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EFFECT OF SERVICE AND COLLABORATIVE LEARNING STRATEGIES ON LEARNERS' ENVIRONMENTAL ATTITUDE

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Abstract:
Environmental issues have become recurring phenomena at international forums. This empirical paper investigates the effects of service learning and collaborative learning on Junior Secondary School students' environmental attitudes. Learners are exposed to environmental studies through many school subjects, and learning strategies have helped to increase students' knowledge and awareness about environmental issues. However, environmental challenges and problems are still on the increase in Nigeria. The students are also culpable as their attitude does not reflect what they learn. This paper is premised on the cognitive dissonance theory. The quantitative study employed the multistage sampling technique. The results revealed that there was a significant effect of treatment (service and collaborative learning strategies) on junior secondary school students environmental attitude ($F(2,582) = 1317.79$; $p<0.05$, partial $\eta 2 = 0.819$). Based on this finding, it was recommended that teachers adopt service and collaborative learning strategies in teaching environmental concepts and problems to improve student performance and, more importantly, positively influence their attitudes. Teachers should use service and collaborative learning strategies to provide practical experience for students to be well-grounded and equipped to use these strategies.

Keywords: Service learning, collaborative learning, environmental attitude, environmental knowledge
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INTRODUCTION

Environmental issues have recurred at international forums, and Nigeria is no exception. The environment has become a central issue of discussion at the United Nations General Assembly, where various steps are taken to create awareness among people in various countries (Castellanos & Queiruga-Dios, 2021: Kopnina, 2020; Liobikienė et al. (S., 2019; Mavuso et al., 2022; Ogunbiyi & Ajiboye, 2009). Taylor et al. (2009) succinctly put it by saying that the world's people are living in a period when environmental issues are receiving the attention that has never been seen before. However, the attitude towards the environment still shows that we have to pay more attention to challenges facing the human physical environment.

Environmental Crises are everybody's burden at local, national, and international levels. Most environmental problems, such as floods, pollution (air, water, noise, and land), desertification, deforestation, global warming, and climate change, are all due to human error of omission or commission. Alabi et al. 2019, Jenkens and Jenkens (2009), and Liobikienė and Poškus (2019) corroborate the view that human decision-making, and subsequent actions about interactions with the environment, can maintain and protect the environment or modify or destroy it. This clearly shows that humans have a major role to play in shaping their environment, as well as in preparing for the consequences of such influence. Human beings, either individually or collectively, have

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caused damage to the human environment through their deliberate or non-deliberate actions. This, in turn, brought about myriad social problems.

There are persistent problems of uncontrolled waste generation, poor waste disposal, uncontrolled discharge of harmful industrial waste, inefficient waste management, and poor legislation by the government (Alabi et al., 2019). (Gbadamosi, Ajagbe & Awolola, 2010; Handerson et al., 2008; Osibanjo, 2008). These problems are more visible in developing countries with high rates of poverty. Apart from these man-induced environmental problems, natural disasters like floods, landslides, tornadoes, and coastal and land erosion also take their toll. In the words of Nkire (2011), drought, floods, deforestation, and poor agricultural practice have driven about 25 million environmental refugees off the land.

Alabi et al. (2019). Abiona (2008), Olatundun (2008), and Gbadamosi (2013) identified peoples' poor attitude towards environmental issues as one of the factors contributing to environmental problems in Nigeria. They all advocated using teaching strategies for improving learners' academic knowledge and performance in Environmental Education (E.E.). Varela-Candamio et al. (2018) advocated for education to change people's behavior and engendering pro-environmental choices. They suggested that education will help tackle ecology and attendant social challenges. Education has always been used to bring about change in society as it enables individuals to have a clearer and better understanding of phenomena. The study, therefore, supports the views of other scholars cited above on the need for education to change human attitudes toward the environment.

This research comes against the backdrop of various studies which have sought to address environmental challenges in Nigeria. In 2008, Ajiboye and Ajitoni observed that students exposed to participatory learning strategies performed better than those taught using conventional (talk and chalk) methods. However, academic performance does not necessarily translate to a change of attitude (Aguanta & Tan, 2018). Erhabor and Don (2016), in a study conducted on environmental education knowledge and attitude, found that the relationship between subjects' knowledge and attitude was either negative or non-existent. This is why it happens that despite the literacy level of Nigeria, 62% (Worldbank.org, 2022), many environmental issues still result from human negligence. This is attested to by researchers claiming that environmental decadence in Nigeria is increasing (Adu et al., 2014; Erhabor & Don, 2016; Ogunbiyi & Ajiboye, 2009).

Gbadamosi (2013) also investigated the effect of gender and school location on the environmental knowledge of primary school pupils but did not consider what might likely lead to a change of attitude. It is not enough to boost academic knowledge if the knowledge does not lead to attitudinal change, especially in the human environment. Priority should be given to an education that reflects character.

Research by different scholars (Adu et al., 2014; Alabi et al.; Erhabor & Don, 2016; Ogunbiyi & Ajiboye, 2009; Abiona, 2008) testify that environmental challenges are increasing in magnitude and getting out of control. It, therefore, means there is a need to ensure a change of attitude through education. While there must be an improvement in learners' knowledge and academic performance, this paper opines that it is equally important to have noticeable improvement in students' attitudes through the knowledge they acquire because a change of attitude might likely transform into a cleaner and more sustainable environment.

This study investigates how service and collaborative learning strategies affect students' attitudes as a way of departure from improving knowledge and academic performance alone.

METHODS

This study adopted the positivist paradigm and employed a quantitative research design to investigate the view.

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The population comprised all Junior Secondary School Students in Ibadan, Nigeria. This study used a multistage random sampling technique to select participating schools. It made use of Junior Secondary School students in the selected schools. This group was considered appropriate for this study because they learned environmental concepts in their Social studies subject. They were also not preparing for any national examination and were mature enough to be taken out of their school environment should the need arise.

Data Collection. The following instruments were developed and used to gather the needed information for the study. Environmental Attitude Questionnaire (EAQ), Service Learning Guide (SLG), Collaborative Learning Guide (CLG), and Conventional Learning Guide (CLG). A preliminary quantitative survey of the prevailing environmental attitude of the students was carried out at three experimental and three control schools before the commencement of the activities by administering the pre-test. The administration of the pre-test was carried out using the instruments designed for the study. There was also the administration of a post-test after the treatments had been administered.

Ethical consideration. All ethical considerations were strictly adhered to. Ethical considerations in this research were based on permission, granting of informed consent, confidentiality, anonymity, and avoidance of harm to participants. Johnson and Christensen (2017) and Vos et al. (2011) make it clear that research must "be based on mutual trust, acceptance, cooperation, promises, and well-accepted conventions and expectations" among all the people who have one role or the other to play in research. This study ensured that appropriate permissions were obtained, and the participants were assured that neither their schools nor names would be revealed in the study. They were also informed of their right to withdraw participation should they feel so. It is also important to state that no participant was exposed to harm.

Hypotheses. Several hypotheses were generated to guide the investigation of the research problem. The following null hypotheses were tested at a 0.05 level of significance:

1. Ho1: There is no significant main effect of treatment (service and collaborative learning strategies) on Junior Secondary School students' environmental attitude.
2. Ho2: There is no significant main effect of gender (Male/Female) on Junior Secondary School students' environmental attitude.
3. Ho3: No significant main effect of school location (urban/rural) on Junior Secondary School students' environmental attitude.
4. Ho4: There is no significant main interaction effect of treatment and gender on Junior Secondary School Students' environmental attitude.
5. Ho5: There is no significant interaction effect of treatment and school location on Junior Secondary School Students' environmental attitude.
6. Ho6: There is no significant interaction effect of school location and gender on Junior Secondary School students' environmental attitude.
7. Ho7: There is no significant interaction effect of treatment, school location, and gender on Junior Secondary School students' environmental attitude.

RESULT AND DISCUSSION

Table 1. Analysis of Covariance (ANCOVA) of Post-Attitude by Treatment, Gender, and Location

Source	Type III Sum of Squares	df	Mean Square	F	Sig.	Partial Eta Squared
Corrected Model	213549.478	12	17795.790	625.346	0.000	0.928
Intercept	32161.527	1	32161.527	1130.159	0.000	0.660
PreAttitude	116905.917	1	116905.917	4108.084	0.000	0.876

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Treatment	75002.283	2	37501.141	1317.793	0.000*	0.819
Gender	14.320	1	14.320	0.503	0.478	0.001
Location	271.363	1	271.363	9.536	0.002*	0.016
Treatment x Gender	16.849	2	8.424	0.296	0.744	0.001
Treatment x Location	311.650	2	155.825	5.476	0.004*	0.018
Gender x Location	65.144	1	65.144	2.289	0.131	0.004
Treatment x Gender x Location	115.564	2	57.782	2.030	0.132	0.007
Error	16562.280	582	28.458			
Total	2515804.000	595				
Corrected Total	230111.758	594				

R Squared = 0.928 (Adjusted R Squared = 0.927) * denotes significant p<0.05

Table 1. revealed that there was a significant main effect of treatment (service and collaborative learning strategies) on junior secondary school students environmental attitude ($F(2,582) = 1317.79$; $p<0.05$, partial $\eta 2 = 0.819$). The effect was 81.9%. This means the treatment accounted for 81.9% variation in junior secondary school students' environmental attitudes. Thus, hypothesis 1 was rejected. In order to determine the magnitude of the significant main effect across treatment groups, the estimated marginal means of the treatment groups were carried out, and the result is presented in Table 2.

Table 2. Estimated Marginal Means for Post-Attitude by Treatment and Control Group

Treatment	Mean	Std. Error
Service Learning strategy (SLS)	72.82	0.46
Collaborative Learning Strategy (CLS)	68.96	0.49
Conventional Strategy (C.S.)	44.74	0.39

Table 2 showed that students in Service Learning strategy (SLS) treatment group 1 had the highest adjusted post-attitudinal mean score in environmental attitude (72.82), followed by Collaborative Learning Strategy (CLS) treatment group 2 (68.96). In contrast, the Conventional Strategy (C.S.) control group had the least adjusted post-attitudinal mean score (44.74). This order can be represented as SLS> CLS > C.S.

Table 3. Bonferroni Post-hoc Analysis of Post-Attitude by Treatment and Control Group

Treatment	Mean	SLS	CLS	CS
Service Learning strategy (SLS)	72.82		*	*
Collaborative Learning Strategy (CLS)	68.96	*		*
Conventional Strategy (C.S.)	44.74	*	*	

Table 3 indicated that the post-attitudinal mean score of students exposed to the Service Learning strategy (SLS) was significantly different from their counterparts taught using Collaborative Learning Strategy (CLS) and Conventional Strategy (C.S.) in environmental attitude. Furthermore, the post-achievement of students taught using collaborative learning strategy significantly differed from their counterparts exposed to conventional strategy. This implies that the significant difference revealed by the ANCOVA resulted from the difference between the treatment groups (service and collaborative learning strategies) and the control group (conventional strategy) and between the two treatment groups regarding students' post-attitudinal mean scores in environmental attitude. Ho2: No significant main effect of gender (male/female) on junior secondary school students environmental attitude.

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Table 1 shows that there was no significant main effect of gender (male/female) on junior secondary school students environmental attitude ($F(1,582) = 0.50$; $p>.05$, partial $\eta 2 = 0.001$). Hence, hypothesis 2 was not rejected. This implies that gender (male/female) did not affect junior secondary school students' environmental attitudes. Ho3: No significant effect of school location (urban/rural) on junior secondary school students' environmental attitude.

Table 1 indicated that there was a significant main effect of school location (urban/rural) on junior secondary school students environmental attitude ($F(1,582) = 9.54$; $p<0.05$, partial $\eta 2 = 0.016$). The effect is 1.6%. This means that a 1.6% variation in junior secondary school students' environmental attitudes was accounted for by school location. Thus, hypothesis 3 was rejected. In order to determine the magnitude of the significant main effect across school locations, the estimated marginal means of the treatment groups were carried out, and the result is presented in Table 4.

Table 4. Estimated Marginal Means for Post-Attitude by School Location

School location	Mean	Std. Error
Urban	62.97	0.26
Rural	61.38	0.44

Table 4 shows that urban students had the higher adjusted post-attitudinal mean score in environmental attitude (62.97), while their rural counterparts had the least adjusted post-attitudinal mean score (61.38). Ho4: There is no significant interaction effect of treatment and gender on junior secondary school students environmental attitudes.

Table 1 shows that there was no significant interaction effect of treatment and gender on junior secondary school students environmental attitude ($F(2,582) = 0.30$; $p>.05$, partial $\eta 2 = 0.001$). Hence, hypothesis 4 was not rejected. This means treatment and gender did not affect junior secondary school students' environmental attitudes. Ho5: There is no significant interaction effect of treatment and school location on junior secondary school students environmental attitude.

Table 1 shows that there is a significant interaction effect of treatment and school location on junior secondary school students environmental attitude ($F(2,582) = 5.48$, $p<.05$, partial $\eta 2 = 0.018$). The effect size is 1.8%. This indicates that a 1.8% variation in junior secondary school students' environmental attitudes accounted for the interaction of treatment and school location. Thus, hypothesis 5 was rejected. This implies that school location affected junior secondary school students' environmental attitudes. In order to explore the interaction effect, Figure 1 presents the interaction in a line graph.

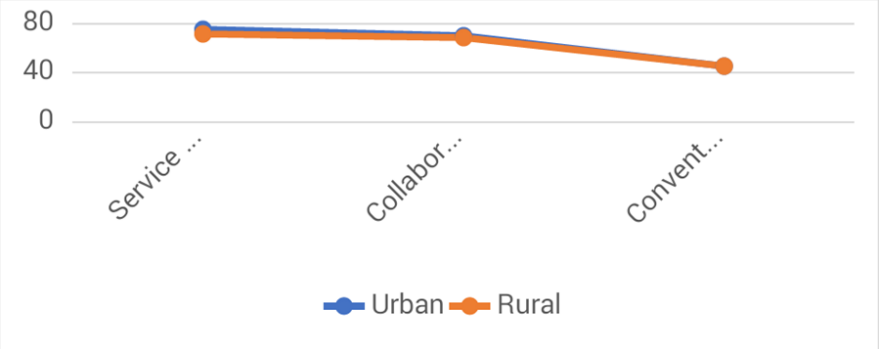

Figure 1. Treatment and School Location on Students' Environmental Attitude

Figure 1 shows that urban students exposed to the service learning strategy had the highest environmental attitude mean score (74.73), followed by rural students in the service learning

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strategy (70.92), urban students in the collaborative learning strategy (69.51), rural students in collaborative learning strategy (68.41), rural students in conventional strategy (44.82). In contrast, urban students in a conventional strategy had the least attitudinal mean score in environmental attitude (44.67). The interaction is di-ordinal. This implies that, based on the school location, it differs from the same group of students across the strategy with better environmental attitude mean scores. Ho6: There is no significant interaction effect of gender and school location on junior secondary school students environmental attitude.

Table 1 shows that there was no significant interaction effect of gender and school location on junior secondary school students environmental attitude ($F(1,582) = 2.29$; $p>.05$, partial $\eta 2 = 0.004$). Thus, hypothesis 6 was not rejected. This indicates that gender and school location did not affect junior secondary school students' environmental attitudes. Ho7: There is no significant interaction effect of treatment, gender, and school location on junior secondary school students' environmental attitude

Table 1 shows that there was no significant interaction effect of treatment, gender, and school location on junior secondary school students environmental attitude ($F(2,582) = 2.03$; $p>.05$, partial $\eta 2 = 0.007$). Thus, hypothesis 7 was not rejected. This means treatment, gender, and school location did not affect junior secondary school students' environmental attitudes.

Main Effect of Treatment on Students' Environmental Attitude

The results revealed that there was a significant main effect of treatment (service and collaborative learning strategies) on junior secondary school students environmental attitude ($F(2,582) = 1317.79$; $p<0.05$, partial $\eta 2 = 0.819$). The effect was 81.9%. This means the treatment accounted for 81.9% variation in junior secondary school students' environmental attitudes. This may not be unconnected to the fact that both strategies are participatory and enable the students to reflect on their choices. Alabi et al. (2019) and Oladapo (2012) opined that environmental concerns are made only when people see themselves as an integral part of nature. Macionis (2007) states that the lack of favorable attitudes resulted from individualistic postures adopted as people put themselves first over communal and environmental goals.

Welch found that education had a significant influence on environmental attitudes. A study by United Nations Environment Programme (UNEP, 2014) investigated environmental attitudes' cognitive and affective bases to indicate that what people feel and believe about the environment determines their attitudes. Attitude scores also show that cooperative learning experiences benefit intergroup relations. Ajitoni (2011) notes that students exposed to such learning experiences displayed greater knowledge and attitude scores and better out-of-class inter-ethnic interaction than those exposed to conventional classroom practices. Similarly, the findings showed a positive change in attitude towards fellow students from similar and different cultural groups and teachers from different social classes, displayed by students in the cooperative learning group. The findings also support the findings of Ogunbiyi (2006), who found that value clarification strategy had a significant main effect on pre-service teachers' attitudes to environmental education.

These findings are in tandem with the explanation by Kitayama and Tompson (2015) that cognitive dissonance theory provides a framework through which we can conceptualize cognition motivation and that motivated cognition produces desirable social behaviors. This study's findings have established that the learning strategies used in this study could influence the learners' change of attitude toward environmental issues (Yahya & Sukmayadi, 2020). The learning strategies assisted in motivating learner cognition by making them key participants in the knowledge generation process and, eventually, in developing a positive attitude.

This research work implies that the students under this learning strategy were able to acquire the values and traits of group roles like a positive use of knowledge, patience, consideration of

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others, cooperation, love, unity, and loyalty by students. The participatory approach to learning assisted the students in acquiring values and traits that will no doubt develop their interest in protecting their environment and working together as a team in protecting biodiversity.

The study also revealed a need to incorporate service learning and collaborative learning strategies in our educational system as strategies that could help improve students' environmental knowledge and attitude. Teachers must be trained and retrained for professional development on using active and participatory-based learning strategies in teaching and learning environmental concepts. There should be a nexus between what is learned in the classroom and real-life situations.

CONCLUSION

This study would make the students move from passive to active citizens with positive attitudes toward the physical environment. It would also awaken their consciousness that they can change their environment, society, and the world. Furthermore, the students would understand the nexus between human action and the consequences of such action on the physical environment. The findings of this study would help society at large, as it will enable the school to emphasize participatory learning more, improving the knowledge of the coming generation about their environment. It would also inculcate the right attitude into them for the greater benefit of their society, thus raising a generation of humans committed to sustainable development. Service learning and collaborative learning strategies were established to be very effective in enhancing the positive environmental attitude of students towards the environment.

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