

Assessment of the Influence of Environmental Adult Education on Solid Waste Management in South-South Federal Universities, Nigeria

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Abstract: The study examines the influence of environmental adult education (EAE) on solid waste management in Federal Universities in South-South Nigeria. The data were collected using a structured questionnaire. Findings from the study revealed that awareness of staff and students in Federal Universities in South-South Nigeria on solid waste management is low. The study further revealed that despite the positive influence of EAE on solid waste management on universities campuses the universities managements are not promoting EAE. The study concluded that EAE which promotes awareness of and about the environment among the staff and students must be introduced. The study recommended that management of the universities should carry out aggressive EAE on campus by introducing it as a compulsory General Studies course for students at all levels and organize regular seminars/workshops based on EAE to staff, students, and other members of the university communities.

Key words: Environment, Adult Education and Solid Waste Management.

I. INTRODUCTION

There is no gainsaying that one of the greatest endowments of nature is the natural environment. Man is born into the environment, does all his life endeavors in and from the environment, dies in the environment, and buried in the same environment that once gave him life and comfort. These wastes which are either in solid, liquid, or gaseous forms, need to be properly managed otherwise they could constitute serious threat to the environment and hazardous to man's health and existence.

Thus, waste management is an activity that should be an integral part of man's life. Waste management refers to all those activities and actions required to manage waste from its inception to its final disposal (Uhuo and Zavodska, 2016). This includes amongst other things, collection, transport, treatment and disposal of waste together with monitoring and regulation. It also encompasses the legal and regulatory framework that relates to waste management encompassing guidance on recycling etc. Individuals and organisations of various natures generate waste in the process of their operation and existence, thus one of the major activities in all organisations is how they manage their corporate wastes.

The result of the continuous expansion of federal universities in Nigeria is massive inflow of students, staff (teaching and non-teaching) and other people and institutions whose daily

activities are linked to the university. In some universities, manufacturing companies are established as a source of revenue generation. Furthermore, some of the universities that have Faculty of Agriculture operate farms that produce lot of crops and vegetables as well as animal and poultry products and in the process generate large quantity of solid waste. At the various staff residential quarters, huge amount of solid wastes [biodegradable and non-biodegradables] are generated daily. At the Health Services Department, large amount of medical wastes are generated. On a daily basis, large quantities of wastes especially from food substances are also generated from the students' hostel. Since all these endeavors generate such magnitude of wastes daily, there is a dare need to properly manage these wastes in order to avert a disastrous situation such as outbreak of diseases on the campuses.

However, it is depressing to observe that in all the universities in South-South Nigeria, the problem of solid waste management is very monumental. Solid wastes such as papers and food substances are dumped on the ground without proper collection facilities. At times, these wastes litter the campus, creating offensive odour which constitutes a health hazard to members of the University communities. Even when these wastes are collected, they are disposed off in large pits within the campuses. This puts the lives of those in the surrounding area at risk. When the wastes get dried they are burnt and at other times, they are buried. These practices are outdated and unfriendly to the environment as they increase the problem of air pollution and contamination of underground water. In these institutions, there appear to be no clear plans to recycle these wastes or convert them to wealth.

For man to play his role effectively in the mutualistic relationship between man and his natural environment, he requires certain fundamental and requisite knowledge and skills. In this direction, Jain and Rao (2014) indicate that:

The human factor in the development of the various pursuits is very important because it is man who can use the existing resources on earth in a real and constructive manner. The extent to which man is able to exploit the environment depends on a number of factors, chief among them being the knowledge, skill, hard work and proper training...

Obviously, this knowledge, skill, and training fall into the purview of environmental education, and environmental adult education in particular. Environmental education refers to a process that allows individuals to explore environmental issues, engage in problem solving, and take appropriate actions to improve the environment (Ehezuzi, 2016). The natural result of this kind of education is that the individuals involved develop a deeper understanding of environmental issues and acquire the requisite skills to make informed and responsible decisions.

Environmental adult education, according to Ononeze (2019) is a hybrid outgrowth of the environmental movement and adult education, which combines ecological orientation with learning paradigm to provide a vigorous educational effort in teaching environmental issues. In simple terms, Okorie (2016) describes environmental adult education as that education that enables adults to understand the nature of the natural environment by increasing their environmental literacy. It is this type of education that focuses on the complexity of the environment and how the interactions and action of adults on environment have affected the seen and the unseen environment and provides information to the learners on how to sustain the environment. According to Mbalisi (2016), it is an educational programme that enables people to be conscious of what they already know about their environment and have the knowledge close at hand through their daily actions.

The simplest and perhaps the most comprehensive meaning of the concept of environmental adult education is captured in the UNESCO Tbilisi Declaration of 1977 in Ehezuzi (2016) which describes it as:

A learning process that increases people's knowledge and awareness about the environment and associated challenges, develops the necessary skills and expertise to address these challenges, and fosters the attitudes, motivations and commitments to make informed decisions and take responsible actions.

In the light of the fact that academic and social activities in universities generate large amount of solid wastes, there is need to examine the waste management policies and practices in federal universities in South-South Nigeria with a view to ascertaining if they meet acceptable standards as stated in the Nigeria National Policy on Environment. Consequently, there is need to critically examine environmental adult education and vis-a-vis its role in promoting and engendering proper and acceptable waste management policies and culture in the university campuses since majority of the people on the universities campuses are adults.

Statement of the Problem

Successive governments in Nigeria appear to be overwhelmed by the enormity of the problem of solid waste management. The scenario is not different in federal universities in the South-South Nigeria. However, management of tertiary institutions in this zone has been making efforts to ensure that

wastes do not constitute a health hazard on campus. Though the university is a place where sound minds and disciplined people are trained, the attitude of members of the universities communities do not significantly differ from those outside the campus. This therefore presents the challenge of education, especially environmental education, since those who operate in the University campuses are mostly literate in the general form of education but not specifically in environmental education. It also presupposes that there is dearth of environmental adult education as well as weak commitment by the management of the institutions to ensure proper management of solid waste on the campuses. The problem of this study therefore is to ascertain the level to which environmental adult education promotes solid waste management in federal universities in South-South Nigeria.

Research Questions

The following research questions were posed to guide the study:

- i. What is the level of environmental awareness among staff and students in universities in south-south Nigeria?
- ii. To what level can environmental adult education promote solid waste avoidance/reduction in federal universities in south-south Nigeria?
- iii. To what level can environmental adult education stimulate environmental friendly solid waste disposal methods in federal universities in south-south Nigeria?
- iv. To what level does management of federal universities in south-south Nigeria promote environmental adult education for solid waste management among staff and students in the universities?

Objectives of the Study

In specific terms, the study sought to:

- i. examine the level of environmental awareness among staff and students in universities in south-south Nigeria;
- ii. ascertain the level to which management of Federal Universities in South-South Nigeria promote environmental adult education for solid waste management among staff and students in the universities.

II. METHODOLOGY

The study adopted the descriptive survey design which was considered suitable for this research since it accommodates systematic collection, analysis and presentation of data collected without any manipulation. The population of the study is 43,481 individuals, consisting of principal officers, academic staff, senior non-academic staff, and post-graduate students in the six (6) Federal Universities in South-South Nigeria.

Table 1: Population of the Study

S/N	Name of Institution	Category of Staff			Post Graduate Students	Total
		Principal Officers	Academic	Senior Non-Academic		
1	University of Port Harcourt	6	1,344	1,340	8,006	10,696
2	University of Uyo	6	1,004	1,150	7,472	9,632
3	University of Benin	6	1,450	1,950	7,661	11,067
4	University of Otueke	6	420	336	450	1,212
5	University of Calabar	6	1,201	1552	7,340	10,099
6	Petroleum University, Delta State	6	321	448	0	775
Total		36	5,740	6,776	30,929	43,481

Source: Establishments Division, Registry Department, and Post-Graduate Schools of the Universities as at 2020.

The subjects in this study were chosen due to their involvement in waste management in the institutions either by way of waste generation, policy formulation, monitoring of policy compliance, evaluation of actions, etc. Post graduate students were included in the population not only because they form an integral part of the university community but they are more aware of the subject of waste management than the undergraduates.

The sample of the study is 972 universities staff and students selected through the multi-stage sampling procedure. In the first stage, the researcher purposively selected all the six (6)

Federal Universities in the study area. In the second stage, the Taro Yamen formula was used to determine the minimum sample to be selected for the study which is 400 ($n = 400$). In the third stage, purposive sampling technique was used to select all the principal officers in the six universities under study while proportionate sampling technique was used to select the sample in the other strata in the population. 100% of the principal officers were selected in the management stratum, 5% of academic and senior non-academic staff in the staff strata; and 1% of post-graduate students. Table 2 below shows details of sample selected.

Table 2: Sample Selected for the Study

S/N	Name of Institution	Category of Staff					Post Graduate Students	1%	Sample Selected
		Principal Officers	Academic	5 %	Senior Non-Academic	5 %			
1	University of Port Harcourt	6	1,344	67	1,340	67	8,006	80	220
2	University of Uyo	6	1,004	50	1,150	58	7,472	75	189
3	University of Benin	6	1,450	73	1,950	98	7,661	76	253
4	University of Otuoke	6	420	21	336	17	450	5	49
5	University of Calabar	6	1,201	60	1552	78	7,340	73	217
6	Petroleum University, Delta State	6	321	16	448	22	0	0	44
Total		36	5,740	287	6,776	340	30,929	309	972

The instrument for data collection is a structured questionnaire titled: Environmental Adult Education and Waste Management in Universities Questionnaire (EAEMUQ). The questionnaire structured in the 4-point modified Likert Rating Scale has a reliability index of 0.87. Out of the 972 copies of the questionnaire administered, 102 and 76 post graduate students and non-academic staff respectively did not return their copies. However, all the 794 copies returned were properly filled and used for data analysis.

The data collected were presented in tables and processed using statistical tools of mean (weighted mean and pooled

mean). A criterion mean (\bar{X}_c) of 2.5 which was determined based on the four point scale was used as a basis for decision. Calculated mean scores of 2.50 and above were regarded as high and acceptable while scores below 2.50 were regarded as low and rejected.

III. RESULTS

RQ 1: What is the level of environmental awareness among staff and students in Federal Universities in South-South Nigeria?

Table 3: Computed Mean Responses and Weighted Means on the Level of Environment Awareness among Staff and Students in Universities in South-South Nigeria

S/N	Questionnaire Items	VHL (4)	HL (3)	LL (2)	VLL (1)	Total	\bar{X}	Remark
1	Awareness of the natural environment.	290	334	100	70	794	3.06	HL
		(1,160)	(1,002)	(200)	(70)	(2,432)		
2	Awareness of the physical environment of the university.	400	250	77	67	794	3.24	HL
		(1,600)	(750)	(154)	(67)	(2,571)		
3	Awareness of solid waste management.	97	101	350	246	794	2.06	LL
		(388)	(303)	(700)	(246)	(1,637)		
4	Awareness of environmental friendly attitudes to campus environment.	88	94	344	268	794	2.00	LL
		352	(282)	(688)	(268)	(1,590)		
5	Awareness of environmental laws.	72	55	200	522	794	1.73	VLL
		(288)	(165)	(400)	(522)	(1,375)		
Grand Mean							2.42	LL

From Tables 3 above, we observed that with a grand mean of 2.43 which is slightly less than the criterion mean there is low level of awareness on solid waste management among staff and students in universities in south-south Nigeria. The level of awareness on waste management, environmental laws, and environmental friendliness is amazingly low.

RQ 2: To what level can environmental adult education promote solid waste avoidance/reduction in Federal Universities in South-South Nigeria?

Table 4: Computed Means and Weighted Means on the Level to which Environmental Adult Education promotes Waste Avoidance/Reduction in Federal Universities in South-South Nigeria

S/N	Questionnaire Items	VHL (4)	HL (3)	LL (2)	VLL (1)	Total	\bar{X}	Remarks
6	Reduce solid waste generation.	391	272	100	31	794	3.29	HL
		(1,564)	(816)	(200)	(31)	(2,611)		
7	Waste reduction.	399	300	60	36	794	3.39	HL
		(1,596)	(900)	(120)	(72)	(2,688)		
8	Waste avoidance.	407	317	48	22	794	3.40	HL
		(1,628)	(951)	(96)	(22)	(2,697)		
9	Waste reuse.	423	333	30	8	794	3.47	HL
		(1,692)	(999)	(60)	(8)	(2,759)		
10	Waste to wealth.	459	211	58	66	794	3.34	HL
		(1,836)	(633)	(116)	(66)	(2,651)		
Grand Mean							3.58	VHL

Observations on data analysis in Table 4 shows that all the items recorded mean scores higher than the criterion mean and that to a high level, the respondents accepted all the items. On the basis of the above analysis, we observed that environmental adult education to a very high level, promotes waste avoidance/reduction in Federal Universities in South-

South Nigeria. This is supported by the weighted grand mean ($\bar{X}_{wg} = 3.58$) being greater than the criterion mean.

RQ 3: To what level can environmental adult education stimulate environmental friendly solid waste disposal methods in Federal Universities in South-South Nigeria?

Table 5: Computed Means and Weighted Means on the Level EAE Stimulates Environmental Friendly Waste Disposal Methods in Federal Universities in South-South Nigeria

S/N	Questionnaire Items	VHL (4)	HL (3)	LL (2)	VLL (1)	Total	\bar{X}	Remarks
11	Use of waste bin	500	220	74	0	794	3.54	VHL
		(2,000)	(660)	(148)	(0)	(2,808)		
12	Incineration.	494	206	80	14	794	3.49	HL
		(1,976)	(618)	(160)	(14)	(2,768)		
13	Land filling.	367	283	94	50	794	3.22	HL
		(1,468)	(849)	(188)	(50)	(2,555)		
14	Waste separation from source	352	318	100	24	794	3.26	HL
		(1,408)	(954)	(200)	(24)	(2,586)		
15	Waste bagging.	540	230	20	4	794	3.64	VHL
		(2,160)	(690)	(40)	(4)	(2,894)		
16	Waste transportation	555	234	5	0	794	3.69	VHL
		(2,220)	(702)	(10)	(0)	(2,932)		
17	Adequate dump site management	600	174	0	0	794	3.68	VHL
		(2,400)	(522)	(0)	(0)	(2,922)		
Grand Mean							3.50	VHL

Observations on data analysis in Table 5 above shows that all the items recorded mean scores higher than the criterion mean and that to a high level, the respondents accepted all the items. With a grand mean of 3.57, the study revealed that environmental adult education, to a very high level, stimulates

environmental friendly waste disposal methods in federal universities in south-south Nigeria.

RQ 4: To what level does management of Federal Universities in South-South Nigeria promote environmental adult education for solid waste management among staff and students in the universities?

Table 6: Computed Mean Responses and Weighted Means on the Level of Management of Federal Universities Promotion of EAE Strategies for Solid Waste Management among Staff and Students

S/N	Questionnaire Items	VHL (4)	HL (3)	LL (2)	VLL (1)	Total	\bar{X}	Remarks
18	Teach EAE as a course.	21	12	143	618	794	1.29	VLL
		(84)	(36)	(286)	(618)	(1,024)		
19	Erect electronic/digital bill board.	5	8	111	670	794	1.18	VLL
		(20)	(24)	(222)	(670)	(936)		
20	Erect analogue bill boards.	100	77	200	417	794	1.82	VLL
		(400)	(231)	(400)	(417)	(1,448)		
21	Circulate handbills on EAE.	4	4	121	665	794	1.17	VLL
		(16)	(12)	(242)	(665)	(935)		
22	Organize awareness campaign.	54	63	232	445	794	1.65	VLL
		(216)	(189)	(464)	(445)	(1,314)		
23	Educate staff and students on waste management laws through seminars and workshops.	7	3	222	562	794	1.31	VLL
		(28)	(9)	(444)	(562)	(1,043)		
24	Reward environmental friendly behaviours among staff and students.	0	0	59	735	794	1.07	VLL
		(0)	(0)	(118)	(735)	(853)		
Weighted Grand Mean							1.33	VLL

The analysis of data on RQ 4 as contained in Table 6 shows that all the items recorded very low level responses from the respondents. The analysis shows a weighted grand mean of 1.33. This is far lower than the criterion mean of 2.5. This therefore implies that management of Federal Universities in South-South Nigeria, to a very low level, promotes environmental adult education for solid waste management among staff and students in the universities.

IV. DISCUSSION OF FINDINGS

The result of this study in RQ 1 revealed that though members of the university communities in the study area are aware of their physical and natural environment, their level of awareness of solid waste management is low. Many of them have the wrong notion that solid waste management ends at the point of disposal. Their level of awareness of environmental friendly attitudes to campus environment is also very low and hence, they do not see burning of solid waste as an inappropriate and unfriendly action. Also, their level of awareness of environmental laws is also very low.

The combinations of ignorance of modern solid waste management techniques and ignorance of extant environmental laws have increased the propensity of staff and students of the universities to exhibit unfriendly environmental attitude. These findings corroborate Uhuo and Zavodská (2016) who observed that "...knowledge and understanding of the environment are important since a degraded environment means a lower quality of life for all".

The study also revealed that environmental adult education has the capacity to significantly promote solid waste avoidance and reduction in federal universities in South-South Nigeria. This is because knowledge of EAE helps people to reduce the quantity of solid waste they generate in their residence, offices and business areas. Application of EAE knowledge fosters solid waste reduction, avoidance and promoted waste reuse. Desa, Kadir & Yusof (2015) highlighted the importance of solid waste reduction on campus when they observed that recycling alone will not earn a campus a clean bill of environmental health. Waste reduction and reuse are far more effective ways of reducing environmental impact, and the goal should be a net reduction in the campus waste stream.

Apart from the above which is how EAE can help individuals to promote waste avoidance and reduction in universities, the institution can also engage in waste to wealth activities. If they direct the contractors or the units responsible for solid waste collection, transportation and disposal to separate the biodegradable wastes and dump them in a designated place(s) in the University Farms where they can be converted to compost manure. Eric (2020) noted that farm produce grown with compost manure have been proven to be more nutritious than the ones grown with non-organic fertilizers. Thus EAE not only reduces solid waste generation; but encourages solid waste reuse, influences solid waste avoidance, and promotes waste to wealth policies and activities. These findings are in consonance with Desa, et al (2015) who emphasized that the

culture of environmental friendliness can be inculcated in the minds of people through environmental education; and that waste management should not be concerned only with the conversion of solid waste for reuse, but reduction of activities that generate wastes, and that environmental adult education is a veritable tool for achieving this.

The study furthermore, revealed that environmental adult education significantly stimulates environmental friendly waste disposal methods in Federal Universities in South-South Nigeria. It does this through exposing people to the various modern and acceptable solid waste disposal techniques that will make the environment safe and decent. Such techniques include: use of waste bin, incineration, land filling, waste separation from source, waste bagging, appropriate waste transportation, and adequate dump site management. According to Igbinsa and Osayanda (2017) information and knowledge are critical to action and performance. Pfeffer and Sutton (2000) opined that "there is only a loose and imperfect relationship between knowing what to do and the ability to act on that knowledge". This inability to transfer knowledge of what needs to be done into action and/or behaviour that is consistent with that knowledge is called the 'knowing-doing gap' or the 'performance paradox'.

In RQ 4, it was revealed that the level to which Federal Universities in South-South Nigeria promote environmental adult education for solid waste management among staff and students in the universities is unimpressively low. This is in line with Desa, Kadir & Yusof (2015) who opined that any environmental education programmes at a university must be rooted in the belief that the process of paying attention to the environment will have the greatest impact if it becomes an integral part of the educational mission of the institution. Similarly, Uhuo and Závodská (2016) held the opinion that there is an obvious inadequacy in the environmental education pattern in both the Nigerian and Guyanese educational curricula as pertaining solid waste management. While asserting that the Nigerian National Educational Research and Development Council (NERDC) only touched elementary facts on environmental issues in Social Studies, Health Education, Integrated Science, Agricultural Science and Geography among others, they recommended that the curricula of both countries need to be adjusted to include environmental education topics and training at the primary, secondary, tertiary, and non-formal education levels.

V. CONCLUSION

Based on the findings, this study concluded that the level of environmental awareness among staff and students in universities in South-South Nigeria is low. This is not far from the fact that the universities managements are not showing enough commitment to attitudinal change towards the promotion of sustainable environment through creation of positive environmental awareness and consciousness among staff and students especially as it concerns solid waste management. This study further conclude that the universities

in South-South Nigeria are not promoting environmental adult education that could develop in the staff and student environmentally friendly attitude that could bring about effective solid waste management in the universities campuses. This is despite the fact that all the universities in the region have departments of adult education with environmental adult education specialists that can serve as resource persons in organizing environmental education programmes that could promote environmental awareness and positive attitudes to the environment among staff and students in the universities.

VI. RECOMMENDATIONS

Based on the findings and the conclusion, this study recommends that:

1. University management in South-South Nigeria should develop result-oriented environmental management policy and actions that adopts environmental adult education as instrument for awareness creation for effective management of solid waste generated by staff and students on campus.
2. Specifically, university management should ensure that EAE is offered as General Studies Course and should be mandatory for all students. At the post graduate levels, university management should find a way of incorporating EAE it into the curriculum of all courses.
3. Management of the universities should build digital and other types of bill boards reflecting the tenets of EAE, and solid waste management tips at strategic points in the universities. Other materials such as flyers, posters, handbills and banners should be used to create and promote environmental awareness among members of the university communities.
4. Departments of adult education in the universities should regularly organize university-wide seminars on solid waste management for staff, students and other stakeholders in the universities communities such as traders, business centre operators (including banks), contractors, the security department and other law/policy enforcers. During orientation programmes for first year students, experts in environmental education should be invited to deliver lectures on environmental friendliness, and solid waste management particularly on the university campus.
5. University management should encourage both staff and students to form environmental management clubs. This will be a good forum to inculcate the values of friendly environmental attitudes to members. Experts on EAE should be invited by the club leadership, from time to time, to deliver talks to club members. This will reinforce the lessons learned in EAE classes.

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