Received: 22nd February, 2023 Revised: 2nd April, 2023 Accepted: 3rd May, 2023

CARITAS UNIVERSITY AMORJI-NIKE, EMENE, ENUGU STATE

Caritas Journal of Management, Social Sciences and Humanities

CJMSSH, Volume 2, Issue 2 (2023)

INVESTIGATING UNIVERSITY STUDENTS' ENVIRONMENTAL KNOWLEDGE AND WASTE DISPOSAL BEHAVIOUR IN ENUGU STATE, NIGERIA: A CRITICAL ANALYSIS

Anayo D. Nkamnebe
Christian, Nwankwo
Abude Peter

Authors' Affiliation

[1]Professor Of Marketing,
Nnamdi Azikiwe University Awka,
Nigeria.
Email: nkamnebe@unizik.edu.ng

[2]Department Of Marketing,
Caritas University Enugu, Nigeria.
Email: nwankwochristian23@gmail.com

[3]Department Of Marketing, School Of Business Studies
Federal Polytechnic Orogun , Delta State
Email: abudepeter@yahoo.com

Keywords:

Environmental Knowledge
Waste Disposal Behaviour
University Students
Enugu
Nigeria
Walk The Talk
Pro-Environmental Behaviour
Pollution

ABSTRACT

This study investigated university students' environmental knowledge and prevailing waste disposal behaviour in Enugu State, Nigeria. Fundamentally, environmental knowledge refers to as the amount of knowledge a person has regarding environmental issues. The main objective of this study is to empirically investigate university students' environmental knowledge and waste disposal behave our in Enugu State, Nigeria. In order to achieve this stated objective, survey research design was adopted and the population of this study comprises undergraduates students of five selected universities in Enugu State, Nigeria. A sample size of 400 respondents was statistically drawn out from the population of 69,091 students using Slovin's formula. Questionnaire was the major instrument for primary data collection and stratified random sampling was adopted. Confirmatory factor analysis was applied to check reliabi]ity of the research instrument with respect to internal consistency. Tables and percentages were used to answer research questions while structural equation modeling was used to test the hypothesis at .05 margin of error. Statistical package for social science SPSS version 23.0 software was used for analysis. It was found that there was no positive relationship between environmental knowledge and waste disposal behaviour of university students. We conclude that there was no positive relationship between environmental knowledge and waste disposal behaviour of university students. We recommend among others that environmental education programmes be infused into the academic curriculum for university students to enable them "walk the talk".

Introduction

Evidence from extant literature (John 2015, Serbtan, 2012, Mbuligue, 2002) suggests that waste disposal in universities in developing countries constitute one of the major factors leading to declining health conditions among students in these institutions, and it remain a challenge to many developing countries of the world (Grimm, Faeth & Redman, 2008, Jacob & Besen 2011). As reported by Homwerg & Bhada (2012), world cities are producing about 1.3 billion tons of solid waste annually and this is projected to reach 2.2 billion by 2025. In recognition of this, pro-environmental behaviour has been prioritized in major global developmental agendas including the Sustainable Developmental Goals (SDG). Similar to many other development indicators, there is a paradigm shift (Ababio, 2014) developed countries seem to have succeeded in effective waste disposal practices and now have shifted focus on minimizing environmental pollution and maximizing resource recovery while countries in developing world, including Nigeria continue to grapple with basic collection and disposal issues.

Pro-environmental behaviour seeks to protect the health of students and the environment while providing resources for sustainable development. Sustainable development in our context emphasizes the need to promote sustainability and advocates that form of development which minimizes negative impact on the environment and society (Liu, Wang & Fujitsuka, 2012). The overarching theme of this paper is to discuss how environmental knowledge can foster pro-environmental behaviour, which by extension, contributes toward green campus.

According to Chan and Lau (2016) McBride (2013) environmental knowledge refers to as the amount of knowledge a person has regarding environmental issues. It is also knowledge of the facts about key relationships that leads to environmental impacts and environmental responsibility of an individual that leads to responsible environmental behaviour (Rivera & Mostata, 2016; Hungerford, Mariakowa Ski, Volk & Meyer, 2008).

Numerous studies (see Laroche & Toffoli 2014; Arman, Haruna & Hussein, 2012) also commented that environmental knowledge is correlated with behaviours towards the environment, that is, if students have the knowledge of the environment, it encourages pro-environmental behaviour like proper waste disposal.

The use of environmental knowledge in this current study is premised on the models and theories that suggests that increased knowledge of a phenomenon will result positively to attitudinal and behavioural change towards it (see Okoye 2015; Hungerford & Volk 1990; Rarusey & Rikson 1970). They further argue that knowledge level of students and their appreciation of environmental issues and concepts are crucial determinants of their willingness to participate in environmental related activities and to engage in actual activities that are necessary for sustaining the environment for future generations (Rowe 2007, Armon, Orion & Carmi 2014).

Further research (see Disinger & Roth 1992) has it that environmental knowledge as the first component of environmental literacy is a precondition of thoughtful behaviour and action. Therefore, knowledge is necessary for decision about the adoption of eco practices and for initiation of action. Environmental literacy encourages an understanding and interactions of human beings and their natural environment with regards to both living and non-living things (Kostadinora 2013, Roth & Disinger, 1992). Eco-practices focuses on incorporating environmental sustainability behaviour at every stage of waste collection and disposal (Liu et al, 2015).

In the same vein, Bybee (1997) explains that when an individual lack environmental knowledge and awareness, this prevents him/her from adopting a sustainable behaviour.

Interestingly, Schahn and Holzen (1990) distinguished between abstract knowledge and concrete knowledge, whereas abstract knowledge measures factual knowledge about the environment (example, ecology, harmful effects of phosphate on marine life (Maloney & Ward, 1973). Concrete knowledge measures knowledge about environmental behaviour that can actually be applied to the protection of the environment (example proper waste disposal, green consumption, energy and water conservation (Holtz & Schahn 1990). Green consumption on the other hand, is normally related to environmentally responsible consumption where

consumers consider the environmental impact of purchasing, using and disposing of various products, or using various green services (Bockman, Razzouk & Sirotnik, 2009; Bray, Johns & Kilbum 2011, Gadenne, Sharma, Kerr & Smith, 2011).

As human race is currently pre-occupied with environmental related issues, students should show responsibility for zero waste, shun products that is not green, encourage reuse and should be proactive about protecting the ecosystem. Environmentally responsible students must have knowledge and awareness of environmental issues (Taufique, Siwar, Talis & Charabar 2014). Maloney and Ward (2011) argued that university students are supposed to possess higher levels of environmental knowledge than their parents and Nkamnebe (2017) asserts that their environmental knowledge will influence their parents waste disposal behaviour.

In view of preceding scenarios, this study has set out to achieve the main objective of empirically investigating university students' environmental knowledge and waste disposal behaviour, with a view to developing explanatory model on successful environmental education for policy makers in Nigeria universities.

Statement of the Problem

Despite global advocacy on environmental literacy and waste disposal behaviour, our university environment continues to be polluted and degraded. Waste disposal still remain a quagmire that virtually affects everybody in Nigeria (Williams, 2017; Nkamnebe, 2018; Luca, Ispass & Candura, 2015). Extant literatures have documented that authorities saddled with the responsibility of waste disposal in our universities leave much to be desired (Uchenna & Olabisi, 2016). According to United Nations Scientific and Cultural Organizations (UNESCO) (2016), there is need to embark on sensitization programmes that would emphasize good environmental culture and catch them young as well as participation in environmental issues.

Universities in Enugu State present a horrifying picture of indiscriminate waste disposal behaviour of students. These have environmental and health consequences in that it provides a breeding ground for insects and animals which spread diseases such as fever and malaria or diarrhea (Davis & Toyama, 2012). The reasons for this behaviour gap have not yet been sufficiently researched. On the other hand, these may be as a result of lack of environmental knowledge, age bracket, gender, ethnicity and religion. Without doubt, higher educational institutions can play a key role in promoting and teaching of environmental sustainability due to inherent expertise among staff and students as well as their engagement with a wide range of stakeholders (Bailey, 2015). However, despite the intensifying environmental education efforts and the spread of environmental literacy concept, there is still a growly discourse in literature on whether and how environmental knowledge influence waste disposal behaviour of university students in Enugu State, Nigeria.

Several studies have been conducted with respect to environmental knowledge of university students. For instance, Kaplowitz and Levine (2005) conducted a research to measure levels of environmental knowledge of Michigan State University students. McGrim (2014) examined environmental knowledge of university students in Indonesia. Aman, Hamin and Hussein (2012) conducted a study to examine the influence of environmental knowledge and green purchasing intention on 384 students in Britain. Donavan (2001) conducted a research aimed to evaluate twelfth-grade students' environmental knowledge in Texas, United States of America. Septu (2009) evaluated waste disposal practice in public educational institutions in Nwanza, Tanzania. Apparently, these quantum of researches have contributed to increase students' environmental awareness but did not investigate the relationship between environmental knowledge and waste disposal of university students in Nigeria. Moreso, these studies are alien to a typical developing nation like Nigeria, therefore it is imperative to conduct Nigeria based research on the subject matter.

This inadequacy of empirical data on environmental knowledge and waste disposal behaviour of university students in Nigeria and western dominance of literature on environmental knowledge arose a research interest and therefore warranting a empirical investigation.

Objectives of the Study

The focal point of this study is to investigate university students' environmental knowledge and

waste disposal behaviour in Enugu State, Nigeria. However, the specific objectives are:

1. To examine how gender influence waste disposal behaviour of university students in Enugu State, Nigeria.
2. To ascertain the effect of age on waste disposal behaviour of university students in Enugu State, Nigeria.
3. To discuss the relationship between ethnicity and waste disposal behaviour of university students in Enugu State, Nigeria.
4. To identify how religion influence waste disposal behaviour of university students in Enugu State, Nigeria.

Research Questions

1. To what extent does gender influence waste disposal behaviour of university students in Enugu State, Nigeria?
2. What is the relationship between age and waste disposal behaviour of university students in Enugu State, Nigeria?
3. What is the relationship between ethnicity and waste disposal behaviour of university students in Enugu State, Nigeria?
4. To what extent does religion influence waste disposal behaviour of university students in Enugu State, Nigeria?

Research Hypotheses

H_1: Gender does not influence waste disposal behaviour of university students in Enugu State, Nigeria.

H_2: Age has no significant relationship on waste disposal behaviour of university students in Enugu State, Nigeria.

H_3: Ethnicity has no significant relationship on waste disposal behaviour of university students in Enugu State, Nigeria.

H_4: Religion does not influence waste disposal behaviour of university students in Enugu State, Nigeria.

Scope of the Study

The scope of this study was set at three levels which include: content, study/geographical area, and unit of analysis scope. This is consistent with the studies (see Andogah, Bouma & Nerbonne, 2012; Nenty, 2009, Andrade 2009) that three-level definition of scope is increasingly becoming a tradition in research. Therefore, this study focuses on investigating university students' environmental knowledge and waste disposal behaviour in Enugu State, Nigeria. The area of study/geographical scope is five selected universities in Enugu State Nigeria, namely University of Nigeria Enugu and Nsukka Campuses, Enugu State University of Science and Technology Enugu and Agbani Campuses, Caritas University Emene, Godfrey Okoye University Thinkers Corner Enugu and Madonna University Akpugo Campus.

The area was chosen because of the presence of first generation universities at the time of this study which span from 2017 to 2019 and it is expected that they would proxy the waste disposal behaviour in Nigeria universities. The unit of analysis scope are all the undergraduate students that are involved in generation and disposal of waste in the selected universities.

REVIEW OF RELATED LITERATURE

Concept of Environmental Knowledge

Environmental knowledge refers to as the amount of knowledge a person has regarding environmental issues. It is correlated with behaviours towards the environment, meaning that if students have the knowledge of the environment, it will encourage pro-environmental behaviour like proper waste disposal (Laroche & Toffoli 2014, Rivera & Mostaka 2016).

Environmental knowledge influence pro-environmental behaviour (Molina, Sainz & Olaizola 2013) and studies (see Maineri, Barnet & Oskamp 1999, Molina et al (2013) contend that students with greater environmental knowledge are more likely to behave responsibly in order to protect the environment. Conversely, it has also been reported that high levels of individual environmental knowledge may not necessarily lead to the development of positive environmental attitudes (Kennedy, Beckley & Mcfarlance, 2009).

Environmental knowledge can also be defined as "a general knowledge of facts, concepts and relationships concerning the natural environment and its major ecosystems" (Fryxell & Lo, 2013; Choi & Lee, 2012). Consumer research in the contexts of environmental issues shows that environmental knowledge influence how consumers/students gather

and organize information, including how the specific information is used in decision making especially waste disposal and how it shapes consumers evaluation of products and services (Martin & Simintras 1995). Pro-environmental behaviour has a positive and moderate correlation with environmental knowledge and a negative and moderate correlation with a lack of concern for the environment, (Tikidou, 2006).

Environment

According to Breman and Withgott (2005) as further cited in Igbokwe (2016), the word environment is a French word "environner" meaning to surround. It is the sum total of or surroundings, a complete set of systems that interacts with and influences one another, while considering the environment in its most exclusive sense, Breman and Withgott (2005) highlighted that it "consists of the complex web of scientific, ethical, political, economical and social relations that shape our daily lives. Raven and Berg (2006) defined environment as all the external conditions, both biotic and abiotic that affect an organism or group of organisms.

Knowledge

Knowledge consists of truth and beliefs, perspectives and concepts, judgments and expectations, methodologies and know-how (Enefaa 2019, Wiig, 1993). Turban (1992) in Enefaa (2019) argues that knowledge is information that has been organized and analyzed to make it understandable and applicable to problem solving and decision making. Natarajan and Shekhar (2000), defines knowledge as highly contextualized information enriched with individual interpretation and expertise.

Theoretical Review

Over the decades, a number of theories and frameworks capable of nurturing pro-environmental behaviour have been propounded by scholars in the area of environmental literacy and documented in the literature (see Tomera 2013, Dunlap 2005). Most of these theories and frameworks are designed to explain environmental literacy predictors among students in different contexts. This study therefore was anchored on Tomera's (2013) theory of environmental responsible behaviour.

Tomera's Theory of Environmental Responsible Behaviour

This study was anchored on Tomera's (2013) theory of environmental responsible behaviour which states that environmental knowledge will influence whether a student adopt proper waste disposal or not. Thus, the assumption of this theory is that students are predisposed to pro-environmental behaviour when they are environmentally literate. In other words, the theory though very simple, offer a succinct explanation of the interacting variables of human behaviour in environmental preservation (see Hungerford & Tomera 1987) and also highlights how multitude of variables interact in different degrees to influence pro-environmental behaviour.

Empirical Literature

Ogunijinmi, Oluwatuyi and Onyia (2016) examined ecological knowledge and attitudes of university students in Akure, Nigeria. The study used questionnaire to collect primary data which was analyzed using descriptive statistics. The results indicate that there was a strong and significant relationship between the status of the school and ecological attitudes of the students.

Don, Juliet & Erhabor (2016) studied university students' adults and environmental knowledge in Texas, United States of America. Data were soured from both primary and secondary sources and analyzed using tables, percentages and descriptive statistics. The descriptive statistics were employed to check the behaviour of data and to read them for inferential statistical analysis, ascertain the level of students' environmental issues. The results indicates that students' scored higher marks than the adults, the adults had higher scores on environmental responsible behaviour.

Aman, Harua and Hussein (2012) examined the influence of environmental knowledge and concern on green purchasing intention of 384 Sabahan consumers in Britain. The results showed that environmental knowledge has a positive significant relationship on the students' green purchase intention.

Koblierska, Tarabula-Fiertak & Grodzinna (2007) assessed polish school students' environmental knowledge and actions for the benefit of the environment. Questionnaire was the major instrument for primary data collection. The paper employed survey research design and regression analysis to ascertain the level of knowledge regarding

the environment. The sample size was determined using purposive sampling technique. Evidence from the study showed that high level of environmental knowledge does not influence pro-environmental behaviour.

Furthermore, Hovarth (2013), investigated university students' sustainability knowledge in Maryland United States of America. Data collected were analyzed using both descriptive and inferential statistics. A total of 300 students were sampled. It was discovered that students who took three or more sustainability courses had significantly higher environmental literacy than students who took zero to two courses. These studies again, showed that the factors affecting both environmental literacy and environmental education need further evaluation.

Gap in Literature

From the empirical works reviewed above, it is clear that no researcher has investigated how environmental knowledge influence university students' waste disposal behaviour in Nigeria. This is the lacuna which this current study seeks to fill.

METHODOLOGY

Research Design

Survey research design was adopted and used in this study because it involved asking questions and recording responses using a structured instrument (Hair, 2012). This type of design is more directly related to descriptive and causal research and success in collecting primary data is more a function of correctly designing and administering the survey instrument which in this research is the questionnaire (Okeke, 2017). This study was conducted across five selected universities in Enugu State, Nigeria. A sample size of 400 respondents was statistically drawn out from the population of 69,091 students using Slovin's formula. This study was based on stratified random procedure. Data used in this study came from two main sources: secondary data which were sourced from already existing materials like journals, seminar papers, annual reports and mainstream textbooks among others. On the other hand, primary data were first hand information and the instrument used for this is questionnaire. The questionnaire used in this study was designed using both close and open end questions and was designed to cover all possible challenges to environmental knowledge. Five point likert scale of strongly agree, agree, undecided, disagree and strongly disagree was used to measure some of the questions while others were measured using frequency. This is in line with researches in marketing and consumer behaviour. The data collected to test the hypotheses for this study were analyzed using the structural equation modeling while confirmatory factor analysis was used to determine the degree of internal consistency between the multiple measurements and to ensure the reliability and the unidimensionality of the items used to measure the constructs. The data was analyzed with the aid of the computer software, statistical package for social sciences (SPSS) 23.0 software.

Model Specification and Description of the Variables

The specification of the model is a mathematical representation of dependent and independent variables incorporated in a model. The equation of multiple regression of this study is as follows: $Y = \beta x_1 + \beta x_2 + \beta x_3 + \beta x_4$

Where

Y = Dependent variable

β_o = Intercept

β_1 = Coefficient representing the contribution of independent variables X_1 X_2 X_3 X_4 that is associated with the predictor variable.

X_1 = Represents the independent variables that influence the dependent variable.

e = Donate error terms.

DATA ANALYSIS, RESULTS AND CONCLUSION

The data collected were analyzed with the aid of statistical package for social sciences (SPSS) version 23.0 software. A total of 400 copies of questionnaire were distributed to the respondents out of which 368 were returned as correctly filled and usable. This represents a response rate of 92% which is quite appreciable and was informed by the method of distribution.

Table 1: Demographic Profile of Respondents

Demographic Variables/Options	Frequency	Percent	Valid Percent	Cumulative Percent
Gender				
Male	165	44.8	44.8	44.8
Female	203	55.2	58.2	100.0
Total	368	100	100	
Age Bracket				
18-20 years	66	17.9	17.9	17.9
21-25 years	138	37.5	37.5	55.4
26-30 years	164	44.6	44.6	100.0
Total	368	100.0	100.0	
Ethnicity				
Igbo	301	81.8	81.8	81.8
Hausa	37	10.1	10.1	9.8
Yoruba	31	8.2	8.2	100.0
Total	368	100.0	100.0	
Religion				
Christianity	317	86.1	86.1	86.1
Islam	51	13.9	13.9	100.0
Total	368	100.0	100.0	

Source: Field Survey, 2018

From table 4.1, 165 (44.8%) of the respondents were males while 203 (55.2%) were females. This shows that females responded to the survey more than the males. On age bracket, 66 (17.9%) were within the age of 18 – 20 years, 138 (37.5%) were within the age bracket of 21 – 25 years; while majority of 164 (44.6%) were within the age bracket of 26 – 30 years. On ethnicity, majority of the respondents 301 (81.8%) wereIgbo, 37 (10.1%) were Hausa, while the remaining 30 (8.2%) were Yoruba. This is informed that the study was conducted in an Igbo dominated area. On religion, 317 (86.1%) were Christians while the remaining 51 (13.9%) were of the Islamic faith. Again Enugu State is Christian dominated hence the high response from Christianity.

Table 4.2: Descriptive Statistics

	N	Minimum	Maximum	Mean	Std Deviation	Skewness		Kurtosis	
	Statistics	Statistics	Statistics	Statistics	Statistics	Statistics	Std Error	Statistics	Std Error
GD1	368	2	5	4.35	.716	-1.311	.127	2.412	.254
GD2	368	1	5	3.56	1.152	-567	.127	-798	.254
GD3	368	1	5	3.27	1.253	-177	.127	-1.116	.254
GD4	368	1	5	1.129	1.129	-912	.127	.119	.254
AG1	368	1	5	3.25	1.290	-193	.127	.1.170	.254
AG2	368	1	5	3.02	1.278	-064	.127	-1.293	.254
AG3	368	1	5	3.60	1.172	.672	.127	-502	.254
AG4	368	1	5	3.36	1.214	.607	.127	.703	.254
ETH1	368	1	5	3.08	1.391	-289	.127	-1.217	.254
ETH2	368	3	5	4.33	-509	.290	.127	-946	.254
ETH3	368	1	5	4.11	1.058	-1.280	.127	.817	.254
ETH4	368	1	5	3.92	1.050	-1.096	.127	.766	.254
RG1	368	1	5	3.23	1.343	-046	.127	-1.402	.254
RG2	368	3	5	4.31	-582	-169	.127	-602	.254
RG3	368	1	5	3.72	1.347	-508	.127	-1.286	.254
RG4	368	1	5	3.81	1.190	-1.116	.127	.388	.254

Source: SPSS Person 23.0

Table 4.2 present the information requested for each of the items used to measure the variables of this study. The next two columns show the minimum and maximum and the highest under maximum is 5 while the least under minimum is 1. This is a confirmation that the variables were measured with five point scale coded one to five. Also from the table, all the items have means range 3.39 to 4.3 among other means values while most of the standard deviation values are above one. Standard deviation measure variability hence with standard deviation above one for items measured with five point likert scale is an indication that the respondents are not in agreement as their opinions are diverse.

Descriptive also provides information concerning the distribution of the scores on continuous variables (Skewness and Kurtosis) (Pallant, 2006). The Skewness value provides an indication of the symmetry of the distribution. It gives us the idea of the shape of distribution of the data (Kothari & Garg, 2014; Gujarati, Porter & Gunas Ekar, 2013). Kurtosis on the other hand provides information about the "peakedness" or flatness of the distribution curve. Positive skewness values indicates positive skew (scores clustered to the left at the low values). Negative skewness indicate a clustering the scores of the high end which is the situation with our data. Positive kurtosis values indicate that the distribution is rather peaked (clustered in the centre) with long thin. Kurtosis values below 0 indicate a distribution that is relatively flat (too many cases in the extremes). In this study, the skewness of the items are mixed with very high values and very low values. Also the kurtosis show very high and very low or values below zero. This implies that there is a mix of peakedness and flattened values in the items.

Table 4.3: Regression Results and Hypotheses Testing

	Estimate	S.E	C.R	P	Label
ZWDB ← ZAG	.013	.007	1.884	.060	Not supported
ZWDB ← ZGD	.126	.036	3.478	…	Supported
ZWDB ← ZETH	-130	.086	-3.476	…	Supported
ZWDB ← ZRG	-086	.026	-3.242	…	Supported

Four hypotheses were proposed and results were enumerated below.

H_1: (Gender does not influence waste disposal behaviour of university students in Enugu State, Nigeria), the coefficient i.e Beta (β) for gender is .013, critical ratio (CR) is 1.884 and *p* value of .060 which is above .05 margin of error. Thus, H_1 is rejected signifying that gender does not really influence waste disposal behaviour.

H_2: (Age has no significant relationship on waste disposal behaviour of university students in Enugu State, Nigeria). ZGD has a coefficient of .126, critical ratio (CR) of 3.478 and *p* value of .000 which is well below the .05 margin of error. Thus, H_2 is accepted or supported signifying that age has a positive relationship with waste disposal behaviour.

H_3: (Ethnicity has no significant relationship on waste disposal of university students in Enugu State, Nigeria) the coefficient for ethnicity is .310; critical ratio (CR) is -3.476 and *p* value of .000 which is well below the .05 margin of error. Thus, H_3 is accepted or supported showing that ethnicity has a positive significant relationship with waste disposal behaviour.

H_4: (Religion does not influence waste disposal behaviour of university students in Enugu State Nigeria) the coefficient for religion is -466; critical ratio (CR) is -2.598 and *p* value of .009 which is well below the .05 margin of error. Thus, this shows that there was a relationship (positive) between religion and waste disposal behaviour.

CONCLUSION AND IMPLICATIONS

The main objective of this research is to investigate university students' environmental knowledge and waste disposal behaviour in Nigeria. From the reports and publication from mainstream literature as well as materials reviewed showed that the number one problem affecting students waste disposal behaviour in Nigeria is lack of environmental knowledge. In the sequel, if students have the knowledge of the environment, it influence pro-environmental behaviour (Ofori, 2017). World cities are producing about 1.3 billion tons of solid waste annually and this is projected to reach 2.2 billion by 2025 (Homweg & Bhada, 2012). In recognition of this projection, pro-environmental behaviour has been recognized in major global developmental agencies including the sustainable developmental goals (SDGs).

This study seeks to examine how gender, age, ethnicity and religion influence waste disposal behaviour of university students. Questionnaire was used to measure the indentified questions that pose challenges to environmental knowledge and waste disposal behaviour. The data collected were run using statistical package for social sciences (SPSS) software. The preliminary analysis which includes data entry, data presentation and descriptive analysis were done with (SPSS) while multiple linear regression to measure the impact of the independent variables on the dependent variables. To now address the research objectives and answer the research questions the four components were used as independent variables to run a multiple regression. The dependent variable is waste disposal behaviour. The result is in Table 4.3 and shows that three of the factors: age bracket, gender, ethnicity and religion have significant relationship (positive) with waste disposal behaviour. Thus, it can concluded that three of the four factors influence waste disposal behaviour

of university students in Nigeria. These findings agree with Murdoch (2012) that religion and gender issues affects environmental literacy of university in developing nations.

This study has some implications for environmental education and policy makers. The study identified age bracket, gender, ethnicity and religion as a major challenge to waste disposal behaviour. Hence there is need for urgent infusion of environmental education programme into the university scheme of work. Marketing practitioners need to encourage consumption and production of green products for sustainable living.

References

Ababio, M. (2014). Mapping the invisible and real African Economy Urban-Waste Circuitry Urban Geography, 33 (1) 1 – 21.

Aman, A. L., Hama & Hussein, Z. (2012). The influence of environmental knowledge and concern on green purchase intention, the role of attitude as a mediating variable. *British Journal of Arts, Social Sciences,* 7, 145-167.

Andogah, G., Bouma, G. & Nerbonne, J. (2012). Every document has a geographical scope, data and knowledge engineering. 81-82 November – December, 1-2.

Andrade, A. D. (2009). Interpretive research aiming at theory building: Adopting and adapting the case study design. The quantitative report writing, 14 (1) 42-60.

Armon, S., Orion, N. & Carmai, N. (2014). Environmental literacy components and their promotion by institutions of higher education in Israel case study. *Environmental Education Research, Pp 1-27.*

Bailey, R. (2015). Solid waste management in the world's cities. United Nation habitat's third global report on the state of water and sanitation in the world cities. United Kingdom, Newcastle Tyme Inc.

Breman, S. & Withgott, S. J. (2005). Essential environment; The science behind the stories. San Francisco, Pearson and Benjamin Publishers.

Bybee, R. (1979). Science education for an ecological society. American Biology Teacher, 41; Pp 154-163.

Chain, R. & Lau, L. (2016). The effectiveness of environmental claims among Chinese consumers. *Journal of Marketing Management,* 13 (4): 437-452.

Choi, G. J. & Lee, K. Y. (2012). Explaining pro-environmental behaviours with environmentally relevant variables: A survey in Korea. *African Journal of Business Management* Vol. 6 (29), Pp 8677-8690.

Davis, K. T. & Toyama, K. (2015). The world's scavengers: scavenging for sustainable consumption and production. Globalization and the environment. USA: Atlanta Press.

Dery, F. (2017). Investigating university students' knowledge and practices towards appropriate solid waste management practices in the Greater Accra Region, Ghana. *Environmental Sciences,* 16, (4) Pp 1 – 16.

Don, Juliet, U. & Erhabor (2016). Impact of environmental education on the knowledge and attitude of students towards the environment: *International Journal of Environment and Science Education.* Vol. 11 No. 12 5167-5375.

Dunlap, R. (2005). Of Global concern: Result of the health of the planet survey. Environmental, 35 (9) 1 – 15, 33-39.

Enifa, A. B. (2019), Knowledge management process and information system of deposit money banks in Nigeria: A Critical Analysis: *2019 International Conference Proceedings,* Nnamdi Azikiwe University, Awka, Nigeria.

Fryxell, G. L.O.C (2013). The influence of environmental knowledge and values on managerial behaviours on behalf of the environment: an empirical examination of

managers in China. *Journal of Business Ethics,* 46(1): 45-69.

Grimm, N. B, Faeth, S. H. & Redman, C. L. (2008). Global change and ecology of cities, Science. 319 (5864) 756-760.

Hoomweg, D., Bhada, T. (2012). What A Waste, A Global Review of Solid Waste Management Urban Development Series Knowledge Paper. World Bank Available http://siteresources.worldband.org. INTURBA DEVELOPMENT/Resources/336387-11334852610766/what a waste/2012 final.pdf date accessed 20/8/2017.

Horarth, N. (2013). Toward instrument of assessing sustainability knowledge assessment development, process and results from a pilot survey at University of Maryland. Retrieved January 10, 2015 from http://www.jsedimensions.org/wordpress/wpcontentsupheads/2015/06 havardsustainability-literacy-assessment-final version PDF-Ready-/pdf.

Hungerford, H. R. & Volk, T. L. (1990). Changing Learner Behaviour through Environmental Education. *Journal of Environmental Education, 34*, (4) 4-11.

Igbokwe, A. B. (2016). Environmental literacy; exploring the potential for the advancement of environmental education in Ontario schools. *International Journal for Cross-Disciplinary Subjects in Education* (1) CDSEJ Vol. 1, 3 Issue 1.

John, G. (2006). The essential impact of context on organizational behaviour. Academy of management review, 31 (2) 368-408 Doi:105, 465/AMR 2006202080687.

John, J. (2015). An assessment of community participation in the municipal solid waste management: case study of Kigoma municipal council: Unpublished master thesis, Open University of Tanzania.

Kennedy, E. H., Beckley, T.M., McFarlarlane & Nadeau, S. (2009). Why we don't walk the talk: Understanding environmental values/behaviour gap in Canada. *Journal of Human Ecology Review,* 16 (2) 151 – 160. Larache, M. & Toffoli, R. (2014). The influence of culture on pro-environmental knowledge attitudes and behaviour. *A Canadian perspective: Advances in Consumer Research* 23 (1), 196-202.

Kobierska, H., Tarabula, F. & Grodzinska, M. (2007) Attitudes of environmental education in Poland. Journal of Educational Res

Kaplowitz, M. D. & Levine, R. (2006). How environmental knowledge measure up at a big ten University. *Environmental literacy research,* Vol. 11 No. 2, Pp 143-160.

Liu, X, Wang, C. & Fujitsuka, T. (2012). Sustainable consumption, green purchasing behaviours of urban residents in China. Sustainable development, 20 (4) 293-308.

Liu, S. Y, Yeh, S. C., Liang, S. W. & Tsai, W. (2015). A National investigation of teachers' environmental literacy as a reference for promoting environmental education in Taiwan. *The Journal of Environmental Education, 46 (2), 114-132.*

Luca, M., Ispass, A. & Candera, N. A. (2015). Pro-environmental behaviours in the household and holiday setting: An exploratory study among brass citizens. *Journal of Information Society and Sustainability Develop. Vol. 7 (8) 95 – 99.*

Mainieri, T., Barnet, T. & Oskamip, U. S. (1999), Green buying: the influence of environmental concern on consumer behaviour. *Journal of Social Psychology*, 137 (2) 189 – 204.

Maloney, M. P. & Ward, M. P. (1973). Ecology, Let's hear from the people: An objectives scale for the measurement of ecological attitudes and knowledge. American psychologists, 28 (7), 583-586.

Maloney, M. P. & Ward, M. P. (2011). Ecology, Let's hear it from people. American psychologist, 28, 583-566.

Martin, B. & Simintras, A. C. (1995). The impact of green products lines on the environment: does what they know affect how they feel? *Marketing intelligence Journal Plan,* 13 (4): 16-33.

Mbuligual, S. E. (2002). Institutional solid waste management practices in developing countries: A case study of three academic institutions in Tanzania. Resources, conservation and recycling, 35 (3), 131-146.

McBride, B. C. (2013). Environmental literacy, ecological literacy; ecoliteracy: What do we mean and how do we get here? Ecosphere, 4 (5) 67. http://

McGrim, A. E. (2014). Quantifying and understanding ecological literacy: A study of final year students at Liberal Arts Institutions. Retrieved.

Mobley, C. Voglas W. M. & Deward, S. L. (2010). Exploring additional determinants of environmentally responsible behaviours: the influence of environmental literature and environmental attitude. *Journal of Environmental Behaviour,* 42 (4) 420 – 447.

Molina, V. M. A., Sainz, F. A. & Olaizola, J. I. (2013). Environmental knowledge and other variables affecting pro-environmental behaviour: Comparison of University students from emerging and advanced countries. *Journal of Cleaner Production,* 61, 13-138.

Natarajan, G. & Shekar, S. (2000). Knowledge management, enabling business growth. New Delhi, Tata McGraw Hill Publishing Co. Ltd.

Nenty, H. J. (2009). Writing a quantitative research design thesis. *International Journal of Education Science, (1)* 19 – 32.

Nkamnebe, A. D. (2018). Lecture Note on Advanced Research Methodology. UNIZIK PG School Awka, Nigeria.

Ogunjinmi, A. A., Oluwatuji, G. B. & Onyia, S. B. (2015). Determining ecological knowledge and attitude of students towards the environment: *International Journal of Environment and Science Education,* Vol. 11 No. 12, 5167-5375.

Okeke, T.C. (2017). Challenges to online shopping in Nigeria. A study of selected online shoppers in Awka, Anambra State. *Journal of Management Sciences in the Nigeria's Quest for Development. A Festschrift in honour of Professor Pita Ejiofor, Awka, Pp 229-249.*

Okoye, O. F. (2015). Students' waste disposal. A disciplinary problem in tertiary institutions. *International Journal of Education and Research, Vol. 3, No. 10 Pp 54-66.*

Ramsey, C. E. & Rickson, R. E. (1978). "Environmental knowledge and attitudes" *The Journal of Environmental Education, Vol.* 8, No. 1, Pp 10-18.

Rivena, M. & Mostata, M. M. (2016). Re-evaluating green marketing strategy. A stakeholder perspective: *European Journal of Marketing,* Vol. 41 No. 11 – 12; Pp 1328-1358.

Roth, C.E & Disinger (1992). Environmental literacy for science: Mathematics and Environmental Education (CSMEE), Ohio State University, Columbus, Off.

Rowe, D. (2007). Education for sustainable future science. New York Times, Washington Vol. 317, No. 5836, 323.

Serban, C. (2012). Waste management in public educational institutions of Bucharest City. Romania Procedia Environmental Sciences; 14, 71-78.

Schahm, J. & Holzen, E. (1990). Studies of individual environmental concern: The role of knowledge, gender and background variables. *Environment and Behaviour,* 21, 57-81.

Septu, F. (2009). Waste management in public educational institutions of Mwaanze Tanzania: The COMESA periodicals. 5(3); Pp 96-142.

Taufique, K.M.R, Siwar, C. N., Talib, B. A. & Chamber, N. (2014). Measuring consumers' environmental responsibility. A synthesis of constructs and measurement scale items: Curr World Environ 2014, 9 (1) Available from: http://www.cwejournal.org/?p = 5961.

Tikidou, I. (2006). The effects of knowledge and attitudes upon Greeks' pro-environmental purchasing behaviours. *Journal of Environmental Management* 14 (3): 124-134.

Tomera, A. N. (2013). Analysis and synthesis of research on responsible environmental behaviour, A meta-analysis. *The Journal of Environmental Education,* 18, 1-8.

Turban, E. (1992). Expert systems and applied artificial intelligence. London: Macmillan Press.

Uchenna, O. C. & Olabisi, T. A. (2015). Solid waste management through neighbourhood cooperative society in Onitsha Nigeria. *Journal of Scientific Research and Reports,* 9 (1) 1 – 9.

United Nations Education Scientific and Cultural Organization (UNESCO) (2016). Environmental education in communities. *Environmental Bulletin, Vol. 25; Pp 32-37.*

Wiig, K. (1993). Knowledge management foundation: London, Routledge.

Williams, R. D. (2017). An assessment of environmental literacy among Oklahoma public high school students and the factors affecting students' environmental literacy. Master's thesis Harvard Extension School.