The Effect of Environmental Education on Environmental Management among Primary School Teachers in Kenya

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Abstract

Environmental problems result from human behaviour and therefore Environmental Management starts with a change in human behaviour. This change in behaviour is possible through Education and educators have been challenged over the years to rethink the role Environmental Education can play in Environmental Management. It has however been noted that Environmental Education has been in existence for more than three decades yet there is continued environmental degradation (Steele, 2010). Teachers play a key role in the transmission of the requisite knowledge, attitudes and behaviour for Environmental Management; it is thus necessary that they possess these attitudes and behaviour that are necessary for the effective provision of Environmental Education. The purpose of this study is to determine the effect of Environmental Education on Environmental Management among Primary School Teachers in Kenya. In addition, this study seeks to establish the correlation between Environmental Attitudes and Environmental Behaviour. Since it seems little if any research has been conducted in Kenya regarding Environmental Education; this research is expected to help fill this gap by contributing to the existing literature. This quantitative cross-sectional survey research uses teachers from Kenya to determine the effect of Environmental Education on Environmental Management. Data was collected from 220 participants using a questionnaire and analyzed using PASW version 21. The results of the study showed that: there was no significant correlation between Environmental Attitudes and Environmental Behaviour; Environmental Education had no significant effect on Environmental Behaviour; and there was no significant difference by gender in Environmental Attitudes and Environmental Behaviour.

Key words: Environmental Education, Environmental Behaviour, Environmental Attitudes.

Introduction

Most environmental problems result from human activities (Gardner & Stern, 2002; UNCHE, 1972) and as such the quality of the environment is greatly influenced by our actions. Increase in human populations, technological advancement and globalization have led to accelerated levels of environmental degradation (Kilinc, 2002). These problems are manifested through species extinction, shortage of fresh water, environmental pollution, deforestation, climate change and land degradation (UNEP, 2002). The survival of human beings is greatly dependent on natural resources and consequently, the destruction of these resources is detrimental to our health, life and peaceful existence.

Several authors concur that the effectiveness of Environmental Management is possible through the development of the right attitudes, awareness and a change in behavior. (Larijani & Yeshodhara, 2008; MDG, 2010). Hungerford and Volk (1990) note that education is an important tool in shaping human behavior and thus essential in achieving the required changes in attitude, lifestyle and behavior necessary for Environmental Management.

Acknowledging the role of education to solve societal problems at the Stockholm Conference in 1972 and affirming it at subsequent environmental forums (Belgrade, 1975; Tbilisi, 1977; Brundtland, 1987 and Rio de Janeiro, 1992) has led to educators being challenged to rethink the role that education can play in changing human mindset to one that is caring for the environment (Steele, 2010). One of the recommendations of the Rio conference

(Agenda 21) was that environment and development be incorporated into the education curriculum as an essential part of learning. In response to this, most world nations included Environmental Education into their School Curricula. Kenya was not left behind, and in affirming her commitment to the recommendations of Agenda 21, incorporated Environmental Education concepts into various subjects at different levels of education. Republic of Kenya (2007) notes that the topics covered in the Kenya Primary and Secondary School curricula include: global concerns towards the environment, social impacts on the environment and methods of conserving the environment. In addition, several universities and colleges in the country offer diplomas and degrees in Environmental Studies. The result of this inclusion of Environmental Education concepts in the curricula however seems not to have been satisfactory in the fight against environmental problems as noted by Songok, Nabwire and Ong'unya (2014). This brings the concern on why there is a gap between the rhetoric and reality. In addition, it tends to imply that whatever is being learnt in Environmental Education seems not to be translated into reality to inform behaviour.

Teachers play an important role in the transmission of the knowledge, attitudes and behaviour for Environmental Management. It is thus necessary that classroom teachers have the requisite knowledge, attitudes and behaviour required to provide effective Environmental Education. Most of the literature reviewed on the effect of Environmental Education on Environmental Management however, have focused on Primary School Students (Erdogan, 2011; Mutisya, Kipngetich & Rono, 2013), High School Students (Ramadoss & Gopalsamy, 2011) and Pre-service Teachers (Uzun and Keles, 2012). Little if any research has been carried out using In-service Teachers as the study participants. If teachers are not studied, then the link between Environmental Education and Environmental Management may remain unclear as they are the ones charged with the responsibility of imparting knowledge, attitudes and behaviour to students and they have a key role to play in

the management of the environment both at present and in the future.

The purpose of this study was therefore to determine the effect of Environmental Education on Environmental Management among Primary School Teachers in Kenya. The study sought to determine the correlation between the Environmental Attitudes and Environmental Behaviour of the teachers. Further comparisons were then carried out to establish if there is a statistically significant difference by gender in Environmental Attitudes and Environmental Behaviour.

Methods Population and sample
This study is quantitative in nature and employed cross-sectional survey design procedures. The study population was Primary School Teachers in East-Karachuonyo Division, Kenya and the study targeted 220 teachers as the study participants. Cluster sampling technique was used to divide the study area into four zones (Rambira, Kendu, Nyakongo and Central). Purposive sampling was then applied to select schools believed to have more than 10 teachers within these four zones. All the teachers within the selected schools were considered as potential samples for this study.

Research Instrument
Data was collected using a four-likert scale Environmental Management Questionnaire which comprised of four sections: Demographic information, Environmental Education, Environmental Attitudes and Environmental Behaviour. The attitude scale was based on the New Environmental Paradigm which was then modified to suit the study sample. The behaviour scale was majorly developed by the researcher. The Environmental Education Scale was developed by the researcher and was based on the Kenya School Environmental Education Curriculum.

The instrument was pilot tested using 37 teachers within the study area. A confirmatory factor analysis was conducted to determine whether Environmental Attitudes and Environmental Behavior were uni-dimensional constructs. The results showed that Environmental Attitudes consisted of four subscales: attitude towards human right

to alter the environment; attitude towards personal conservation behaviour; attitude towards humannature relationship; and attitude towards human utilization of nature. Environmental Behaviour consisted of four subscales as well: behaviour to degrade the environment; behaviour to reduce waste; general tendency to behave proenvironmentally; and sustainable use of resources. A reliability analysis was then carried out to acquire the Cronbach's Alpha for each of the scales/subscales. The Cronbach's Alpha for each of the subscales was as follows: attitude towards human right to alter the environment (.66), attitude towards personal conservation behaviour (.57), attitude towards human-nature relationship (.56) and attitude towards human utilization of nature (.40), behaviour to degrade the environment (.82), behaviour to reduce waste (.62), general tendency to behave proenvironmentally (.76) and sustainable use of resources (.61). According to Santos (1999), a Cronbach's Alpha of .70 is acceptable in Social Sciences this therefore implies that the reliability of some of the subscales were weak. To remedy this, the weak items should be deleted from the scale. The subscales with weak reliabilities had the following number of items: attitude towards personal conservation behaviour, attitude towards human-nature relationship had three items each; attitude towards human utilization of nature and behaviour to reduce waste had two items each; and sustainable use had four items. Bastick and Malaton (2007) caution that the removal of the weak items may lead to loss of important information. They further recommend that a value-judgment be done between the reliability that would result from dropping an item and the extra information that it would add if it is maintained. With this in mind coupled with the fact that these subscales consisted of only a few items, the researcher decided to retain the items.

Data analysis
Predictive Analytic Software (PASW) version as moderate on a scale of one to four.

Correlation
Pearson's correlation results indicated that there was a statistically insignificant positve

21 was used to analyze data. The demographic data were analyzed using descriptive statistics and presented using frequencies and percentages where applicable. The correlation between Environmental Attitudes and Environmental Behaviour was determined using Pearson's correlation. Multiple regression was employed to determine the effect of Environmental Education on Environmental Management The Independent-sample t-test was used to determine gender differences in Environmental Attitudes and Environmental Behaviour.

Results
Out of 220 participants in the study, 120 (62.8%) were male and 100 (45.5%) were female. The modal age-range was 20-30 years with 107 (48.6%) of the respondents indicating that they belonged to this category, 80 (36%) of the respondents were between 30-40 years, 17 (7.7%) indicated their age-range over 40 while

16 (7.3%) indicated their age range was under 20 years. Majority of the respondents (39.1%) indicated their highest level of education as diploma, another 25.1% indicated certificate as their highest level of education. 24.1% of the respondents indicated that they hold a bachelor's degree while only 26 (11.8%) indicated their highest level of education as master's degree.

It is worth noting that majority of the respondents had more than 5 years teaching experience with 84(38.2%) of the respondents indicating their teaching experience as 5-10 years, another 58(26.4%) recording their teaching experience as 11-15 years and yet another 21 (9.5%) indicating their teaching experience as over 15 years. Only 57 (25.9%) of the respondents indicated that they had less than 5 years teaching experience. The total average score for Environmental Behaviour was 2.12 while for Environmental Attitudes was 2.24 implying that the teachers' attitudes and behaviour towards the environment can be rated correlation between Overall(total) attitude and overall (total) behaviour (r=.02, p=.79>.05) . This implies that the more positive one's Environmentally Attitude is, the more likely he/she is to behave in an

environmentally friendly way.

There is a statistically significant negative relationship between attitude towards personal conservation behaviour and sustainable use of resources ($r= -.17$, $p=.01<.05$). This implies that the more positive the attitude towards personal conservation behaviour, the less likely one would use environmental resources sustainably. **Table 1: Correlation**

The correlation between attitude towards human right to alter the environment and behaviour to degrade the environment is positive and statistically significant ($r=.17$, $p=.01<.05$). This implies that the more one felt that he or she had the right to alter the environment, the more they were likely to engage in behaviour that degrades the environment.

Variable	Coefficient (r) and pvalue (p)	Total behaviour	Behaviour to degrade the environment	Sustainable use of resources	Behaviour to reduce waste	General tendency to behave proenvironmentally
Personal conservation	r	-.05	.13	.17	-.11	-.06
	p	.45	.09	.01	.12	.39
Right to alter nature	r	-.04	.17	-.07	-.29	-.06
	p	.53	.01	.27	.00	.36
Human dominance over nature	r	.08	.08	.10	-.08	.04
	p	.27	.27	.13	.25	.58
Human-nature relationship	r	.30	.12	.21	.12	.30
	p	.00	.07	.00	.07	.00
Total attitude	r	.02	.12	.04	-.26	.02
	p	.79	.08	.55	.00	.73
Utilization of nature	r	-.19	-.27	.19	-.18	-.14
	p	.01	.00	.00	.01	.04

On the other hand, the relationship between attitude towards human right to alter the environment and behaviour to reduce waste is negative ($r=-.29$, $p=.00 < .05$). This implies that the more one feels that human beings had the right to alter the environment, the less likely they are to engage in behaviour that reduce waste.

Multiple Regression

Multiple linear regression was used to determine the effect of Environmental Education on Environmental Behavior. The other independent variables included in the analysis were level of education, years of teaching experience and salary bracket. The model summary revealed that the model explained 12% of the variance in Environmental Behaviour ($R^2= .12$, $f (6,213) = 4.63$, $p=.00$).

Environmental Education has no significant effect on Environmental Behaviour ($\beta= .13$, $t=1.93$, $p= .06$). This result indicates that the

participants' frequency of behaving in an environmentally friendly way increases by 13 units with each unit increase in Environmental Education.

According to the model, salary bracket is the strongest predictor of Environmental Behaviour (β=.47, t=3.73, p=.00). This shows that for every unit increase in salary, the frequency of behaving pro-environmentally increases by 47 units. Therefore salary bracket

Table 2: Multiple Regression

has a significant effect on Environmental Behaviour.

The level of Education has a negative effect on Environmental Behaviour (β=-.08, t=.82, p=.41), this effect is however not statistically

significant. According to the coefficient table, the frequency of Environmental Behaviour decreases by 8 units for each unit increase in the Level of Education.

The effect of years of teaching experience on Environmental Behaviour is negative (β=-.13, t=-1.12, p=2.64). This implies that for every one year increase teaching experience, the frequency for behaving in an environmentally friendly way reduces by 13 units. This effect is however not statistically significant.

Age has a statistically insignificant negative effect on Environmental behaviour (β=.14, t=-1.63, p=.11). This implies that the frequency of behaving in an environmentally friendly way decreases by 14 units for every one year increase in age.

R	R^2	f	Standardized coefficien	ts (β)	t	P
3.39	.115	4.63	Environmental Education	.13	1.98	.05
			Salary Bracket	.47	3.76	.00
			Age-range	-.14	-1.63	.11
			Level of Education	-.08	-.83	.41
			Years of teaching experience	-.13	-1.12	.26

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			Level of Education	-.08	-.83	.41
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Independent sample t-test

There was no significant difference by gender in Environmental Attitudes (*f*=.62, *p*=.4; Females*: M*= 2.40, *SD*=.31; Males*: M*= 2.42, *SD*= .29*)*. The gender mean difference was not statistically significant (*t*=1.14, *df*=218, *p*=.26).

The group statistics results showed that there were 120 male respondents (*M*=2.09, *SD*=.49) and 100 female respondents (*M*=2.15, *SD*=.44) Levene's test of equality of variance revealed that f=2.80, p=.10 thus equal variance was assumed. As shown by the results of the ttest for equality of means (*t*=-.98, *df*=218, *p*=.33), there was no statistically significant difference by gender in Environmental Behavior With regards to sustainable use of resources, equality of variance was assumed as indicated by Levene's test for equality of variance (*f*=.27,

$p=.61$; Females: *M*=2.18, *SD*= .67; Males: *M*= 2.36, *SD*= .63. The t-test for equality of means showed that *t*=2.08, *df*=218, *p*=.04. There is thus a statistically significant mean difference by gender in the sustainable use of resources.

According to the group statistics for behaviour to reduce waste, the male respondents had a mean of 2.20 with a standard deviation of 1.05 while the female respondents recorded a mean of 2.50 with a standard deviation of .92. Levene's test for equality of variance revealed that *f*=5.55, *p*=.02 therefore equal variance was not assumed. T-test for equality of means indicated that *t*=-2.25, *df* =217.28, *p*=.025<.05. Thus it can be stated with 95% confidence that there exists a statistically significant difference by gender in behavior to reduce waste.

In comparing the mean between male and female respondents regarding general tendency to behave pro-environmentally, equality of variance was assumed as shown by Levene's test for equality of variance (f=1.35, p=.25). The t-test for equality of means indicated that there was a statistically significant mean difference in general tendency to behave pro-environmentally by gender (t=-2.37, df=218, p=.018< .05).

		Group Statistics		Levene's Test Equality of V		Equality means		
		Mean	Standard deviation	F	P	t	df	p
Overall Attitude	Male	2.42	.29	.38	.54	.66	218	.512
	Female	2.40	.31					
Overall Behaviour	Male	2.09	.49	2.80	.10	-.98	218	.33
	Female	2.15	.44					
Utilization of nature	Male	2.35	.74	2.95	09	1.11	218,	.27
	Female	2.24	.66					
Human nature relationship	Male	1.90	.56	.69,	.41	-.84,	218	.40
	Female	1.97	.57					
General tendency to behave proenvironmentally	Male	1.93	.80	1.35	.25	218	218	.018
	Female	2.17	.72					
Behaviour to degrade the environment	Male	2.2	1.05	5.55	.02	-2.25,	217.28	.025
	Female	2.5	.92					
Sustainable use of resources	Male	2.36	.63	.27	.61	2.08,	218,	.04
	Female	2.18	.67					

Discussion

The results of this study indicated that there is no statistically significant correlation between Environmental Attitudes and Environmental Behaviour. This is consistent with the findings of Weidenboerner (2008) who found a moderately weak relationship between Environmental Attitudes and Environmental Behaviour. However, it contradicts the findings of Kitzmuller (2013) who found a strong correlation between Environmental Attitudes and Environmental Behaviour. Although the overall Environmental Attitudes did not have a significant correlation with overall Environmental Behaviour, some of the dimensions of these two variables had significant correlations: attitude towards personal conservation behaviour and sustainable use of resources; attitude towards human right to alter the environment and behaviour to degrade the environment; attitude towards human right to alter the environment and behaviour to reduce waste

The multiple regression results indicated that Environmental Education had no significant effect on Environmental Behaviour and explained only 3% of the variance in it. This contradict the findings of Erdogan (2011) who reported that Environmental Education led to Environmentally Responsible Behaviour. It was expected that Environmental Education would have a significant effect on Environmental Behaviour since Education in its own right should shape human behaviour (Hungerford & Volk (1990) . It is also worth noting that from the model, only salary bracket had a significant effect on Environmental

Behaviour .

In addition, the findings of this study revealed that there was no significant difference by gender in Environmental Attitudes. It was expected that the females would have a more positive attitude towards the environment than the males as during the review of literature it was found that a number of authors (Alim, 2014, Kibert, 2000) reported that the females had a more positive attitude towards the environment than the males.

The results of this study indicated that there was no significant difference by gender in the overall Environmental Behaviour. On the other hand, there was a statistically significant difference by gender in all the other dimensions of Environmental Behaviour except behaviour to degrade the environment. This finding corroborates the results of a previous research done by Weidenboerner (2008). However, the findings of this research contradict the findings of Kibert (2000) who found a significant difference in Environmental Behaviour by gender.

It is evident from the findings of this study that Environmental Education in Kenya seems to have a weak influence on the Environmental Behaviour of Primary School Teachers. The findings of this research have implications for policy makers with regards to Environmental Education and is expected to stimulate further research on Environmental Education in Kenya.

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