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**PRE-SERVICE CHEMISTRY TEACHERS'  
KNOWLEDGE OF GREEN CHEMISTRY  
PRINCIPLES AND ATTITUDE AS  
DETERMINANT OF THEIR BEHAVIOUR  
TOWARDS ENVIRONMENTAL  
SUSTAINABILITY**

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## Pre-Service Chemistry Teachers' Knowledge of Green Chemistry Principles and Attitude as Determinant of Their Behaviour Towards Environmental Sustainability

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### Abstract

*The attitude and behaviour of individual towards the environment today would determine how the environment will respond to us in the future. Hence this study sought to examine pre-service chemistry teachers' knowledge of green chemistry principles and attitude towards environmental sustainability. The research adopted the descriptive survey of the correlation type, and 750 pre-service teachers were randomly selected for the study. A validated questionnaire was distributed to 815 pre-service teachers in six federal Schools comprises of University and Colleges of Education in Nigeria with 750 duly filled and returned. Mean, Standard Deviation, Multiple Regression, were used for data analysis. Findings revealed that pre-service teachers in the universities possessed low knowledge of green chemistry principle, it was also discovered that the pre-service teachers had favourable attitude and behavioural intention to act in a manner that promote environmental sustainability. However, it was discovered that the pre-service teacher's behavioural intention does not translate to their actual behaviour towards the environment. The study found relative significant contributions of knowledge was ( $\beta=.190$ ;  $t=1.212$ ;  $p<0.05$ ) and attitude was ( $\beta=.233$ ;  $t=1.523$ ;  $p<0.05$ ) to the prediction of pre-service teachers' behaviour towards promoting environmental sustainability in Nigeria. The study therefore recommended among others that the schools where teachers are trained for the future should restructure their curriculum to incorporate sustainable development concepts that inform the trainee teachers of the significant roles they can play in achieving the sustainable development goals and most importantly promote environmental culture in their classroom.*

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### Introduction

The term Sustainable development was defined as a "development that meets the needs of the present without compromising the ability of future generations to meet their own needs" (UN, 1987). In practical term, sustainable development means, before starting any economically profitable activities, the consequences of the activities on human and environment should be considered (Karpudewan, Zurida, Morita, 2009). This definition implies the need to strike a balance between current economic activities and social development, on the one hand, and environmental protection and the preservation of cultural diversity through education for future generations, on the other. Sustainable development lies on three pillars, which are economic, society and environment. These pillars define what sustainable development is and how Government, private bodies and individuals can work in order to achieve sustainable development goals, it also implies that every human on the surface of the earth should possess good understanding of the interrelationship among the three pillars, and work in a way that we can collectively achieve it.

In an attempt to popularise the sustainable development and its different strategic components, the United Nations Conference on Environment and Development (UNCED) in 1992 suggested Education as a tool to actualised sustainable development because they saw that Education for Sustainable Development is a skill-oriented educational paradigm aiming on the preparation of young people to become responsible future citizens (Stuckey, Hofstein, Mamlok-Naaman and Eilks, 2013). The sustainability of the future hinges on decision making, decision on resources consumption, environmental protection, and the search for new and alternative technologies for preservation of the current resources having the future in mind. The resources everybody must be concerned and preserve for the future is mainly the environment, which is the totality of our existence both biotic and abiotic. The care and sustainability of this environment hinges on the attitude, behaviour and decisions of the citizens. Many of these decisions are related to chemistry and chemical industries (Karpudewan, Zurida, Morita, 2009; Bradley, 2005). Ten (10) out of the seventeen (17) sustainable development goals agreed on by the United Nation in 2015 were linked to chemistry by the Global Chemicals Outlook II published by the United Nations Environmental Program (UNEP) (UNEP, 2019). This is to show that sustainable practices in chemistry is central

to achieving environmental sustainability, and that there is need to reform chemistry curriculum in order to incorporate green chemistry concepts and practices that focus on sustainability.

Regular chemistry curriculum development and teacher education is needed to develop general and domain-specific knowledge and skills in the learners that enable the learners in the future to assess and make decision about chemistry based products, technologies and processes that are environmentally friendly (Burmeister et al., 2012). This implies that all students that pass through school chemistry curriculum should acquire skills that will enable them to make sound decision in the wider society and in the field of science and technology in particular that will promote environmental sustainability irrespective of whether they later will embark in a career in science and technology or not, because all of them will be asked to act as responsible citizens in the future and to contribute to societal decision making Hofstein, Eilks and Bybee (2011) cited in (Manlok-Naaman and Eilks, 2017). Chemistry if its contents are well selected and designed to reflect the future has the potential to prepare pre-service teachers and their future students to become a responsible citizen that can make sustainable environmental decisions in the society. According to Braun et al (2006) reforming chemistry curriculum to include green chemistry concepts provide a connection between the material thought in class and the students' everyday environment. Green chemistry makes use of locally made, environmental friendly materials as an alternative to consumables in the laboratory that pollute the environment when accident occurs or when it is not properly disposed by students in the laboratories and personnel in the industries. When students are exposed to this kind of learning environment, it offers them the platform to apply what they learn to real life situation in the environment. According to Haack et al (2005) cited in Karpudewan and Zurida (2009), Green chemistry allows the students and teachers to ethically address the environmental issues faced by the local and global community. The concept of Green chemistry is a student-centered approach which brings about deep learning. Teaching and learning of green chemistry enables development and acquisition of higher order cognitive skills such as problem solving skill and decision making ability (Anne, 2007). Green chemistry came as the solution to the problem of waste production by encouraging chemical industries to make their reactions and products environmentally benign (Agbayewa, Oloruntegbe and Alake, 2013). The implementation of green chemistry is guided with the incorporation of green chemistry principles proposed by Anastas and Wagner (1998). Green chemistry experiments is highly feasible as these experiments are to be integrated into the existing curriculum, meaning that, the whole structure of the curriculum is not changed but the existing chemistry experiments would be presented in greener manner that promote the sustainability of the environment.

Despite the importance of green chemistry to the actualization of environmental sustainability, it has been observed that the teaching of chemistry in Nigeria is being plague by lack of knowledge, awareness of green chemistry concepts in chemistry curriculum and inability to make chemistry students connects many chemistry concepts to their environment. Research have shown that pre-service teachers and their instructors often have insufficient knowledge and skills in sustainable development and the roles chemistry plays in promoting environmental sustainable behaviour (Burmeister & Eilks, 2013; Juntunen & Aksela, 2014). In order to prepare the pre-service teachers, the teacher's training school curriculum needs to be modified to include sustainable concepts so that they can equip them to become a responsible teacher that would make a suitable decision, imbibe good behaviour and be a better member of the society. The Nigerian Ministry of Education has done a lot to develop a curriculum for Environmental Education and has implemented various teaching and learning strategies to enhance environmental awareness and internalise values on the importance of environmental protection, but there is no trace that the system supports innovations and recognise chemistry as a subject that can help the environment if it is well practiced. In countries like Germany, Malaysia, Brazil and United States, a lot of efforts have been put in place to ensure the incorporation of green chemistry concepts in their school curriculum in order to promote the sustainability of their environment and encourage their citizens to imbibe pro-environmental behaviours. The common ground among these countries is that they saw green chemistry as a common research program resulting from interdisciplinary cooperation of university teams, independent research groups, industry, scientific societies and governmental agencies, with each having their own programs devoted to decreasing pollution (Wardencki, Curyo and Namieoenik, 2005). The university teams tend to prepare the future teachers to teach the youngster in the secondary schools so as to catch them young. The benefits of catching them young as opined by Agbayewa, Oloruntegbe and Alake (2013) is to make the youngsters imbibe environmental consciousness and be responsible for their actions towards the environment early in life. These youngsters could grow to become chemists who will make sure the 12 principles of green chemistry are adopted in the industries they find themselves working.

Behavioural intention is the wiliness of the individual to act in a way that promotes the safety of the environment. Behavioural intention is the readiness to behave in a manner that preserves the environment for the future Steg and Vlek (2009). Gronhoj and Thogersen (2012) state that behavioural intention in pre-service teachers is highly influenced by awareness, knowledge, attitude and moral obligation toward change. This implied that an individual

obligation to act in a way that is environmentally friendly should be brought to focus in research. According to Chen, Yu, Liaw and Huang (2010), environmentally responsible behaviors have not been reflected in the society as expected. This may be an issue worthy of shifting attention to in order to diagnose the reason why this responsible behaviour has not been imbibed by students and the people in the society.

Based on this, the pre-service teachers' knowledge and factors responsible for their actual behaviour towards the environment such as knowledge and attitude towards environmental sustainability are investigated.

### Purpose of the Study

The study investigated chemistry pre-service teachers' knowledge of green chemistry principles and behavioural intention towards environmental sustainability. Specifically, the study examined:

1. the pre-service chemistry teachers' knowledge of green chemistry principles.
2. the pre-service chemistry teachers' attitude towards environmental sustainability.
3. the pre-service teachers' behaviour (behavioural intention and actual behaviour) towards environmental sustainability.
4. check the joint and relative contributions of knowledge of green chemistry principles and attitude to the prediction of pre-service teachers' actual behaviour towards environmental sustainability.

### Research Questions

The following research questions were posed for this study

1. What is pre-service chemistry teachers' knowledge of green chemistry principles?
2. What is pre-service chemistry teachers' attitude towards environmental sustainability?
3. What is pre-service teachers' behaviour (behavioural intention and actual behaviour) towards environmental sustainability?
4. What are the joint and relative contributions of knowledge of green chemistry principles, and attitude to the prediction of pre-service teachers' behaviour towards environmental sustainability?

### Methodology

**Research Design:** The design of the study was a descriptive survey of the correlational type. It is a quantitative research that involves two or more variables from the same group of participant. The design also shows whether an increase or decrease in the independent variables (knowledge of green chemistry principles and attitude towards environmental sustainability) affects the dependent variable (behavioural intention and actual behaviour) towards environmental sustainability.

**Population, Sample and Sampling Technique:** The population for this study consisted of all the pre-service teachers in federal universities in South-South geo-political Zone of Nigeria. The sample size was 750 pre-service teachers offering chemistry education as a course in the university and chemistry/Biology or physics in college of Education. Purposive sampling technique was used to select South-South Geo-Political Zone out of the six Geo-Political Zones in Nigeria because most of the states that constitute this Zone are industrial based and mostly oil producing states. From this zone three states were randomly selected as displayed in table 1 below. Two public schools: one university and the other college of education where teachers are trained were randomly selected from each of the state. Finally, the instrument was administered to students in the department considered for the study with the aid of research assistant in each of this school. The table below revealed the states, schools and number of students selected.

Table 1: *Distribution of State, Schools and number of Students selected from each*

STATE	SCHOOLS	NUMBERS OF STUDENTS
Bayelsa	Federal University, Otuake	145
	IJBCEs	112
Rivers	University of Port Harcourt	162
	Federal College of Edu, Omoku	120
Delta	Delta State University	143
	Fed. College of Edu. Asaba	68

**Research Instrument:** The research instrument used to gather data for the study was a questionnaire adapted from Muderrisoolu and Altanlar (2011). The instrument consisted of two sections; A and B. Section A dealt with demographic variables of respondents such as gender and school. Section B had sub-sections on knowledge,

attitude, behavioural intention and actual behaviour. The response categories of the items on Section B were based on five-point rating scale ranging (SA) strongly agree, (MA) moderately agree, (U) Undecided, (MD) moderately disagree, (SD) strongly disagree for attitude, behavioural intention and actual behaviour sub-sections while the response type for the knowledge sub-section was based on multiple response type. The response categories were assigned numerical values of 5, 4, 3, 2 and 1. The internal consistency of the instrument was determined using Cronbach Alpha and kuder-Richardson. The reliability coefficients established for the different section of the questionnaire were presented in table 2 below:

Table 2

*Kuder Richardson (KR) and Cronbach Alpha Result of the different Dimensions of the Questionnaire*

Dimensions	Number of items	Cronbach's Alpha/KR
Attitude towards	10	.77
Behavioural Intention	6	.71
Actual Behaviour	10	.79
Knowledge	10	.86

**Procedure for Data Collection:** The instrument was administered to the respondents through personal contacts by the researchers and other research assistants from each of the selected schools. Out of 815 questionnaires administered, 750 were duly filled and returned. This represented 92.02% rate of return. The respondents' responses were regarded as reflecting their knowledge attitude and behaviour towards environmental sustainability. It was assumed that the responses obtained were sincere.

**Data Analysis Technique:** Mean, standard deviations, percentages, and multiple regression analysis were used to answer research question. In determining pre-service teachers' behavioural intention and actual behaviour, any item with a mean of 3.00 and above was considered agreed upon while less than 3.00 was considered disagreed upon for all the items.

## Results

### Respondents' Demographic Information

*Table 3: Sample Characteristics*

Gender	N	%
Male	343	45.7
Female	407	54.3
<b>Total</b>	<b>750</b>	<b>100</b>
School	N	%
University	512	68.3
College	238	31.7
<b>Total</b>	<b>750</b>	<b>100</b>

Table 3 shows that 343 (45.7%) of the respondents were male, while 407 (54.3%) of the respondents were female. This implies that female pre-service teachers participated most in this study. More so, 512 (68.3%) of the respondents were from the University, while 238 (31.7%) were from the Colleges Education. This implies that most of the participants in the study are in the Faculty of Education in the University.

**Research Question 1:** What is the level of pre-service teachers' knowledge of green chemistry principles?

*Table 4: Level of pre-service teachers' knowledge of green chemistry principles*

Score	Frequency	Percentage	Mean	Std. Deviation
0-9	91	12.00		
10-19	167	22.30		
20-29	152	20.30		
30-39	147	19.60		
40-49	112	15.00		
50-59	32	4.30	38.20	15.43
60-69	30	4.00		
70-79	7	0.90		
80-89	2	0.30		
90-100	10	1.30		
<b>Total</b>	<b>750</b>	<b>100</b>		

N = 750, Highest Mark Obtainable = 100

Decision Value: Low 0.00-39.00. Average 40.00-69.00, High 70.00-100.00.

Table 4 shows the level of pre-service teachers' knowledge of green chemistry principles. The result from the above table shows that 12.0% of the pre-service teachers scored 0-9, 22.3% scored 10-19, 20.3% scored 20-29, 19.6% scored 30-39, 15.0% scored 40-49, 4.3% scored 50-59, 4.0% scored 60-69, 0.9% scored 70-79, 0.3% scored 80-89, while the remaining pre-service teachers who constituted 1.3% scored 90-100. The overall mean score of the pre-service teachers is 38.20 (a value which falls within the range of decision value for low) with standard deviation value of 15.43. Based on this result and in line with the decision value, it can be inferred that the level of pre-service teachers' knowledge of green chemistry principle is low.

**Research Question 2:** What is the level of pre-service teachers' attitude towards environmental sustainability?

Table 5: *Pre-service teachers' attitude towards environmental sustainability*

Items	M	SD
Humans are severely abusing the environment	3.45	.51
The balance of nature is very delicate and easily upset	3.39	.47
The balance of nature is strong enough to cope with the impacts of modern industrial Nations	2.99	.51
Humans will eventually learn enough about how nature works to be able to control it	4.20	.75
The so-called ecological crisis facing humankind has been greatly exaggerated	2.45	.51
Humans have the right to modify the natural environment to suit their needs	1.35	.68
Plants and animals have as much right as humans to exist	3.90	.70
Despite our special abilities humans are still subject to the laws of nature	4.80	.81
If things continue on their present course will soon experience a major ecological Catastrophe	3.90	.75
When humans interfere with nature, it often produces disastrous consequences	4.35	.86
<b>Overall Mean Rating</b>	<b>3.50</b>	<b>0.66</b>

N=750

**Key:** 1 = **Strongly Disagree**, 2 = **Moderately Disagree**, 3 = **Undecided**, 4 = **Moderately Agree**, 5 = **Strongly Agree**

**Decision Value:** 0.00-2.99 = **Negative**, 3.00-5.00 = **Positive**.

Table 5 shows the pre-service teachers' attitude towards environmental sustainability. The table revealed that the pre-service teachers agreed to these items: Humans are severely abusing the environment ( $\bar{x} = 3.45$ ), the balance of nature is very delicate and easily upset ( $\bar{x} = 3.39$ ), humans will eventually learn enough about how nature works to be able to control it ( $\bar{x} = 4.20$ ), Plants and animals have as much right as humans to exist ( $\bar{x} = 3.90$ ). Furthermore, the pre-service teachers agreed that despite our special abilities humans are still subject to the laws of nature ( $\bar{x} = 4.80$ ), if things continue on their present course will soon experience a major ecological Catastrophe ( $\bar{x} = 3.90$ ) and they believed that when humans interfere with nature, it often produces disastrous consequences ( $\bar{x} = 4.35$ ). However, the pre-service teachers do not believe that ecological crisis facing humankind has been greatly exaggerated ( $\bar{x} = 2.45$ ), the balance of nature is strong enough to cope with the impacts of modern industrial Nations ( $\bar{x} = 2.99$ ), and that humans have the right to modify the natural environment to suit their needs ( $\bar{x} = 1.35$ ). Meanwhile, based on the value of the weighted average (3.50 out of 5.00 maximum value that is obtainable) which falls within the decision value for positive, it can be inferred that the pre-service teachers have positive and favourable attitude towards promoting environmental sustainability.

**Research Question 3:** What is pre-service teachers' behaviour (behavioural intention and actual behaviour) towards environmental sustainability?

Table 6:

*Mean Ratings and Standard Deviation of pre-service teachers' responses on the Items addressing their behavioural intention and actual behaviour*

S/N	Items	Mean ( $\bar{X}$ )	SD	Remark
<b>BEHAVIOURAL INTENTION</b>				
1	I intend to use biodegradable, no phosphate soaps ore detergents	3.45	1.10	Agreed
2	I will always buy products whose contents are environmentally safe	3.01	0.76	Agreed
3	I will stop buying from a company which showed a disregard for the environment	2.34	1.12	Disagreed
4	I will cut down on the use of my car by using public transportation	2.87	1.22	Disagreed
5	I intend to joined community cleanup efforts to sensitize people about environmental issues	3.67	2.01	Agreed
6	I will enrolled in a course so as to learning more about environmental Issues	3.85	1.56	Agreed
<b>Overall Mean Rating on Behavioural Intention</b>		<b>3.20</b>	<b>1.30</b>	<b>Agreed</b>
<b>ACTUAL BEHAVIOUR</b>				
1	I used biodegradable, no phosphate soaps ore detergents	3.13	0.72	Agreed
2	Read labels on products to see if the contents were environmental safe	2.07	0.53	Disagreed
3	Purchased a product because it was packaged in reusable or recyclable containers	1.76	0.75	Disagreed
4	Switched from one brand to another due to concern for the environment	1.87	0.11	Disagreed
5	Stopped buying from a company which showed a disregard for the environment	2.11	0.31	Disagreed
6	Bought products made from recycled material	1.82	0.21	Disagreed
7	Cut down on the use of your car by using public transportation, car pooling, etc	2.01	1.11	Disagreed
8	Joined in community cleanup efforts	1.02	0.23	Disagreed
9	Watched TV programs about environmental problems	2.77	1.21	Disagreed
10	Talked to others about environmental issues	1.22	1.01	Disagreed
<b>Overall Mean Rating on Actual Behaviour</b>		<b>2.00</b>	<b>0.62</b>	<b>Disagreed</b>

Table 6 presents the pre-service teachers' mean ratings on behavioural intention and actual behaviour towards environmental sustainability. The overall mean rating on **behavioural Intention** ( $\bar{X}$ =3.85; SD 1.30) showed that majority of the pre-services teachers had intention to imbibe good behaviour towards the environment. However, the overall mean rating on **Actual Behaviour** ( $\bar{X}$ =2.00; SD 0.62) showed that pre-service teachers' behaviour towards the environment is poor. This implies that their behavioural intentions do not translate to their actual behaviour toward sustaining the environment.



**Research Question 4:** What are the joint and relative contributions of knowledge of green chemistry principles and attitude to the prediction of pre-service teachers' actual behaviour towards environmental sustainability?

Table 7:

*Multiple Regression Analysis Results of Joint and Relative Contributions of Knowledge and Attitude to the prediction of Pre-service Teachers' Behaviour to Environmental Sustainability*

Model summary

R= .221

R<sup>2</sup>=.111

R<sup>2</sup> (Adjusted) = .418

Standard Error of Estimate =1.76543

F=19.10, P <0.05

Model		Unstandardized Coefficients		Standardized	T	p.
		B	Std. Error	Coefficients Beta		
1	(Constant)	11.322	.621		12.935	.000
	PK	.190	.034	.025	1.212	.000
	A	.233	.044	.013	1.523	.001

a. Predictors: (Constant), PK, A

b. b. Dependent Variable: Actual Behaviour

Table 7 revealed that knowledge and attitude had positive multiple correlation with behaviour towards environmental sustainability (R=.221). The Adjusted R Square value of .418 indicated that knowledge and attitude jointly contributed 41.8% to the variability of pre-service teachers' behaviour towards environmental sustainability. This implies that, the remaining 58.2% is due to other variables not included in this study. Analysis of Variance (ANOVA) of multiple regression data showed that the Adjusted R square value was significant (F=19.10,  $p < 0.05$ ).

The result of relative contributions of the independent variables to the prediction of pre-service teachers' behaviour towards environmental sustainability revealed that knowledge and attitude contributed differently to the prediction of behaviour of pre-service teachers towards environmental sustainability as indicated, knowledge ( $\beta = .190$ ;  $t = 1.212$ ;  $p < 0.05$ ) and attitude ( $\beta = .233$ ;  $t = 1.523$ ;  $p < 0.05$ ) significantly contribute to the prediction of pre-service teachers' behaviour towards environmental sustainability. This implies that knowledge of environmental issues and positive attitude towards it are very important factors responsible for peoples' behaviour towards the environment.

### Discussions of Findings

Table 4 revealed that the pre-service teachers' knowledge of green chemistry principles is low. This implies that, the pre-service teachers are not prepared and mentally ready for the task of incorporating green chemistry principles in their daily activities in the classroom. This may be attributed to the lack of green chemistry concepts in the current curriculum used in preparing the pre-service teachers for the future in all the higher institutions in Nigeria. This finding is in agreement with the assertion of Junstunen and Aksela (2014) that teachers and their instructor possessed low knowledge of sustainable chemistry. They further posit that due to this low level of knowledge, promoting sustainable chemistry teaching in the classroom would be difficult; meanwhile a study in Malaysia found that despite students' knowledge and awareness about environmental issues, it does not translate to a favourable environmental behaviour. The finding of the study also corroborated the finding of Gwekwerere (2014) who asserted that despite the growing body of knowledge about human impact on the environment and the need to work towards a sustainable future, participation in environmental activities among the teachers remains low.

Table 5 revealed the attitude of pre-service teachers towards environmental sustainability in south-south Nigeria. It was revealed that the pre-service teachers possessed positive attitude towards environmental issues. Majority of the teachers believe that human interference with nature, will often produces disastrous consequences. This is a good indication to solving the prevailing environmental issues in our society, as a positive attitude is a predictor of pro-environmental behaviour. This finding corroborates existing literature of Muderrioolu and Altanlar (2011) in which they opined that student teachers possessed favourable attitude towards environmental issues. Attitude according to Gwekwerere (2014) is a predictor of peoples' behaviour and reaction to the environment. This was proven in this study as majority of the pre-service teachers believed that if things continue on their present course, we will soon experience a major ecological Catastrophe. Possessing this mindset prepares an individual to act and

protect the environment. This is an indication that the attitude of teachers is very important and should always be considered in any educational endeavour.

Findings from the study revealed that the pre-service teachers have good and favourable behavioural intention towards the environment. The pre-service teachers prefer to always buy products whose contents are environmentally safe. However, they do not have intention to stop buying from a company which showed a disregard for the environment or cut down on the use of private car by using public transportation. This behavioural intention could be as a result of several awareness programs the teachers must have attended or watched on the Television. This finding compares well with Hassan, Shiu and Shaw (2016) in their empirical assessment of evidence of an Intention-behaviour gap found that teachers have good intention to treat the environment in a sustainable manner. However, the pre-service teachers' actual behaviour towards environmental sustainability is poor. The pre-service teachers do not read labels on products to see if the contents are environmentally safe, they do not talk to others about environmental issues. Furthermore, the pre-service teachers do not join in community cleanup efforts to protect the environment. This is an indication that their behavioural intention does not translate to a favourable behaviour towards the environment. This finding contradicted the finding of Muderrioolu and Altanlar (2011) in which they found that undergraduate students behave favourably and participate most times in any environmental endeavours.

The findings of this study revealed that knowledge of green chemistry principles and positive attitude had positive multiple correlations with good behaviour towards environmental sustainability. The variables jointly accounted for 41.8% to the variability of pre-service teachers' behaviour towards environmental issues. This indicated that the more the level of knowledge and positive attitude the pre-service teachers possessed, the more their readiness to act and participate in any environmental endeavour.

The multiple regression result also revealed that the two variables substantially predict the behaviour of the pre-service teachers towards environmental sustainability. This finding is in alignment with the assertion of Stewart and Gilg (2007), and Muderrioolu and Altanlar (2011) who in their separate studies found that knowledge of an issue and favourable attitude towards it serves as good predictor towards undergraduate students' actions towards the environment. Stewart and Gilg (2007) further stressed that behaviour towards the environment is guided by day-to-day lifestyles of individuals.

### **Conclusion**

The study established that knowledge and attitude are key factors that determine peoples' behaviour towards environmental sustainability. Hence, pre-service teachers have great intention to behave in a favourable manner towards promoting environmental sustainability. Positive attitude is also regarded as a key element in fostering an individual to contribute to the sustainability of the environment. Pre-service teachers are ready to imbibe good culture that will enable them to incorporate and teach sustainable related concepts, and inculcate good behaviour in their future students.

### **Recommendation**

It is high time curricularists and educators formed an ally with world power to focus more on education as an instrument and exploit its potency to achieve the sustainable development goals. Teachers have been neglected in the quest for education for sustainable development. It is now time to ensure that teachers are at the centre of events, the schools where teachers are trained for the future should rethink their curriculum to incorporate sustainable development concepts that inform the trainee teachers of the significant roles they can play in achieving the sustainable development goals and most importantly promote environmental culture in their classroom.

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