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An Investigation of the Factors Motivating Students' Stay in Private Universities' Hostels.

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Abstract: Provision of housing accommodation to students of higher institutions has been a great challenge over the years. Various efforts had been made both by the government and private individuals/organisations to assuage this situation but astronomical increase in the number of students gaining admission into the available institutions has all the time dwarf these efforts. This study therefore examined the factors motivating students to stay in the hostels. Questionnaires were administered on 325 students in the Bells University of Technology and Crawford University. The data collected were analysed using frequency distribution and mean. . The study found that electricity supply, peer/friendship influence, security, parental influence and water supply are mostly the factors motivating students to stay in the hostel. Following these findings, the study recommends that hostel providers should take critical look into and incorporate these factors that motivate students to stay in the hostel. This study is expected to serve as a guide to new hostel providers.
Keywords: Accommodation, Choice, Hostel, Students, University

1.0 Introduction

Housing is an important tripod of human settlement that fulfils basic need. Ibem and Amole (2010) opined that it impacts on the quality of life, health, welfare as well as productivity of man. In a report, The World Bank (2002) defines housing as "the residential environment, neighborhood, micro district or the physical structure that mankind uses for shelter, and the environments of that structure, including all necessary services, facilities, equipment and devices needed for the physical health and social well-being of the family and the individual". It is a fundamental human need in all societies and essential right of every individual. In advanced nations, housing is generously available to all classes of people which include the poor and the needy due to subsidies from the government (Yusuff, 2011).

Over the years there has been increasing concern for student housing resulting from the astronomical rise in student population due to increasing interest to acquire education institutions of higher learning. The upward thrust in population has been accompanied by diverse difficult shape of student housing ranging from wanting infrastructure facilities to overcrowded environment. This has culminated in rejuvenated quest in the search for the best and attainable steps towards achieving efficient, conducive academic driven environment (Owolabi, 2015). The most important thing is that students' housing should offer the primary infrastructure required by the students. In this category are facilities such as toilets, running water, electricity, study room, canteen, buttery, kitchenet recreation area. It is very common to discover that such facilities are either not available or in a state of complete disrepair.

All over the world, provision of accommodation for students' population takes different forms which include non-residential, residential, and dual-residential. The dual-residential would be where the university houses her students' population for a period of time probably the first and final year, while during the remaining period, the students sourced for their own accommodations.

Arising from the above scenarios and the large proportion of students still clamouring to be housed in one way or the other necessitated the need examined the factors motivating them to stay in the hostels.

2.0 Literature Review

Having done the introduction in the previous section, this section of the work is devoted review literature on the importance of hostels in schools. Also it take a look at the advent of private hostels, especially as part of the facilities provided by private universities.

2.1 Importance of Hostels in Schools

Oluwunmi, Akinjare, Ayedun and Akinyemi (2011) posited that the demand for school infrastructure at all stages from the primary to tertiary has a long way transcend the exponential growth of construction of new schools and even the stepping-up of the existing ones. At the tertiary level, the unprecedented boom in the number of applicants for admission on yearly basis has led to the rapid development of new institutions, especially private

universities. Over the years, the aftermath of increased number of applicants has been that the existing institutions have had to double or even triple their intake without a proportionate expansion of facilities, even hostel accommodation.

The significance of the social environment in students' life cannot be overemphasized. One of the main features that students and their parents are concerned about when enrolling in a university is the availability of facilities for student accommodation. The import of housing as a major determinant of man's welfare, life sustenance and survival are of great importance. It has and will always be a primary concern to individual, family, community and the nation in general. Housing is vital to human existence as it ranks among the top three needs of man. Its provision has always been of great necessity to man. As a unit of the environment, housing has profound influence on the health, efficiency and social welfare of the community (Omole, 2001).

According to Ajayi, Nwosu and Ajani (2015) students' housing constitutes part of the facilities that students take into consideration before making a choice of the school they intend to attend among other considerations. This therefore makes it very necessary for schools to give students housing a top precedence while enhancing the reputation of the school among other issues. Ajayi, Nwosu and Ajani (2015) further viewed students' housing to include facilities such as bedrooms which can serve the dual purpose of study and sleeping, bathrooms and toilets, kitchen, laundry, recreational areas and access to internet services as

this further improve the study-learning experience.

Commenting on facilities needs for students' accommodation, Abramson (2009) stated that the student housing can be further enhanced by providing additional facilities such as ATM machines, car park, mini markets, bookshops and cafeterias within the precinct of the students' housing. Students' housing in Nigeria has not received the desired attention both from the government and the management of the institutions as Ubong (2007). The author observed that hostel accommodation has not received the required attention although it is a very integral part of pupil personnel management. The author further observed that inadequate maintenance of the services and infrastructure of hostel accommodation is also predominant. There have been reported cases of students taking ill in the hostels as a result of poor sanitary conditions. It is important to note that student accommodation must not only be adequately provided for in relation to the student population of a university, but it must also be able to satisfy their needs if the best in term of academic excellence is to be gotten from them.

Various studies, including Akpan (2000), Federal Republic of Nigeria (FRN, 1998) Ukeje, Akabogu and Ndu (1992), had identified the benefits derived by students' staying in the hostel that it facilitates learning, co-curricular activities, security, moral training, national integration, private relationships and pupil personnel management (PPM)

Private investment in hostel facilities is a global phenomenal. In the United Kingdom, the volume of investments

in student housing has increased by more than 120% between 2011 and 2012 and was then projected to remain positive for the next 10 years. In Nigeria, investment in hostel accommodation dated back to 1980. It came as an intervention in solving the problem of accommodation faced by students in Universities that operated non-residential policy. Public universities were finding it difficult to accommodate the teaming population of students giving admission, due to limited spaces available and the cost of providing hostels was becoming very astronomical and beyond their financial capabilities. Following the recommendations of the harmonizing Committee was set up in 1998 that student accommodation and feeding should be fully privatized, private investors came into the business of provision of private accommodation even at an exorbitant cost (Sawyerr and Yusof (2013)). According to Aguda (2005) private sector involvement in student hostel development in Nigeria was not common because the investors perceived it as a risky venture and the demands of management of institutions are huge. However, with the advent of private universities in the educational scene in Nigeria opens a floodgate of provision of hostels to house the students. Most of the private universities are fully residential with aim of keeping good eye on students' security and engender proper moral upbringing.

3.0 Methodology

The study was carried out using survey approach. Questionnaires were administered to students from the selected institutions by adopting multi-step sampling methods. A total of 344 respondents were adopted from the two universities (Bells University of Technology, 194 and Crawford University, 150). The study sampled only the students living within the hostels. This was done with the understanding that they will be able to state the reasons why they have opted to stay in the hostels. Out of the administered questionnaires, 334 copies were retrieved out of which 9 were not properly completed hence, they were rejected. The remaining 325 copies were used for the analysis contained in this study. The data collected was then processed and analysed through the use of appropriate statistical tools in order to ensure a meaningful presentation and analysis of data collected.

4.0 Results and Discussion

This research was carried out with the main purpose of identify the factors that motivate students to stay in hostels provided within the school premises. The study was conducted on students of Bells University of Technology, Ota and Crawford University, Igbesa, all in Ado/Odo – Ota Local Government Area of Ogun State. The data collected was collated and analysed as contained in Tables 1 – 4.

Table 1: Response Rate

Universities	No. of Questionnaires Administered	No. of Questionnaires Retrieved
Bells	194	182
Crawford	150	143

Total	344	325

Table 1 contains the response to the questionnaire administered on the respondent students in each of the universities. 56.9% response rate was gotten from Bells University of Technology and 41.6% in Crawford

University. The table show 4 94.5% of the quest administered was retrieved. The total percentage return of 94.5% was adjudged adequate to be able to generalize the findings from the study.

Table 2: Respondents' Profile

Characteristics	Sub-headings	Bells	Crawford
		F (%)	F (%)
Age of Respondents	Below 16 years	0 (0)	7 (4.9)
	16 – 20 years	119 (65.4)	84 (58.7)
	21 - 25 years	57 (31.3)	41 (28.7)
	26 - 30 years	6 (3.3)	8 (5.6)
	30 years above	0 (0)	3 (2.1)
	Total	182	143
Gender of Respondents	Male	106 (58.2)	104 (72.7)
	Female	72 (41.8)	39 (27.3)
	Total	182	143
Respondent's Academic Level	200	60 (33.0)	22 (15.4)
	300	71 (39.0)	32 (22.4)
	400	27 (14.8)	68 (47.6)
	500	24 (13.1)	4 (2.8)
	Total	182	143

The profile of the respondents were as shown in Table 2. Consideration was basically on the age, gender and academic level of the respondents. From the table, it could be inferred that the student age clustered around 16 and 25 years (Bells 96.7% and Crawford 87.4%). This shows that the students are still within the age bracket at which they should be able to state what motivates them to opt to staying in the hostels. The gender of the respondent students as contained in Table 2 indicates that 58.2% of the students in Bells University are males while the remaining 41.8% are females. On the other hands, male students in Crawford University accounted for 72.7% while the female students accounted for 27.3%. From this, it could be inferred that the study is gender inclusive, it considers the views of both gender on the issues of hostel facilities. Academic level of respondents shows that respondents cut across the various class levels of the two universities. It is evident from Table 2 that respondents are at different level of academic pursuit in the selected universities. However, a great percentage (39.0%) of the respondents in Bells are in 300 level while in Crawford, they are in 400 level (47.6%).

Table 3: Occupants per Hostel Room

Occupants per Hostel Room	Bells	Crawford
	F (%)	F (%)
2	9 (4.9)	21 (14.7)
3	3 (1.6)	4 (2.8)
4	78 (42.9)	61 (42.7)
5	15 (8.2)	0 (0)
6	57 (31.3)	35 (24.5)
8	20 (11.0)	22 (15.4)
Total	182 (100)	143 (100)

Hostel room occupancy in the selected universities are depicted in Table 3. The occupancy rate indicates the bed space per room which shows the number of students that can stay in a room. The occupancy ranges from 2 to 8 students per room. The table reveals that the highest room occupancy in the two universities is 4 with proportion of 42.9% and 42.7% for Bells University and Crawford University respectively.

This was followed by room occupancy of 6 that produced 31.3% (Bells) and 24.5% (Crawford). The most crowded room occupancy in the two universities has 8 students in a room. This has proportions of 11% (Bells) and 15.4% (Crawford). As much as hostel accommodation is important, the outcome from this study, where more than 4 students share a room is pathetic and unhealthy.

Table 4: Factors Motivating Students' Stay in the Hostel

Factors	Bells	Crawford	Average Mean	Ranking
	Mean	Mean		
Electricity Supply	4.67	3.56	4.12	1st
Space Adequacy	3.66	2.39	3.03	11th
Serenity/Noiselessness	2.66	2.80	2.73	15th
Natural Ventilation	3.65	2.88	3.27	7th
Security	3.68	3.47	3.58	3rd
Water Supply	3.40	3.45	3.43	5th
Indoor Temperature	3.29	3.18	3.24	9th
Cleanliness	2.98	3.04	3.01	12th
Comfortability	3.26	2.94	3.10	10th
Proximity to other facilities	2.58	2.92	2.75	14th
Natural lighting	2.92	3.90	3.41	6th
Religious Bias	2.61	3.91	3.26	8th
Peer/Friendship Influence	3.30	3.96	3.63	2nd
Internet Connectivity	2.30	3.40	2.85	13th
Parental Influence	3.48	3.42	3.45	4th

The mean of the fifteen (15) factors considered by students in choosing to stay in the hostel were as shown in Table 4. It is evident from the table that electricity supply was highly prioritized by the students as they ranked it as number one factor (average mean 4.12). This was followed by peer/friendship influence ranking as number two, with average mean of 3.63. Security and parental influence third and fourth with average mean of 3.58 and 3.45 respectively. The least ranked factor considered for staying in the hostel is serenity/noiselessness with average mean of 2.73. This is an indication that students consider those factors that ranked higher as very germane to their stay in the hostels. Factors like serenity, proximity to other facilities, internet connectivity as well as space adequacy are considered secondary in choosing whether to stay in the hostels or not.

5.0 Conclusion and Recommendations

The study examined the factors that come into play when considering whether student would want to stay in the hostel. This was done with a view to keeping school authorities and private hostel providers of facilities to put in place in the construction of such facilities. The study discovered that electricity supply, peer/friendship influence, security, parental influence and water supply are considered crucial by students in deciding whether or not to stay in the hostel. On the other hand, factors such as internet connectivity, proximity to other facilities and serenity/noiselessness, even though they are considered in staying in hostel, they do not carry strong consideration.

In the light of the findings of this study, recommendations are made that the hostel providers should take critical look into the factors motivating students to stay in the hostel. This is with special reference to new hostels that will come up in future.

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Cleaners' Perception of Solid Waste Generation in the University College Hospital, Ibadan, Nigeria

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Abstract Environment-friendly approach to hospital waste management practices is imperative, if health of staff, patients and quality of the environment would be guaranteed. To achieve this, information on quantity and composition of hospital solid waste generation is essential. The study explored cleaners' perception of quantity and composition of solid waste produced in the activity areas of University College Hospital (UCH), Ibadan, Nigeria. Data were obtained through perceptual rating of cleaners that dealt directly with solid waste in UCH. Cleaners were required to rate the level of generation of fourteen identified solid waste components peculiar to hospitals as found in literature. Data for the study were collected through the use of structured questionnaires, using purposive sampling technique. One of every cleaner in each of forty (40) selected units in the study area was surveyed randomly. Cleaners were asked to rate solid waste components generated in each unit using a five Likert scale. Findings of the study showed that the mean WGI for the study area was 2.3. Seventeen activity areas had their mean WGI higher than the mean index ($\overline{WGI}$), while the remaining thirteen

had negative deviations around the index. It was established that level of perception of medical solid waste generation in the areas other than clinics and wards was very low. It was found that 95% of the activity areas sampled were perceived to produce high quantity of nylon/polythene/plastics waste. Mean results shows variation in the quantity and components of solid waste generated in the activity areas of UCH. Therefore, the input of cleaners in assessing solid waste quantity and characteristics in hospitals is very important for effective waste management strategy.

*Keywords***:** Cleaners, Perception, Medical waste, Solid waste and University College Hospital

1.0 Introduction

Studies on quantity and composition of healthcare solid waste generation abound in literature (Engdaw *et al*., 2009; Haylamicheal, *et al*., 2011; Kagonji and Manyele, 2011; Idowu, *et al*., 2013; Tasfahun, *et al*., 2014). Those focusing on solid waste production in tertiary hospitals involving different activity areas are very hard to come by, especially in the developing countries (Akinpelu, 2017). This study is set to fill the gap in literature. The research work relied on information obtained from perception of cleaners to estimate the quantity and characteristics of solid waste generated in the activity areas of the institution. The University College Hospital (UCH), Ibadan, Nigeria is a tertiary hospital which was established before independence. The hospital engages in treatment, training, research and provision of accommodation among others. These activities lead to waste generation that was diverse in nature. This was as a result of areas of specialties and scale of operation of the hospital. The evaluation of quantity and components of solid waste produced in each of these areas is pivotal to its effective management. It has been established however that lack of reliable data on the quantity and components of healthcare waste is one of the factors

responsible for inadequate waste management practices, particularly in developing countries (WHO, 2004).

In recent past, scholars have documented health hazards associated with improper management of healthcare waste (Coker, 2002; Pruss-Ustun *et al*., 2005; Manyele and Lyasenga, 2010). Coker (2002) in his study posits that inadequate management of healthcare waste is a major cause of diseases such as hepatitis B and C, HIV/AIDS and tetanus. Eye infections, asthma, dysentery, sore throat and cough are related diseases, some of which are life-threatening. Furthermore, the study established that nurses, doctors, pharmacists, and waste handlers including cleaners and other auxiliary staff as well as patients' relations are prone to the diseases. Manyele and Lyasenga (2010) observed that sharp materials are most dangerous category of healthcare waste. They reported that injuries occur because syringe, needles or other sharps have not been collected in safety boxes. It was documented that in the year 2000, 16,000 HCV, 66,000 HBV and 1000 HIV infections occurred as a result of exposure to medical waste among healthcare professionals worldwide (Pruss-Ustun *et al*., 2005).

It is pertinent therefore, that components and generation rate of

medical waste be ascertain for sustainable planning and implementation of waste management strategies. Of importance is the input of cleaners in the quantification and characterization of medical waste, especially in a big healthcare institution such as University College Hospital (UCH), Ibadan. This is because cleaners deal with waste on daily basis; as such, it is expected that they have idea of quantity and components of waste produced in their unit. Studies on cleaners' perception of healthcare solid waste generation in activity areas of tertiary hospitals in Low-income countries have not been empirically documented (Akinpelu, 2017). Thus, this study is embarked on to explore this neglected area of research with a view to contributing to the existing knowledge in the field. In achieving the aim, the study collected data on the cleaners' perception on the rate of solid waste generation and components generated in the activity areas of the University College Hospital, Ibadan.

Information on cleaners' perception of the quantity and components of solid waste produced daily in their place of assignment could provide insight into the quantity and composition of waste generated in such activity area. Therefore this study is set to provide answers to the following questions: What are the cleaners' perceptions of the quantity and characteristics of solid waste produced in the activity areas of UCH? Are there variation in the quantity and composition of solid waste generated in the activity areas? These and other questions were answered by this study. Findings of this study would provide information to policy makers on the importance of cleaners' input in designing an informed strategy for medical solid waste management in the activity areas of UCH in particular and teaching hospitals in general.

2.0 Methodology

The study utilized primary data obtained through questionnaire administration. In administering the questionnaire, the hospital was stratified into eight major groups, consisting of 101 units. Using purposive sampling technique, 40 units where there were cleaners were selected for survey. One of every cleaner in each of forty activity areas was sampled randomly. From this sampling technique, a total of 40 questionnaires were administered. Information were obtained on quantity and components of solid waste generated in the activity areas of UCH, Ibadan. Solid waste produced in UCH were classified into twelve categories has found in literature (Coker and Sridhar, 2010). These included: pathological, pharmaceutical, infectious, radioactive and sharp. Others were paper, nylon/polythene/plastics, food waste, rag & textile, metal & cans, broken glass & bottle and old furniture. Cleaners were asked to rate solid waste components generated in each activity areas using a five Likert scales of Very low (VL), Low (L), Just high (JH), High (H) and Very high (VH). A weight value of 1, 2, 3, 4 and 5, was assigned to each of the ratings respectively. Further analysis gave rise to the Addition of the Weight Value (AWV). The AWV of each component was arrived at by adding the product of the number of responses for each component and the respective weight

value assigned to it (Afon, 2006). This is expressed in mathematical terms as

$$AWV = \sum_{i=1}^{5} C_i V_i \qquad (i)$$

Where: AWV = Addition of weight value,

Ci = Number of rating an attribute i; and

Vi = weight attached to attribute i (1, 2, 3, 4, 5)

To arrive at WGI, AWV is divided by the total number of responses. This is also expressed mathematically as

$$WGI = \dfrac{AWV}{\sum_{i=1}^{5} C_i} \qquad (ii)$$

Where: WGI = Waste Generation Index and Ci = is as defined previously.

Waste Generation Index (WGI) ranged between the values of 1 and 5. The higher the WGI, the higher the quantity of the component was perceived to be generated. The WGI obtained for each solid waste component in the respective activity areas is as presented in Table 1.1.

3.0 Results and discussion

Discussed in this section are the findings on solid waste generation based on assessment of cleaners in the different activity areas of the University College Hospital (UCH), Ibadan, Nigeria.

3.1 Solid waste generation using the cleaners' perceptual data

Using the aforementioned method, the mean index for each solid waste components in the activity areas denoted by $\overline{WGI}$ was computed by adding up the WGI of the entire components and dividing it by the number of the listed components (n) (n=12). The mean WGI of the activity

areas under study is 2.3 (see Table 1.1), implied that the perceived level of solid waste generation in general was close to low (2.0).

Seventeen activity areas had their mean WGI higher than the mean index ($\overline{WGI}$). These activity areas included Accident and Emergency (3.1), Central X-ray (2.5), Public-Private Laboratory (2.8), Operation theatre (2.9), Geriatric ward (2.7), Mortuary (2.4) and Private suite (2.9). Others were Medical ward (2.5), Surgery ward (2.8), Labour ward complex (3.0), General out-patient (2.7), Geriatric clinic (2.4), Surgery clinic (2.8), Pharmacy (2.7), Non-Academic Staff Union (NASU) canteen (2.4), Nursing school (2.5) and Alexandra brown hall (2.5). The perception levels of solid waste produced in these activity areas were close to just high on aggregate. On the other hand, activity areas such as Paediatrics, Hospice, Radiology clinic, Children clinic, Kitchen and College had mean WGI that was the same as the mean index (2.3) of the forty activity areas under investigation. The remaining activity areas had their mean WGI to be lower than mean index. In this group were Radiology ward (2.2), Nerou-science unit (2.1), Obstretrics and Gyneacology (2.1), Intensive care unit (2.0), ENT and Eye (2.2); Special treatment disease (2.2) and Physiotherapy (2.1). Others included: Medical clinic (2.1), Ante-natal (2.0), Human resources unit (2.0), Senior Staff canteen (2.1), Access bank (2.1), Union bank (1.9), Alanu house (2.2), Mosque (1.8), Central record unit (1.6) and Church (2.0).

To further show the perception level of cleaners on solid waste generation in the study area, all the waste

components were grouped into two based on their standard deviations. The first group had their deviation higher than $\overline{WGI}$. This established that the perceived solid waste generation was higher than $\overline{WGI}$. Waste components in the second group were those with negative deviation. It means the $\overline{WGI}$ is higher than the waste generation index (WGI).

Table 1 Computed Waste Generation Index in the Activity Areas of University

Activity Area	Pathological	Pharmaceutical	Infectious	Radioactive	Sharps	Paper	Nylon/ poly/plastic	Food waste	Rag & Textile	Metal / Can	Broken bottle	Old furniture	Total	Mean
Accident & Emergence	3.0	4.0	5.0	2.0	5.0	3.0	4.0	5.0	2.0	2.0	2.0	1.0	38.0	3.2
Central X-ray	1.0	3.0	4.0	3.0	3.0	3.0	4.0	2.0	2.0	2.0	2.0	1.0	30.0	2.5
Public-Private laboratory	1.0	2.0	5.0	2.0	5.0	3.0	4.0	3.0	2.0	2.0	3.0	2.0	35.0	2.9
Operation theatre unit	5.0	3.0	5.0	2.0	5.0	2.0	4.0	2.0	3.0	2.0	2.0	1.0	36.0	3.0
Geriatric ward	1.0	3.0	5.0	1.0	4.0	2.0	4.0	5.0	2.0	2.0	2.0	1.0	32.0	2.7
Mortuary	5.0	2.0	4.0	1.0	2.0	2.0	3.0	2.0	2.0	2.0	2.0	1.0	29.0	2.4
Private suite	1.0	3.0	5.0	2.0	4.0	3.0	4.0	5.0	2.0	3.0	2.0	2.0	35.0	2.9
Radiology ward	1.0	2.0	4.0	1.0	3.0	2.0	4.0	2.0	2.0	2.0	2.0	1.0	26.0	2.2
Neuro-science unit	1.0	2.0	3.0	1.0	3.0	3.0	4.0	2.0	2.0	2.0	1.0	1.0	25.0	2.1
Medical ward	1.0	3.0	5.0	1.0	3.0	2.0	4.0	4.0	2.0	2.0	2.0	1.0	30.0	2.5
Surgery ward	4.0	2.0	5.0	2.0	4.0	2.0	4.0	2.0	2.0	2.0	2.0	3.0	34.0	2.8
Paediatrics	1.0	2.0	5.0	1.0	3.0	2.0	4.0	2.0	2.0	2.0	2.0	1.0	27.0	2.3
Obstretrics & Gynaecology	2.0	2.0	4.0	1.0	3.0	2.0	3.0	2.0	1.0	2.0	2.0	1.0	25.0	2.1
Labour ward complex	5.0	4.0	5.0	2.0	4.0	2.0	3.0	3.0	3.0	2.0	2.0	1.0	36.0	3.0
Intensive care unit	1.0	2.0	5.0	1.0	3.0	2.0	3.0	1.0	1.0	2.0	2.0	1.0	24.0	2.0
Hospice	1.0	2.0	3.0	1.0	2.0	4.0	4.0	3.0	1.0	2.0	1.0	2.0	26.0	2.3
General out-patient unit	1.0	2.0	5.0	1.0	5.0	3.0	5.0	5.0	1.0	2.0	2.0	2.0	33.0	2.7
ENT & Eye	1.0	2.0	4.0	1.0	3.0	2.0	4.0	2.0	1.0	2.0	2.0	1.0	25.0	2.1
Special Treatment	1.0	2.0	4.0	1.0	2.0	3.0	4.0	2.0	1.0	2.0	2.0	1.0	25.0	2.1
Radiology clinic	1.0	3.0	4.0	2.0	2.0	3.0	4.0	2.0	1.0	2.0	2.0	2.0	28.0	2.3
Physiotherapy	1.0	2.0	3.0	1.0	1.0	3.0	4.0	2.0	1.0	2.0	2.0	1.0	23.0	1.9
Geriatric clinic	2.0	2.0	5.0	2.0	3.0	2.0	3.0	5.0	1.0	2.0	1.0	1.0	29.0	2.4
Surgery clinic	2.0	3.0	5.0	2.0	4.0	3.0	4.0	3.0	2.0	3.0	1.0	1.0	33.0	2.8
Medical clinic	1.0	2.0	4.0	2.0	3.0	3.0	3.0	2.0	1.0	2.0	1.0	1.0	25.0	2.1
Children clinic	1.0	3.0	5.0	2.0	3.0	2.0	3.0	3.0	1.0	2.0	1.0	1.0	27.0	2.3
Ante-natal	1.0	2.0	4.0	2.0	3.0	2.0	2.0	3.0	1.0	2.0	1.0	1.0	24.0	2.0
Human resources unit	1.0	1.0	1.0	1.0	1.0	5.0	4.0	3.0	1.0	3.0	1.0	2.0	24.0	2.0
Pharmacy	1.0	4.0	4.0	1.0	1.0	4.0	4.0	3.0	2.0	2.0	2.0	1.0	29.0	2.4
Kitchen	1.0	1.0	1.0	1.0	2.0	2.0	5.0	5.0	3.0	3.0	2.0	2.0	28.0	2.3
NASU canteen	1.0	1.0	1.0	1.0	2.0	2.0	5.0	4.0	3.0	4.0	3.0	2.0	29.0	2.4
Senior staff canteen	1.0	1.0	1.0	1.0	1.0	2.0	5.0	4.0	2.0	3.0	2.0	2.0	25.0	2.1
Access Bank	1.0	1.0	1.0	1.0	1.0	4.0	4.0	3.0	2.0	3.0	2.0	2.0	25.0	2.1
Union Bank	1.0	1.0	1.0	1.0	1.0	4.0	3.0	2.0	1.0	2.0	2.0	2.0	21.0	1.8
Alanu house	1.0	2.0	2.0	1.0	1.0	3.0	4.0	3.0	3.0	2.0	2.0	2.0	26.0	2.2
Mosque	1.0	1.0	1.0	1.0	1.0	2.0	4.0	2.0	2.0	2.0	1.0	1.0	19.0.	1.6
College	1.0	1.0	1.0	1.0	1.0	4.0	4.0	4.0	3.0	3.0	2.0	2.0	27.0	2.3
Central Record unit	1.0	1.0	1.0	1.0	1.0	5.0	1.0	2.0	2.0	1.0	1.0	1.0	18.0	1.5
Nursing school	1.0	2.0	1.0	1.0	1.0	5.0	5.0	5.0	4.0	3.0	1.0	1.0	30.0	2.5
Alexandra brown hall	1.0	2.0	1.0	1.0	1.0	4.0	5.0	5.0	2.0	4.0	2.0	2.0	30.0	2.5
Church	1.0	1.0	1.0	1.0	1.0	4.0	4.0	3.0	2.0	2.0	2.0	1.0	23.0	1.9
Mean WGI	1.5	2.1	3.3	1.4	2.6	2.9	3.9	3.0	1.9	2.3	1.8	1.4	2.3	2.3
WGI- $\overline{WGI}$	-0.8	-0.2	1.0	-0.9	0.3	0.6	1.6	0.7	-0.4	0.0	-0.5	-0.9	0.0	0.0
(WGI- $\overline{WGI}$)²	0.64	0.04	1.00	0.81	0.09	0.36	2.56	0.49	0.16	0.00	0.25	0.81	0.00	0.00

Presented in Table 1.1 are seven solid waste components with positive deviations about the mean. The solid waste components in this category ranked in order of importance were nylon/polythene/plastics materials, infectious, food waste, paper and sharps. Their respective deviations were 1.6, 1.0, 0.7, 0.6 and 0.3. The implication of this is that WGI of each solid waste component was higher than $\overline{WGI}$ of the forty activity areas combined. The components were mostly generated on daily basis, due to the indispensability of activities that produced them. Based on their deviations, nylon/polythene/plastics materials (1.6) were perceived as highest. It was mainly (5.0) produced from General Out-patient unit, Kitchen, Non-Academic Staff Union canteen, Senior Staff canteen, Nursing school and Alexandra hall. The quantity of nylon/polythene/plastics materials generated in the aforementioned activity areas is a function of multipurpose usage of the materials. Next in rank is infectious waste (1.0). It was largely (5.0) generated from activity areas such as Accident and Emergency unit, Public-Private Laboratory, Geriatric ward, Medical ward, Operation theatre, Private suite and Surgical ward. Others were Paediatrics, Labour ward complex, Intensive care unit, General out-patient, Geriatric clinic, Surgery clinic and Children clinic. This implied that most of materials used for patients in these units became infectious. Findings of this study agreed with the reports of Akinpelu (2017) that most activity areas surveyed in the University College Hospital (UCH), Ibadan, generated more of general (domestic) and infectious waste.

In addition, infectious waste generation was however least (1.0) in areas such as Human resources unit, Kitchen, Non-Academic Staff Union canteen, Senior Staff canteen, Access, bank and Union bank. Others were Mosque, College, Central Record unit, Nursing school, Alexandra Brown hall and Church. These activity areas rarely produced infectious waste because they were not meant for the treatment of patients but complement medical services of the University College Hospital, Ibadan. Solid waste component with the least (0.2) positive deviation was sharps. It has highest (5.0) perceived level of production in Accident and Emergency unit, Public-Private Laboratory and Operation theatre unit. It could be inferred that health cases handles in the aforementioned areas required the use of sharp materials, which later become sharp waste. The least (1.0) was reported in activity areas such as Physiotherapy department, Human Resources unit, Pharmacy, Kitchen, Non-Academic Staff Union canteen, Senior Staff canteen, Access bank, Union, bank and Alanu house. Others were Mosque, College, Central Record unit, Nursing school, Alexandra Brown hall and Church. The quantity of sharp materials generated in the activity areas could be attributed to the fact that those activity areas performed functions that were secondary to core purpose of establishing the hospital. This finding is in-tandem with results of a study carried out by Akinpelu (2017). The author reported that sharp wastes were rarely produced in activity areas of UCH where complementary services were being rendered.

Similarly, solid waste com having negative deviation at

$\overline{WGI}$ included: pharmaceutical, rag/textile, broken bottle, pathological, radioactive and old furniture. Their respective deviations in order of importance about the $\overline{WGI}$ were -0.2, -0.4, -0.5, -0.8, -0.9 and -0.9. Pharmaceutical waste had the highest (-0.2) negative deviation. The Mean WGI (2.1) of the component is close to the $\overline{WGI}$ (2.3). It could be inferred that the quantity of waste material produced was perceived to be low. It is however worth noting that pharmaceutical waste was generated chiefly (4.0) from activity areas like Accident and Emergency unit, Labour ward complex and Pharmacy department. Apart from Central X-ray, Geriatric ward, Operation theatre unit, Private suite, Medical ward, Radiology clinic, Surgery clinic and Children clinic, the perceived level of the quantity of waste component produced from other areas of the hospital was below the average. Rag/textile waste was next in ranking with (-0.4) negative deviation. The waste component was perceived to be highest (4.0) at the Nursing school. The reason was that nursing students that resided in the hostels often discard their abandon textile materials into the storage receptacles provided by the school. Activity areas such as Operation theatre unit, Labour ward complex, Kitchen, NASU canteen and Alanu house perceived level (3.0) was higher than the average. The remaining areas surveyed were perceived to produce the waste component at the rate below the average. Pathological waste was next in ranking with (-0.8) negative deviation. Earlier study by Akinpelu (2017) established that pathological

wastes were considered as sensitive materials that should be handled with utmost care. It is either sent to pathological laboratory or autopsy room for proper examination, before it is disposed under tight supervision. It was perceived to be highest (5.0) in Operation theatre, Mortuary and Labour ward complex. Other activity areas except for Surgery ward (4.0) and Accident and Emergency unit (3.0), recorded the least.

Radioactive and old furniture waste had the least (-1.9) negative deviations. Information gathered from the cleaners confirmed that this type of waste materials was rarely turned out. This could be adduced to the fact that patients that required radioactive materials were view in number and very hazardous in nature, while old furniture have long life span, hence small quantity of waste were produced. Both waste had highest WGI (3.0) in Central X-ray and Surgery ward as presented in the table 1.1. In all other activity areas the ranking of the waste is either low (2.0) or very low (1.0). This implied that radioactive materials were used only in specialized units, while old furniture materials were rarely generated because of its durability.

Moreover, it could be established that infectious waste had its WGI in all the clinics and wards to be higher than $\overline{WGI}$ of the forty activity areas altogether. Clinics and wards are major activity areas where the primary functions of establishing the hospital are performed. Consequently, high rate of infectious materials (gloves, plaster, bondage, and cotton wool among others) used on daily basis. It could be established therefore that all and wards in UCH g

infectious waste with variation in the quantity produced based on nature of clinic or ward. Nylon/polythene/plastics had its WGI in all activity areas higher than $\overline{WGI}$ except in few places such as Ante-natal (2.0) and Central record (1.0). It could be inferred that most of materials used in the study area were packed with nylon or polythene. Plastics were observed to be used mainly for storing of solid waste and carrying of materials from one unit to another. It was common materials that were utilized in most of the sampled areas. This supported by result obtained by Akinpelu (2017) in a study conducted in UCH, Ibadan. He reported that high quantity of nylon/polythene and plastics materials were produced in most of the activity areas surveyed.

Further analysis showed that $\overline{WGI}$ of the activity areas surveyed is higher than WGI of radioactive waste in all the activity areas, except in X-ray units. The implication is that 97.5% of all the activity areas sampled did not produced radioactive materials. Table 1.1 showed that twelve activity areas had WGI of 2.0. The remaining twenty-seven (27) areas had (1.0) WGI. Old furniture had its WGI in all the activity areas to be lower than $\overline{WGI}$ of the forty activity areas combined except in Surgery ward (3.0). Old furniture waste as presented in the table had fourteen activity areas with WGI of 2.0, while twenty-five out of forty areas surveyed recorded WGI of 1.0. It could be concluded that old furniture waste was rarely generated in 97.5% of the study area. This could be adduced to the long life span of most furniture materials.

Findings of the study showed that level of perception of medical solid waste generation in the areas other than clinics and wards was very low, except for places such as Alanu house, Nursing school and Alexandra brown hall where small quantity of pharmaceutical waste was produced. The generation of pharmaceutical waste in the activity areas might be attributed to their residential nature. Production of nylon/polythene/plastics materials were perceived to be generally high in all the activity areas surveyed, except in Ante-natal and Central record unit. The level of nylon/polythene/plastics waste generated in the study area is a testimony to indispensability of its usage. It can be established that 95% of the activity areas sampled were perceived to produce high quantity of nylon/polythene/plastics waste.

4.0 Conclusions and Recommendations

Findings of the study have clearly shown that cleaners' perceptual data in the formulation of an informed policy on solid waste management is imperative. The study showed that there was variation in the quantity and components of waste generation in the activity areas of the University College Hospital (UCH), Ibadan. It is suggested therefore that the basis for allocation of human and material resources to waste management activities in the study area should be guided by the information on the characteristics and quantity generated in each of the unit and department. Priority should however be given to medical areas of the hospital in terms of resources allocation, regulations and monitoring of waste management practices. The sections were

substantial infectious and/or hazardous waste emanated. Future research should be directed towards investigating the cleaners' perceptual data on the rate of generation and adequacy of storage receptacles in the different activity areas of UCH. This would provide information that would enhance effective and efficient solid waste collection.

Acknowledgements

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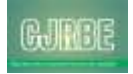
Place Attachment in Poor Residential Neighbourhoods of Akure Nigeria

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*Abstract***:** This paper reports the findings of an attachment experiment in Nigeria's poor residential neighbourhoods. The study examined how residents were attached and the factors that predicted attachment to the neighbourhoods. Specifically, three ranges of attachment, the home, the area, and the city were investigated. In order to determine the degree of the attachment, it also explored the social and physical aspects of attachment. Statistics was collected from questionnaires distributed in the core of Akure, Nigeria, to a group of 532 household heads in four poor residential neighbourhoods. These have been evaluated using frequencies and models of categorical regression. Results indicate that the attachment rate varies across the three ranges. City attachment is the highest and social attachment has been found higher among residents of poor neighbourhoods than physical attachment. Length of residency and household number are the strongest predictors in all three ranges.

*Keywords***:** neighbourhoods, attachment, housing, poor residential neighbourhoods, Nigeria

1.0 Introduction

Several social science researchers (Twigger-Ross & Uzzell, 1996, Lawrence, 2002, Bonaiuto, Fornara, and Mirilia Bonnes, 2003) have conducted numerous studies for more than three decades to determine neighbourhood attachment. In spite of the high level of research on this topic, Most of the experiments were carried out in Western countries. Such research explored how attached residents are to their environments and the factors that account for attachment. However, there is very little research to tell us if the results of the studies in other less developed countries are generalizable to neighbourhoods. It is not known whether the factors that promote attachment in most neighbourhoods have the same effects in the most disadvantaged areas or whether there are different factors at work in those areas. More research is therefore needed in other contexts to test the generalizability of the results and models developed in western contexts. Moreover, most of the studies examining neighborhood attachment focused more on housing's social characteristics than on its physical attributes. Therefore, for design and planning, these studies were of very little influence and significance.

This paper is concerned with the relationship between residents and their neighbourhoods in poor residential environment of Akure, Nigeria. An appropriate criterion must be established to assess the residential environment. Over the years, many indicators of the neighborhood environment have been developed, including the concept of attachment, which has been used in evaluating the residential environment. It has been used majorly to investigate the relationship between people and their residential environment (Tognoli, 1987; Lawrence, 2002, Bonaiuto, Fornara, and Mirilia Bonnes, 2003). Attachment to a neighbourhood is considered important in the evaluation of environment as spatial inequalities and concentration of poverty is on the increase and this is expected to weaken levels of attachment. (Dorling & Rees, 2003). Attachments in poor residential neighbourhoods are likely to be influenced by a lot of factors, and it has been found that levels of attachment are weaker in these neighbourhoods. It is therefore necessary to carry out similar research in poor residential neighbourhoods in Nigeria since attachment varies from one place to the other and little is known about the kind of places people are attached to or what kind of neighborhood dimensions they are attached to. This research is relevant because it will add further to the existing literature on this very important topic by concentrating on the degree of attachment to poor neighborhoods in a developing nation like Nigeria as neighborhoods in developed countries are not usually comparable to the less developed countries.

Most studies on attachment have focussed mainly on one level of the neighbourhood (Cooper Marcus, 1992, Hufford, 1992). However few researchers have found out that attachment exists also in other levels such as house or street, and the city (Hidalgo & Hernanandez, 2001, Cuba & Hummon, 1993). Therefore in measuring attachment, it would be necessary to identify the various levels of attachment and the comparison between them.

The specific objective of this study was therefore to assess the degree of attachment to three specific spatial levels, house, neighborhood and city, and also to examine the physical and social dimensions of attachment in poor residential neighbourhoods of Akure, Nigeria. The study also tried to investigate whether the social-demographic characteristics of the respondents influence attachment.

2.0 Literature Review
2.1 Poor neighbourhoods and place attachment
Attachment is characterized as a positive connection between a person or group and their environment (Low & Altman, 1992; Williams *et al.,* 1992). Place attachment also accounts for complex yet lasting positive people-to-people relationships and valued socio-physical environments such as homes (Brown & Perkins, 1992). Place attachment is the bond of human sentiment, not only with the physical surroundings of the place, but also with the individuals and behaviours of people in the place in agreement with its physical setting (Khaled, 2016).

These attachment bonds often reflect and help in group and individual identity communication. Residential neighbourhood attachments are also described as feelings of pride in and appearance of the residential area (Twigger-Ross & Uzzell, 1996) and a general sense of well-being (Harris, Werner, Brown, & Ingebritsen, 1995). Similarly, Hummon (1992) identified objective factors such as neighbourhood size and type, housing quality and ownership, and the nature of the physical neighbourhood as particularly important in developing a sense of community attachment and

feeling. Place attachment is often conceptualised as a bond or tie to a particular area (such as community, city, or country) that evolves over a period through continuous interactions (Scannell, Cox, Fletcher, & Heykoop, 2016). Social involvement has also been identified to be the most consistent and significant means of developing sentimental ties to the neighbourhood (Rennick, 2003). Long-term residency, which develops bonds through increased local social ties, is one such process, perceptions of the neighbourhood, such as maintenance and relationships with neighbours, also contribute to a stronger level of attachment. In addition, the resident's general attachments are influenced by experiential, historical and personal perceptions of satisfaction in the neighbourhood. Place associations are further reinforced by frequent experiences with the community and neighbors, seasonal events, continuing physical personalization and maintenance, and positive feelings and values about the house, home and neighborhood (Werner, Altman, Brown, & Ginat, 1993).

Residential attachment strengthens and provides stability, familiarity, and protection in poor neighborhoods, but attachments can also change as individuals and households grow, society age, or as the attachment-supported processes change (Brown, *et al.* 2003).

Most communities usually decline when housing stocks and the resident's age, owned homes later turn to rentals, and poor tenants move in (Myers, 1983). Nevertheless, place attachments are often correlated with the changing housing   and   community

circumstances, but they are not defined. For example, a case study of Boston's West End urban renewal in the US found that residents, amid declining housing, had strong place attachments and community viability (Brown, Perkins, & Brown, 2003). The West End community urban renewal program pushed people out of their homes and West Enders grieved for years for homes and communities that had been lost.

Likewise, new high-rise public housing Pruitt-Igoe in St. Louis, which was originally physically sound, did not command connections or other obligations, and the plan deteriorated rapidly (Brown *et al.* 2003). For various reasons, both examples show the danger of connecting good residential value with strong residential bonds and weaker-attached poor neighborhoods. Poor housing and conditions in the community may affect strong place attachments but also reflect residents ' deteriorating physical and or economic capacity to sustain their homes. Therefore, place attachments are supportive ties to physical and social environments that sustain identity and other psychological advantages.

Attachment to poor neighbourhood was questioned by Bailey, et al, (2011), they were of the opinion that because of the composition of the neighbourhoods, attachment are likely to be lower. Nevertheless, in poor urban communities, place attachments have been overlooked as a potential strength. If these bonds of attachment exist in a poor neighbourhood it can be activated toward neighbourhood improvement (Ayoola, 2015).

Brown *et al.* (2003) concentrated on the relationship between the interpretation of negative physical features and the affective attachment to the environment. The study found that place attachment was higher for residents perceiving fewer incivities on their block and less physical decline. Similarly, Mesch and Manor (1998) suggested that by evaluating an environment as a good place to live, location attachment is determined: the higher residents rate the characteristics of their physical and social setting, the greater the probability of place attachment.

3.0 Methodology
3.1 Study Area
Akure is a traditional town in Nigeria, similar to the country's several other traditional Yoruba cities. The city is located in the country's south-western part. It is located approximately at 7 ° 15'N latitude and 5 ° 15'E longitude, approximately 1.214 ft. (370 m) above sea level. The rapid development of the city stemmed from the city's political status, initially a provincial headquarters but now a state capital.

According to the 2006 census, the population of Akure was 360,268. With an annual increase of 2%, it was expected to be 486,300 by 2016 (National Population Commission of Nigeria (web). The constant growth of the population has been tied to the administrative role of the city and its long-standing status as a centre of economic activity and also been classified as an oil-producing state, two features that have attracted a large array of immigrants.
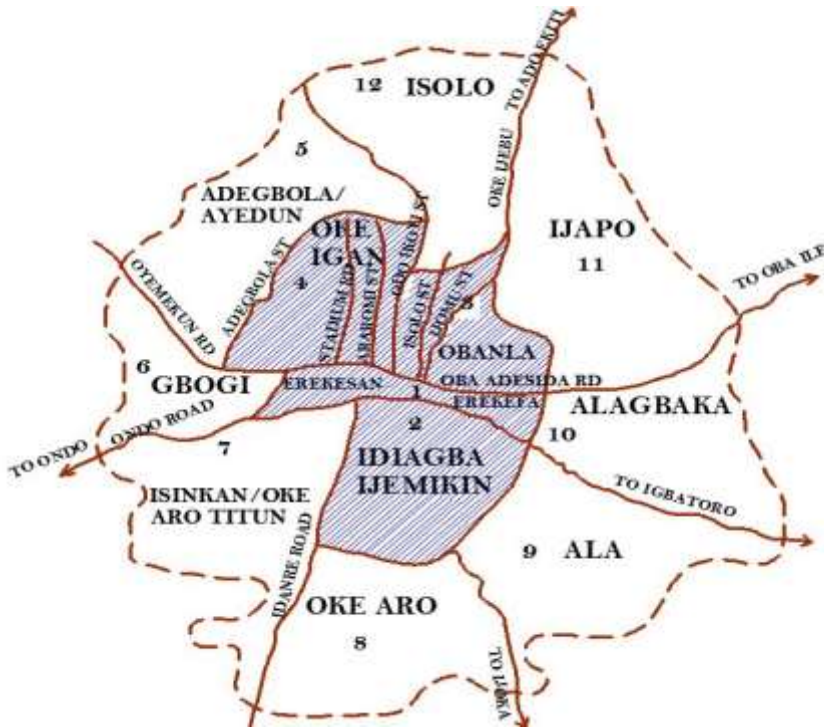
Figure 1 Akure division into 12 residential zones
Source   Owoeye, (2012)

3.2 Data Collection

This paper is part of a larger analysis that examined urban poverty in central residential communities in Akure, Nigeria. This paper is however focused on measuring the degree of attachment in poverty concentrated neighbourhoods. This study uses primary data to achieve a reasonable measure of attachment through a standardized questionnaire survey. Based on the study's purpose, the questionnaire layout is designed to make the question series easy to follow, making it easy for the respondents to understand. To assess attachment to the home, neighbourhood and community, these questions were formulated. In addition, questions have been included to differentiate between the physical and social aspects of attachment. The study adopted element that other researchers used previously (Gerson *et al,* 1977, Manor, 1998) to assess attachment, "I would be sorry to move out"

This item was used to determine the house, neighbourhood and city attachment. It was also adopted in distinguishing between the physical and social dimensions of attachment ' I'd be sorry to move out without the people I live with. In relation to the home, neighbourhood, and community, these questions were also asked. The scale for measuring place attachment consisted of nine items and answers range from 1(strong disagree) to 5(strongly agree). The internal consistency of the scale used was first calculated. The result reveals a

Cronbach's alpha of 0.86 for the whole scale, indicating a high degree of reliability. The same was calculated for the house, neighbourhood and city and obtain an alpha of 0.79. This also shows a high degree of consistency but smaller than the overall scale as a whole. The questionnaire contained information on the physical characteristics of the neighbourhoods under study and the socio-demographic characteristics of the respondents, in addition to the attachment.

Akure city as characterised by Owoeye and Omole, (2012) was divided into 12 residential zones by applying the Burgess Theory of concentric Zones and further narrowed down into 3 zones namely, the inner core, intermediate and the periphery. Zones 1,2,3 and 4 represent the inner core, zones 5,6,7, 8 and 11 represents the intermediate while zones 9,10 and 12 represents the periphery (fig 1).

The neighbourhoods with the highest concentration of poverty were selected for this study, and the study is also limited to households living within the four poor residential neighborhoods in the core of Akure's. The four neighborhoods selected are Zone 1 covering the Erekefa / Erekesan market, the Town Hall, the General Post Office and the King Palace, Zone 2 covering Idiagba, Ijemikin, Irowo, Odopetu, Ajagunle, Zone 3 covering (Araromi, Oja Oshodi, Odo-Ikoyi, Isolo and Ijomu via Oke-Ijebu streets), and zone 4 covering the other side of Araromi, Odo–Ijoka and Old stadium areas.

The core urban zone which is the study area is characterized by an infrastructure that is nonfunctional due rapid urbanization, inadequate supply of housing units, and improper coordination of physical development due to poor planning and a dearth of basic infrastructure. Most of the buildings in this part of Akure are already old and in need of rehabilitation. The population within the area is mostly in the low-income category; consist of either the unemployed or the self-employed.

The sample size was determined by the number of existing buildings in the area since the administration of the questionnaire will be done on one person per household and one household per household. The analytical unit was the head of the household in the housing units.

The sample size for the analysis is five hundred and fifty-seven of a total population of approximately 2228 residential buildings, which was developed using the 95 percent confidence sample size calculator. Based on their relation to population size, the questionnaire number for each area was determined. A systematic random technique was then used to select the houses being studied; every fourth residential building was selected for interview, starting from the first dwelling unit in each of the streets involved. The basic focus of questionnaire administration was the heads of households in each house. For the questionnaires (Table1a) the percentage return was 95 percent (532 copies), which was considered sufficient for the study. The study was analysed using single factor descriptive analysis and categorical regression analysis.

Table 1a: Distribution of Questionnaire

Zones	No. of questionnaire	No retrieved
Zone 1	102	97
Zone 2	162	157
Zone 3	196	186
Zone 4	97	92
Total	557 (100%)	532 (95%)

4.0 Results

4.1 Demographic Characteristics of Respondents

Table 1 shows the demographic characteristics of the respondents. Out of the 532 respondents, (50%) are male, and (49.6%) are female, while 2 of the respondents didn't indicate their gender. There was also a good representation of each participating age bracket. More than a third (31.8%) of respondents belonged to the 26-40 very active age bracket; this group also represented the most economically active group, while respondents between 56 and above represented the most economically active group while the 20.5% remaining respondents represents the elderly.

Most respondents fall within the low-income brackets; about one-third of household heads earned less than NGN10,000 per month (below the national minimum wage of NGN18,000 per month approved by the Federal Government of Nigeria for the lowest-paid civil servants at the time of the survey), and nearly 38% earned just NGN10,001-20,000 per month.

However, the neighbourhood was home to a few households living far above the minimum wage. The neighbourhoods are dominated by those living in rented apartment (51.5%) and those living free in family homes (25.8 %) dominated the communities. The average household number per building is 5, and the average household number is 20. The socio-demographic profile of the respondents is evidence of a concentration of neighbourhood poverty.

Table 1b Socio-demographic characteristics of respondents (n = 532).

Variable	Characteristics	Frequency	%
Gender	Male	266	50.0
	Female	264	49.6
	Missing values	2	0.4
Age	< 25	101	19.0
	26-40	169	31.8
	41-55	153	28.8
	56-70	9 1	17.1
	71+	1 8	3.4
Marital Status	Single	122	22.9
	Married	283	53.2
	Divorced	20	3.8
	Widowed	82	15.4
	Single parent	15	2.8

Income	< 10,000	171	32.1
(NGN per	10,001-20,000	200	37.6
month)	20,001-30,000	67	12.6
	30,001-40,000	44	8.3
	40,001-50,000	26	4.9
	50,000+	17	3.2
Homeownership	Owner	115	21.6
Status			
	Renter	274	51.5
	Rent free	4	.8
	Living in family house	137	25.8
House Type	Rooming apartment (face me I face you)	400	75.2
	Flat	85	16.0
	Others (single dwelling unit, semi-detached)	47	7.3
Length of residency	0-10 years	118	22.2
	11-20 years	140	26.3
	21-30 years	125	23.5
	31-40 years	79	14.8
	41-50 years	38	7.1
No of households	1-2	79	14.8
	3-4	121	22.7
	5-6	283	53.2
	Above 6	49	9.2

Note. Percentages may not add up to 100 due to rounding and because some respondents did not answer every question

4.2 Levels of attachment

Since the aim of the paper was to calculate the level of attachment towards three levels of attachment and not general attachment, the average scores for each of the different levels were calculated (Table 2). First, there was a determination of the level of general attachment to the home, neighbourhood and community. The house attachment measure revealed on a scale of 1 to 5 an average of 3.06. This implies that the residents were quite attached to their house, which is an agreement with the results of previous studies (Brown, Perkins & Brown, 2003; Hernandez & Hidalgo, 2001). Also, the measure of neighbourhood and city attachment attained a value of 3.19 and 3.26

respectively. So according to the result, attachment to the house is lesser than city and neighbourhood attachment. In agreement with the result of other study carrying out a similar comparison (Cuba & Hummon, 1993), Attachment to the neighbourhood was higher than the house. However, attachment to the city was considered highest among the three levels of attachment under investigation. The result of the levels of attachment, however, differs from the findings of Hernandez & Hidalgo, (2001) where attachment to the neighbourhood was considered the weakest. This difference in the results of the levels of attachment in the two studies could likely be as a result of the difference in socio-economic

profile of the respondents and also the difference in the physical and social characteristics of the neighbourhoods. Attachment to the house in this study is likely to be affected based on the tenure status of the respondents, only 21% of the respondents are home-owners while others are renters or living free in family houses. This factor may also influence attachment since most residents are likely to have a lesser emotional bond to their residence. In any case, the study corroborates previous researches that attachment to place is also possible in poor residential environments despite the difference in ranking of levels of attachment.

Second, the physical and social dimensions of attachment were analyzed and compared. The measure of physical and social attachment was also measured across the three levels. The measurement of the house's physical attachment shows an average of 3.04. This was the weakest interaction level compared with the other stages. Attachment to the neighbourhood was the highest with an average of 3.31, followed by attachment to the city at an average of 3.23. The neighbourhood in this context is considered the most important information of attachment. This result is in agreement with the result of (Cuba & Hummon, 1993).

The social attachment was found greater than physical attachment in all levels. Social attachment to the city was found lowest at an average of 3.37 while attachment to the house came second at an average of 3.57. Social attachment to the neighbourhood ranked highest at an average of 3.69. As expected a lot of activities are carried out in the neighbourhood in which the residents are directly involved and the possibility of wanting to further be a part could be a reason for higher attachment. The study, however, agrees with the observations of (Hernandez & Hidalgo, 2001), that social dimension is indeed highly important in the formation of attachment to place. The results of this study, therefore, confirm previous studies on attachment, and that the physical and social characteristic of place affects people's feelings toward their place of residence.

Table 2 Mean score of the different levels and dimensions of attachment

	Global Attachment	Social Attachment	Physical Attachment
House	3.06	3.57	3.04
Neighbourhood	3.19	3.69	3.31
City	3.26	3.37	3.23

4.3 Predictors of attachment

To test whether the respondents ' socio-demographic characteristics influence the attachment levels, categorical regression analysis was performed using the optimal scaling method with convergence criteria set at 0.00001. The analysis consisted of three levels of attachment, the house, neighbourhood and city as dependent variables while the independent variables were the socio-demographic characteristics namely (sex, age, marital status, income, number of households, tenure status, house types and length of residency).

The result of the regression analysis between attachment to the house and socio-demographic characteristics are supported by the regression representation with multiple R=0.327 and R2= 0.107. This means that the regression model shows that 10.7% of the difference in the attachment to the house in the study area is influenced by the socio-demographic characteristics of the residents. The explanation for this low value could be that other factors rather than demographic characteristics are responsible for this attachment. The ANOVA result also shows that F=4.338, df = 14, p= 0.000, which also signifies that the regression model is significant at 0.000. This shows that all the variables together have a significant relationship with the house attachment. This confirms the findings of Hummon (1992) which suggested that socio-demographic variables considerably sway attachment. Of the eight variables used, four are major house attachment predictors. As shown in (Table 3), the variables in their importance of attachment to the house, number of households (b=-.104), age (b=.231), length of residency (b=.129), and house types (b=.089). The remaining four variables sex, income, marital status and tenure status are not significant predictors of house attachment in the study.

The result of the regression model between the neighbourhood and socio-demographic characteristics of the respondent yielded a multiple R=0.260 and R2= 0.067. This suggests that there is a relationship (though weak) between neighbourhood attachment and socio-demographic characteristics of respondents. Similarly, the result of the analysis of variance also produced F=2.610, df = 14, p= 0.001, which

confirms a significant relationship. Nevertheless, just five of the eight variables of socio-demographic characteristics influenced attachment to the neighbourhood. As revealed in (Table 3), the major predictors in their order of importance are the length of residency (b=.175), tenure status (b=-.083), sex (b=.084), house type (b=-.093), and the number of households (b=-.080). The remaining three variables age, income and marital status are not significant predictors of neighbourhood attachment.

Similarly, predictors of city attachment were also considered using the same regression method. The regression analysis between attachment to the city and socio-demographic characteristics is made clear with multiple R= 0.268 and R2= 0.072. This explains that the regression analysis reveals 7.2% of the variance in the attachment to the city in the study area. The model indicates that there is a relationship (though weak) between city attachment and socio-demographic characteristics of respondents. The reason for this could be because other issues rather than socio-demographic characteristics are responsible for this attachment.

Also, the result of the analysis of variance also produced F=1.940, df = 20, p= 0.005, which confirms a significant relationship. However, only five of the eight variables of socio-demographic characteristics influenced attachment to the neighbourhood. As revealed in (Table 3), the important predictors in their order of significance are the length of residency (b=.179), tenure status (b=.100), age (b=.117), number of households (b=-.105) and income (b=-.089). The remaining three variables sex, house type and marital status are not significant predictors of

neighbourhood attachment. Also, predictors of city attachment were also considered using the same regression method. The regression analysis between attachment to the city and socio-demographic characteristics is explained with multiple R= 0.268 and R2= 0.072.

Table 3   Model summary and coefficients of demographic predictors of attachment.

	Standardised coefficient (House)					Standardisedcoefficient (Neighbourhood)					Standardised coefficient (City)				
	Beta	Std.error	df	F	Sig	Beta	Std.error	Df	F	Sig	Beta	Std.error	Df	F	Sig
Sex	.067	.043	1	2.456	.118	.084	.044	3	3.651	.013*	.068	.043	3	2.454	.062
Age	.231	.053	2	18.804	.000**	.071	.049	1	2.106	.147	-.117	.052	3	4.995	.002*
Marital status	-.069	.050	1	1.876	.171	-.056	.048	1	1.326	.250	.038	.049	2	.604	.547
Income	-.067	.042	1	2.553	.111	-.027	.043	2	.402	.669	-.089	.044	2	4.063	.018*
No. of households	-.104	.042	4	6.079	.000**	-.080	.043	2	3.449	.033*	-.105	.043	2	5.821	.003*
Tenure status	.024	.042	2	.326	.722	-.083	.043	3	3.655	.013*	-.100	.043	3	5.367	.001*
House types	-.089	.042	2	4.419	.013*	-.093	.043	1	4.615	.032*	-.033	.043	1	.600	.439
Length of residency	.129	.047	1	7.529	.006*	.175	.046	1	14.309	.000**	.179	.047	4	14.733	.000**

*Significant predictors P<0.05
** Significant predictors p= 0.000

5.0 Discussion

This study has revealed that residents were highly attached to the study area. It also provides an insight into the ranges of attachment and the dimensions of attachment. It has shown that attachment differs at the house, neighbourhood and city ranges. There is also a difference between physical and social attachment to places. This finding supports similar studies that suggested attachment differs at the different spatial ranges (Brown, Perkins &Brown, 2003; Hernandez & Hidalgo, 2001). In support of previous studies (Cuba &Hummon, 1993, Hernandez & Hidalgo, 2001), the city has a higher level of attachment and the neighbourhood attachment was also found to be higher than house attachment unlike the other studies. Surprisingly the house range received the lowest level of physical attachment among the three ranges under investigation. This is probably because the houses are in very poor physical condition and majorly lack the necessary infrastructure to have a decent living. The findings here indicate that people are more likely to be attached to affluent neighbourhoods than poor neighbourhoods due to the wide gap in the condition and quality of infrastructure available.

The result also showed that social attachment is higher than physical attachment in all the three ranges investigated and therefore supports previous studies (Hernandez & Hidalgo, 2001). The neighbourhood and the house are the strongest in terms of social attachment. Indeed this is not unexpected because more social interaction and activities takes place at this level which could lead to higher attachment.

This study also found that most of the characteristics which influenced place attachment also accounted for attachment in poor urban neighbourhoods. This research, for instance, found that age and number of household are strong determinant attachment to the house. Attachment is likely to increase as age increased; thus following previous studies

which established correlation linking respondents socio-economic characteristics and attachment. Also, the results of previous studies (Rennick, 2003, Hummon, 1992) have shown that length of residency and tenure status are strong predictor of attachment, this study confirms the findings. Indeed, across the three ranges of attachment, length of residency and number of households are the strongest predictors of attachment. Hashemnezhad et al., (2013), suggested that length of residency in a neighbourhood is likely to increase local ties, which is an important part of attachment.

6.0 Summary and Conclusion

This paper looked at place attachment in the perspective of poor urban neighbourhoods in Nigeria. First it was interested in examining the dimensions of attachment in poor neighbourhoods and the ranges of attachment. Second, it investigated the factors which influenced attachment in this context, most importantly the socio-

demographic characteristics of the residents. The study showed that attachment is possible in poor or declined residential neighbourhoods. It also provided information about the user group by revealing the user attributes which influenced attachment at the three different ranges (house, neighbourhood and city).

This paper has revealed that the results of attachment studies in other neighbourhood situation cannot simply be universal to all residential neighbourhoods. Differences occurred from the socio-economic characteristics as well as from the physical dimensions of neighbourhoods. Although the physical and social dimensions of attachment were similar to those of other studies, the ranges of attachment differed slightly from the results of other studies on general attachment. There were also certain socio-demographic characteristics that influenced attachment in each of the ranges of attachment. This study as specifically showed the different

predictors of attachment at each of the specific ranges.

However, length of stay is a strong predictor of attachment across the three ranges examined in this study. The longer the residents stayed the more attached they became. This is probably because as time goes on, they become accustomed to the physical situation around their housing environment and also got more involved socially, which improved their level of attachment.

Finally, neighbourhood physical characteristics contributes to attachment, yet too little attention in place attachment research has been paid to the physical nature of places, hence future studies of attachment should investigate how the neighbourhood physical characteristics contributes to attachment. Research on which attributes of the physical environment enhances attachment will be of immense benefit to architects, planners and policy makers in the process of design or buildings and cities.

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Thermo-Hygrometric Comfort of Naturally Ventilated Classroom Building as a Function of the Openings Positioning and Orientation

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Abstract The basic functional requirement of a classroom environment suggests a safe, delightful and relaxing place for the learners' physical and psychological well-being and vigor such that there will be an aligned expression of satisfaction with the thermal environment. This study assessed the operational thermal comfort of naturally ventilated one-side-window oriented classroom building in Abeokuta, Ogun state, Nigeria using objective and subjective research approaches. The objective research technique involved the use of standardized measurement devices in the assessment of associated environmental factors which were relative humidity, airflow rate, ambient and

mean radiant temperatures. The human factor aspect of thermal comfort was subjectively assessed using a questionnaire structured on ASHRAE scale. The measurements were taken at the height of 130 cm at the time intervals of 7:50 – 8:30 am (morning session) and 2:20 – 3:00 pm (Afternoon session) from the month of March 2016 through to February 2017, Mondays to Fridays, excluding days of any form of holidays. The descriptive statistics of the environmental factors data obtained showed that the indoor environment of the assessed classrooms was warm and stale with an average ambient temperature range of 29.37 - 30.08 ℃, mean radiant temperature 29.24 - 31.28 ℃, relative humidity 67.81 - 68.99 % and wind speed 0.022 - 0.037 m/s. The multiple linear regression analysis gave an *R*-value of .943 with .889 chances that the average ambient temperature of the classrooms will be affected by time-invariants and microclimate variables which was an indication of good level of prediction. The human factors of the thermal comfort observed a variation between the perceived and the preferred thermal sensation with respect to the time of the day and seasons which was unsatisfactory for the teaching and learning process.

Keywords: Thermal comfort, mean radiant temperature, ambient temperature, airflow rate, relative humidity

1.0 Introduction

Physical classroom environment as part of the students' environment is a function of the structural design and mode of construction of the building. The most fundamental design choice in the building's orientation improves and advances designs for better performances (Azodo, 2017). The fundamental features of classroom building environment and its structure is described in terms of capacity, form, and openings (Yacan, 2014 and Wahab, 2015). The needs of an educational building for instance, prior to implementation are determined before designed and built to meet already determined needs (Wahab, 2015). This implies that buildings are meant to basically provide and maintain a comfortable indoor environment at thermal equilibrium with the surroundings for human activities and aspirations (Gallardo et al., 2016 and Croome, 1991). This explains why comfort issues should always be considered a major role in the design stage of building for the maximal daily operation of the buildings.

Thermal comfort is a conceptual whole made up of complicated and related parts, and it is partly subjective. It essentially integrates human, environmental and contributing factors (Wahab, 2015 and Gado and Mohamed, 2009, Szokolay 1985, De Dear et al., 1991 and Mors, 2010). Broadly speaking, actual operating conditions with variable elements or parameters such as air temperature, air humidity, relative airflow rate, mean radiant temperature, thermal insulation of clothing, physical activity, person's age, gender, food, drink, body shape, subcutaneous fat, colour of internal surfaces and lighting system defines the thermal comfort of an indoor environment (Szokolay 1985, Chenvidyakarn, 2007, Gado and Mohamed, 2009 and Majewski et al., 2017). An individual's physical and psychological well-being and vigor in a pleasing environmental c[...] express satisfaction with the

environment, the state of physical and mental well-being of the individual (Hyde, 2000, Ho et al., 2009 and Pino et al., 2012). Although individual's adaptive behavior can be very versatile having the capacity to adapt to wide variations in their physical environment while continuing to function, their performance, productivity, and efficiency do vary according to the conditions in their immediate environment (Bradshaw, 2006; Akande and Adebamowo, 2010). For the classroom environment to meet up with the basic function which among other things is learning, it should be a delightful and relaxing place to learn, safe, with lots of natural light and fresh air. Benefits associated with comfortable thermal environment found in the literature include physical and psychological wellness, the relative better health of occupants, increased attentiveness and fewer errors, increased productivity and reduced rates of absenteeism (Bradshaw, 2006 and Marino et al., 2016).

The human body metabolizes continuously which require heat rejection from the body in order to maintain thermal equilibrium. Consequently, this essentially maintains a constant normal internal body temperature of about 98.6°F (37.0°C) (Bradshaw, 2006). Should the core body temperature decrease or increase by more than about one degree Celsius, either hypothermia or hyperthermia respectively set in (Alder, 1999). Therefore, for an individual to remain healthy, the heat loss must be maintained within a very narrow range of body temperature at a controlled rate (not too fast or too slow). If heat loss is as a result of combined effects of conduction, convection, radiation, and evaporation owing to the environmental condition, the body's rate of heat production, the excess heat must be stored in body tissue. But body heat storage is always small because the body has a limited thermal storage capacity. Therefore, as its interior becomes warmer, the body reacts to correct the situation by increasing blood flow to the skin surface and increasing perspiration (Bradshaw, 2006). As a result, body heat loss is increased, thereby maintaining the desired body temperature and balance (Bradshaw, 2006).

Thermal discomfort in an academic or educational building has the tendency to create unsatisfactory conditions for the teaching and learning process (Bradshaw, 2006). This is often manifested in the learners' attentiveness, concentration, efficiency, productivity, and performance reduction (Bradshaw, 2006 and Wahab, 2015). Prescott (2001) stated that students in thermal discomfort environment are vulnerable to hyperthermia also known as heat stress. Heat stress deals with a combination of air temperature, air movement, radiation, humidity, clothing as well as behavior which induces a physiological inability of the body to maintain its temperature within limits that permit normal physiological performance (Aynsley, 1996). This thermoregulation failure of the body system that occurs when more heat is absorbed or produced by the body than it dissipates can negatively influence an individual learning capacity (Bradshaw, 2006). The higher the activity level one is subjected to, the more heat

person will produce. If the heat produced by the body becomes too much, sweating happens, which causes discomfort (Havenith et al., 2002).

Just as stated earlier in this study that thermal comfort has been found to be a combined effect of many complicated and related parts. However, air temperature is considered an indicator of thermal comfort with regard to the environmental and personal factors (Nevin, 2003). That's why most times air temperature is considered the main design parameter in building construction so that energy exchange between the occupants and the surroundings can be an effortless adaption to the prevailing climatic condition for a comfortable and conducive internal and external environment for its inhabitants (Herrington and Vittum, 1977 and Akande and Adebamowo 2010). In a literature (Bradshaw, 2006), it was found that thermal performance of a building is liable influenced by the building's ability to modify the prevailing outdoor climate to a unique indoor environment. It then makes factors such as shape, orientation, location, absorption of solar radiation, window to wall ratio and materials be necessary to feature when considering the functional adequacy of any building space and the suitability of the built environment, contribute to the way buildings are able to respond to their external environment (Bradshaw, 2006 and Adunola, 2015). Additionally, orientation, window placement, and spatial organization affect the natural ventilation and solar radiation reception ability of a building (Bradshaw, 2006).

Heat gain through the window openings accounts for 25 - 28% of the total heat admitted into the indoor space (Al-Tamimi, 2011). Therefore, in other to minimize solar admittance and at the same time maximize ventilation in an indoor space, buildings orientation should be an imperative issue for interception of prevailing winds and face the direction of the strongest solar radiation (Bradshaw, 2006). The result is the achievement of effective ventilation while thermal impact from solar radiation is minimized (Koranteng and Abaitey, 2010). According to Wahab (2015) buildings constitute a substantial percentage of most educational institutions' assets, user needs, and operating costs. The performance level of this resource is therefore very critical to educational effectiveness (Wahab, 2015). This form the conceptual basis of this study as it quantifies the thermal comfort of students in one-side-window oriented classroom building structures in Abeokuta, Nigeria.

2.0 Materials and Methods

The classroom building environments assessed were on the same location, having same window placements as well as orientation (sun path). The classrooms arrangement is linear viewed from the building design. The fenestration is such that the windowless side faces the east while the windowed side faces the west. The building is a bungalow consisting of offices, library, laboratory and classrooms, however only five classroom were assessed in this study (Figure 1). There were no trees shading effects on the outdoor environment. The orientation of the study site location effec

classroom building is solar radiation on the windowless side (East facing) morning hours due to sun rise and in the afternoon at the windowed side due to sun set. The various dimensions of the studied classrooms are shown in table 1. The school in which the study was conducted is located in Abeokuta, Ogun state. The geographical of study location is of wooded savanna with the

coordinate of 7° 9' North latitude and 3° 21' East longitude (Hoiberg, 2010). The climatic condition of Abeokuta are average ambient temperature 28°C, average relative humidity 74%, wind speed ranges from 2.9 - 4.0 m/s, and annual rainfall 750 mm (Ajayi et al., 2017). The elevation of Abeokuta is 66 meters above sea level.
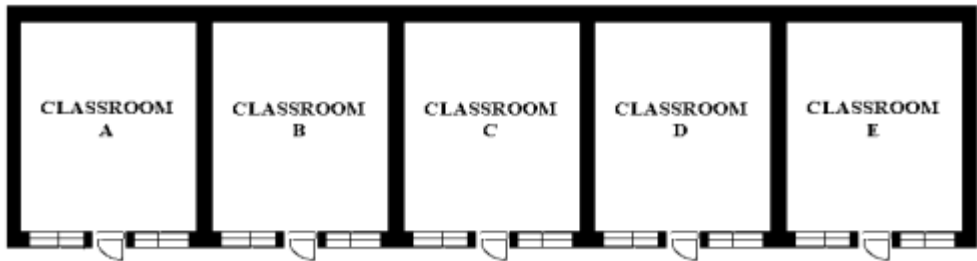

Figure 1 The diagrams of the classrooms assessed

Objective and subjective research approaches were adopted in the conceptual assessment of the thermal comforts (environmental and human factors). The objective approach

involved the quantification of environmental factors namely mean radiant and ambient air temperatures, relative humidity, and airflow rate.

Table 1 Design dimensions of the studied classroom building

Classrooms capacities (m^3)		Area of First Window (m^2)	Area of Second Window (m^2)	Area of Doors (m^2)
A	87.12	5.20	3.60	2.06
B	87.56	5.46	3.47	2.09
C	87.56	5.47	3.60	2.07
D	87.79	4.93	3.40	2.04
E	89.10	4.93	3.40	2.20

Factory calibrated instruments used for environmental factor data collection included GM816 digital anemometer for the airflow rate, the digital LCD thermometer hygrometer temperature measured relative humidity and air temperature. The mean radiant temperature was measured using an infrared thermometer. The measurements were taken twice daily

during school hours 7:50 – 8:30 am (morning session) and 2:20 – 3:00 pm (Afternoon session) from the month of March 2016 through to February 2017, Mondays to Fridays, excluding days of any form of holidays. This measurement interval was considered as they represent the period of greatest use or sensitivity to discomfort (Arens and Ballanti, 1977).

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environmental parameters were measured at the center of the classrooms and at a height 130 cm, which represents the height of a sitting person's head. The measurements and recordings were carried out five times at the intervals of 60 seconds in each of the five assessed classrooms with the use of a stopwatch giving 5 minutes reading per study point (classroom). The human factors were subjectively assessed using a questionnaire structured on ASHRAE 7-point scale (cold, very cold, slightly cold, neutral, slightly warm and very warm) to quantify individual's adaptive behavior of the students in their physical environment. The assessment of human factors aspect of thermal comfort comprises the participants' perceived and preferred thermal sensation in the morning and afternoon sessions as well as the seasons (wet and dry). The effects of ambient temperature, relative humidity, and airflow rate were factored into the occupants' thermal sensation. Consistent perceived occupants' thermal sensation with their preferred thermal sensation is termed satisfied otherwise unsatisfied. The subjective responses were obtained from thirteen (13) participants randomly selected from each of the assessed classrooms. Participation was free as no incentive was offered. The collected data were analyzed using Microsoft Excel 2007 and SPSS 16.0.

3.0 Results and Discussions

The descriptive statistics of the measured classroom environmental factors during the survey were presented in table 2. The measured environmental variables which included airflow rate, relative humidity, ambient and mean radiant temperatures for students' physical and psychological wellness in the classroom environment were of an approximate range of values for the five assessed classrooms with an average ambient temperature range of 29.37 - 30.08 °C, mean radiant temperature 29.24 - 31.28 °C, relative humidity 67.81 - 68.99 % and wind speed 0.022 - 0.037 m/s. Considering that students spend most of their time in a seated position at schools (Samani and Samani, 2012), comparing the data obtained with the standard values required for sedentary activities which are 26.00 – 28.00 °C for indoor ambient temperature and 40.00 - 70.00 % for relative humidity (CIBSE, 1999) the indoor air temperature was higher while the relative humidity fell within the range. The environment variables are the basic factors in the determining the impacts of the indoor thermal environment on human body physiology as such has been found to affect the motor nerve conduction velocity, sensory nerve conduction velocity and skin temperature (Liu et al., 2007). The necessity of adequate relative humidity in maintaining thermal comfort is in its effect as high levels of humidity inside buildings prevent the evaporation of sweat from the skin which is the main method human body losses heat (Givoni, 1976). On the contrary, low humidity levels can cause symptoms such as dryness of throat and skin, and can cause irritation of the mucous membranes, where the heat loss is greater than the heat produced by the body, issues like shivering are the resultant effects. In addition, the human body has a thermal interaction with the environment with

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grades of thermal sensation. The temperatures of the surfaces surrounding an enclosed space in relation to the temperature of a body within the space determine the rate and direction of radiant heat flow between the body and the surrounding surfaces (Bradshaw, 2006). The obtained average ambient temperature range of 29.37 - 30.08 °C in this study fell within the range 29 – 35 °C considered warm (Matzarakis and Mayer, 1996) as well in the presence of inadequate air circulation, the space stales. The airflow rate function in maintaining thermal comfort is in the effect heat

loss from the human body by convection, an evaporative capacity of the air and consequently the cooling efficiency of sweating, though when excessive causes the sensation of draught (Givoni, 1976; McMullan, 2002). The significant contribution of the mean radiant temperature to the thermal comfort of an indoor environment of an occupant is by the radiant exchange of heat from surrounding surfaces. This makes it useful to consider the design and creation of adequate ventilation space of a classroom enclosure innate radiant heat exchange.

Table 2 The Summary of the Descriptive Analysis of the Measured Environmental Factor

Measured environmental factor variables	Descriptive analysis	CLASSROOM				
		A	B	C	D	E
AT (°C)	Minimum	20.30	23.30	22.90	23.10	23.00
	Maximum	35.20	36.80	36.50	37.40	41.80
	Mean	29.37	29.49	29.84	29.87	30.08
	Std. Deviation	4.45	4.52	4.39	4.78	5.30
RH (%)	Minimum	51.00	50.00	50.00	51.00	51.00
	Maximum	89.00	88.00	89.00	89.00	88.00
	Mean	68.07	67.81	68.99	68.70	68.22
	Std. Deviation	13.15	12.49	13.13	12.02	11.87
WS (m/s)	Minimum	0.000	0.000	0.000	0.000	0.000
	Maximum	0.400	0.400	0.100	0.400	0.400
	Mean	0.027	0.035	0.037	0.031	0.022
	Std. Deviation	0.047	0.077	0.040	0.063	0.060
MRT (°C)	Minimum	23.30	23.30	23.30	23.30	23.10
	Maximum	35.30	35.10	35.60	35.20	35.70
	Mean	29.24	31.28	29.24	29.37	29.32
	Std. Deviation	4.65	4.00	4.75	4.78	4.82

Structure designs by making modify the microclimatic condition and as such affect the thermal comfort of the environment. Adunola (2015) stated that buildings irrespective of whatever location are meant to provide convenient requisite thermal indoors environment for conducive human

activities. Passive buildings act as a filter between the outside conditions imposed by the weather, which is determined by the location, and the indoor conditions that need to meet occupant comfort requirements (Lenoir, 2013). Natural ventilation, through the adoption of

ventilation by appropriate building openings (window and doors) placements is a passive cooling method for buildings make the building occupants safe, clean and comfortable as well it has a strong influence on their productivity, physical and mental well-being (Hyde, 2000; Ohba and Lun, 2010; Bradshaw, 2006). The considered variables which were measurement intervals and seasons showed that the relative humidity was high in the morning

hours compared with the afternoon session for all the classrooms. The average ambient temperature was low in the morning but high in the afternoon. A similar observation was made for mean radiant temperature as it was for the ambient temperature (Table 2). The similar observation obtained for the five assessed classrooms was ascertained to be as a result of the similar orientations, openings and same location.

Table 3 Descriptive statistics of the environmental factors of assessed classroom with consideration to measurement interval and seasons

Seasons	Classroom	Measurement intervals							
		MORNING				AFTERNOON			
		RH	AT	MRT	AFR	RH	AT	MRT	AFR
Wet	A	79.97	25.62	24.89	0.029	60.32	33.34	32.80	0.038
	B	78.81	25.56	24.95	0.084	61.39	33.22	33.12	0.015
	C	78.75	27.21	24.83	0.011	66.50	33.13	32.96	0.048
	D	78.06	25.81	25.05	0.071	63.08	33.31	33.19	0.017
	E	76.69	26.09	24.62	0.049	60.75	33.21	33.21	0.013
Dry	A	80.46	24.59	24.89	0.026	51.26	34.94	33.95	0.025
	B	80.14	24.71	24.94	0.020	51.03	35.17	34.48	0.020
	C	80.43	24.70	24.83	0.031	50.75	34.48	34.33	0.026
	D	80.97	24.88	25.05	0.017	52.42	35.44	35.47	0.021
	E	81.88	24.47	24.62	0.016	53.44	35.20	36.42	0.010

Studies have shown that the combined effect the environmental factors such as ambient temperature, mean radiant temperature, relative humidity and air circulation or airflow rate in a natural ventilated space offers comparatively higher comfort to occupants (Busch, 1990) which is a function of the design. Although variation in temperature or heat is an important indicator that should be taken into account in the investigation of the environmental condition of a space, air temperature alone is neither a valid nor an accurate indicator of thermal comfort or thermal stress (Hayatu et al., 2015). However, it's easy to relate

with and use has made it the most commonly indicator for thermal comfort. Going by Hayatu et al. (2015) opinion that ambient temperature should always be considered in relation to other environmental and personal factors started up from the basis that the average ambient temperature of an environment is dependent on its microclimatic variables such as mean radiant temperatures, air circulation or flow rate, and relative humidity. Therefore, is often taken as the main design parameter for thermal comfort (Hayatu et al., 2015). The effects of mean radiant temperatures, air circulation

and relative humidity on the ambient temperatures of the classrooms were evaluated using multiple linear regression analysis. The analysis showed a multiple correlation coefficient (*R*-value) of .943 which was an indication of good level of prediction of the ambient temperature from predictors with .889 chances that the average ambient temperature of the classrooms will be affected by regressor variables (measurement intervals, seasons, airflow rate, mean radiant temperature, relative humidity) (Table 4).

Table 4 Summary of the Model

Model	R	R Square	Adjusted R Square	Std. Error of the Estimate
1	.943[a]	.889	.888	1.57398

a. Predictors: (constant), measurement intervals, seasons, wind speed, mean radiant temperature, relative humidity

Analysis of variance for the dependent variable (ambient temperature) which was used to determine if the overall regression model is a good fit for the obtained variables showed that the independent variables statistically significantly predicted the dependent variable, $F(5, 702) = 1119.829$, $p < .0005$ (Table 5). This implies that the regression model was a good fit of the regressor variables.

Table 5 Analysis of variance for the dependent variable: ambient temperature

Model		Sum of Squares	Df	Mean Square	F	Sig.
1	Regression	13871.449	5	2774.290	1119.829	.000[a]
	Residual	1739.150	702	2.477		
	Total	15610.599	707			

a. Predictors: (constant), measurement intervals, seasons, airflow rate, mean radiant temperature, relative humidity

The general form of the estimated model coefficients to predict the ambient temperature of a classroom space from the mean radiant temperature, air circulation, relative humidity, measurement interval which has to do with the time of the day (measurement interval) and the season gave an expression

$AT = 24.869 – (.104 \times RH) – (.924 \times AFR) + (.167 \times MRT) – (.268 \times S) + (4.992 \times MI)$ (1)

Where

AT = Ambient temperature
RH = Relative humidity
AFR = Airflow rate
MRT = Mean radiant temperature
S = Seasons
MI = Measurement intervals

The unstandardized coefficients indicated how much the dependent variable (ambient temperature) varies with each of the independent variable or the predators when all other independent variables (meas~~~~~~ intervals, seasons, airflow rat

radiant temperature, relative humidity) are held constant (Table 6). The table showed that for an increase in the ambient temperature of the classroom environment the unstandardized coefficient, such as relative humidity, wind speed and season of the year decrease in the ambient temperature. The dependency on the ambient temperature on the microclimatic variables in the expression is supported by studies in literature (Stein and Reynolds, 2000; Hussein et al., 2002; Klein and Schlenger, 2008). The relative humidity as described by Stein and Reynolds (2000) is the ratio the water vapor density in the air to water vapor density at the same total pressure and temperature. This was stated to affects the rate of evaporation from the skin of an individual in a space (Stein and Reynolds, 2000). At ambient temperatures as high as imminent to the average skin temperature of 34°C, necessitates evaporation heat loss so as to maintain comfort. However, study has shown that exposure to low relative humidity conditions which results in increased evaporation rate from the skin disposes an exposed person to dry and irritated skin sensation (Klein and Schlenger, 2008). The sensitivity of the human body in a space according to Hussein et al. (2002) is to the temperature variation rather than relative humidity as there is still scarce categorical evidence that demonstrated and supported that there is detrimental impact from either high or low humidity to the health of normal people. Likewise Hou (2018) study maintained that rate of airflow and its circulation in an environment account for the temperature rise effect that might result in human thermal sensation and discomfort.

Table 6 The multiple regression tests for prediction of the effects of regressor variables on the ambient temperature in the classroom environment

Model		Unstandardized Coefficients		Standardized Coefficients		
		B	Std. Error	Beta	T	Sig.
1	(Constant)	24.869	1.604		15.505	.000
	Relative humidity	-.104	.012	-.278	-8.408	.000
	Wind speed	-.924	1.029	-.012	-.899	.369
	Mean radiant temperature	.167	.029	.165	5.691	.000
	Seasons	-.268	.131	-.029	-2.055	.040
	Measurement intervals	4.992	.331	.532	15.098	.000

a. Dependent variable: ambient temperature

A simple and logical measure of thermal comfort is time-invariant as comfort or discomfort occurs on a given period of the day (Arens and Ballanti, 1977). The comfort or discomfort sensation is based on perception or interrelated perception of the sense organs such as the brain, eyes, nose, ears, tactile and heat sensors. The condition were the human body experiences thermal discomfort sensation in too hot or too cold condition, when the surrounding air is odorous and stale as well as when the

body works too hard to maintain thermal equilibrium. In a space where the heat produced by an occupant's body is proportionate to the heat loss without any form of mechanical, ventilating and air conditioning control mechanism. When the comfort condition exists, the mind is alert and the body operates at maximum efficiency (Bradshaw, 2006). When the state of the mind is satisfied with the thermal environment that is if the environmental condition demands minimal stimulation of the skin's heat sensors and of the heat-sensing portion of the brain thermal comfort is assumed (Bradshaw, 2006). Physiologically comfort can be interpreted as the achievement of thermal equilibrium at our normal body temperature with the minimum amount of bodily regulation (Bradshaw, 2006). However, this situation is not absolute but rather varies with the individual's metabolism, peculiarity of engaged activity, and physiological adjustment and adaptability of the individual body over a narrower or wider range of ambient temperature. The human factor aspect of thermal comfort subjectively assessed using questionnaire structured on ASHRAE 7-point scale to quantify an individual's adaptive behavior of the students in their physical environment is presented in table 7. This comprises the students' sensation and the preferred sensation during the morning and afternoon sessions. The temperature, relative humidity, and airflow rate effects were all factored into the occupants' perceived thermal sensation. For the wet season, it was observed that the predominant thermal sensation perceived by the participants

was cold (33.8%) which was as deserved by the same proportion of the participants. However, the predominant perceived thermal sensation by the participants was 26(40%) in the afternoon whereas the preferred thermal sensation was slightly cold 20(30.8%). During the morning hours of the dry season, most of the participants (43.1%) perceived warm thermal sensation while the preferred thermal sensation was slightly cold by 20(30.8%) participants. 42(64.6%) of the participants voted warm as the perceived thermal sensation whereas the predominant preferred thermal sensation by the participants was 19(29.2%) for afternoon sessions of the dry season (Table 7). Consistent perceived occupants' sensation with their preferred thermal sensation termed satisfied otherwise unsatisfied analysis showed that the design structure of the building created thermal discomfort with high unsatisfactory conditions for the teaching and learning process for both the time of the day (morning and afternoon sessions) and season (Figures 1 and 2). The observations in this study agreed with Bradshaw (2006) and Hayatu et al. (2015) studies. The dent in thermal comfort observed in this study that considered one-sided window classrooms was found to be an addition in studies that considered opposite sided windowed classroom (Witkowska and Gładyszewska-Fiedoruk, 2018). This could be attributed the cross ventilation effects which gave a melioration to the air circulation, indoor ambient temperature and relative humidity. This is because the negative effect of solar radiation

which is increase the ambient temperature is taken care of by the air circulation and relative humidity.

Table 7 Participant's physical environment responses on ASHRAE 7-point scale

| Participant's physical environment responses on ASHRAE 7-point scale	Wet Morning		Afternoon		Dry Morning		Afternoon	
	TP n(%)		TP n(%)		TP n(%)		TP n(%)	
	TS n(%)		TS n(%)		TS n(%)		TS n(%)	
Cold	22(33.8)	22(33.8)	4(6.2)	9(13.8)	12(18.50)	14(21.5)	3(4.6)	7(10.8)
Very cold	12(18.5)	5(7.7)	5(7.7)	7(10.8)	2(3.1)	2(3.1)	4(6.2)	8(12.3)
Slightly cold	10(15.4)	20(30.8)	6(9.2)	20(30.8)	8(12.3)	20(30.8)	4(6.2)	19(29.2)
Neutral	1(1.5)	5(7.7)	7(10.8)	7(10.8)	2(3.1)	7(10.8)	2(3.1)	7(10.8)
Slightly	14(21.5)	5(7.7)	17(26.2)	10(15.4)	4(6.2)	9(13.8)	10(15.4)	10(15.4)
Warm	6(9.2)	6(9.2)	26(40.0)	9(13.8)	28(43.1)	11(16.9)	42(64.6)	11(16.9)
Very warm	22(33.8)	2(3.1)	4(6.2)	3(4.6)	9(13.8)	2(3.1)	3(4.6)	3(4.6)
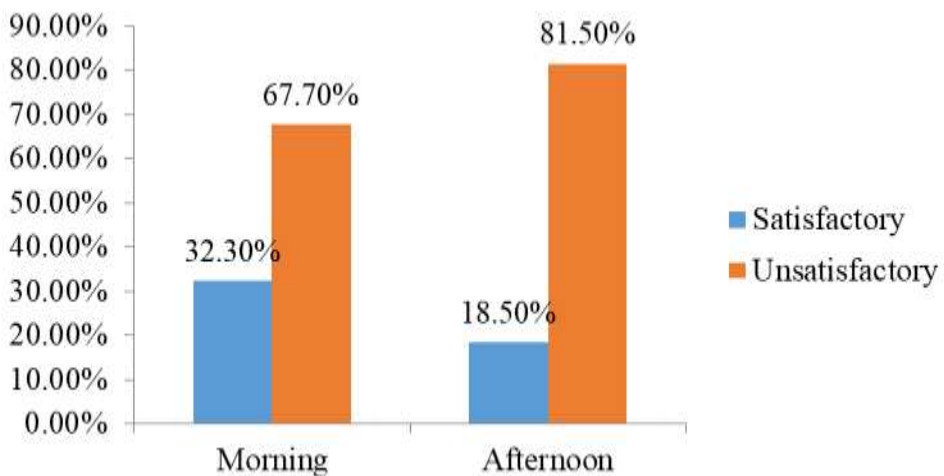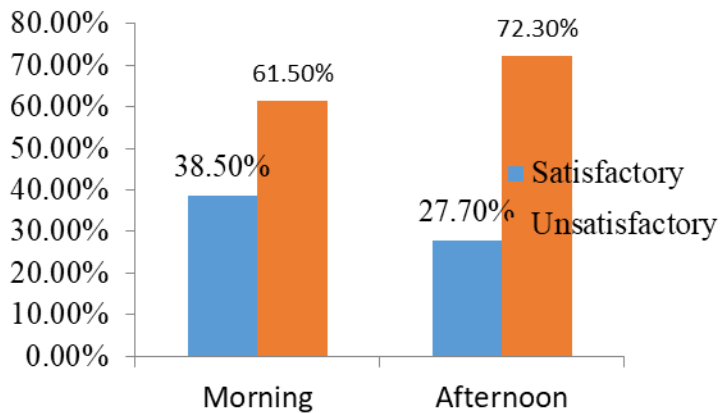
Figure 2b Thermal sensation of the participants during the dry season

Conclusion

The comfortable thermal classroom environment is relative to better health of occupants, increased attentiveness and fewer errors, increased productivity and reduced rates of absenteeism. The assessed operational thermal comfort of naturally ventilated classrooms environment in this study was carried out in a one-side-window oriented classroom building showed that the environmental factors were not in compliance with the microclimatic variables for an indoor environment for the sedentary activities required in an academic environment. The vote for the perceived and preferred thermal sensation among the participants observed variations. It was concluded that the design structure of the assessed building structures created thermal discomfort with high unsatisfactory conditions for the teaching and learning process for both the time of the day (morning and afternoon sessions) and season. For the maximization of natural ventilation effect that will guarantee thermal comfort for the design of passive classroom buildings, cross ventilation should put into consideration.

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Physical Planning Implications of Street Vending in Ogbomoso, Nigeria

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***Abstract*:** Following the observation of the proliferation of informal economic activities in Nigerian urban centres, this study examines the spatial pattern and environmental implications of street vending, the socio-economic characteristics of street vendors and public perceptions of street vending. Instrumentation of data collection includes direct counting, questionnaires and interview. The data was analysed using cross tabulations, structured observation and Mixed Method Content Analysis. The findings from the study show an appreciable number (1,080) of informal structures indiscriminately located along the major roads. The study also confirms the preponderance (44%) of metal containers among fixed vendors. The socio-economics characteristics of street vendors show that they are generally of low educational status, gender imbalanced, dominated by productive and agile young people with a relatively high daily income. The physical planning implications of street vending include; incompatible land uses, building deformations, the menace of temporary structures, change in land use functions, poor waste disposal and environmental eyesores. The study recommends the integration of street vending into urban planning policy to maximise the economic benefits of street vending while minimising its land use and environmental consequences.
***Keywords*:** Urbanisation, informality, street vending, unemployment

1.0 Introduction

Urban planning in developing countries, particularly in cities with rapid urbanization, is facing a wide range of social, economic and environmental problems inflicted by unguided and uncontrolled urbanization. It is widely believed that urbanization generally creates a wide market base, and thus enhances production and consumption activities, which in turn generate economic growth and development. The reverse is the case in cities of less developed countries where the growth is taking place in the absence of significant industrial expansion. As a result, there is disequilibrium among demographic, economic, political and environmental factors of urbanisation.

This is particularly true of Nigerian urban centres where city expansion is mainly based on informal processes (see Adeboyejo, 2013). Most of the urban agglomerations in Nigeria grow without any official planning. In the face of this unguided urban growth, "formal economies have failed to cope; socio-economic conditions have progressively become unpalatable and 'poor-unfriendly'" (Kamete,2013) These negativities constitute a growing and enduring urban crisis. Urban informality is a natural response to this crisis

Informality permeates all aspects of the urban system, including housing and land occupation (Roy, 2003), commerce, production and work (Maloney, 2006), and even the public sphere and political processes (Mizstal, 2001; 2005). However, the economic aspect of urban informality, expressed as informal sector or economy, dominates the debate on urban informality. Perhaps, as a result of controversy surrounding its continued existence within the urban landscape.

The International Labor Organization (ILO) estimates that "the proportion of the urban work force engaged in the informal sector is highest in sub-Saharan Africa, and accounts for more than 50% of urban employment in two of the countries surveyed in 1999". However, the capacity of the informal sector economy to absolve a teeming population of the unemployed into the labour force has posed a considerable challenge to urban land use planning and management in Nigeria (Adeyinka et al, 2006). This is as a result of the capacity of the sector to generate land use problems such as sprawl problem, incongruous land uses, building alterations, the menace of temporary structures, alteration of land use functions, open space conversions and land degradation (Okeke, 2000). Moreover, the appalling environmental conditions associated with informal sector activities and settlements constitute a major threat to the health and well-being of urban life (Nwaka, 2005).

Expectedly, there emerged diverse viewpoints on what should be the appropriate attitudes and policies towards the informal sector. The exponents of the sector (Ademu, 2000), presents it "as a vital source of employment and income for the poor, the seedbed of local entrepreneurship, and a potent instrument in the campaign to combat poverty and social exclusion". On the other hand, critics of the sector, mainly from urban planning profession (Okeke, 2000: Adeyinka et al, 2006; Abolade, 2012) and government authorities, dismiss the sector as an anomaly, a source of disorder, environmental nuisance and an obstacle to the

development of a modern economy (see Nwaka, 2005). It is, therefore, obvious that the interest in informal sector has been sparked as much by dissatisfaction with its negativities, as by gratification of its positivities.

The conflicting positions on informal sector pose a difficult dilemma for planners and policy makers, and tend to reinforce the ambivalence and hostility of official attitudes towards the sector (Nwaka, 2005). Therefore, in an attempt to juxtapose the positions of the two schools of thought, this study examines street vending activities in Ogbomoso, Nigeria.

2.0 Conceptual and Theoretical Frameworks

There is a multitude of conceptualisations and definitions of informality as there are evidences of its proliferation in developing world. Informality, also known in the literature as informal sector, has been variously referred to as "instability", "lack of organisation", "disorganised". However, the term was introduced into development literature four decades ago by social anthropologist Keith Hart in his article - Informal income opportunities and urban employment in Ghana. Hart (1973) coined the term informal sector and used it principally to describe a variety of employment mainly on the fringes of the organised of "modern" part of economy and sometimes technically illegal. He explained further that price inflation, insufficient wages, and a growing number of workers who were surplus to the requirements of the urban labour market had led to a soaring level of informality in the income generating activities of workers, which varied in terms of legality, official

registration, skills required, and other factors.

In 1972, International Labour Organisation (ILO) began to codify the definition of informality, particularly keeping in mind the needs of national statistical authorities in measuring the extent and nature of informality. Two decades after Hart's original contribution, ILO (1993) conceived informality as thus:

> *"They [informal enterprises] are private unincorporated enterprises (excluding quasi-corporations), i.e. enterprises owned by individuals or households that are not constituted as separate legal entities independently of their owners, and for which no complete accounts are available that would permit a financial separation of the production activities of the enterprise from the other activities of its owner(s). Private unincorporated enterprises include unincorporated enterprises owned and operated by individual household members or by several members of the same household, as well as unincorporated partnerships and co-operatives formed by members of different households, if they lack complete sets of accounts."*

From the foregoing, informality was originally and commonly restricted to economy but the definition has been extended to include "housing and land occupation' (Roy, 2003), "commerce, production and work" (Maloney, 2006) "public sphere and political processes" (Mizstal, 2001; 2005) and all other aspects of urban system. In this direction, Watson (2009) conceptualises informality as "encompassing forms of income

generation, forms of settlement and housing, and forms of negotiating life in the city". However, in this study, the focus is on enterprise aspect of informality. Therefore, we talk of street vending as component of urban informal economic activities where individuals sell their wares along streets and sidewalks to passing pedestrians and motorists. A street vendor offers goods for sale to the public without having permanent built up structure. A fixed street vendor stays on site, occupying space by the road side, usually with temporary or semi-permanent structures while a mobile street vendor moves from location to location carrying his wares on carts, or in cycles or baskets on his head.

Theoretically, three contrasting frames dominate the current discussion of informality. These are the views as expressed by dualist, structuralist and legalist schools of thought. The dualists link the persistence of informal activities to insufficient formal job opportunities as result of "a slow rate of economic development and a faster rate of urbanization" (Tokman 1978). Therefore, the theorists working within this perspective view the formal and informal sectors as having almost distinguishable features from each other and therefore represent almost two opposite parts of the economy.

In a swift response to the dualists' sentiment, there emerged the structuralist understanding of informal sector. The Structuralist proponents oppose the view as expressed by the dualists to examine the way in which forms of production, productive units, technologies, and workers are integrated into various parts of the economy (Rakowski 1994). Based on their units of analysis, the structuralists asserted that both the formal and informal economies are intrinsically linked. They argued that there are evidences of informality in formal enterprises. For instance, informal employment abounds in several formal enterprises in form of part time workers, temporary workers and home workers who were employed in formal businesses through contracting or sub- contracting arrangements. They also posited that both formal and informal enterprises wage workers are subordinated to the interest of capitalist development, providing cheap goods and services (Moser, 1978; Portes et al, 1989).

The legalist school of thought on informality was led by economist Hernando De Soto who focused on entrepreneurs and institutional constraints that make informality a rational economic strategy. The legalists attribute the growth of informal enterprises to the strict rules and regulation, taxes, time and effort involved in complying with formal state procedures (De Soto, 1989). They blame the rise of informality phenomenon on excessive state regulation and not to the dynamics of labour market. The legalist see informality as radical breaking of legal barrier, a natural response to real market forces, and not to the rise in unemployment and the need to for jobs. Although, the legalists focus on the regulatory environments of both formal and informal enterprises and not the firms, they acknowledge that capitalist interests collude with government to set the bureaucratic 'rules of the game' (De Soto, 1989).

3.0 Methodology

Based on the typology of street vending, data were collected on prevalence of street vending in Ogbomoso. Data were also collected on the spatial distribution of vending activities, socio-economic characteristics of street vendors, land use and environmental implications of street vending and people's perception of street vending activities. For data on immobile vending, the two major roads in Ogbomoso (LAUTECH/High school axis and Grammar school/Federal axis) were delineated into corridors using major junctions (Table 1). In each corridor, the prevalence of informal structures such as kiosks, containers, sheds, big umbrellas and other makeshift structures being used for street vending, were obtained through direct counting. For data on mobile street vending, the head count of mobile vendors was conducted simultaneously in all major junctions along the corridors for duration of 40 minutes each on a weekend. To ensure pro-rata representation, fixed vendors were clustered into five units based on the types of structures used. On this basis, questionnaires were administered on 286 fixed vendors using Yamane (1967)'s published table at ±5% precision level where confidence level is 95% and P=.5. While 135 mobile vendors were sampled using accidental sampling method.

Data on land use and environmental implications of street vending were obtained through structured or systematic observation while data on people's perception of street vending were collected with the aid of structured interview. All data were collected with the help of trained Research Assistants on a weekend between 9am and 12am.

Data on the prevalence and incidence of street vending were analysed using descriptive statistic such as z score, tabulation and cross tabulation. The socio-economic characteristics of street vendors were presented in percentages. Narrative analysis was utilized to analyse data on land use and environmental implications of street vending while peoples' perceptions of street vending were analysed using Mixed Method Contents Analysis.

Table 1 Selected corridors and Junction for sampling purpose

SN	Road corridors	Major junctions
Lautech / High School Road (6km)		
1	Lautech to General	General
2	General to Starlight	Starlight
3	Starlight to Takie	Takie
4	Takie to Akande	Akande
5	Akande to Iyana Adeleke	Iyana Adeleke
6	Iyana Adeleke to High school	High school
Grammar school / Express (5.3km)		
1	Grammar schl to Oja Igbo	Oja Igbo
2	Oja Igbo to Takie	Takie
3	Takie to Odo oru	Odo oru
4	Odo oru to express	Express

4.0 Findings and Discussions

4.1 Street Vending in Ogbomoso: Prevalence, Sites and Structures

There are widespread reports of uncontrolled infiltration of informal sector activities in virtually every segment of urban space, especially along major roads of cities (Jelili and Adedibu, 2006; Adedeji et al, 2014). The preponderance of vending activities in Ogbomoso has been confirmed in this study. Based on typology of vending activities, the incidence of fixed vending was obtained by counting the number of temporary and semi-permanent structures (Table 2) while the incidence of mobile vending was derived by head count of mobile vendors. (Table 3)

4.1.1 Fixed Street Vending Activities

Table 2 shows a remarkable incidence of fixed vending activities along the two major roads in Ogbomoso. The findings show that 1080 informal structures were indiscriminately located along the two major roads for vending activities. Analysis revealed that 73.6% of these structures are scattered along LAUTECH/high school axis. When disaggregated by road corridors, General/starlight corridors claims the highest incidence of street vending. The reason for this is not farfetched, Sabo is a settlement mostly inhabited by migrants and it is expected that the vast majority of them engage in informal sector as it has been posited that migrants in non-industrialized cities were likely employed in informal jobs and contributed to the growth of informal sector (Kusakabe, 2006). Moreover, Sabo is an important commercial hub of Ogbomoso. Odo orun/Express corridor generated the lowest incidence of street vending. This may not be unconnected with the presence of two organised public buildings (Power Holding Office and Federal Government College) along this corridor. Federal Government College, apparently the most organised, occupies a vast land space along this corridor and does not allow the erection of informal structures along its fence.

Table 2 Incidence of Street Vending in Ogbomoso

SN	Road Corridors	Kiosks	Containers	Shed	Display Table	Big Umbrella	Total	Z scores
1	Lautech to General	10	28	3	4	9	54	-0.816
2	General to Starlight	44	80	44	35	30	233	1.889
3	Starlight to Takie	20	69	26	36	26	177	1.042
4	Takie to caretaker	11	24	7	12	21	75	-0.499
5	Caretaker to Iyana Adeleke	21	55	13	12	32	133	0.378
6	Iyana Adeleke to High school	15	56	12	17	23	123	0.227
7	Grammar schl to Oja Igbo	33	84	6	5	7	135	0.408
8	Oja Igbo to Takie	2	16	2	7	4	31	-1.164
9	Takie to Odo oru	12	56	12	5	12	97	-0.166

10	Odo-oru to express	6	7	4	2	3	22	-1.300
	Total	174	475	129	135	167	1080	
	Percentage	16.1	44	11.9	12.5	15.5	100	

Figure 1 shows the types of informal structures used for street vending activities in Ogbomoso. From the Figure, 174 (16.1%) use kiosk, 167(15.5%) stay under big umbrella, 135 (12.5%) use covered display table, 129 (11.9%) erected shed while significant proportion (44%) use metal containers. The preponderance usage of metal containers has been observed to have negative implications not only for the users but also for the environment (Adedeji et al, 2014) This, they attributed to the fact that steel is not biodegradable, has high heat storage capacity, high thermal conductivity, impairs users' comfort and builds general environmental discomfort.
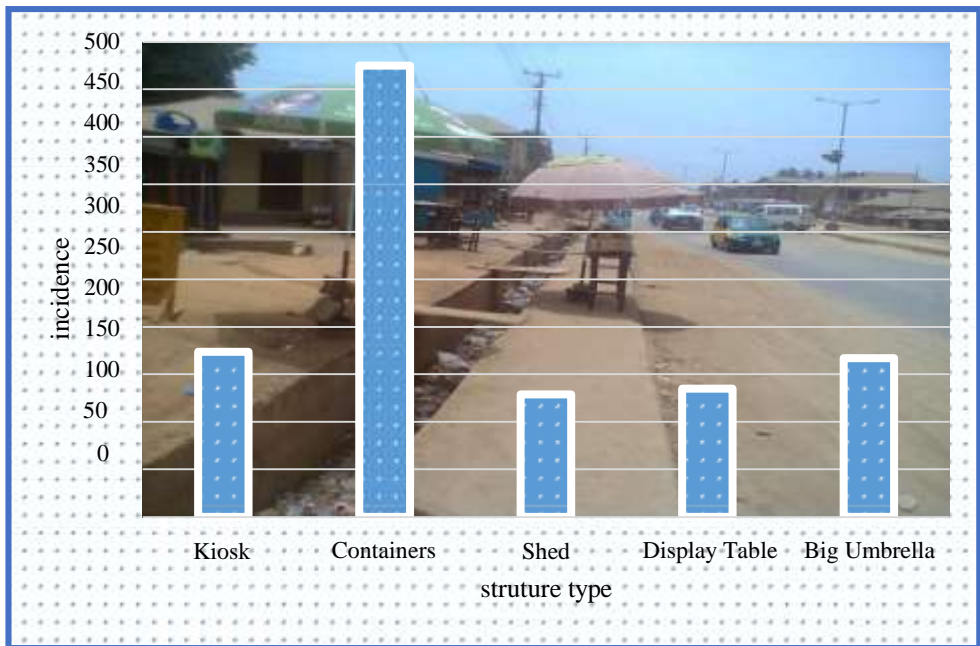

Figure 1: Structures used in Street Vending in Ogbomoso

4.1.2 Mobile Street Vending

There were considerable number of street vendors who move from location to location to sell their wares in Ogbomoso. The locational pattern of mobile vendors indicated that they vary in numbers from location to location (Table 3). Mobile street vendors are profoundly visible in Caretaker and Oja-Igbo junctions more than any other junctions. This ma be unconnected with the influen

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Akande market and Oja Igbo markets respectively for the two junctions. There is also high incidence of vendors in Takie, General, starlight and express. The reasons being that they serve as transportation nodes in Ogbomoso. Moreover, they are important commercial hubs in Ogbomoso.

Table 3 Incidence of Mobile Street Vending in Ogbomoso

SN	LOCATIONS Major Junctions	STREET HAWKERS Male	Female	Total	Z scores
1	General	11	37	48	0.278669
2	Starlight	14	35	49	0.359573
3	Takie	13	38	51	0.521381
4	Caretaker	18	41	59	1.168613
5	Iyana Adeleke	12	23	35	-0.77308
6	High school	9	19	28	-1.33941
7	Oja Igbo	15	43	58	1.087709
9	Odo oru	8	17	25	-1.58212
10	Express	12	36	48	0.278669
	Total	112	289	401	0.278669
	Percentage	27.9	72.1	100	

4.2 Characteristics of Street Vendors In Ogbomoso

Evidences as shown on Table 4 revealed that street vending in Ogbomoso is heavily dominated by female (62.8% vs 37.2%). This study corroborated gender disparity of street vendors as reported in similar studies in Nigeria (Adedeji et al, 2014; Nduka and Duru, 2014) and elsewhere (Kusakabe, 2006). However, there are relatively fewer female fixed vendors than female mobile vendors (57.8% to 67.8%). One significant implication of this distribution is street vending contributes to women's economic autonomy.

Street vending is more concentrated among vendors within 18–30 years (30.1%). The population of street vendors tends to decrease as age increases. One important finding about age pattern of street vendors is that underage constitute an appreciable proportion of street vendors. They constitute almost half (42.5%) of the mobile vendors while in the overall, they accounted for more than one quarter (26.4%) of the sampled street vendors. This shows that street vending provides a ground for child labour to thrive. This validates the findings in some studies on child labour onshore (Ogunkan and Fawole, 2009; Abisoye, 2013; Ogunkan, 2014) and offshore Nigeria (Celik and Baybuga, 2009; Kangsangbata, 2008)

Table 4 Socio-economics characteristics of street Vendors

Characteristics	Street vendors					
	Fixed Vendors		Mobile Vendor		TOTAL	
	No	%	No	%	No	%
Sex						
Male		42.2		32.2		37.2
Female		57.8		67.8		62.8
Age						
Under 18		10.2		42.5		26.4.
18 – 30		31.3		29.2		30.1
31 – 40		28.2		12.3		20.3
41 – 50		16.5		9.8		13.2
Above 50		13.8		6.2		10
Educational Level						
No formal education		12.5		19.5		16
Primary Schl		33.7		55.5		44.6
Secondary Schl		44.2		22.7		33.4
Tertiary		9.6		2.3		5.9
Marital status						
Single		28.9		53.2		41.1
Married		57.3		27.8		42.5
Divorced		9.2		15.4		12.3
Widowed		4.6		3.6		4.1
Income per Day						
Less than N200		26		32.5		29.2
N201 – N500		21		27.5		24.2
N501 – N1000		29.1		23.5		26.3
N1001 - N1500		10.2		9.3		9.7
N1501 –N2000		8.2		7.2		7.7
Above N2000		5.9		-		2.9

There is an observable disparity in the education level of fixed and mobile vendors. Majority (54.2%) of fixed vendors are secondary school certificate holders while significant proportion (47.9%) of mobile vendors did not go beyond primary school. There is relatively fewer (12.5%) uneducated fixed vendor than mobile vendor (19.5%) while more fixed mobile vendor (8.5%) attended tertiary education than their mobile vendor counterparts (1.3%). This pattern is in line with Kusakabe (2006)'s findings where a disparity in education level of fixed and mobile vendors was reported. However, an overall analysis revealed that education level of street vendors in Ogbomoso is generally low, almost half (44.6%) of the vendors had only completed primary education. This is

consistent with most findings in the literature (Ayeni, 1980; Rupkamdee et al, 2005). It indicates that most vendors possess low skills and lack the level of education required for the better paid jobs in the formal sector.

The income from vending varies among street vendors. A significant proportion (36.5%) of mobile vendors, realised a daily profit of less than N200 compared to 29% of fixed vendors who earned similar daily profit margin. A noticeable proportion (32.3%) of fixed vendors make a daily profit of more than N1000. This proportion include 31.6% that earned above N2000. On the other hand, 23.5% of mobile vendors earned more N1000 daily profit but none make it up to N2000. The overall income analysis indicates that more than two third (39.4%) of vendors realised more than N200 daily profit while an appreciable proportion (27.9%) make well above 1000 daily profit. Almost one fifth (18.3) of this group make more than N2000 daily profit. The income distribution of street vendors indicates that the income from street vending is relatively high. In view of this, Rupkamdee et al. (2005) noted that "street vending is not only a choice for the urban poor but is also becoming an attractive occupation for

the educated middle class". Therefore, street vending is no longer an economic activity among the urban poor but serves as an 'economic choice' for other classes as well. This gives credence to the belief of legalist school of thought that "informality is a natural response to real market forces, and not to the rise in unemployment and the need to for jobs" (De Soto, 1989)

4.3 Reasons for Vending
The question has been asked over and over again in different studies as to why people get involve in street vending. The dominant answer has always been "unemployment" (Ayeni, 1980; Kusakabe, 2006. However, this is negated in this study, as less than a fifth (18.5%) of the sampled street vendors confirmed they resorted to street vending as a result of prevailing high rate of unemployment in the country. A vast majority (45.5%) embrace street vending as a means of livelihood. This shows a changed in orientation about street vending as a buffer for unemployed. Rather it has become a vital source of employment. Other reasons given by street vendors include low capital requirement (24.2%) and the need to supplement family income (11.8%).
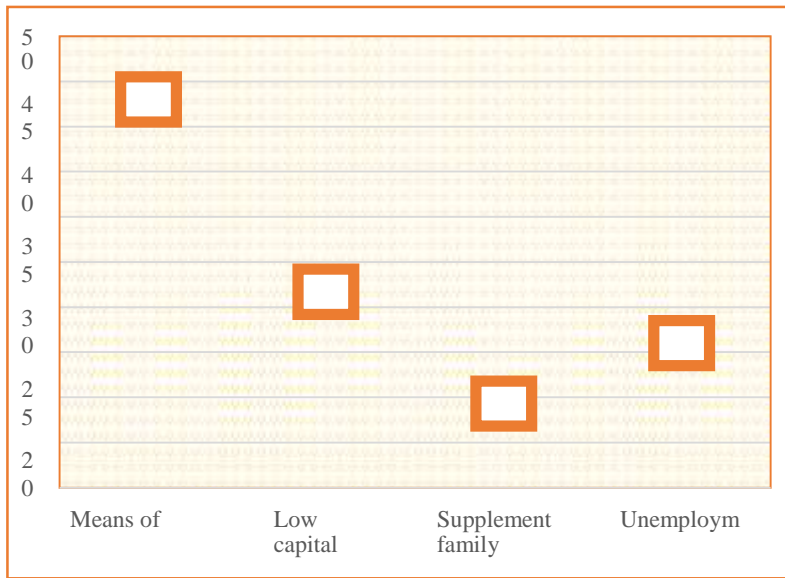
Figure 2: Reasons for Vending

4.4 Choice of Location

There are numbers of market in Ogbomoso, yet there are growing number of street vendors. The study sought to know the reasons why street vendors are attracted to road side or moving from location to location as oppose to other areas designated for trading activities. The findings show that appreciable proportion of vendors (44.5%) were attracted to the street because of high patronage. About one quarter (24.5%) of street vendors prefer to vend on the street because it is requires no formal application procedures. Almost one fifth (19.2%) of street vendors choose to ply their trade on the street because they do not have enough capital to sell sufficient goods in the market while slightly above one tenth (11.8%) cited nearness to home.

4.5 Street vending in Ogbomoso: Land Use and Environmental Implications

There are evidences in the literature that street vending has land use and environmental implications. "Informal sector generates land use problems such as sprawl problem, incongruous land uses, building alterations, the menace of temporary structures, alteration of land use functions, open space conversions and land degradation" (Okeke, 2000; Adeyinka et al, 2006) as well as a number of environmental issues (Nwaka, 2005). Similar findings were recorded in this study and are as discussed

4.5.1 The menace of temporary structure

Temporary structures are synonymous to street vending in Ogbomoso. It is perhaps, the most obvious problem of street vending in the city. Temporary structures have become so pervasive that they appear more numerous than the legally approved shops, shopping centres, and other business structures. They have become so rampant that their social legitimacy appears to be no longer in question. At the time of the conduct of this study, there were 1080 temporary structures along the two

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major roads in Ogbomoso. The problem becomes more appreciable when the number of temporary structures is normalised by road distance. (Table 5)

Table 5 Informal structures normalized by road length

SN	Major Road	Road distance (km)	Temporary structures	Structure/km
1	LAUTECH to High School	6	795	133/km
2	Grammar school to Express	5.3	285	54/km
	Total	11.3	1080	96/km

From Table 3, it could be inferred that there are 133 temporary structures in every kilometre along LAUTECH/High school corridor while 54 temporary structures are located in every kilometre along Grammar School/ express corridor. It can also be pronounced that in every kilometre along the major roads in Ogbomoso, there are at least 98 temporary structures. The implication is that the proliferations of temporary structures along major roads distort urban landscape, deface urban sight and constitute environmental eyesores and therefore creates a poor impression about city for outsiders.

4.5.2 Incongruous land use
Driving by the quest to attract pedestrians and other road users, vendors, especially fixed vendors, locate themselves at strategic points with heavy human traffic. where they can be seen by pedestrians and motorists. In the process they settle in streets spontaneously without any official allocation by erecting both temporary and semi-permanent structures on the road. This leads to conflicting land uses. The encroachment of structures on walkways has reduced the road capacity as the pedestrians make use of the vehicular way. This sight is common along Grammar School/ express axis (Plate 1). More worrisome is the locations of those structures within road setbacks

Plate 1 Encroachment of Pedestrians' Walkway along Takie to Odo Oru Corridors

Haphazard erection of structures for vending activities also has serious implication for residential and commercial land uses. These structures compete for land spaces to the detriment of planned residential neighbourhoods and organised commercial structures such as banks, supermarkets, filling stations among others. This grossly affected the ventilation in residential buildings along the road as it deprived them of the necessary air space.

The far-flung vending structures also has serious implication for public land use. For instance, there are high concentration of containers by the fence of Anglican Grammar school (Starlight/Takie corridors). Apart from reducing the aesthetic value of the school, the activities of vendors are not healthy for conducive learning environment.

Plate 2 Indiscriminate Erection of Structures at Anglican Grammar School

4.5.3   Waste Disposal and Management

In the literature, it has been confirmed that street trading activities have negative impact on the urban cleanliness quality and urban metropolis (Adedeji et al, 2014). This is particularly true of street vending in Ogbomoso where different types of waste such as paper, pure water nylon, polythene bags, food leftover and agricultural waste are generated by street vendors. These wastes, which are largely organic, are generated from the sale of food items, provision, vegetables/fruit, water sachets, etc, dumped on the streets, gutters and drainages. To worsen the situation, those vendors have no proper waste disposal method. This challenge is compounded by mobile street vendors at various undesignated places where several food stuffs and other goods are sold. They litter the whole places with waste of different kinds. In the process, the waste so generated interfere with other elements of city infrastructures: blocked drainage leads to unwarranted floods which shorten the life span of tarred roads. The large volume of garbage, dirt and often unsanitary waste generated by street vendors lead to unhygienic environment, health hazards and general deterioration and dilapidation of urban environment.

The problem of waste disposal is particularly visible in General/Starlight, Starlight/Takie and Grammar School/Oja-Igbo corridors where the problem of street vending is more severe. In those locations, roads are littered with heaps of waste after heavy downpours being/ transported by run-off water is a common sight. In those corridors, the trash of pure water sachet, rotten vegetables, leftover food and other wastes littered on the street, drainage and gutter have become an eyesore

4.6 Residents' Perceptions of Street Vending

Residents' opinions differ on street vending activities. Some of the residents see vending activities as a normal phenomenon, a means of subsistence and employment opportunity for jobless people. Most of

the advocates of street vending were of the opinion that the sector is an important source of income and employment as it provides an opportunity that minimizes the impact of social exclusion for many urban residents. They considered street vending as a means of subsistence and an important way to reduce urban crime.

"Many unemployed youth and adults who would have constituted security threat to our society have found solace in street vending. The sector has also reduced urban poverty significantly" **R1, 54**

> *"Street vendors contribute significantly to urban economy, they also sustain industries by providing markets for their products"* **R3, 38**
>
> *"It is better to engage in some form of work than to remain idle. Street vending provides people with the opportunity to earn a living. It is better than stealing as there is dignity in work"* **R3, 45**

On the other hand, critics of street vending express the opinion that the disadvantages of street vending outweigh its advantages. They disregard street peddling as a source of social disorder, citing haphazard and indiscriminate location of vending structures in urban centres. They also frowned at street vending because of its negative impact on the urban cleanliness quality and its implication for residents' environmental health. Others, speaking from their quest for order, perceived street vending as an anomaly to achieving urban modernity

> *"One cannot but raise concern about environmental health implication of street vending. Street vendors by their activities generate a lot of solid waste without proper waste disposal method. This has resulted in unsanitary environmental conditions with dire consequences on residents' health and well-being"* **R4, 57**
>
> *"While I am not against street vending as economic activity, I frowned at the problem Street vendors constitute to urban environment. I am particularly not in support of the way and manner they encroach pedestrians' walkway and sometimes, motorist drive way....."* **R5, 47**
>
> *"Street vending has become part and parcel of urban landscape but there is no hiding the fact that they deface urban environment.*
> *Vendors are exposed to accidents and other vices"* **R6, 37**

The question that readily comes to mind is why did the residents' opinions differ on the appropriate attitude to street vending? While it is intuitively appealing to assume that human perception of social, physical and natural phenomenon is a function of physiological and psychological processes, residents' background characteristics have an overwhelming influence in their perception of street vending in Ogbomoso. Mixed Method Content Analysis allows us to know how residents' perception vary with their background characteristics. This is achieved by transforming collated and analysed text from different interview into the frequency of each theme. Thereafter, the mean scores of positive and negative perception of street vending, were made comparable by scaling them 1-2 respectively. It is observed

from Figure 3, that none of the variables of has a mean value that tends towards negative perception (i.e 1.5 or higher). Nonetheless, this should not be mistakenly taken to mean that every resident embrace street vending, it is just that more

residents perceived street vending as a normal urban phenomenon. Therefore, with overall mean score of 1.36, it assumed significant number of residents are street vending apologists.
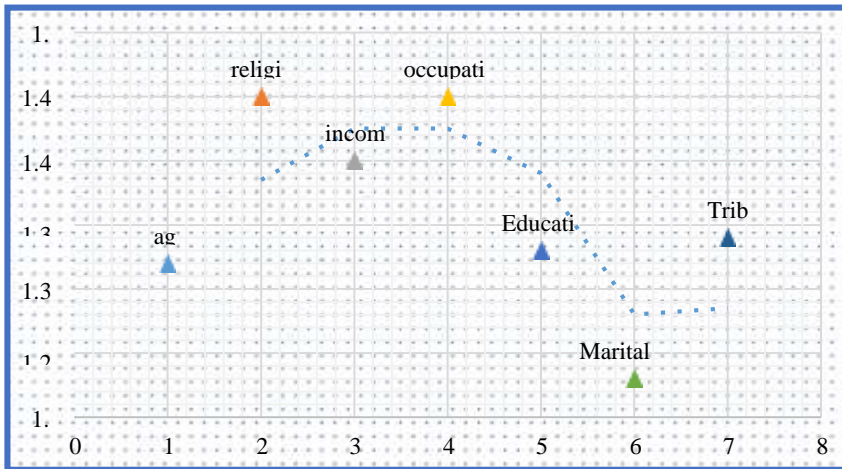

Figure 3 Perception of street vending by residents' characteristics
Mean scores range between 1 and 2; and the higher the value recorded the more negatively disposed residents are to street vending

However, rather than generalised the effect of residents' characteristics, a disaggregation by socio-economic variables (see Table 6) shows that such perceptions vary across income group, education level and occupation. For instance, there is positive perception of street vending among residents earning N30000 or less while those earning higher than N30000 perceive street vending as having more negative value than positive value.
Residents' positions on the presence of

street vending also vary according to educational groups. That the mean scores increase with educational level indicates that more educated residents tend to perceive street vending from its negative value. The occupation of residents is also a determinant of their perception of street vending. While artisans and traders were positively disposed to street vending, civil servants and contractors were negatively disposed to it.

Table 6 Perceptions of street vending among different Categories of the Public

Characteristics	Residents' Perception			
	Positive (1)	Negative (2)	Total	*Mean
Monthly Income				
Less than N7000	7	1	8	1.13
N7000 – N15000	5	2	7	1.29
N15001 – N30000	7	3	10	1.30
N30001 – N50000	7	7	14	1.50
N50001 –N100000	4	2	6	1.34
Above N100000	1	4	5	1.80
Education Level				
No formal education	3	1	4	1.25
Primary education	6	1	7	1.15
Secondary education	17	10	27	1.32
Tertiary education	5	7	12	1.59
Occupation				
Artisan	5	2	7	1.29
Traders	19	3	22	1.14
Civil servants	5	9	14	1.65
Contractors	2	5	7	1.72

*Mean scores range between 1 and 2; and the higher the value recorded the more negatively disposed residents are to street vending.

4.7 Major Implications of the Findings

This study has confirmed the ubiquitous spread of street vending activities in Ogbomoso. The remarkable incidence of fixed vending activities along major roads in Ogbomoso, where a significant number of informal structures for vending activities are indiscriminately located raised serious land use and environmental questions.

The study identified that temporary structures have become so pervasive that they seem to have outnumbered legally approved shops, shopping centres, and other business structures. The implication is that the proliferations of temporary structures along major roads distort urban landscape, deface urban sight and constitute environmental eyesores.

The study also recognised haphazard erection of structures for vending activities as having serious implication for residential and commercial land uses. These structures compete for land spaces to the detriment of planned residential neighbourhoods and organised commercial structures such as banks, supermarkets, filling stations among others. The preponderance of metal containers has serious implications for the environment and users as it impairs comfort and builds general environmental discomfort.

The study has also revealed that there are variations in the socio-economics

characteristics of street vendors, however, they evolved a noticeable pattern of socio-economic characteristics as they are generally of low education status, gender imbalanced, and are dominated by productive and agile young people. The income distribution of street vendors indicates that the income from street vending is relatively high. This implies that street vending is no longer an economic activity among the urban poor but serves as an 'economic choice' for other classes as well.

The residents' perceptions of street vending differ along socio-economic attributes. The conflicting positions of residents on street vending will pose a difficult dilemma for planners and policy makers, and tend to reinforce the ambivalence reactions to physical planning initiatives to address the negative impacts of street vending.

5 Conclusion and Recommendations

This study finds that street vending serves as a vital source of employment and income for a section of urban populace. However, it constitutes a bane in the quest for order, a source of urban environmental problem and an obstacle to the development of modern economy. Therefore, it is reasonably appealing to integrate street vending into urban planning policy to maximise the economic benefits of the sector while minimising the land use and environmental consequences. In this wise, it is essential that the following are taken into consideration

(i)   urban authorities should embark on participatory economic programs where the voices of urban residents shall be included in formulating policies. In this wise, the inclusion of vendors' voices in the

management of the market shall provide constructive ways to improve both the urban space utilisation as well as enhance vendors' businesses

(ii) Street vending is usually characterised by informal structures generally converge around transportation nodes in an unorganised manner. This disrupts pedestrian and vehicular traffic and undermines the value of the area. It is therefore, recommended that urban authorities in collaboration with urban planners should embark on sustainable urban renewal program that will provide appropriate-sized shopping facilities at an appropriate space along these transportation nodes.

(iii) Recommendation (ii) above can be achieved through gentrification, a potent form of urban renewal whereby old and relatively new houses within specific area or along transportation are converted from their previous use to new uses especially for commercial activities.

(iv) The government should provide organized markets at planned alternative locations through public participation. Necessary facilities should be provided in these markets in order to decongest vending activities along the major roads.

(v)   The extant planning and environmental laws on street vending should evaluated and reviewed, where necessary. The laws should also be properly

implemented to discourage the erection of informal structures

along major roads.

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