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# FOSTERING ENVIRONMENTAL LITERACY AMONG PRIMARY SCHOOL PUPILS: IMPLICATIONS FOR TEACHER EDUCATION

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## Abstract

Growing concerns about the environmental unsustainability of human activities provided the opportunity for policy interventions, aimed at encouraging sustainable development. Despite this, human action increases environmental risk. Hence, there is the need to address the problem from educational sector by employing instructional strategies that are community-based and participatory, such as service learning and educational trips using constructivism theory. The study therefore, investigated the improvement of environmental literacy (knowledge and practices) of primary school pupils through service learning and educational trips. Two null hypotheses were tested at 0.05 level of significance. A total of two hundred and sixty four (264) primary five pupils of intact classes from twelve schools purposively selected from Oyo Metropolis, Oyo state of Nigeria, using a pretest-posttest control group quasi experimental design. Two instrument; Environmental Knowledge Test ( $r=0.86$ ) and Environmental Practices Scale ( $r=0.76$ ) were used. Data collected was analysed using Analysis of Covariance. Treatment had significant main effects on pupils' environmental knowledge ( $F(2,251) = 29.98; p < 0.05$ ) and practices ( $F(2,251) = 12.93; p < 0.05$ ) than conventional strategy. This implies that there is the need for teachers' development on the use of service learning and educational trips in promoting environmental literacy in social studies.

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***Keywords:*** *Environmental literacy, Service learning, Educational trip, Social Studies, Environmental education.*

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## Introduction

The impact of contemporary human life on the environment has caused two interrelated social problems: pollution and resource depletion, such that the global natural environment has been found, in certain critical dimensions, to have come close to the limits of its carrying capacity (Agunbiade, 2007). The repercussion of deteriorating environmental conditions has been much on global ecology. The major environmental threats facing Nigeria and most developing countries are municipal solid

waste, soil erosion, flooding, pollution, inadequate environmental sanitation, desertification, deforestation (Adeyemi, 2012; Isiquzo, Ndikanwu & Adebajo, 2011) among others that are inimical to healthy living. Recently, flood ravaged some communities in about 23 states in Nigeria resulting to lost of lives and properties, as well as the disruption of academics calendars, insecurity and so on (Adeyemi, 2012). This problem has been basically attributed to peoples' lack of environmental awareness, lack of necessary skills to identify, prevent

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and solve environmental problems among others (World Wild Fund, 2008; Ajitoni & Gbadamosi, 2012). However, government efforts at solving environmental problems appear more or less ineffective as a result of limited resources and inadequacies of government policies (Gbadegesin, 2012). From the foregoing, it is clear that practically oriented environmental education is the answer to the challenges posed by people's unsustainable attitudes and behaviour toward the environment (Ajitoni, 2005).

Researchers discovered that the ultimate outcome of environmental education is in promoting citizen action; to be environment literate. It is thus crucial for environmental educators to focus on environmental literacy as the main goal of environmental education (Rowe, 2009; Erocak, 2010). Although there is not yet a consensus in the scientific and education communities about what environmental literacy entails, however, many working definitions of environmental literacy exist. North American Association for Environmental Education (2000) defines Environmental literacy as basic functional education for all people which provides them with elementary knowledge, skills and motives to cope with environmental needs and contribute to sustainable development. Roth (1992) further defines environmental literacy as the capacity to perceive and interpret the relative health of environmental systems and to take appropriate action to maintain, restore, or improve the health of those systems. In this study, environmental literacy is viewed as the outcome of a process of education about the environment which has knowledge and skills (practices) components. However, literature reveals that relatively low achievement have been made in educating the citizens to be environment literate when examine the severity of human impacts on the

environment (Osibanjo, 2008, UNESCO, 2008).

In line with this, the importance of environmental education through school subjects such as social studies has been stressed by scholars in finding solutions to environmental problems. However, teachers' methods of teaching particularly the conventional methods have been found to be inadequate for a value-laden subject like social studies. A lot has been done in the area of environmental education specifically in experimenting the efficacy of different instructional strategies on the learning outcomes of students/citizens in the subject but with minimal results such as outdoor learning (Olatundun, 2008); full and quasi participatory strategies (Ajitoni, 2005) among others. Community-based and participatory instructional strategies that would encourage critical thinking and enable decision making have therefore been advocated; service learning and educational trips instructional strategies.

Service learning is an instructional strategy through which students apply their academic skills and knowledge to address real life needs in their own communities. It provides a compelling reason to learn teaches the skills of civic participation and develops an ethic of service as well as civic responsibility. By solving real problems and addressing real needs, students learn to apply classroom learning to a real world context and at the same time, students provide valuable service to schools and community (Klute, 2002; Anderson, 2009). Service learning is centered around projects. Service projects can be categorized either by the type of service performed, or by the issues and problems the service addresses. Yanesh (2002) gives four primary types of service- direct service, indirect service, advocacy and research.

Also, an educational trip is an

instructional strategy which involves taking learners out of classroom situations to designated places in their immediate environment to study in a real life setting (Erinosho, 2008). In a study, Wells and Lekies (2006) examined linkages between childhood nature experiences and adult environmental attitudes and behaviours. It was discovered that childhood participation with “wild” nature (e.g., hiking, camping, or playing in the woods), had a significant positive effect on both adult environmental attitudes and behaviours. In spite of the impacts of use of service learning and educational trips on learning outcomes, it is note worthy that, they have not been effectively utilized in Nigeria unlike developed countries.

The new paradigm in environment and resource management is working in partnership with children and youth, who are the future leaders, to understand the environment in its technical, socio-ecological, economic and cultural contexts (Smith & Sobel, 2010). It is against this background that this study therefore, involved primary school pupils.

#### Statement of the Problem

Efforts by researchers to find lasting solutions to environmental problems have not yielded much fruitful result as most of the strategies adopted did not bring about improved environmental literacy (environmental knowledge and practices). This is partly because the teaching of environmental education has not utilised outdoor and community-based strategies in social studies such as service learning and educational trips that have the potential to promote environmental literacy but have not been in common use for teaching environmental education in Nigeria. The study, therefore, investigated the effect of service learning and educational trips instructional strategies on primary school pupils' environmental literacy (knowledge and attitude) in social studies.

#### Hypotheses

**Ho1:** There is no significant main effect of treatment on pupils' environmental knowledge.

**Ho2:** There is no significant main effect of treatment on pupils' environmental practices.

#### Objective of the study

The study was designed to find out if service learning and educational trips instructional strategies have significant effects on primary school pupils' environmental literacy (environmental knowledge and practices) in social studies.

#### Theoretical framework

This study is based on the constructivist instructional framework. It is premised on the ideas postulated by Vygotsky, Gagne, Piaget, Bruner, Ausubel and Jonassen. The central idea in constructivism is that human learning is constructed, that learners build new knowledge upon the foundation of a prior or previous learning. This view of learning is participatory and sharply contrasts with one in which learning is the passive transmission of information from one individual to another, a view in which reception, not construction is key. The theory guides the use of service learning and educational trip because they are activity-based and participatory. The two strategies stimulate, engage, and give opportunity for pupils to construct knowledge and reflect on what they have learnt.

#### Methodology

The study adopted a pretest- posttest, control group quasi-experimental design. The participants consisted of two hundred and sixty four( 264) ;139 male and 125 female primary five(5) pupils of intact classes from twelve public primary schools purposively selected from Oyo Metropolis of Oyo State

based on the following criteria: being public schools; having one or more environmental problem(s) and the schools far apart from one another in terms of geographical location. This is to prevent interaction effects among students across schools. The sampled schools were randomly assigned to experimental and control groups. Reports from the State Ministry of Environment and Departments of Environment (2009) in the selected Local Government Areas established some major environmental issues and problems that are peculiar to Oyo town and its environ. This corroborates the work of Olatundun (2008) on some major environmental issues and problems in Nigeria. Such issues and problems were re-examined in the study as included in primary five social studies curriculum; human environment, types of resources; environmental problems such as (i) pollution (ii) soil erosion (iii) deforestation and (iv) flood.

Six research instruments were designed for data for data collection; Environmental Knowledge Test is a multiple choice test with two sections adapted from Venas and Doris (2006). It had been validated by the developer and reliability coefficient calculated was 0.80. Also, Environmental Practices Scale of 15 items patterned along a 3-point Likert scale of always, sometimes and never was adapted from Mansaray and Ajiboye (1997). The instrument consists of two sections. Section A comprises the demographic data of the participants such as gender, age, class, and school name. Section B contains statements to measure environmental practices of the pupils. However, to ensure that the instruments maintain their status, they were subjected to face and content validation using experts review and pilot tested in a neutral school. The internal consistency reliability measure was calculated using Kuder-Richardson 20 (KR20) for environmental knowledge test and Cronbach alpha for Environmental Practices Scale which yielded a

reliability value of 0.86 and 0.75 respectively. Also, Teachers Instructional Guide for control, Service Learning project planning worksheet Guide for Experimental group 1, Educational Trips Guide for Experimental group2 and Environmental Education Module were designed by the researcher to sensitize and enlighten facilitators and validated using experts review.

**Procedure:** Six research assistants were trained by the researcher for two weeks. Environmental Knowledge Test and Environmental Practices Scale were administered on experimental and control groups prior to the instruction. The scores obtained after administering served as pre-tests. The pupils in all the groups were exposed to the treatment the same time for eight weeks. Thereafter, post-test was carried out to determine the effect of the treatments.

### **Procedure for Experimental Group 1: Service Learning Instructional Strategy**

#### **Phase 1: Preparation**

The teacher guides pupils to link the concept with environmental issue in the school/ community used. The Teacher guides the pupils to mention the areas experiencing environmental issues for the study. Pupils decide on what they would do to solve the problem (services to perform).

#### **Phase 2: Action**

The Teacher assists the pupils to organize the project themselves and develop a work plan and carry out the service such as making of sand bag and planting of trees to control erosion, washing of toilet and so on.

#### **Phase 3: Reflection**

The Facilitators provide structured time for pupils to think, talk and write about what they did and observed during the service activity.

**Phase 4: Demonstration/ Celebration**

The pupils organize presentations on what they have learnt and how the project has positively affected them.

**Procedure for Experimental Group 2: Educational Trips Instructional Strategy**

**Phase 1: Preliminary phase (Before the educational trip)**

The teacher obtains the factual background and technical skills required to understand the specific purpose of the trip. Teacher gives a brief outline and purpose of the fieldwork to be given to the pupils.

**Phase 2: Teacher's and Pupils' activities (Educational trip)**

The teacher and the pupils visit the study sites such as illegal dump sites, erosion site in the school compound, Old Oyo National Park and so on. Each pupil writes down what he/she has observed. The pupils ask questions from the teacher and or community members.

**Phase 3: Follow up/ Evaluation**

The Pupils present and discuss their observations from the environmental problems sites visited in the next class. The Teacher evaluates the pupils by asking questions.

**Procedure for Control Group: Modified Conventional Teaching Method:** the treatment was based on four major procedural steps, which are sequentially linked. They are introduction, presentation, evaluation and conclusion.

**Data Analysis:** Analysis of Covariance (ANCOVA) was used to analyse the data obtained in testing hypotheses, using pre- test as covariates. The Multiple Classification Analysis (MCA) was used to determine the magnitude of the performance of the various

groups. Scheffé Post hoc analysis was carried out, to determine the source of significant effect of treatment. All hypotheses were tested at 0.05 level of significance.

**Results**

$H_{01}$ : There is no significant main effect of treatment on pupils' environmental knowledge.

Table 1 presents the findings of the study with respect to the effects of treatment on pupils' environmental knowledge.

**Table 1: Summary of ANCOVA of Post Test Environmental knowledge and Environmental Practices Scores by Treatments**

Source of Variance	Hierarchical Method				
	Sum of Squares	df	Mean Square	F	Sig.
Covariate PRETEST KNOWLEDGE	3.01	1	3.01	.47	.49
Main Effects (Combined)	384.94	4	96.24	14.99	.00
TREATMENT	384.79	2	192.40	29.98	.00*
Covariates PRETEST PRACTICES	246.32	1	246.32	25.70	.00
Main Effects (Combined)	975.41	4	243.85	25.44	.00
TREATMENT	247.97	2	123.98	12.93	.00*

**\*Significant at P < 0.05**

From Table 1, there is significant main effect of treatment on pupils' environmental knowledge ( $F_{(2,251)} = 29.98; p < 0.05$ ). This means that the adjusted post test scores of pupils in the two experimental groups and control are significantly different. Hence, hypothesis 1 is rejected. Table 2 shows the magnitude of the mean scores according to the treatment groups.

**Table 2: Multiple Classification Analysis of Environmental knowledge Scores According to Treatments**  
Grand mean=12.41

Treatment + category	N	Predicted Mean		Deviation		Eta	Beta
		Unadjusted	Adjusted for factors and covariates	Unadjusted	Adjusted for factors and covariates		
TREATMENT							
Service learning	87	28.53	28.48	1.52	1.46		
Educational trips	83	27.09	27.24	7.68E02	1.41	.32	.32
Control	94	25.61	25.52		1.49		
R = .57							
R square = .32							

Table 2 revealed that pupils in the educational trip instructional group had higher adjusted post test environmental knowledge score ( $\bar{x} = 12.42; adj. Dev$

. =0.01) and control ( =11.01; adj. dev. = -1.39). This means that the educational trip was the most effective at improving pupils' environmental knowledge followed by service learning and control. Further, Scheffé post hoc tests were carried out to trace the sources of the significant effect and findings are presented in Table 3.

**Table 3: Scheffé Post hoc Tests of Environmental Knowledge by Treatments**

Treatment	N	$\bar{X}$	Treatment		
			1. Service Learning Strategy	2. Educational Trips Strategy	3. Control
1. Service Learning	87	12.42		*	*
2. Educational Trips	83	13.97	*		*
3. Control	94	11.01	*	*	

\* Pairs of groups significantly different at  $P < 0.05$

From Table 3, there are significant differences ( $p < 0.05$ ) between pairs of groups service learning ( = 13.97) and control (  $\bar{X}$  =11.01) as well as educational trips (  $\bar{X}$  = 13.97) and control (  $\bar{X}$  =11.01). This shows that, each of the three possible pairs of groups is significantly different from one another and three pairs contributed to the observed significant effect of treatment on pupils' environmental knowledge.

**Ho2:** There is no significant main effect of treatment on pupils' environmental practices.

From Table 1, the main effect of treatment on pupils' environmental practices is significant ( $F_{(2,251)} = 12.93$ ;  $p < 0.05$ ). This means that, there is significant effect of treatment on environmental practices of pupils exposed to service learning, educational trip and control group. The null hypothesis 2 is rejected.

**Table 4: Multiple Classification Analysis of Environmental Practices Scores According to Treatments Grand mean= 27.02**

Treatment + category	N	Predicted Mean		Deviation		Eta	Beta
		Unadjusted	Adjusted for factors and covariates	Unadjusted	Adjusted for factors and covariates		
TREATMENT							
Service learning	87	12.43	12.42	1.99E - 02	1.75E - 02		
Educational trips	83	13.96	13.97	1.56	1.56	.42	.42
Control	94	11.01	11.01	1.39	-1.39		
R square		.42					
R square		.18					

Table 4 shows that the adjusted post test environmental practices scores of the service learning instructional group was higher (  $\bar{X}$  =28.48; adj. dev.=1.46) than that of educational trip (  $\bar{X}$  =27.24; adj. dev.=.22) and control ( =25.52; adj.dev.= -1.49). This implies that the service learning instructional strategy was more potent for improving pupils' environmental practices than the educational trip and control respectively. Further, the scheffé tests were carried out to trace the actual sources of significance in respect of treatment and environmental practices.

**Table 5: Scheffé Post hoc Tests of Environmental Practices by Treatments**

Treatment	N	$\bar{X}$	Treatment		
			1. Service Learning Strategy	2. Educational Trips Strategy	3. Control
1. Service Learning	87	12.42		*	*
2. Educational Trips	83	13.97	*		*
3. Control	94	11.01	*	*	

\* Pairs of groups significantly different at  $P < 0.05$ .

Table 5 shows that the three pairs of groups had significant differences from each other. Hence, service learning (  $\bar{X}$  =28.48) is slightly different from educational trip (  $\bar{X}$  =27.24); service learning (  $\bar{X}$  =28.48) is slightly different from control (  $\bar{X}$  = 25.52); and the educational trip (  $\bar{X}$  =27.24) is slightly different from control (  $\bar{X}$  =25.52). This means that they all contributed to the observed significant effect of treatment on pupils' environmental practices in Social Studies.

**Discussion**

The findings revealed that, the magnitude of environmental knowledge scores favoured the educational trip group followed by the service learning group and the control. The results showed that the two experimental strategies gave the opportunities



for pupils to connect learning to local topics, problems or issues and participatory in nature.

The higher environmental knowledge score recorded in educational trips may be due to the fact that pupils were taken out of classrooms to places where they could gain first-hand experiences. The result supports the findings of Erinoshio (2008) and Wellington (2007) who all reported that educational trip enriched knowledge and enhanced cognitive retention.

The higher environmental knowledge scores of pupils obtained in service learning over the control might be attributed to active pupils' engagement in teaching-learning process. In the study, teachers and pupils became co-investigators of local problems. This lends credence to the submissions of Sobel (2004) that service learning is the process of using the local community and environment as a starting point to teach concepts in social studies and other subjects across the curriculum emphasizing hands-on, real-world learning experiences. In the control group, the pupils were passive listeners during the lesson and resulted in poor feedback.

More so, service learning instructional strategy was superior to educational trips instructional strategy because the mean post-test environmental practices scores in service learning instructional strategy was 28.48 which is higher than that of the educational trips which was 27.24. This results may probably be, because learners in service learning instructional strategy worked with their teachers in developing clear learning objectives that address the change in attitude, the project addressed the real community need and pupils have an opportunity to reflect on and learn from their project before, during and after their service. It also offered opportunity for pupils to learn academic content that involves, discovery, organising, problem solving and so on.

Also, educational trips instructional strategy was more effective than the conventional teaching strategy probably because pupils were exposed to environmental problems around them. Also, pupils have the opportunity to acquire technical 'know how' to solve these problems more than pupils that were exposed to conventional strategy. This finding is in agreement with the findings of Palmberg and Kuru (2005) who found that pupils exposed to outdoor activities were found to have a stronger relationship with nature and exhibited better social behaviour than pupils who were not exposed to such activities. The findings is also in consonance with findings of Klute (2002) and Smith and Sobel (2010) who reported that educational visits provide opportunity for learners to explore their environment.

#### **Summary of findings**

1. There was significant main effect of treatment on pupils' environmental knowledge.
2. There was significant main effect of treatment on pupils' environmental practices.

#### **Conclusion**

This study found that educational trips and service learning instructional strategies had significant effect on environmental literacy of primary school pupils. Also, it proved more effective for the teaching and learning of environmental issues and problems in social studies than conventional methods.

#### **Policy Implications of the study to teacher education**

Service learning and educational trips instructional strategies should be incorporated in the teaching of

environmental issues and concepts in Social Studies at the primary school level for better learning outcomes. Teacher educators and their institutions should not only include service learning and educational trips in the curriculum but also make it compulsory for pre-service teachers to have practical experiences. Also, government should organise a form of re-training programme for primary school teachers on effective ways of using Service learning and educational trips instructional strategies. Lastly, for successful implementation and dissemination of this curriculum areas, adequate fund should be made available and release on time for school management to organise service learning and educational trips as it happened in the case of developed countries.

#### **Recommendations**

Based on these findings, it was recommended among others that

1. Teachers should ensure that projects which require a higher level of maturity or intellectual ability are avoided for younger children and also projects that are puerile or not intellectually stimulating are to be avoided for older students.
2. Service learning committee should be put in place in our schools to help teachers engage service learning, monitor progress, provide support during the project and help document the students' activities. Also, educational visit coordinators should be in primary school as in the case of developed countries. Educational visit coordinators are expected to plan and offer advice on what parents and pupils should know before embarking on the trip.

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