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Gender Dimensions and the Inter-Relationship of Environmental Variables among Secondary School Students in Edo South Senatorial District, Nigeria

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Abstract. This study investigated gender dimensions and the inter-relationship of environmental variables among secondary school students in Edo South Senatorial District, Nigeria. The study was guided by four hypotheses, tested at the 0.05 level of significance. A descriptive correlational survey design was adopted. The population comprised 21,222 Senior Secondary School students, from which a sample of 1,202 students was selected using a simple random sampling technique. Two instruments were used: an achievement test and a questionnaire. Descriptive statistics, including frequency counts and percentages, were employed, while Pearson Product Moment Correlation and Wilks' Lambda statistics were used to test the hypotheses. The hypotheses were rejected, indicating significant gender differences and relationship among students' environmental variables. The study concluded that gender influences secondary school students' environmental knowledge, attitude, and practices in Nigeria. The study therefore concludes that gender-inclusive teaching strategies such as hands-on projects, debates, real-world applications should be used in teaching students; and schools should encourage role models from all genders in environmental leadership.

Keywords: Gender dimensions, Environmental variables, Students, Nigeria

1. Introduction

Environmental sustainability is a critical concern in contemporary society. Students, as future custodians of the planet, are vital targets for environmental education initiatives. Effective environmental education is expected to enhance knowledge, shape attitudes, and promote pro-environmental behavior (UNESCO, 2017). However, the linkage between these components is not always straightforward. This paper aims to explore how students' environmental knowledge and attitudes relate to their environmentally friendly behaviors.

Three interrelated components define the framework for environmental variables and these are: environmental knowledge which implies the understanding of ecological systems, environmental issues, and sustainable practices; environmental attitudes which involves beliefs, feelings, and values regarding environmental protection; and environmental friendliness which involves the actions taken by individuals that benefit or reduce harm to the environment, such as recycling, water conservation, and energy efficiency. This framework is supported by the Knowledge-Attitude-Behavior (KAB) model (Kollmuss & Agyeman, 2002) and the Theory of Planned Behavior (Ajzen, 1991), both of which posit that behavior is influenced by both knowledge and attitude, alongside factors such as perceived control and social norms.

1.1 Relationship between Environmental Knowledge and Attitude

Studies suggest a positive correlation between environmental knowledge and environmental attitudes. Students with higher environmental knowledge are more likely to express concern and moral responsibility toward the environment (Bradley et al., 1999). However, knowledge alone does not always foster pro-environmental attitudes, especially when it is abstract or unconnected to students' lived experiences (Esa, 2010). Additionally, emotions and personal relevance play a significant role. For instance, students may understand the science behind deforestation but not feel emotionally engaged unless they experience or visualize its impacts (Kals et al., 1999).

1.2 Relationship between Attitude and Environmental Friendliness

Environmental attitudes are widely regarded as predictors of environmentally friendly behavior (Steg & Vlek, 2009). Students who value and care for nature are more likely to engage in sustainable actions. However, the attitude-behavior gap remains a persistent issue. Despite positive attitudes, many students do not consistently act in environmentally responsible ways (Kollmuss & Agyeman, 2002). Barriers to environmental attitude include lack of enabling infrastructure (e.g., access to recycling facilities), low perceived self-efficacy (believing one's actions make little difference), and peer influence and social norms. this suggests that while attitude is necessary, it is not sufficient without supportive environments and empowerment strategies (Bamberg & Möser, 2007).

1.3 Relationship between Knowledge and Environmental Friendliness

Environmental knowledge is positively associated with pro-environmental behavior, both directly and indirectly through attitudes. Students equipped with factual understanding are more likely to participate in environmentally friendly actions such as energy saving or proper waste disposal (Esa, 2010). However, as with attitudes, the presence of knowledge does not always lead to behavioral change. Rickinson (2001) found that although students often possess basic environmental knowledge, they may lack opportunities or motivation to apply it. Educational programmes that combine theoretical knowledge with practical engagement—such as school clean-up projects or eco-clubs—tend to yield better behavioral outcomes.

1.4 Gender and Environmental Friendliness

Gender influences how individuals perceive and respond to environmental issues. Research indicates that women are generally more environmentally conscious and supportive of eco-friendly practices than men (Zelezny, Chua, & Aldrich, 2000). This tendency is often attributed to traditional gender roles, where women are more involved in household responsibilities and community welfare, areas closely tied to sustainability decisions such as water use, waste management, and energy consumption (OECD, 2008). Women are also more vulnerable to the impacts of environmental degradation, especially in developing countries where they rely heavily on natural resources for food, water, and fuel (UN Women, 2014). This heightened exposure has led many women to become leaders in environmental activism and sustainable development initiatives, particularly at the grassroots level. Including gender perspectives in environmental policies can enhance the effectiveness and fairness of sustainability efforts. Gender-sensitive approaches ensure that both women and men have equal opportunities to contribute to and benefit from environmental protection strategies (UNEP, 2016). Therefore, integrating gender equity into environmental planning is essential for creating resilient and inclusive solutions to global ecological challenges.

2. Conceptual Framework

The following schema is used to explain the relationships among the relevant variables of the study:

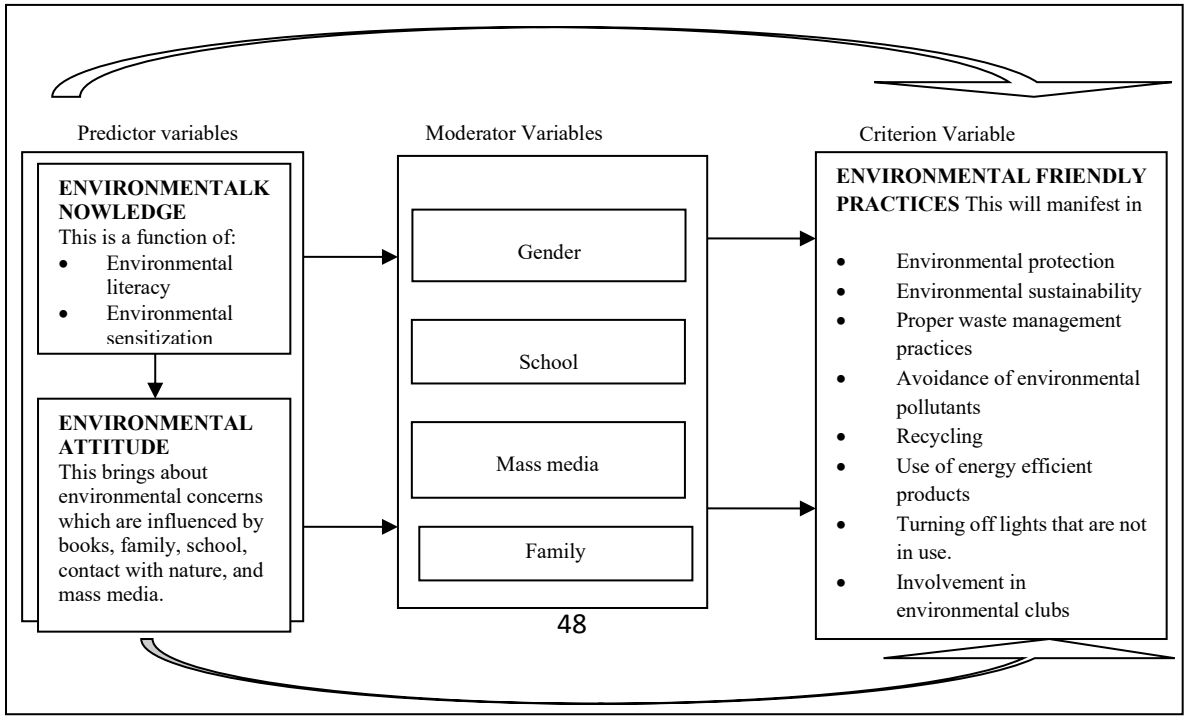

Figure 1: *Conceptual Framework Showing the Relationship among Environmental Knowledge, Attitude and Friendly practices (Source: Odia, 2019)*

From the conceptual framework, it can be deduced that environmental knowledge is gotten from environmental literacy and sensitisation. Environmental knowledge is linked to environmental attitude. Adequate knowledge about the environmental will translate into positive attitudinal disposition to issues affecting the environment. Factors influencing an individual's environmental knowledge are also those that influence his/her environmental attitude. Environmental knowledge and attitude can predict environmental friendly practices. Other factors that could influence environmental friendly practices include gender, school, mass media, and family and so on.

The study aimed at finding out gender differences and the interrelationship of environmental variables among secondary school students in Edo South Senatorial District, Nigeria. Specifically, this study sought to:

- examine the relationship between environmental knowledge and friendly practices among secondary school students in Edo South Senatorial District, Nigeria;
- examine the relationship between environmental attitude and friendly practices among secondary school students in Edo South Senatorial District, Nigeria;
- establish the relationship between environmental knowledge and attitude among secondary school students in Edo South Senatorial District, Nigeria; and,
- find out if there is significant gender difference among students' environmental variables in Edo South Senatorial District, Nigeria.

2.2 Hypotheses

- There is no significant relationship between environmental knowledge and friendly practices among secondary school students in Edo South Senatorial District, Nigeria.
- There is no significant relationship between environmental attitude and friendly practices among secondary school students in Edo South Senatorial District, Nigeria.
- There is no significant relationship between environmental knowledge and attitude among secondary school students in Edo South Senatorial District, Nigeria.
- There is no significant gender difference among students' environmental variables in Edo South Senatorial District, Nigeria.

3. Methods

The study adopted the descriptive survey research design of correlational type. The population comprised 21,222 students. The sample size was 1,202 students. The multi-stage sampling procedure was used for selecting the sample. Firstly, three local government areas in the Edo South senatorial district were purposively selected for the study. Secondly, all senior secondary schools in the three selected local government areas were listed and six public co-educational and six private senior secondary schools were selected from each of the three local government areas. Thus, 12 schools were selected from each local government area to give a total of thirty-six (36) schools; lastly, 34 students were selected from each school. The sample consisted of 564 boys and 638 girls. Two instruments were used for data collection - an achievement test and a questionnaire. Data collected for the study was analysed using descriptive statistics such as frequency counts, simple percentages, mean, and standard deviation; hypotheses were tested using Pearson Product Moment Correlation and Wilks' Lambda statistics. All hypotheses were tested at 0.05 alpha level.

Results

Hypothesis 1: *There is no significant relationship between environmental knowledge and friendly practices among secondary school students in Edo South Senatorial District.*

Table1: Relationship between Environmental Knowledge and Friendly Practices among Students

		KNOWLEDGE	PRACTICES
KNOWLEDGE	Pearson Correlation (r)	1	0.375
	Sig. (2-tailed)		0.000
	N	1202	1202

$\alpha = 0.05$

Results in Table 1 showed that the correlation coefficient (r) between environmental knowledge and friendly practices among secondary school students is r = 0.375 with a p-value of 0.000 which is significant at 0.05 alpha level. This result depicts a low but significantly positive relationship between environmental knowledge and friendly practices among secondary school students in Edo South Senatorial District and as such the null hypothesis is rejected.

Hypothesis 2: *There is no significant relationship between environmental attitude and friendly practices among secondary school students in Edo South Senatorial District*

Table 2: Relationship between Environmental Attitude and Friendly Practices among Students

		ATTITUDE	PRACTICES
ATTITUDE	Pearson Correlation (r)	1	0.709
	Sig. (2-tailed)		0.000
	N	1202	1202

$\alpha = 0.05$

Table 2 showed that the correlation coefficient between environmental attitude and friendly practices among secondary school students in Edo South Senatorial District is r = 0.709 with a p-value of 0.000 which is significant at 0.05 alpha level. This shows that there is a high and significantly positive relationship between environmental attitude and friendly practices, and as such the null hypothesis is rejected.

Hypothesis 3: *There is no significant relationship between environmental knowledge and attitude among secondary school students in Edo South Senatorial District*.

Table 3: Relationship between Environmental Knowledge and Attitude among Students

		KNOWLEDGE	ATTITUDE
KNOWLEDGE	Pearson Correlation (r)	1	0.515
	Sig. (2-tailed)		0.000
	N	1202	1202

$\alpha = 0.05$

Table 3 showed that the correlation coefficient between environmental knowledge and attitude among secondary school students in Edo South Senatorial District is r = 0.515 with a p-value of 0.000 which is significant at 0.05 alpha level. This shows that there is a significant and positive relationship between environmental knowledge and attitude among students. Thus, hypothesis 3 is rejected.

Hypothesis 4: There is no significant gender difference among students' environmental variables in Edo South Senatorial District

Table 4: Mean, Standard Deviation and Multivariate Analysis of Differences in Environmental Knowledge, Attitude and Friendly Practices among Students based on Gender

Variable	**Gender**	**N**	**Mean**	**Std Dev.**	**df**	**Wilks' Lambda (F)**	**Sig.**
KNOWLEDGE	Male	564	12.03	3.94			
	Female	638	12.28	3.40			
	Total	1202	12.16	3.66			
ATTITUDE	Male	564	55.46	9.13			
	Female	638	56.36	7.50	1200	3.008	0.029
	Total	1202	55.94	8.31			
PRACTICES	Male	564	57.35	10.11			
	Female	638	58.73	7.97			
	Total	1202	58.08	9.06			

Table 4 showed that there are 564 boys and 638 girls. With regards to environmental knowledge, the mean score for boys is 12.03 while that of girls is 12.28 with a standard deviation of 3.94 for boys and 3.40 for girls. The mean score of girls is 0.25 higher than that of the boys. With regards to environmental attitude, the mean score for boys is 55.46 while that of girls is 56.36. Their standard deviations are 9.13 and 7.50 respectively. It can be said therefore that girls have higher mean score than the boys; and girls are more positively disposed in their environmental attitude than boys. With regards to environmental friendly practices, the mean score of boys is 57.35 while that of girls is 58.73. The standard deviation for boys is

10.11 while that of girls is 7.97. It is evident again that girls have a higher mean score than boys.

The hypothesis was tested to find out significant gender difference in environmental knowledge, attitude and friendly practices among students using the Wilks' Lambda (F) test, the results showed that F = 3.008 with a p-value of 0.029 and a degree of freedom (df) of 1200 at 0.05 alpha level. These results showed that there is a significant difference in students' environmental knowledge, attitude and friendly practices based on gender. Further analysis shows that this difference lies in their involvement in environmental friendly practices. As such the null hypothesis is rejected.

4. Discussions

Findings revealed that there was a low but significant and positive relationship between environmental knowledge and friendliness. It is expected that environmental knowledge would be related to environmental practices. The findings led to the conclusion that environmental knowledge is significantly related to friendly practices but environmental knowledge should not be used to predict environmental friendly practices. This finding is in consonance with the findings of the study done by Vincente-Molina et al (2013). The results of their research showed that environmental knowledge has a significant impact on pro-environmental behaviour. When Environmental Education-related theme is well-taught to students, it would have a significant impact on the environmental practices of the students as can be seen from the findings of this study.

Findings further revealed that there was a high and significantly positive relationship between environmental attitude and friendly practices. When environmental attitude is positive, there is the tendency for it to impact significantly on environmental practices. These results led to the conclusion that environmental attitude is significantly related to friendly practices and as such should be used as better predictor of environmental friendliness. These findings corroborate the findings of the study done by Tuncer et al (2009) in Turkey that attitude is one of the best predictors of responsible environmental behaviour while it contradicts that of Vicente-Molina et al (2013) which revealed that attitude is not a significant variable in explaining pro-environmental behaviour.

Findings also revealed that there is a positive and significant relationship between environmental knowledge and attitude and that environmental knowledge can be used to predict environmental attitude. This is in consonance with the findings of the study done by Ifegbesan (2010) in Ogun State in which he concluded that students' environmental knowledge impacts on their environmental attitude; but it contradicts the findings from the cross-cultural study done by DeChano (2006) in Chile, England, Switzerland and United States in which he found no significant relationship between environmental knowledge and environmental attitude.

Findings showed that there was a significant gender difference in environmental knowledge, attitude and friendly practices among secondary school students in Edo South Senatorial District; this difference lies in their environmental practices. When their means were compared, it was found that the mean score of female students was higher than that of the male students in terms of their involvement in environment-friendly activities. This result is expected because of the influence of socialisation process which tends to favour female gender above the male gender in terms of role differentiation. Traditionally, females are made to do most house chores like sweeping, cleaning, and general cleanliness while the males are more often than not exempted from such chores. This role that is associated with the female gender impacts on their environmental attitude and practices of environmental friendliness and this definitely will bring about a difference between the male and female gender with regards to their involvement in environmental friendly practices. This finding is in consonance with the findings of the studies carried out by Zelezny et al (2000) Sharma and Verma (2013) and Ifegbesan (2010) that gender is a significant predictor of pro-environmental behaviour or friendliness. However, the finding disagrees with the finding of the study done by Van et al (2007) in which it was observed that gender is not a significant predictor of environmental concern and attitude.

5. Conclusion

Gender influences secondary school students' environmental knowledge, attitude, and practices in Nigeria, with girls notably ahead in all three domains. Attitudes serve as strong predictors of environmental practice. Environmental knowledge should not be used to predict environmental practices since the relationship between the two variables is low. The interrelationship between knowledge, attitudes, and friendly practices supports theory-based environmental education. Tailored interventions that consider gendered socialization and cultural expectations can increase engagement and sustainability.

6. Recommendations

To reduce gender disparities and engage all students, schools should frame environmental actions in diverse ways – moral, scientific, technological, and adventure-based; use gender-inclusive teaching strategies such as hands-on projects, debates, real-world applications; encourage role models from all genders in environmental leadership; and environmental themes should be infused across subjects in ways that appeal to both genders with emphasis on scientific and moral perspectives.

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