the Environment

For instance, the following basic characteristics could be adopted, thus:

- ⊙ The environment is a multi-component system comprising all living things, non-living things and human-made entities, all of which closely interact to maintain its quality and stability;
- ⊙ Its quality and stability can be altered through negative perturbations from people, animals, and natural forces; and
- ⊙ The stability of its quality can be maintained (or restored, if it has already been interfered with) through the process of conservation of the affected components.
- ⊙ The environment shapes us and we shape it too.
- ⊙ The environment is our only life support system.
- ⊙ It is our responsibility to take good care of it at all times in all places.

3.3 The Challenge for Tertiary Education in Kenya on Learners' Perception of Environment

Tertiary education is the highest level in any system of education where learning is conducted in universities and colleges. These are the institutions that educate most of the people who develop and manage society's establishments and therefore such institutions bear profound responsibilities to increase the awareness, knowledge, technologies and tools to create an environmentally sustainable future (Calder and Clugstron, 2006). Indeed Sustainable Development requires education that not only is lifelong, but also as broad as life itself (Ginkel, 1998). Such should equally serve all people, draw upon all domains of knowledge and seek to integrate learning into all life's major activities. Thus, only Tertiary level of education is capable of achieving the latter feat.

It is worth noting that the narrow perspective of the learners' understanding of the concept of environment observed above gives the impression that humanity owns the environment and therefore is not part of the same (Otewa, 2006). The people with such an attitude feel they are distant from the environment and may possibly be able to avoid the dangers that face the environment due to their irresponsible activities therein. The home and school influences in both Primary and Secondary Education in Kenya, with regard to the understanding of the concept of environment, may not significantly be different. This study revealed that the infusion of environmental concepts in the school curriculum is not well being implemented through both classroom teaching and reference materials available. The presentation of such concepts is interpreted in the light of their career subjects and reference materials such as textbooks give them the same treatment. Such curriculum implementation and pupils cultural perception of their communities on the same, have led them to misunderstand the concept of environment. It is therefore the challenge of Tertiary education to correct the misnomer as it orientates education to Sustainability. Cabral (2006) further asserts that it makes more sense to reshape ourselves than to

attempt to reshape the planet to fit our infinite wants.

Tertiary Education that houses expertise in all manner of research may first have to establish the extent of this challenge by authenticating what environment is in the minds of its admitted students. This will give a hint of the understanding of the concept of environment at the end of Secondary Education. Such investigation could be extended to samples of some senior students in various disciplines just to get a glimpse of the challenge within Tertiary institutions. Further research could be done to establish the environmental perception of the nomadic communities in Kenya because the impact and effect of economic progress cannot be dealt with without first understanding the relationship between the inhabitants and their surrounding, more so their perception of its potential value.

It is important to determine how people perceive and relate to the environment in order to identify relevant behaviour patterns contributing to environmental degradation that can be addressed through strategies of change (Fiedeldey, 1998). The results of such studies would establish the awareness of what environment is to greater segments of Kenyans. Whatever the situation, relevant strategies should then be devised to assist the people in understanding the concept of environment and how it relates to Sustainable Development. This message could then be effectively communicated to all sections of the community for relevant implementation.

The Tertiary institutions as educational centres should review the teaching approach to the concept of environment in totality. Ginkel (1998) observes that having separate Environmental Education may not be helpful. Instead, there is need for organized systematic integration of environmental principles into the curriculum, hence screening the Curriculum or greening the Campus. The teaching approach of the concept of environment should be systematic, where it starts as a broad perspective, taken as an association or a relationship of various components such as living and non-living things. Then the classification and importance of each component to one another, for example, water and living organisms are outlined. Pollution and how it relates to different components of the environment such as water, air and soil is then laid out. Here, the stress should include the causes of pollution by human related activities. Conservation and how it relates to different components is to be traced and there should be a stress on the inter-relationship among the components of the environment; pollution and conservation of the environment. This kind of approach provides for holistic nature of the concept, where components such as humanity and water are given appropriate perspective and the understanding of issues such as conservation of soil is made easier.

Sustainable Development is a process of change in the relationships between social, economic and natural systems and processes. Since environment is the product of interactions between human (social) activities and the life-supporting biophysical (natural) world in which such activities occur (Reddy, 2006), it follows therefore that Sustainable Development is a process of change in the environment. This process of change can be possibly facilitated through education by outlining

the clear understanding of the concepts involved and the facilitation can best be achieved through Tertiary Education. This is due to the fact that every country requires its citizens to be well educated, skilled and motivated because of the growing realization that economic progress must be based on the principles of sustainable development, and that both economic progress and environmental protection are irrevocably linked. Tertiary Education has to come out directly to assist in this effort because of their unique available facilities.

3.4 Conclusion and Recommendations

The relationship between education and sustainable development was first officially recognized at an international level at the 1972 Stockholm Conference on Human Environment. Although it was resolved then to broaden the basis for enlightened opinions and responsibility by individuals and communities in protecting and improving the environmental quality in its full human dimensions, positive impact in Kenya seems to have stagnated at tertiary education levels with little or no effect at primary levels. This scenario exists since 1977, when environmental teaching, research and training were established at the Tbilisi Conference; hence bringing into the picture Education and Sustainable Development.

Similarly, although this is the decade for Education for Sustainable Development (EfSD), its effects at the primary level of education remain generally low, especially in rural areas where environmental action learning has not yet gained momentum. With additional global challenges like the Millennium Development Goals, efforts towards sustainable development may be undermined if deliberate efforts are not made to mainstream sustainability thinking in primary education. In this way a generation of environment conscious citizens will begin to emerge and the environmental curative costs, currently affecting us will be brought under control. Ways and means must be found to integrate environmental learning both vertically and horizontally within our education system. A critical challenge for universities is to produce learning materials including books so simplified yet informative for primary education. Re-tooling of primary and secondary teachers should also be planned for and implemented.

3.5 Review Questions

- i. Tertiary education policy makers would have failed the nation if the practice in tertiary education has no real positive impact on primary education. Comment.
- ii. Briefly discuss the role of the Tertiary Education as a catalyst in developing a learning society for the sustainability of the environment with special reference to Kenya.
- iii. Critically examine the obstacles and opportunities of mainstreaming environmental thinking at primary education level in Kenya today.

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