

# Effects of Motivation Package on Secondary School Students Attitude towards Solid Waste Disposal in Jos North, Plateau State

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## ABSTRACT

The problems of solid waste disposal such as odors, pest infestation, community littering, and devastating effects on environmental health are serious in our secondary schools. This study investigated the effects of motivation package on secondary school students' attitudes towards solid waste disposal in Jos North, Plateau State, Nigeria. This research used quasi-experimental research with a non-equivalent group design. The subject of the research is all SSII Geography students of public and private senior secondary schools in Jos North Local Government Area. The stratified sampling and simple random sampling techniques were employed for the study. The sample includes 43 geography SS2 students from intact classes of the four sampled schools. The experimental group was made up of 8 males and 12 females while the control group was made up of 11 males and 12 females. Therefore there are 20 and 23 students in the experimental and control group respectively. The Students Attitudes towards Solid Waste Disposal Questionnaire (SATSWDQ) was used. The t-test of the independent sample was used to test hypotheses 1 and 2, while Analysis of Covariance (ANCOVA) was used to test 3 and 4 respectively. The statistical package for social sciences (SPSS) version 23 was used for the analysis. The findings show that there is no significant difference between the experimental and control group pre-test solid waste disposal attitude mean score, there is a significant difference between the experimental and control group post-test solid waste disposal attitude mean score, there is a significant effect of school type on student attitude mean scores toward solid waste disposal and there is a significant difference between boys and girls on post-test attitude towards solid waste disposal mean score. The study recommended training and re-training of geography teachers through a series of workshops, seminars, and symposia on Environmental Motivation Package and Female and male students should take part in Green club to promote their knowledge and attitudes toward solid waste management among other recommendations were made. hypotheses 1 and 2, while Analysis of Covariance (ANCOVA) was used to test 3 and 4 respectively. The statistical package for social sciences (SPSS) version 23 was used for the analysis. The findings show that there is no significant difference between the experimental and control group pre-test solid waste disposal attitude mean score, there is a significant difference between the experimental and control group post-test solid waste disposal attitude mean score, there is a significant effect of school type on student attitude mean scores toward solid waste disposal and there is a significant difference between boys and girls on post-test attitude towards solid waste disposal mean score. The study recommended training and re-training of geography teachers through a series of workshops, seminars, and symposia on Environmental Motivation Package and Female and male students should take part in Green club to promote their knowledge and attitudes toward solid waste management among other recommendations were made.

**Keywords:** Attitude, Gender, Solid Waste Disposal, Motivation Package, School type

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Over time, the man in his God-given authority to control his environment has made tools to modify his lifestyle and in so doing, he altered the balanced nature of the ecosystem through practices such as agriculture, roads construction, war, urbanization, industrialization, and other human activities. The environment is man's greatest treasure and the need to care for it cannot be overemphasized. The key to man's health lies largely in his environment hence the need for sanitation

Sanitation is concerned with the maintenance of hygienic conditions through services such as garbage collections and wastewater disposal from the environment. Environmental sanitation deals with the way of life that is expressed in clean homes, farms, schools neighbourhoods, and communities. It is seen as the principles and practice of effecting healthy and hygienic conditions in the environment to provide public health and welfare, improve quality of life and ensure a sustainable clean environment.

Solid waste consists of non-liquid and non-gaseous products of human activities regarded as useless. It can take the form of paper bags, polythene bags, empty tins, bottles, cans, damaged cars, and food waste. Solid waste sorting is a relevant part of solid waste disposal as it distinguishes the types of waste to facilitate their respective endpoint, for instance, waste papers should be destined for the school incinerator whereas food waste should be for the school compost pit and non-degradable elements like bottles, plastics, and other artifacts, they will be collected in a separate receptacle for necessary disposal and recycling.

There seems to be a high level of poor sanitation in Nigeria (Oloruntoba & Elemile, 2011). Studies show that inappropriate solid waste disposal practices in schools in less developed countries constitute one major factor leading to declining environmental health conditions (Ejaz, Akhtar, Hashim & Nalem 2010; Neller & Neller, 2015) Solid waste problems are seen and treated as a global problem and as a major challenge of developing countries (Ifegbasan, 2011). It is a problem recognized at the 1992 Conference on Environment and Development and regarded as a major barrier in the path towards sustainability. Indiscriminate solid waste disposal methods like open burning and open dumping were higher, the same condition may likely exist in the present area

of the study. This is because observation has shown that generally most secondary schools students in Nigeria seem to have a low level of sanitation as the school premises are littered with papers, food waste, and sachet water bags popularly called 'pure water. The problems of solid waste disposal such as odors, pest infestation, community littering, and devastating effects on environmental health and school environmental quality call for the motivation of students to create a positive culture for change in attitude. It is observed that most students have the attitude of disposing of waste indiscriminately, sweeping into the drains, and allowing grass to grow around the school premises without showing any concern. Attitude refers to acquiring a set of values, feelings of concern for the environment, and the motivation for actively participating in environmental improvement and protection (Momoh & Oladebeye, 2010). Attitude is the belief one has towards people and their surroundings (Das, Mishra & Halder, 2018).

There are two types of attitudes, positive attitude, and negative attitude. A positive attitude towards environmental sanitation is one of the cardinal objectives of environmental sanitation, specifically solid waste disposal which is likely to inculcate in the citizenry a sustained culture of environmental ethic and discipline that can engender lasting environmental friendliness. Sometimes school type is a significant factor in dealing with the solid waste disposal attitude of students. Research has shown that students in private schools are more environmentally friendly than those in public schools. Schools are classified into public and private, boys and girls, boarding and day, and rural and urban schools.

Students', attitudes, habits, values, and beliefs must change to have a clean environment. How can this be done? How can one, for example, change the perception of the Nigerian child or adult who believes that filth cannot kill a black man? Studies show that students have good knowledge of environmental sanitation and solid waste disposal but have poor solid waste disposal practices and lack the right attitude towards the practice of solid waste disposal (Ahamad and Ismail, 2015). It is a common saying that 'practice brings about perfection; the students may know but may lack the basic practice of proper solid waste disposal.

Motivation is what underlies behaviour that is characterized by willingness and volition. It is an internal and external factor that stimulates desire and energy in people to continually be interested and committed to a job, role or to make an effort to attain a goal. It is a mechanism that internally propels people to move and get things done; it is usually used in transformational change programmes in educational settings. The ultimate goal of schools is to transform their students by providing necessary skills and by building character and instilling virtue that will enable students to become proactive in environmental issues. Students have various intellectual abilities, from multicultural and diverse socioeconomic backgrounds, it is important to motivate them in various possible ways to ensure that they become environment friendly regardless of their social, economic, and intellectual statuses and to learn to become useful and productive members of the society.

It is against this background that this study will investigate the effects of solid waste disposal motivation package on secondary school students' attitudes and achievements in geography in Jos South, Plateau State.

### **The objective of the study**

The purpose of this study is to determine the effects of solid waste motivation package on attitudes of secondary school geography students towards solid waste disposal in Jos South, Plateau state Nigeria. Specifically, the study achieved the following objectives:

1. Find out the pre-test solid waste disposal attitude mean scores of the experimental and control groups.
2. Find out the post-test solid waste disposal attitude mean scores of the experimental and control groups.
3. Find out the post-test attitude mean scores of private and public school students towards solid waste disposal in the experimental group.
4. Find out the post-test attitude mean scores of boys and girls towards solid waste disposal in the experimental group.

### **Research Questions**

1. To guide the study, the following research questions were posed.
2. What is the pre-test solid waste disposal attitude mean scores of the experimental and control groups?
3. What is the post-test solid waste disposal attitude mean scores of the experimental and control groups?
4. What is the post-test attitude mean scores of private and public school students towards solid waste disposal in the experimental group?
5. What is the post-test attitude mean scores of boys and girls towards solid waste disposal in the experimental group?

### **Hypothesis**

The following null hypotheses were tested at a 0.05 level of significance:

1. There is no significant difference between the experimental and control groups' pre-test solid waste disposal attitude mean scores
2. There is no significant difference between the experimental and control groups post-test solid waste disposal attitude mean scores
3. There is no significant difference between private and public school students' post-test attitude mean scores toward solid waste disposal.
4. There is no significant difference between boys' and girls' post-test attitude mean scores towards solid waste disposal

### **Empirical review**

Many researchers have studied motivation and attitude towards solid waste disposal and some of their studies were reviewed below:

Siwakoti (2009) Studied knowledge, attitude, and practices of women and men toward recycling in North St. James Town Toronto, the study adopted a mixed-method approach to gather data: (i) quantitative (KAP survey) and (ii) qualitative (observation checklist). The field observation checklist was prepared for the qualitative research which was completed by taking a walking tour

of the SJT neighbourhood. A digital camera was used to take photographs of the existing waste disposal facilities around each of the 18 high-rise buildings. A short survey questionnaire was developed for the KAP (quantitative) study. A total of 55 participants (28 males, 27 females) from six selected buildings participated in this study. The majority of participants surveyed (19 participants or 35%) were in the age group of 30-39 years. More than half of the participants were employed and all participants have been residing in St. James Town for somewhere between one and four years. The participants commented that the recycling bin is placed far from the apartment they live in. This is the main reason that the participants do not actively perform recycling. The other reason is the lack of knowledge on which waste materials to recycle. The attitude of the tenants towards recycling tends to be very positive and the rates are much higher than the knowledge and practices. About 69% (Male: 71%, Female: 67%) of the participants did practice recycling, however, only 20% of participants recycled their household waste every day. Whereas the knowledge of the tenants is only 51% the female participants do fewer practices on recycling household waste. According to the result, the female population has higher knowledge (56%) regarding recycling than the male population (46%) does. About 22% of participants received information about recycling from friends and family members. Out of 55 participants, 96% of participants reflect a positive attitude towards recycling. The result shows that 41(75%) participants want to know more about recycling, and 64% of participants would like to participate in the recycling program. The results indicate that the recycling practices are related to the recycling collection site, and therefore we recommend that the recycling bins be made easily accessible by the tenants. The positive attitude towards information needs indicates information sharing is much needed among community members, which could help to understand the perspective of each other on recycling practice.

Kiprotich (2010) investigated Environmental awareness, attitude, and participation among secondary school students: a comparative study of Kasarani and Kibera Division, Nairobi County, Kenya. He contended that degradation poses a major threat to the existence of humanity today both in

rural and urban settlements. In such a scenario, the importance and need for environmental education as a tool for environmental management and conservation cannot be overemphasized. To raise the environmental literacy level among Kenyans, Environmental Education is taught using both interdisciplinary and multidisciplinary approaches. Research has shown that students in urban centers are more environmentally informed compared to those in rural areas. While rural-urban differences in Kenyan household characteristics are still a significant determinant of differences in school participation patterns, there is now a growing urban-urban divide following rapid urbanization. This has come with different characteristics from those of earlier phases used in previous studies to model rural versus urban student levels of awareness, attitudes, and participation. This calls into question the notion that urban settlements in Africa are always advantaged. Kibera and Kasarani represent different settlements of Nairobi. To establish the level of awareness, attitude, and participation of secondary school students in environmental activities in these two different settlements, a comparative case study design was used. The study involved a sample of three hundred and twenty (320) secondary school students randomly selected from secondary schools in Kasarani and Kibera Divisions.

Data was primarily collected using researcher-developed questionnaires. Analysis of the data was done by first coding them in SPSS version 2010. The study has achieved its objective by drawing a comparison between students in different sections of an urban divide. By calculating an Analysis of Variance (ANOVA) and a group statistic using  $P=0.05$ , the hypotheses postulated were tested and it was established that there is no significant difference in the level of awareness, attitude, and level of participation in environmental activities of secondary school students in Kasarani and Kibera Divisions. It was also found out that there is a need to refocus the approach of EE to ensure that it does not only make learners aware but also creates a sense of personal responsibility which is fundamental in ensuring sustainable environmental behavior.

Tekelehana (2015) investigated knowledge, attitudes, and practices of people towards urban environmental sanitation in Wereda nine administration of Gullele

sub-city of Addis Ababa. A survey design was employed for the study. A purposive and simple random sampling method was used to conduct the research. A total of 345 respondents had participated in the study. Knowledge, attitudes, and practices associated with urban environmental sanitation questionnaires and personal observation were the instruments used for data collection. The collected data were analyzed using tables, frequency distribution, percentages, means, graphs, and chi-square test. The finding of the study revealed that respondents were knowledgeable about urban environmental sanitation, however, it was not adequate. Knowledge of residents on environmental sanitation should be promoted. Those with a lower level of education should be the focus group. This can be achieved through organizing workshops, seminars, and conferences on environmental sanitation by environmental sanitation authorities and public health educators. The majority of the respondents had a favourable attitude to urban environmental sanitation, but there were some inconsistencies in residents' attitudes towards various urban environmental sanitation matters. Health education and hygiene awareness should be promoted to influence the resident's attitude that targets personal, household, and community hygiene and sanitation.

The result of the study also revealed that there were improper practices of the residents associated with urban environmental sanitation. Special attention should be given to the practical engagement of the residents in the community through developing the urban garden, urban beautification, and urban agriculture. Lastly, based on the findings, it is also possible to conclude that there was no statistically significant relationship between gender and knowledge of people but there was a statistically significant relationship between age and level of education on knowledge of people, there was a statistically significant difference in the influence of gender, age and level of education on the attitude of people and there was a statistically significant difference in the influence of gender, age, level of education, level of income and family size on the practice of people concerning urban environmental sanitation. Based on the research findings it was recommended that, to improve people's urban environmental sanitation knowledge, attitude, and

practice all stakeholders should have to play their roles.

Ogunjinmi, Onadeko, and Adewumi (2012) investigated the effects of personal factors on the environmental attitudes of local communities around protected areas. This study identified the environmental attitudes of local communities around Nigeria's protected areas and the effects of personal factors on their attitudes. A survey design was employed. Data were obtained from 1170 villagers randomly selected among the local communities in Chad Basin, Cross River, Gashaka-Gumti, Kainji Lake, Kamuku, Okomu, and Old Oyo National Parks and evaluated with Dunlap and van Liere (1978) NEP Scale. The methods for data collection were focus group discussions and individual interviews through questionnaire administration. Analysis was through descriptive statistics, Pearson's Correlations, and Chi-Square analysis. The local communities had negative attitudes towards three items of the Scale while they had positive attitudes towards nine. Household size ( $r = 0.11, P < 0.01$ ), sex ( $\chi^2 = 57.77, P < 0.01$ ), marital status ( $\chi^2 = 31.02, P < 0.01$ ), education ( $\chi^2 = 12.64, P < 0.01$ ), occupation ( $\chi^2 = 49.24, P < 0.01$ ), religion ( $\chi^2 = 16.76, P < 0.01$ ), nationality ( $\chi^2 = 83.38, P < 0.01$ ), ethnic group ( $\chi^2 = 24.15, P < 0.01$ ) were significantly related to environmental attitudes. These factors exert considerable impact on the attitude of the local communities and maybe the key determinants of their behavior towards the protected areas.

Onoja (2014) investigated the environmental awareness and attitude of senior secondary school students in the Anpka education zone. Six research questions and four hypotheses guided the study. Relevant literature was reviewed under three major sub-headings of the conceptual framework, theoretical framework, and review of empirical studies. The study adopted a descriptive survey research design. The population of the study comprised all the senior secondary school class one (SS1) students in the fifty-five (55) secondary schools in the three local government areas in the Anpka education zone. There were two thousand four hundred and seventy-five (2475) SS1 students in the zone. Proportionate stratified sampling technique was used to sample twenty-eight (28) schools out of the fifty-five (55) secondary schools and six hundred and sixteen (616) students out of the two

thousand four hundred and seventy-five students. Two instruments were used for data collection. The instruments are Students Environmental Awareness Scale (SEAS) and the Environmental Attitude Scale for Students (EASS).

The instruments were developed by the researcher and validated by three experts at the University of Nigeria, Nsukka. The data collected were analyzed using the mean score and standard deviation to answer the research questions. T-test was used to test the hypotheses formulated for the study. The major findings of the study based on the analyzed data were that the senior secondary school students have low environmental awareness and attitude, that there is no significant difference between the male and female students' mean score on environmental awareness and attitude. The study concluded that the senior secondary school students in the Anpka education zone possessed low environmental awareness and attitude; that there is no significant difference between male and female students concerning environmental awareness and attitude; there is a significant difference between urban and rural students' environmental awareness and attitude.

### **Theoretical Framework**

This study shall be anchored on the Theory of Planned Behaviour (TPB), proposed by Fishbein and Ajzen (1980). The TPB theory states that what an individual does is determined by personal motivation which is determined by social support, and perceived behavioural control. Attitude, as a framework is not only good for understanding, explaining, and predicting behaviours, but also to provide a useful guide for designing intervention strategies to change or maintain behaviour. The theory is based on an assumption that individual behavioural intentions are directly related to their attitudes. The Theory of Planned Behaviour views a person's intention to perform (or not perform) as the immediate determinant of the action. This behavioural intention, in turn, has two determinants. One is the attitude towards the behaviour a person who believes that performing a given behaviour will lead to mostly positive outcomes will hold a favourable attitude toward performing the behaviour. The other is the subjective norm a person believes that most referents with whom she or he is

motivated to comply think she/he should perform the behaviour will perceive the social pressure to do so. The beliefs that underlie a person's attitude toward the behaviour are termed behavioural beliefs, and those that underlie the subjective norm are termed normative beliefs (Ajzen & Fishbein, 1980).

This theory is related to the study based on the fact that it allows for a better evaluation of human behaviour when participatory decisions are voluntary and under individual control. The desired behavior is predicted by a person's value of what she or he expects to be the outcome of the behavior, for this study the desired behavior will be the students' intention to a positive attitude towards solid waste disposal. The theory is widely used in environmental behaviour research to predict a person's intent to participate in a specified behaviour. Theory of Planned Behaviour has been used successfully empirically and conceptually by many researchers in environmental behaviour to explore attitudes that trace the correlation of beliefs to behaviour.

The introduction of a solid waste disposal motivation package may help to modify the attitude of geography students to become more interested in practical behavioural tendencies that will improve their behaviour towards solid waste disposal in their communities and schools. The theory provides a platform for proper solid waste disposal within the school, by allowing the researcher to carefully plan the intervention based on key focus and waste characterizations. The schools are committed to protecting the environment by developing practices that are safe, sustainable, and environmentally friendly and have developed a practical, staged approach to managing waste in an increasingly sustainable fashion.

### **METHODS**

#### **Research Design**

This research used quasi-experimental research with a non-equivalent groups design. The data collected was quantitative data to describe the research results. This design is appropriate because it will help evaluate the gain scores of the two groups. The independent variable is the motivation package while the dependent variable is attitude and

achievement, also the fact that random assignment of subjects to the experimental and control group is not possible, in this case, intact or preexisting groups are used justify the use of this design.

### Populations and sampling techniques

The subject of the research is all SSII Geography students of public and private senior secondary schools in Jos South Local Government Area. The stratified sampling and simple random sampling techniques were employed for the study. The sample includes 43 geography SS2 students from intact classes of the four sampled schools (2 private schools and 2 public schools). The experimental group was made up of 8 males and 12 females while the control group was made up of 11 males and 12 females. Therefore there are 20 and 23 students in the experimental and control group respectively.

### Instruments/ Procedure

The Students' Attitudes towards Solid Waste Disposal Questionnaire (SATSWDQ) The SATSWDQ will be used to elicit information from the respondent on their attitudes towards solid waste disposal. SATSWDQ contains 15 items on a four rating scale responses, strongly Agree (SA), Agree (A), and strongly disagree (SD), and Disagreed (D) will be assigned value points of 1,2,3,4. Respectively for positive statements and reverse order for negative statements. The instrument has two sections, sections A and B. Section A contains the biodata like school type, gender, age, and serial number or identification number while section B contains the questionnaire and items to be responded to by the students.

The question is adapted from the study of Teklehana (2015) because it had been used in previous research. The reliability of SATSWDQ was established by the Cronbach Alpha method which generated a result coefficient of were 0.860, hence it is reliable. Students' attitudes towards solid waste disposal data were described to know the mean score of each class (experimental and control group). Before the commencement of the experiment, SATSWDQ was administered to experimental and control groups. Two days after the pre-test, the experimental group was taught geography using the motivational package and the control group was not exposed to the motivational package. At the end of the six

weeks of teaching SATSWDQ was administered immediately to experimental and control groups. The response of students was collected back on the spot and scored by the researcher and research assistant.

### Method of Data Analysis

Research questions 1, 2, 3, and 4 were answered using descriptive statistics, like mean and standard deviation. To test the hypothesis, a t-test of the independent sample was used to test hypotheses 1 and 2, while Analysis of Covariance (ANCOVA) was used to test 3 and 4 respectively. The statistical package for social sciences (SPSS) version 23 was used for the analysis.

## RESULTS

**Research question one:** What is the pre-test solid waste disposal attitude mean scores of the experimental and control groups?

**Table 1:** Pre-test attitudes mean scores of students towards solid waste disposal of experimental and control groups

Group	N	$\bar{X}$	SD	Mean Difference
Experimental	20	34.95	12.081	1.73
Control	23	33.22	11.996	

Table 1 reveals the pre-test students' attitude toward solid waste disposal mean scores of experimental and control groups. The result for the experimental group yielded a mean score ( $\bar{X} = 34.95$ ,  $SD = 12.081$ ) and that of the control group yielded a mean score of ( $\bar{X} = 33.22$ ,  $SD = 11.996$ ). The pre-test students' attitude toward solid waste means scores in both experimental and control groups generally indicated low attitude with a low mean difference (1.73). This could be because both groups were not exposed to treatment.

**Research question two:** What is the post-test solid waste disposal attitude mean scores of the experimental and control groups?

Table 2 reveals the post-test students' attitude toward solid waste disposal mean scores of experimental and control groups. The result for the experimental group yielded a mean score ( $\bar{X} = 41.85$ ,  $SD = 11.962$ ) and that of the control group yielded a mean score of ( $\bar{X} = 35.57$ ,  $SD = 11.996$ ). The post-test students'

attitude toward solid waste means scores in both experimental and control groups generally indicated a high attitude with a high mean difference (6.28). This could be because the experimental groups were exposed to treatment.

**Table 2:** Post-Test Attitudes Mean Scores of Students Towards Solid Waste Disposal of experimental and control groups

Group	N	$\bar{X}$	SD	Mean Difference
Experimental	20	41.85	11.962	6.28
Control	23	35.57	11.996	

**Research question three:** What is the post-test attitude mean scores of private and public school students towards solid waste disposal in the experimental group?

**Table 3:** The effects of solid waste disposal package on student's solid waste disposal attitude in private and public schools

Group	School Type	N	$\bar{X}$	SD	Mean Difference
Experimental	Public	4	38.50	12.279	4.19
	Private	16	42.69	11.861	

The result in table 3 indicated that the mean scores of public schools in the experimental group are  $\bar{X} = 38.50$  and private schools  $\bar{X} = 42.69$  with the SD 12.279 and 11.861 respectively. This result shows that private schools students had a better attitude toward solid waste disposal than public schools student in the experimental group.

**Research question four:** What is the post-test attitude mean scores of boys and girls towards solid waste disposal in the experimental group?

**Table 4:** The effect of solid waste disposal motivational package on student solid waste disposal attitude of boys and girls

Group	Gender	N	$\bar{X}$	SD	Mean Difference
Experimental	Male	8	28.88	11.824	13.7
	Female	12	42.58	11.713	

The result in table 4 indicated that the mean scores of male students in the experimental group are  $\bar{X} = 28.88$  and female students  $\bar{X} = 42.58$  with the SD 11.824 and 11.713 respectively. This result shows

that female students had a better attitude toward solid waste disposal than male students student in both the control and experimental group.

**Hypothesis One:** There is no significant difference between the experimental and control groups' pre-test solid waste disposal attitude mean scores

**Table 5:** Results of t-test analysis for the difference between pre-test attitude toward solid waste Disposal mean scores of Experimental and Control Groups

Group	N	$\bar{X}$	SD	Df	T	p-value
Experimental	20	34.95	12.081	41	0.809	0.423
Control	23	33.22	11.996			

Table 5 reveals the t-test for independent sample on pre-test solid waste disposal attitude p mean scores of Experimental and Control Groups. The table shows that the mean value for the experimental group and control group were ( $\bar{X} = 34.95$ , SD = 12.081) and ( $\bar{X} = 33.22$ , SD = 11.996) respectively. The t statistics was 0.809 since the p-value (0.423) is greater than the 0.05 level of significance, the null hypothesis was retained that is there is no significant difference between the experimental and control group pre-test solid waste disposal attitude mean score. It indicated that the pretest mean scores of the experimental group were not statistically significantly different from the pre-test solid waste attitude mean scores of the control group. The two groups were thus considered to be equivalent before the commencement of treatment.

**Hypothesis two:** There is no significant difference between the experimental and control groups' post-test solid waste disposal attitude mean scores

**Table 6:** Results of t-test analysis for the difference between post-test attitude toward solid waste Disposal mean scores of Experimental and Control Groups.

Group	N	$\bar{X}$	SD	Df	T	p-value
Experimental	20	41.85	11.962	41	2.218	0.040
Control	23	35.57	11.996			

Similarly, From table 6, it shows that the post-test mean value for the experimental group and control group were ( $\bar{X} = 41.85$ , SD = 11.962) and ( $\bar{X} = 35.57$ , SD = 11.996) respectively. The t statistics was 2.218 since the p-value (0.040) is less than the 0.05 level

of significance, the null hypothesis was rejected that is there is a significant difference between the experimental and control group post-test solid waste disposal attitude mean score. It indicated that the post-test mean scores of the Experimental group were statistically significantly different from the pre-test solid waste attitude mean scores of the control group. This difference was because of the treatment package used.

**Hypothesis three:** There is no significant difference between private and public school students' post-test attitude mean scores towards solid waste disposal.

**Table 7:** ANCOVA Summary Results of Difference in the Effect of Solid Waste Motivational Package on Students' Solid Waste Disposal Attitude in public and private School

Source	Type III Sum of Squares	Df	Mean Square	F	Sig.
Corrected Model	6222.609 <sup>a</sup>	2	3111.305	1479.195	.000
Intercept	124.316	1	124.316	59.103	.000
SATSWDQ	5773.302	1	5773.302	2744.777	.000
SCHTYPALL	148.118	1	148.118	70.419	.000
Error	84.135	40	2.103		
Total	70005.000	43			
Corrected Total	6306.744	42			

a. R Squared = .987 (Adjusted R Squared = .986)

The analysis of variance (ANCOVA) was conducted in table 7 to determine the significant effect of treatment package on students' solid waste disposal attitude based on school type. The effect of school type (public and private) yielded a mean of ( $\bar{X}$  = 36.00, SD = 11.760) and ( $\bar{X}$  = 42.29, SD=12.279) respectively. The result in table 18 further shows that  $F(1,40) = 70.419$ .  $P = 0.000$ . Since, the p-value of 0.0000 is less than 0.05 level of significance, the null hypothesis is rejected, indicating that there is a significant effect of treatment and school type on student attitude mean scores toward solid waste disposal

**Hypothesis four:** There is no significant difference between boys' and girls' post-test attitude mean scores towards solid waste disposal

**Table 8:** ANCOVA Summary results on effects of treatment on student solid waste disposal attitude based on gender

Source	Type III Sum of Squares	Df	Mean Square	F	Sig.
Corrected Model	6276.250 <sup>a</sup>	2	3138.125	4116.379	.000
Intercept	122.329	1	122.329	160.462	.000
SATSWDQ	5706.638	1	5706.638	7485.578	.000
GENDERALL	201.759	1	201.759	264.654	.000
Error	30.494	40	.762		
Total	70005.000	43			
Corrected Total	6306.744	42			

a. R Squared = .995 (Adjusted R Squared = .995)

The ANCOVA was conducted in table 8 to determine the significant effect of treatment package on students' solid waste disposal attitude based on gender. The effect of gender (male and female) yielded a mean of ( $\bar{X}$  = 42.58, SD=11.824) and ( $\bar{X}$  = 35.25, SD=11.833) respectively. The result in table 15 further shows that  $F(1,40) = 254.654$ .  $P=0.000$ . Since the p-value of 0.0000 is less than 0.05 level of significance, the null hypothesis is rejected, indicating that there is a significant effect of treatment and gender on student attitude mean scores toward solid waste disposal

## DISCUSSION

The study established that the pretest mean scores of the experimental group were not statistically significantly different from the pre-test solid waste attitude mean scores of the control group. The two groups were thus considered to be equivalent before the commencement of treatment. It indicated that the post-test mean scores of the Experimental group were statistically significant differences from the pre-test solid waste attitude mean scores of the control group. This difference was because of the treatment package used. There is a significant effect of treatment and school type on student attitude mean scores toward solid waste disposal. These findings agreed with the works of Siwakoti (2009); Ogunjinmi, Onadeko, and Adewumi (2012), and Tekelehana (2015).

The findings further show that gender has a significant effect on student attitude mean scores

toward solid waste disposal. These findings disagreed with the works of Onoja (2014) that revealed that there is no significant difference between the male and female students' mean scores on environmental awareness and attitude. The study concluded that the senior secondary school students in the Anpka education zone possessed low environmental awareness and attitude; that there is no significant difference between male and female students concerning environmental awareness and attitude; there is a significant difference between urban and rural students' environmental awareness and attitude.

## CONCLUSION

Based on the findings of the study, it was concluded that the Motivation Package has a significant effect on students' attitudes towards solid waste disposal, gender has a significant effect on students' attitude towards solid waste disposal and school type has a significant effect on students attitude towards solid waste disposal among Secondary School Students in Jos North, Plateau State, Nigeria. The findings have far-reaching implications for teachers, teacher educators, educational researchers, science associations, institutions/governments/agencies, companies, and individuals concerned with science and environmental education, among others. For instance, relevant institutions/policymakers should ensure that Environmental Education should be stated clearly in the vision of the Federal Republic of Nigeria and given the attention it deserves. Environmental Education should be made a core course and not just have its concepts infused here and there in school curricula. Important issues on environmental education especially solid waste management should be built and incorporated into the school curriculum of each discipline at all tiers of education, that is primary, secondary, and tertiary levels to create awareness/knowledge and acquisition of favorable attitudes toward environmental issues and problems, particularly, solid waste management for a sustainable environment. Institutional frameworks should be made to align with global best practices. There should be reviews and regularization of regulations and policies to encourage teachers' participation both at the level of formulation and implementation.

## Recommendation

Based on the findings above the following recommendations were made;

In planning for instruction, geography teachers in public and private schools should show or itemize what learners need to know in Environmental Education, how learners are to achieve the intended goals, what teachers need to do to help students develop the required knowledge, and attitudes in the context in which teaching and learning occur. Teachers should be knowledgeable in Environmental Motivation Package and Environmental Education issues and teach students with commitment and appropriate and engaging strategies and activities that will improve students' acquisition and development of favorable attitudes toward solid waste management and other Environmental Education-related issues. There should be training and re-training of geography teachers through a series of workshops, seminars, and symposia on Environmental Motivation Package, environmental issues, and problems as well as how to come up with effective pedagogy in handling the teaching and learning of solid waste management practices in secondary schools.

Female and male students should take part in the Green club to promote their knowledge and attitudes toward solid waste management to equip them for sensitizing and inculcating such attitudes and values in the future.

Geography teachers associations at national and international levels should mount conferences and workshops to sensitize teachers and teacher educators on various aspects of the Environmental Motivation Package, environmental/education, and hazards, as well as, and their incorporation into school curricula through the dissemination of communiqua from such activities to relevant agencies and organs of government for policy decisions and implementation.

Companies should be sensitized on the dangerous effects of indiscriminate and improper disposal of solid wastes and the need to employ environment-friendly strategies such as recycling of industrial waste products through relevant agencies and defaulters sanctioned.

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