Primary School Pupils' Acquisition of Environmental Education in Moshi Rural District in Tanzania

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Abstract

The main focus of this study was to assess the acquisition of environmental education among primary school pupils in Moshi Rural district in Tanzania. The study employed a mixed methods research approach with a sample size of randomly selected 235 pupils. Data were collected through questionnaires, focus group discussions, documentary review and non-participant observation. Results show that majority of pupils had average knowledge and awareness of environmental issues. Also, environmental education offered in schools was considered important. Various sources of environmental education were used to obtain environmental information among the pupils. Moreover, there was considerable evidence of several environmental accomplishments demonstrated at schools and homes. The study concludes that envionmental education acquired in schools is indispensable for creating environment-related knowledge in life.

Keywords: *environmental behaviour, environmental knowledge, environmental literacy*

Introduction

Environmental Education (EE) involves the process of recognizing values and clarifying concepts in order to develop knowledge, skills and attitudes necessary to understand and appreciate the interrelatedness among people, their culture and their bio physical surrounding (UNESCO, 2014). The goal of EE is to develop a world population that is aware of and concerned about the environment and its associated problems. Hence, education can promote environmentally literate citizens who undertake environmentally friendly actions (Buckles, 2018).

Globally, the history of EE as a formal field of study can be traced back to 1970s. During that priod a number of important international conferences that have influenced and shaped policies and practices in environmental education were held. The notable ones include the United Nations Conference on Human Environment in 1972; the International Environmental Education Workshop at Belgrade in 1975; the Intergovernmental Conference on Environmental Education in 1978; the World Commission on Development and Environment in 1987; and the Earth Summit of 1992. All these conferences shed light on the development of EE (UNESC0, 2014). These conferences represent a time in human history when people, globally, congregated to discuss environmental problems as a threat to human survival (Redclift & Woodgate, 2013). Since then to-date, there is significant development to the formality of EE at different levels of education in many countries of the world including Tanzania. EE is a tool that should be used to combat and address the significant negative impact facing the human population on the earth.

The importance of EE in striving for sustainable development is based on the conviction that people would alter their behaviour when they can see that it would make things better, and that they would work together when they needed to (Laurie, Nonoyama-Tarumi, Mckeown & Hopkins, 2016; Peter & Cheruto, 2013; UNESCO, 2014). Thus, the development of an environmentally literate citizenry is an important aim of EE, hence it is a fundamental prerequisite to maintain and improve the quality of the environment. In this regard, Robottom (2007) contends that EE required rallying the much needed support from stakeholders to firmly establish itself in the formal education curricula and other non-formal and informal activities within the community and the entire societal lives. One of the main actors in the implementation of programmes that are geared towards preparing environmentally informed citizens is formal schools. Whether schools can lead in such an undertaking or whether they have succeeded in disseminating environmental knowledge depends on the extent to which innovations and changes have been introduced into their curricula and on schools' commitment to their implementation. Therefore, the purpose of this study is to inquire on the primary school pupils' level of acquisition of environmental education offered in schools.

Literature Review

The utmost goal of EE is to create an understanding of human survival as consisting of interrelated and interdependent co-existence amongst life forms and between biotic and abiotic factors. Buckles (2018) contend that if different mind frames underpin the understanding of nature, there is a likelihood of its impact on practice.

He insisted that an established mind frame is a habit that the mind finds easier to recall and will therefore apply in day-to-day interactions. Therefore, well-cultivated minds are likely to bring about realisation of environment-friendly practices. EE intends to assist in changing people's views of nature thereby emphasis needs to be given to the understanding of life and nature as interconnected. The environmental literate citizenry must understand basic ecological principles, appreciate and care for the environment, possess the skills to identify and analyse critical environmental issues, and share a willing commitment to sustainability (Kaya & Elster, 2018; Kimaryo, 2011; Ndeskoi, 2016).

The goal of EE as initially stipulated in Belgrade Charter (1976) that also became the present-day definition of environmental education states:

> to develop a world population that is aware of, and concerned about, the environment and its associated problems, and which has the knowledge, skills, attitudes, motivations and commitment to work individually and collectively toward solutions of current problems and the prevention of new ones. (UNESCO/UNEP, 1976, p. 2)

Environmental education, should therefore promote learning of environmental matters in a holistic manner and should prepare all recipients to contribute positively to environmental sustainability. In this regard, Vygotsky draws a clear and close relationship between relevance and context, that knowledge is deemed relevant to a learner if it is based on the environment in which the learner lives or operates most (Roth & Lee, 2007).This proposition essentially demonstrates the close link and interdependence that there exist between a community and the school in the education life of the learner.

Schools have been recognized as one of most important sources of information for children (Al-Dajeh, 2012; UNESCO, 2014). Schools can contribute to a child's learning about sustainability of the environment and developing a positive thinking and behaviour. It has been recognized that the end result of EE to a large extent depends on formulation of school curricula and practice relevant to local environmental problems. In other words the success of EE depends on how it has been introduced and implemented at the grassroots level. Moreover, it had been noted that teachers had a crucial role to play in helping to bring about the extensive social changes necessary for acquisition of EE relevant to the sustainable development (Mutisya & Baker, 2011; Ndeskoi, 2016).

In the Tanzanian Education and Training Policy (ETP) of 1995, it was stipulated that EE should be integrated within all subjects at all levels of schooling (MoEC, 1995, MoEVT, 2006). The issue of environmental management and conservation

has been spelt out clearly in the objectives of education in Tanzania. The ETP emphasised, among others, that EE should enable the rational use, management and conservation of the environment (MoEC, 1995). As a result, curriculum review has been incorporating EE issues into the school curricula over time. For instance, 1996, 2002 and 2005 witnessed EE issues for primary education. Apart from that, the government of Tanzania has actively worked with the then Ministry of Education and Vocational Training, together with other governmental and non-governmental organizations, to promote formal and non-formal environmental education (MoEVT, 2006).

The integration of environmental education in school curricula is commendable and timely with due regard to the state of environmental problems, challenges and risks facing the country. It was therefore logical to integrate EE content into formal school curricula at all levels so as to prepare a well-informed citizenry on the environmental issues. More specifically, primary education has been recognized as the appropriate stage at which school children can have the opportunity to learn about environmental issues (MoEVT, 2006). In this regard it has been noted that the path towards a better future for all Tanzanians involves incorporating EE in every curriculum and at all levels of education (MoEVT, 2006). In addition, UNCED (1992) maintained that there is no doubt that EE should form an important component in the school curriculum. Although EE at the international and national levels have attracted a great deal of attention in many countries including Tanzania, and raised national awareness and concern regarding environmental issues, Tanzania is still facing the environmental threats of land degradation, declining access to good and safe water, environmental pollution, loss of wildlife habitats and biodiversity as well as deforestation (VPO, 1997, 2006). In this regard, government has recognized the need for more intensive EE to promote improved management of natural resources, which is a prerequisite for sustainable development.

Despite several initiatives and efforts that have been taken by the government in protecting and maintaing the environment including the integrating EE into school curricula, there is a compelling need to explore the level of acquisition of EE among the most important group in society, namely primary school pupils who are the future generation. Research findings on the teaching and learning of environmental education show that despite the fact that EE is integrated into the content of different subjects, environmental threats still persist, which is an indicator that something has gone wrong with the curricular processes and practices (Kimaryo, 2011; Mtaita, 2005; Ndeskoi, 2016). Other reported barriers to the effective implementation of environmental education in formal schools include the traditional teaching approach, inflexible curricula, too much content to be

learnt and insufficient time for an in-depth approach to the study of environmental matters (Makundi, 2003; Ndeskoi, 2016). Given this status of EE in Tanzanian formal schools, there is a need to conduct an investigation of the acquisition of environmental literacy among the Tanzania's primary school pupils. Consequently, this study attempts to answer the following questions:

i. What is the level of pupils' awareness and mastery of environmental issues that are acquired from the teaching and learning of environmental education in schools?
ii. What are the perceived importance of environmental education among primary school pupils?
iii. What are the main sources of environmental knowledge, awareness and skills used by pupils?
iv. What are the evidences of results and accomplishments that have resulted from the application of pupils' EE knowledge and skills imparted in the classroom?

Methodology

The study employed a combination of both qualitative and quantitative research approaches to gather the data and present the findings. The motivation for combining methods was to create the flexibility and provide for a researcher's judicious decisions about aspects in the study to exhaustively derive evidence to the research questions. Thus, within this approach, numeric and text data were produced, analysed and interpreted using mixed-methods strategies and techniques informed by the study design. A cross-sectional survey design was used because of its usefulness of gathering information on a population at a single point in time. In addition, the design was preferred because of its ability to deal with various cases and variables, and its suitability with quantitative and qualitative methods.

The study was conducted in Moshi Rural district in Kilimanjaro region because of its natural endowment with a favourable climate which constitutes a biosphere reserve and a world heritage site on the windward side receiving reliable rainfall. It is an area that marks the region as a "*hotspot* of Africa, the possibility of multiple treatments and use of the environment among schools. Knowledge of such environmental variables was essential in researching acqusition of EE among the pupils who were the targeted population for this particular study. A simple random sampling was used to select 235 Standard VII pupils from six primary schools. Pupils were potential in providing the needed information, because they

are younger and more attached to the local communities unlike those at the rest of education levels in Tanzania. Data collection methods included questionnaire, focus group discussion, documentary review and non-participant observation. Validity and reliability were determined by doing a pilot study in a school different from the sampled ones. Qualitative data were subjected to content analysis while quantitative data were subjected to descriptive statistics.

Findings and Discussion

Pupils' awareness and mastering of environmental issues

The findings revealed that a considerable majority of pupils had acquired an cognitive understanding of environmental issues and concerns. The results are presented in Table 1 and Table 2.

Table 1: *Pupils Levels of Understanding of Environmental Concepts*

Statements	Pupils understanding of environmental concepts (N=235)							
	Agree		Disagree		Not sure		Majority response	Correctness of response
	f	%	*F*	%	*F*	%		
Controlled use of natural resources may benefit future generations	223	94.9	10	4.3	2	0.8	Agree	Yes
Natural resources have always been there and will be there in the future	145	61.7	85	36.2	5	2.3	Agree	Yes
Future generations may not require today's natural resources	15	6.4	200	85.1	20	8.5	Disagree	No
Future generations have a right to inherit today's natural resources	228	97.0	3	1.3	4	1.7	Agree	Yes
Solid wastes rarely cause health risks to people	11	4.7	214	91.1	10	4.3	Disagree	No
It is worrying that people are destroying the environment by deforestation	217	92.3	13	5.5	5	2.1	Agree	Yes

Pollution causes health risks	212	90.2	15	6.4	7	3.0	Agree	Yes
Man can continue to survive even without other living organisms	195	83.0	3	1.3	37	15.4	Agree	No
Conservation of the environment is the responsibility of every citizen	218	92.8	10	4.3	7	3.0	Agree	Yes
Planting trees and use of terraces can conserve the environment	215	91.5	18	7.7	2	0.9	Agree	Yes

Key: Yes = This was the correct response expected

No= This was not the correct response to give

As the table indicates, majority of the pupils expressed positive agreement or disagreement with statements formulated specifically as would have been covered in a formal EE class. Only a minor proportion scored wrong environmental positions or else was not sure. These findings suggest that, generally, pupils held (and hold) an understanding of environmental concepts and issues as used in the school curriculum. Their understanding implies positive dispositions to EE, hence pupils are more likely to protect natural resources if properly taught and guided. On the other hand, the positive scores on wrong statements (e.g. "future generations may not require today's resources" and solid wastes rarely cause health risks") simply indicated a narrow understanding of concepts and/or practical applications required in establishing or disestablishing relationships.

Further follow-up on understanding and mastery of EE was conducted through a test consisting of an array of test items in the area of environmental literacy and reflecting a range within the three domains of learning ─ the cognitive, the psycho-motor and the affective domains. Scores on the test, from 0 to 100%, were categorized into class intervals of 0-20 (worst, poor), 21-40 (fair), 41-60 (average), 61-80 (good) and 81-100 (very good/excellent). The test performance results and the associated numbers of pupils per class interval were as indicated in Table 2.

Table 2: *Test Scores on Understanding of EE Concepts*

Pupils' test scores on understanding and mastery on EE concepts (N=235)					
Class interval	**Lower class boundary**	**Upper class boundary**	**Mid-points scores (*x*)**	***f***	***fx***
0-20 (Poor)	0	20	10.0	17	170.0
21-40 (Fair)	21	40	31.5	23	701.5
41-60 (average)	41	60	50.5	136	6868.0
61-80 (Good)	61	80	70.5	48	3384.0
81-100 (Excellent)	81	100	90.5	11	995.5
				$\sum f$=235	$\sum fx$=12119

mean score: $\overline{X} = \frac{\sum fx}{\sum f} = 51.6$

From the data in Table 2, it is clear that the mean score in the pupils' performance on the test was 51.6%, which was just an average. Only few pupils (11 or 4.6%) scored exceptionally well, while 40 (or 17%) of the group scored rather poorly. 184 of the pupils (or 78%) obtained average scores.

The average level of environmental knowledge among the pupils can be explained by the failure of various formal and informal institutions both in teacher preparations as implementers of EE in school curriculum and the weak role of indigenous environmental knowledge systems which are essential in disseminating appropriate information about local and global environmental issues. Studies conducted by Makundi (2003), Kimaryo(2011),Ndeskoi (2016) showed that there was inadequate training of primary school teachers who were keen implementers of EE in the school curriculum. Such situation seems to affect the acquisition of EE among the pupils.

On the whole, the study demonstrated statistically that the mean score in the performance of the pupils on the administered test was 51.6%, which was just average. These results are somewhat consistent with results from other studies on environmental literacy with middle school students in the USA (McBeth *et al*., 2008) and South Korea (Shin *et al*., 2005) where students demonstrated a moderate level of environmental literacy. Apart from that, the findings concur with studies

in Kenya, which found that Standard VIII primary school pupils in Kenya's rural town of Narok were aware of the key environmental issues in their local area and also understood the causes of some of these environmental issues (Mutisya & Baker , 2011; Mutisya, Kipgetich & Rono , 2013). This finding would require a more specific enquiry into the actual environmental and educational (pedagogical) conditions in the particular parts of the US, South Korea and Kenya in order to establish the factors of comparability with Tanzania.

In connection with this observation, various studies in different countries have indicated that individuals could have different levels of EE knowledge (Fielding & Head, 2012; Kaya & Elster, 2018; Lie lander, *et al.* 2013; Roth, 1992; Shepardson, 2005). These differentials could be due to several reasons related to differences in the educational systems, school curricula, formal, non-formal and informal EE opportunities, information sources and culture, among others. The findings of the current study are in line with these cited studies since pupils levels of performance in their scores varied among individual pupils.

On the other hand, studies carried out with participants in various grades in Turkey (K-8), on general environmental knowledge and/or knowledge on different environmental concepts seemed to indicate the opposite (Alp *et al*., 2006). The researchers had investigated into the students' general environmental knowledge and found that 6^{th}-10^{th}-grade students had a low level of environmental knowledge. Accordingly, it can be said that the reasons behind the students' knowledge and skills for the environment-related issues could be attributed to the nature of the school curriculum, competence of teachers that can influence acquisition of necessary skills and knowledge, motivation for appropriate actions, and/or availability and nature of reading materials.

Perceived importance of provision of EE among primary school pupils

The findings on pupils' perceived importance of EE are presented in Table 3.

Table 3: *Rating to the Importance of Provision of Environmental Education*

Statements on the importance of acquired EE	Pupils' Ratings of Importance of EE (N=235)			
	Agree		Disagree	
	f	%	*F*	%
Enhances new knowledge on environmental issues	195	84.4	36	15.6
Provides facts about local environmental issues	199	86.1	32	13.9

Statements on the importance of acquired EE	Pupils' Ratings of Importance of EE (N=235)			
	Agree		Disagree	
	f	%	*F*	%
Sharing of knowledge with others on environmental matters	189	81.8	51	22.8
Provides awareness of various environmental issues	176	76.2	55	23.8
Provides knowledge on advantages of a sustainable environment	185	80.1	46	19.9
Enhances knowledge and skills on solving environmental problems	187	80.9	45	19.1
Enhances understanding of relationship between man and environment	199	86.1	31	13.9

It is demonstrated that EE offered in schools is important in and for imparting environment-related knowledge and skills to the recipients. This is confirmed by the positive response rate shown on statements on the importance of EE in schools. Moreover, focus-group discussions revealed that the provision of EE in school curricula plays a vital role to the pupils' development of critical thinking about environmental issues. Pupils showed that EE promotes understanding of a relationship between living and non-living things as well as a necessity of nurturing and conserving such environment. Furthermore, they pointed out various themes and topics that were learnt from the school curriculum such as the definition and meaning of environment, importance of environment, water, weather, animal keeping, agricultural practices, forests, proper health and hygiene,minerals, parts of the body, and balanced diet which enhanced or else deepened the understanding of he world we live in. The following are several of the statements made during the FGD with pupils of the schools visited:

> The teaching of environmental education in primary schools is very important because the environment entails land, living and non-living things. Therefore, through education, children can understand environmental issues that are potential for our well-being and the way we can cope with other environmental challenges through the knowledge we get from teaching and learning EE content in our school subjects (FGD, School A).

> We primary school pupils should be taught this subject in order to understand things that cause environmental destruction in our daily practices of using the environment. We should know what causes environmental problems and the solutions for such problems. Also, through environmental education I think we can understand how to conserve and protect our environment. For example, we learnt that there are some agricultural practices which are destructive to the environment, like cultivating on slopes without using terraces. Therefore, if children are educated during their primary education they may become more knowledgeable on how to undertake different environmental issues in a sustainable ways (FGD, school D).

These various self-expressions and testimonies by pupils during FGDs at schools provide evidence of progressive acquisition,over time, of awareness, knowledge and assumed skills from their exposure to the programme of EE. In any case, however, the fact that four of five schools from where these pupil voices came is suggestive of a view that EE is important in creation of environmental awareness, knowledge and skill for protecting and conserving the environement both for the present and future generation.

The study findings have demonstrated that EE offered in schools is important for imparting environment-related knowledge and skills to the recipients. The fact was confirmed by both questionnaires and FGDs. The study findings concur with those of other previous studies that acknowledge the importance of EE in schools in Tanzania and elsewhere (Makundi, 2003; Mutisya & Baker, 2011; Gough, 2011).

Sources of knowledge, awareness and skills in EE

The findings on the sources of EE information showed that majority of the pupils indicated school textbooks (96.6%), media (87.7%), movies/films such as 'geographic' and 'discovery' (74.0%), friends (66.4%) as major sources of their EE knowledge and skills. It was further noted that family members (64.7%), and indigenous education practices (63.4%) were among the sources of their knowledge and skills of environmental issues. Table 4 presents teacher ratings on sources of EE with frequencies and percentages arranged in descending order.

Table 4: *Pupils' Ratings on the Sources of Knowledge, Awareness and Skills of EE(N=235)*

s/n	**Sources of EE information among pupils**	*f*	%
1.	School textbooks	227	96.6
2.	Media (radio, TV, newspaper)	206	87.7
3.	Movies/Films	174	74.0
4.	Friends	156	66.4
5.	Family members	152	64.7
6.	Indigenous education practice	149	63.4

Form the findings; it is clear that several reliable EE sources are used by pupils to secure information about environmental knowledge, awareness and skills. The use of various media such as radio, television and newspaper as well as movies and films may be attributed to its access to many parts of the country due to the development of information and communication technologies. There is no doubt that some of these sources, especially the television, radio and movies contain considerable knowledge and information, some of which are accurate and objective but otherwise may be wrong or misleading, producing unrelated, false, or insufficient knowledge or the formation of misconception among prospective teachers about environmental issues. This result is in agreement with various other studies such as (Al-Dajeh, 2012; Kaya, et.al, 2018; Ndeskoi, 2016) which indicated that similar sources in the acquisition of EE information at different levels of education. It is imperative to argue that pupils resort to many sources to obtain environmental knowledge, awareness and skills whether formal sources, such as schools, or informal sources, such as the media, friends, family and other indigenous knowledge systems available.

Evidence of demonstrated environmental activities and behaviour acquired from EE in schools

Findings on evidence of environmental achievements and behaviour regarding the extent of acquired EE in schools are presented in Table 5 in their descending order of rating.

Table 5: *Pupils' Self-attestation of Accomplished Activities and Applications of EE (N=235)*

Conceivable activities and applications	**Agree**		**Disagree**	
	f	*%*	*F*	%
Participated in cleanliness of compounds, classroom, waste management and recycling at school and home.	233	99.1	2	0.9
Planned/designed/constructed a garden around our school, home and/or a farm for vegatables/fruits.	230	97.8	5	2.2
Joined others in talking about or demonstrating personal hygiene (at school/at home).	222	94.5	13	5.5
Joined others in cleaning school [and/or] home compound and surroundings	218	92.7	17	7.3
Collected garbage and placed it in disposal bins	216	91.9	19	8.1
Participated in clearing bush and cleaning surroundings at school and in the family.	213	90.6	22	9.4
Engaged in water and power saving precautions in school and home	211	89.7	24	10.3
Used water economically and turned off the light when leaving a room	208	88.5	27	11.5
Planted trees at school, in family yard (for some future purpose – fruits, wind-breaking, controlling erosion) at home.	198	84.2	37	15.8
Asked parents to buy/constructed and used dustbins/ trashcans/waste pits for waste control at home.	183	77.8	52	22.2
Participated in campaigns/seminars on environmental issues (cleanliness, hygine, tree planting, river water and energy conservation.	166	70.6	69	29.4
Advised people (parents, neighbours, fellow pupils) on best conserving the environment.	98	41.7	137	58.3

From evaluating the responses of the participants on the environmental accomplishments rating (Table 5) based on the frequency and per cent of responses, whether agreed or disagreed on practising environmental activities in school, home or surrounding community/village, the results indicate that pupils do practise such environmental activities to a large extent of agreement.. On the other hand, pupils

were less involved in the advising people (parents, neighbours, fellow pupils) on best ways of conserving and protecting the environment. The results show that pupils also demonstrate some environmentally friendly behaviour in some cases especially in areas such as conserving energy and water or disposing of garbage in designated areas. This means that there was a measure of utilisation of acquired EE knowledge and skills, although the accomplishments were demonstrated clearly in schools through pupils self-attestations of EE activities perfomed at their schools and homes.

Conclusion and Recommendations

In conclusion, the study demonstrated that the mean score in the performance of the pupils on EE administered test was just average. This observation was similar to other contexts of the world including USA, South Korea and Kenya where students demonstrated a moderate level of environmental literacy. However, these comparable results of different contexts would require a more specific enquiry on the basis of contextual factors and attributes in order to establish the factors of comparability with Tanzania. These scenarios can be explained by various studies that have concluded such differentials could be due to several reasons related to differences in the educational systems, school curricula, formal, non-formal and informal EE opportunities, information sources and culture, among others. However, EE in primary schools has been and still is important in shaping informed citizens. Thus, the provision of EE among primary school pupils in Tanzania has great importance. This is because school-age children have potential talents, hence a necessity for schools to play their key role in organizing the pupils' personalities and prioritize them in educational programmes in schools. Establishing various environmental programmes in schools contributes to the pupils' practical environmental education, and increasing their awareness. Apparently engaging pupils in field visits of nature and human society, environmental activities in different environmental occasions, as well as introducing environmental issues increase the environmental concerns and practical knowledge of primary school pupils in Tanzania that can lead to obvious changes in their constructive behaviour towards the environment. The study recommends on the necessity of promoting environmentally-related activities to increase environmental literacy such as the establishment of environmental clubs in schools and acknowledging the role of indigenous environmental knowledge in acquisition of EE.

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