The Effect of Landscaping on Health and Environment in Housing Estate, Jos Nigeria

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Abstract: The study examined the effect of landscaping on health and environment in housing estate, Jos Nigeria. The paper is more descriptive and has the objective of finding out the level of awareness by the tenants' on landscaping and its impact on health and the environment. Simple random sampling technique was used and a total of 135 questionnaires were distributed to tenants'. Only 125 of the questionnaires were retrieved representing 92.59%, 7 not clearly filled and 3 was not retrieved. The retrieved questionnaire were analyzed and presented using frequency percentage, likert scale and Chi square. Results of data obtained revealed that 100% of the respondents are well aware of what landscaping is. Age, sex, occupation and the educational level of the respondents affected their knowledge of landscape elements. Based on the findings of the study, some recommendations were made which include the need for more comprehensive environmental education by the government and non-governmental organizations to educate the public on importance of landscaping as it impacts on health and the environment; studies on horticulture, landscape planning and other environmental issues should be integrated into the primary, secondary and tertiary school curriculum. This study concluded that landscaping has positive impacts on the health and the environment of tenants' in the study area.
Keywords: Environment, Estate, Health, Housing, Landscaping.

1.0 Introduction

Housing has been universally accepted as one of the most essential needs for human survival simply because in all ramifications, housing is more than mere shelter as it includes access to much of social infrastructure that enhances livability indices such as education, health and open- spaces (Adeoti *et al.,* 2016). Housing is not only a basic human need, it constitutes a vital component of man's welfare, life sustenance and survival. In the hierarchy of man's needs, housing has been ranked second to food. It has a profound influence on the health, efficiency, social behaviour satisfaction and general welfare of the community. Housing has a significant role to play in the individual, local and national economy (Olujimi *et al.,* 2016).

Adedeji and Fadamiro (2011) opine that the treatment of residential environments has been discovered to have impact on the health, productivity and recreation of urban dwellers just as landscaping around homes lead to reduction of environmental pollution. They further posited that open spaces has potential to provide environmental and social benefits to communities whether directly or indirectly.

An appealing landscape contributes to people's health (Abraham *et al.,* 2009). Studies prove that the environment surrounding a person is of great importance to his or her stress level and health. Various human activities produce pressures that alter the environment, leading to negative impacts on the human health and the environmental eco-system (Barmelgy, 2013). Studies confirm that inhabitants could benefit from nature, greening and landscape through direct contact with such an environment. Greenery has the potential of inducing an active living and increasing public health (Barmelgy, 2013). This findings is in line with Roger Ulrich's Psycho-Evolutionary Theory and Stephen and Rachel Kaplan's Attention Restoration Theory (Health Council of The Netherlands, 2004). Roger Ulrich argues that contact with nature aids recovery from all forms of stress, not just attention fatigue. Characteristics of the environment provide an early-warning signal for safety and survival that triggers positive emotional reactions. Key elements are a level ground surface, considerable spatial openness, the presence of a pattern or structure, curving sightlines and the presence of water (Health Council of The Netherlands, 2004).

The Kaplan's consider natural settings which are aesthetically pleasing are restorative environments which hold one's attention effortlessly (Health Council of The Netherlands, 2004). As noted by Barmelgy, (2013) landscape can be seen as the mitigation process in which health and well-being can be achieved through the sustainability process.

Adedeji *et al.,* (2011) denoted landscaping as the process of shaping, modifying and creating an ordered outdoor scene for functional and supportive roles. Such functions include accent, softening, dust screening, framing, shading, enclosure, circulation control, noise control and surfacing. Indeed, the importance of landscaping of open spaces around buildings cannot be overemphasized. Landscape design material are basically divided into two major categories based on the application and the way they appear.

Soft landscape: refers to the living or natural materials used in landscaping (Ayeni, 2012; A Handbook of Landscape, 2013; Adegbie *et al.,* 2013; Adekunle *et al.,* 2016) these include trees, groundcover, hedges, shrubs and flowers. They are collectively known as vegetation (Ayeni, 2012).Generally, soft landscape serves the functions of screening and maintaining privacy, which breaks the monotony of view; provides habitat for animals-which is important for biodiversity, visual enhancement, erosion control, noise pollution, demarcations, shading, wind breakers as well as air purification (Ayeni, 2012).

Hard landscape: refers to inanimate elements that relate with accessibility, of course change the natural surface to paved surfaces such as kerbs, stones, steps, ramps, walls, bricks, concrete, metal, bollards, tiles, walkways, asphalt, paving, planters, sculptures (Olanrewaju, 2011; Ayeni, 2012; A Handbook of Landscape, 2013; Adekunle *et al.,* 2016).

Hard landscape materials can be transformed into landscape features that can attract the eye, add mass and weight to the composition, create themes and add pleasure to the landscape. Not only does it reduce maintenance costs, it in addition helps divide and define spaces in the landscape, orchestrate the way the landscape is viewed and enhance its beauty (Ayeni, 2012).
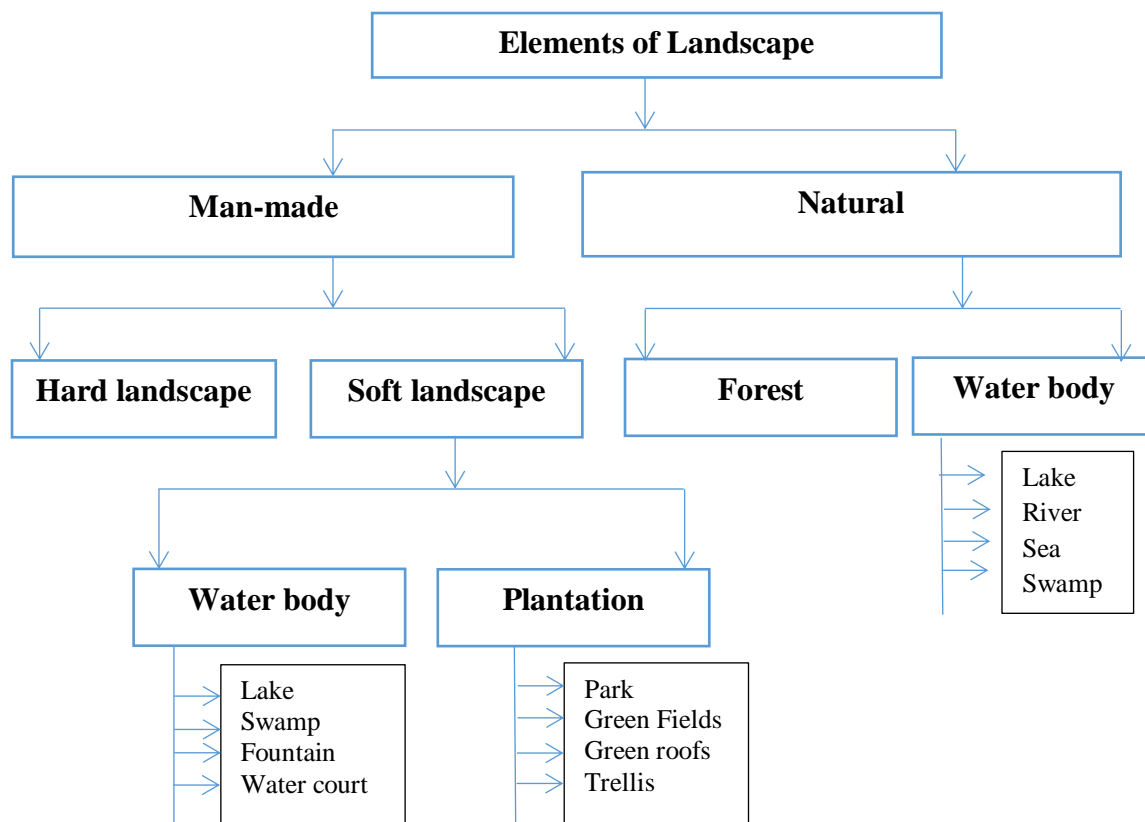
Figure 1. Landscape Design Elements
Source: Authors' construct 2020, as adapted from Ale *et al.,* 2019

Figure 1 shows the classification of landscape elements grouped into man made and includes hardscape, soft cape, water bodies and plantation and natural that is the forest, rocks, ground form and water body (Authors' construct 2020, as adapted from Ale *et al.,* 2019).

The likely consequences of a poorly landscaped environment are increase in the microclimate around a building, increased energy consumption in individual buildings and increasing the energy efficiency of the community as a whole, increase in thermal performance, increase in ambient air temperatures, and increase in urban heat islands (Author's observation, 2020). These factors have adverse health impacts on the occupants, making it imperative to address the benefits of a well landscaped environment at local, regional, national and global levels.

In Nigeria there are studies that has received considerable attention in literature on Housing Estates, most of the studies have examined the effect of landscaping on rental values of residential property in Ijapo housing estate Akure, Nigeria (Bello, 2016); Residents' Perception of Quality of Public Housing in Lagos, Nigeria (Babalola *et al.,* 2016); Perception of Residents on Impact of Proximity of Religious Camps on Residential Properties in Nigeria (Adeniran, *et al.,* 2016); Analysis of Public Perception of Climate Change and Its Impact on Health and Environment in Zaria City and Its Environs (Ikpe, *et al.,* 2016). However there are little or no known studies to examine the effect of landscaping on health and environment in housing estate, Jos Nigeria. This study therefore intends to fill the gap that exists. The study examined the effect of landscaping on health and environment in housing estate, Jos Nigeria. In other to achieve this aim, the research employed the following objectives to: (1) examine the concept of landscaping and landscape elements; (2) examine the role of landscaping and

its impact on tenants' health, (3) examine the role of landscaping and its impact on the environment.

In realizing this goal, the following research questions were raised:
- ✓ What are the concepts of landscaping and landscape elements?
- ✓ How does a well landscaped environment impact on tenants' health?
- ✓ What are the roles of landscaping and its impact on the environment?

These brought about the following hypothesis:
- ✓ **H0$_1$:** states that sex has no significant effect on the role of landscaping and its impact on tenants' health.
- ✓ **H0$_2$:** states that sex has no significant effect on the role of landscaping and its impact on the environment.

The Response of Landscaping and its Impact on the Environment.
Aesthetic Value
Plants provide a variety of aesthetic values and accentuate the architectural design of buildings. Avenue plants such as *Thuja plicata, Lagaestromia indica, Caryota mitis, Juniperus chinensis, Hura crepitans* on our roads and pedestrian walkways (See Plate iv & v) create a safer restful and scenic view and provide shade to the pedestrians and other road users (See Plate i).Trees in a single or double row have strong visual impact.This arrangement is suitable for the urban or built environment (Adams *et al.,* 2002; Orewere *et al.,* 2019).

Plate 1. Trees, shrubs and lawn which beautify the environment and provide shade
Source: Author's field work, 2020.

Health Value
There is mounting evidence that stress and noise have an impact on our physical and psychological health. Trees and vegetation can affect our mood and help relieve stress. Plants include *Araucaria spp, Grevillea robusta* and *Agava sisalana* (A Handbook of Landscape, 2013).

Environmental Value
i) Air Purification

Particles of air pollutants are absorbed by leaf surfaces or they may be deposited on the leaves as they fall on the soil, they are absorbed. Mbah, (2001) indicated that quantified pollution remediation by plants and showed that 85% of lead from vehicles can be removed by a shelter belt of trees (See Plate 1). Landscaping plants mask fumes and disagreeable odour by replacing them with more pleasing scents or absorbing them. Air flow modification caused by these plants affect transport and diffusion of water pollutants and energy. Trees particularly and other plants through their growth processes act as a sink for atmospheric carbon dioxide, the predominant greenhouse gas.

Mbah, (2001), assert increased trees in the landscape will potentially slow the accumulation of atmospheric CO_2. In addition, the production of CO_2 by fossil powered generating plants will be reduced and energy conserved. Some plants such as *Eucalyptus saligna*, *Brunfelsia hopeana*, *Nerium oleander* etc produce sweet scent capable of neutralizing the polluted air thereby making the air fresh for human consumption.

ii) Humidity Control

Humidity is a measure of the amount of water vapor in the air (Ahrens, 2007). As long as heat present, the heat energy will be absorbed by moisture and released to the air in exchange for the use of heat energy. Plants in general increase the humidity of the site. They can therefore increase the thermal comfort during hot, dry seasons, although the plants have to be watered regularly. The plants take water from the soil, and when this water evaporates from the leaves it increases the relative humidity while lowering the air temperature. Pools and ponds behave in a similar manner. Water evaporating from the surface increases relative humidity while reducing air temperature (Adedeji *et al.,* 2010).

iii) Reduced Noise Pollution

Noise pollution is an often overlooked problem. Excessive or unwanted sound has negative physical and psychological effects. Noise can come from many sources, especially roads and highways. Trees can play an important role in deadening unwanted noise. Sound waves are absorbed by a tree's leaves, branches, and twigs. Studies suggest that belts of trees 100' wide and 45' long can cut highway noise to half (A Handbook of Landscape, 2013).

iv) Erosion Control

Trees and shrubs could serve as shield to cover the bare soil while holding the soil together and their roots serving as barriers against run-offs. The characteristic features of plants in land reclamation and erosion control is that their strong spreading roots help to hold the soil particles together (Adams, *et al.,* 2002). Most of the incidences of soil erosion in urban centres can be minimized if appropriate and well planned tree planting is combined with other developmental activities.

Trees such as *Terminalia catappa* has strong spreading roots that can hold the soil together. Planting of drought resistant trees such as *Azadirachta indica* and *Acacia spp* in the Northern part of the country could be effectively used to checkmate the deleterious effects of wind storm common in Kano, Borno and Sokoto States. Adams *et al.,* (2002), found that the wind breaking effect of trees has caused the reduction of wind speed by as much as 30%-50%.Trees and shrubs should be systematically arranged in the direction of the prevailing wind in order to form strong obstruction and resistance against the speed of turbulent windstorm and consequently check its devastating effects.

v) Modification of Temperature: Landscape planting especially trees and shrubs modify solar radiation, for example through provision of shade. The amount of radiant energy absorbed, stored or radiated by buildings and concrete surfacing in the living environment is significantly reduced by shading. Evapotranspiration in planted landscapes helps reduce sensible heat which warms air and the result is reduced temperature. It is estimated that tree planting around houses reduces energy for cooling by 10 to 50% and in temperate climate where heating may be needed, it is reduced by 4 to 22% (NNA/ISSA, 1991; Mbah, 2001).

vi) Water Quality: Plants help anchor soil and reduce storm water runoff, saving the high costs of drainage ditches, storm sewers, and other "engineered solutions" to storm water management. A Street lined with 32' tall trees can reduce runoff by almost 327 gallons, allowing cities to install smaller and less expensive water management systems. Reducing runoff also decreases topsoil erosion and the amount of silt and other pollutants washed into streams, rivers and lakes (A Handbook of Landscape, 2013).

Fences/Boundary Demarcation
Plant species such as *Duranta rupens, Dodonea viscosa, Hibiscus spp.,Thevetia peruviana, Rosa sinensi* are used in constructing fences in our surroundings. While Popular woody species such as *Lonchocarpus cyanescens,P.santalinoides,Millefia thonningii, Jatropha species, Dracaena mann Thevetia peruviana, Moringa oleifera, Calotropis procera* serve for boundary demarcation in both urban and rural landscapes in Nigeria (See Plate 2). They demarcate boundaries between church lands, school lands and farm lands (Omokhua *et al.,* 2002). Fences around private buildings provide, restrict movement of domestic animals and eliminate trespasss. They are also used in primary, secondary and tertiary institutions in game courts.

Shelter
The shade of trees is welcomed by man and beast alike, providing essential shelter in the hottest climates (See Plate 3). Trees are often used as windbreaks to shelter sensitive crops (A Handbook of Landscape, 2013).Example is *Caesalpinia pulcherrima, Tectona grandis, Terminali catappa*

Plate 2. Trees and shrubs used in   Plate 3. Shelter provided
boundary demarcation   from vegetation (Trees)
Source: Author's field work, 2020

Plate 4 & 5. Use of hard scape and soft scape elements to define the pedestrian walkways
Source: Author's field work, 2020

Materials and Methods
Research Locale
The study area is Chalim Housing Estate, Jos located along Bauchi road and opposite Bauchi Motor Park. The estate is bounded by University of Jos senior staff quarters along Bauchi road by the east and with Department of Fisheries by the west, while Bauchi road that leads to University of Jos main campus passes the Federal College of Forestry, Jos from south-north. The housing estate is in the city of Jos in Jos North Local Government Area of Plateau State (See Figure 2) (Archives of Library and Documentation Unit FCF, Jos, 2018).

Figure 2. Google Earth Map of Housing Estate (Chalim), Jos
Source: Google Earth Map, 2019

Jos plateau, is located in the central part of the country between latitude 8° 30' and 10º30' N and longitude 8° 20' and 9° 30'E, (See Figure 3) with a surface area of about 9,400km². It has an average elevation of about 1,250 metres above sea level and stands at a height of about 600 metres above the surrounding plains (Archives of Library and Documentation Unit FCF, Jos, 2018).

**Figure 3. Map of Nigeria (top) showing Jos and Map of
Plateau State (down) showing Study area.
Source: Adapted from Orewere, *et al.,* 2019.**

Research Method
Research method describes the schemes, procedures and strategies used by the researcher during the study. It is planned, methodical and scientific in nature and is made in such manner as to be replicated again (Albert, 2015). It often describes a procedure by which the research or inquiry can be carried out in order to examine a research problem.

The study followed a descriptive research methodology in which a field survey of the study area was carried out. The descriptive method uses the data so obtained to provide deep insight into the phenomena of landscaping.

Population of the Study
Population of a research is defined as the people whom appeal to the interest of the researchers in generalizing the outcomes of the research (Al Kindy *et al.,* 2016). The target population is taken to be 204 tenants' in the housing estate.

Sampling Techniques and Sample Size
A sample is a sub-set of a population and the portion of the population from which data were collected. For example, the population of all individuals in Chalim Housing Estate was selected as samples, thus the sample method was stratified. The researcher first divide the population into strata on the number and type of groups that exist in the population, after which random sampling was used to select appropriate sample size from each stratum.

The sample size was determined through the use of formula for estimation and sample size determination for finite population as provided by Pearson, (2016) and Saunders *et al.,* (2003) as follows:

$$n = \frac{N}{1 + N(e)^2}$$

Where n = sample size

 N = the target population (204)

 e = margin of error (5%)

$$\therefore n = \frac{204}{1 + 204(0.05)^2}$$

$$n = \frac{204}{1 + 204(0.0025)}$$

$$n = \frac{204}{1 + 0.51}$$

$$n = \frac{204}{1.51}$$

$$n = 135.0$$

Therefore, by this calculation, the sample size was generalized to 135.

Method of Data Collection
Data was drawn from primary and secondary sources. Relevant data were obtained by field survey and photographic means to have accurate three dimensional views of the study estate. The primary data were sourced from structured questionnaires as the principle research tools. The questionnaire was employed to collect first hand data directly from household heads and also the design professionals in charge of the management of the study estate. In addition, the public institution managing the estate was visited to obtain relevant information and maps.

Instrument or Data Collection
The instruments that were used for this study were the questionnaire designed by the researchers. The questionnaire was divided into sections and questions were asked and expected response was either Yes or No. The other sections anticipated response which were measured on a four-point likert scale format which ranges from Strongly Agree (SA), Agree (A), Disagree (D) and Strongly Disagree (SD). The scale is assigned numerical value of 4, 3, 2, and 1 respectively from positive expression to negative opinion.

Method of Data Analysis
Data from the survey was analyzed using Statistical Package for Social Sciences (SPSS) 23. Data presentation include, Frequency percentage, Likert scale and Chi square.

Results and Discussions
This section gives in detail information gotten from data analysis in order to achieve the aim of the research. Findings from this study are as follows:

**Distribution of Respondents**
The socio-economic result in Table 1 and Figure 4 shows that out of the total respondents that participated in this exercise, majority (66.4%) were males while few (33.6%) were females. It also reveals that 42.4% of the respondent's falls between the ages of 26-35 years, 28.8% falls between ages 16-25 years, 16.8% are above 46 years while 12% falls between the ages of 36-45 years. For the marital status, 57.6% were married, 36.8% single, 4% are divorced while few (1.6%) are widowed. The level of education results reveals that majority of the respondent (80%) had tertiary qualifications, 18.4% had secondary education while 1.6% had traditional education. The result on occupational status shows that most of the respondents (49.6%) are civil servants, 28% are student, 13.6% do petty trading, and 6.4% are unemployed while 2.4% are politicians. These also shows that in Chalim housing estate, most of the respondent (40.8%) occupy 3 bedroom flat. Other properties occupied by the respondents are as follows; 2 bedroom flat (34.4%), 1 bedroom flat (20%), 4 bedroom flat (3.2%) and duplex (1.6%). Result also reveals that 39.2% of the respondent have stayed in Chalim housing estate for a period between 1-5 years. Others have stayed for the following periods: 11-15 years (37.6%); 6-10 years (14.4%); above 16 years (7.2%) and 1.6% of them have stayed for a period of less than 1 year.

Table 1. Socio-economic characteristics of the respondents

Respondent n = 125	Variables	Frequency (F)	Percentage (%)
Characteristics			
Sex	Male	83	66.4
	Female	42	33.6
	Total	**125**	**100**
Age Group (Year)	<15	0.0	0.0
	16-25	36	28.8
	26-35	53	42.4
	36-45	15	12
	>46	21	16.8
	Total	**125**	**100**
Marital Status	Single	46	36.8
	Married	72	57.6
	Divorced	5	4
	Widowed	2	1.6
	Total	**125**	**100**
Level of Education	No Formal Education	0.0	0.0
	Primary Education	0.0	0.0
	Secondary Education	23	18.4
	Tertiary Education	100	80
	Traditional	2	1.6
	Total	**125**	**100**
Occupation	Student	35	28

	Petty Trading	17	13.6
	Civil Servant	62	49.6
	Politician	3	2.4
	Unemployed	8	6.4
	Total	**125**	**100**
Type of Properties Occupied	1 bedroom flat	25	20
	2 bedroom flat	43	34.4
	3 bedroom flat	51	40.8
	4 bedroom flat	4	3.2
	Duplex	2	1.6
	Total	**125**	**100**
Period stayed in Chalim Housing Estate (Years)	<1	2	1.6
	1-5	49	39.2
	6-10	18	14.4
	11-15	47	37.6
	>16	9	7.2
	Total	**125**	**100**
Source: Field Survey, 2020.			
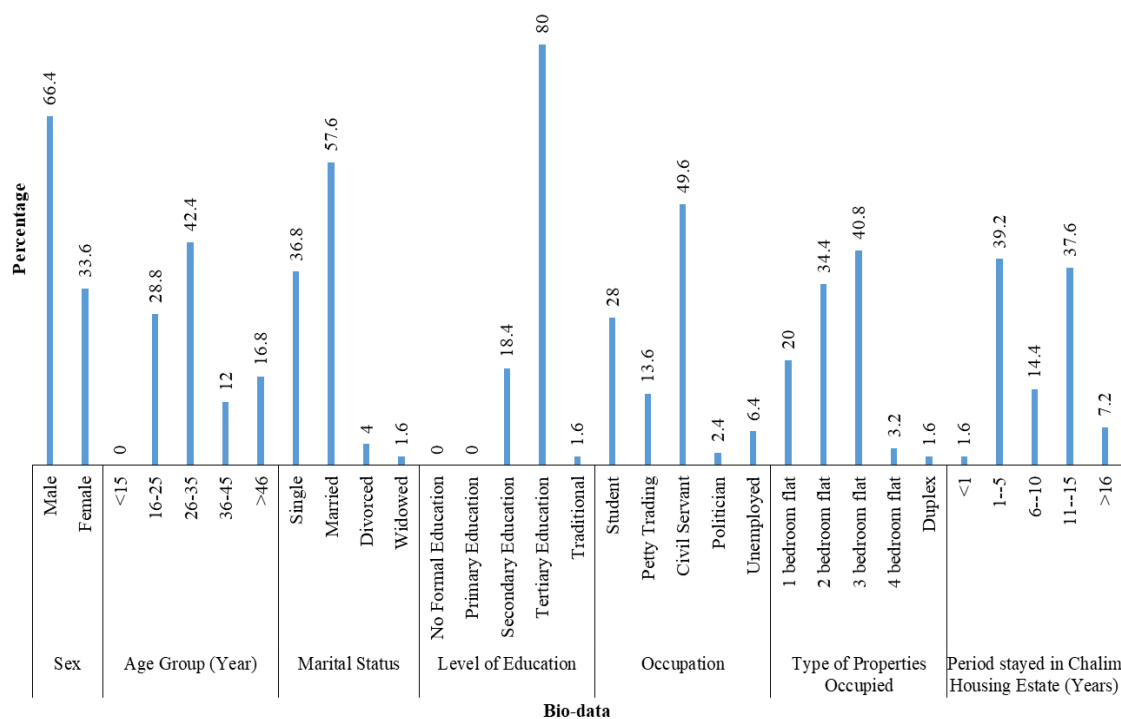
Figure 4. Socio-economic characteristics of the respondents
Source: Graphing by Authors' 2020.

Tenants' Perception of Landscaping and Landscape Elements

Tenants' awareness of what is landscaping?
Result in Table 2 represents the respondents' view on awareness of landscaping. The table shows that 125 (100%) of the responses agree to the fact that they are aware of what landscaping is. This implies that respondents must have been aware of landscaping from their environs or any other source.

Table 2. Awareness of landscaping

Respondent n = 125 Characteristics	Variables	Frequency (F)	Percentage (%)
Aware of landscape	Yes	125	100
	No	0	0
	Total	**125**	**100**
Source: Field Survey, 2020			

Availability of landscape elements present within the occupied property
Result in Table 3 shows the information gathered on landscape elements present within the type of property occupied. Nine (9) items were used to seek respondent's views on the research questions. Out of the nine items, two were rejected while seven were accepted. Items 1-9 translated into 3.71, 3.67, 3.53, 3.22, 3.50, 3.49, 2.08, 3.52, and 1.71 mean respectively. The result thus reveals that trees, flowers and shrubs, lawn, ground covers, pedestrian walkways, fence and drainage are the only landscape elements present within the properties occupied in Chalim housing estate while rocks/hills and fountains/pools are not present among the landscape element.

Table 3. Landscape Elements Present within the type of Property Occupied

ITEM (n = 125)	VMA (4)	A (3)	NA (2)	NS (1)	Total	Mean	Decision
Trees	89(356)	36(108)	0(0)	0(0)	464	3.71	Accepted
Flowers & Shrubs	84(336)	41(123)	0(0)	0(0)	459	3.67	Accepted
Lawn	71(284)	49(147)	5(10)	0(0)	441	3.53	Accepted
Ground covers	42(168)	68(204)	15(30)	0(0)	402	3.22	Accepted
Pedestrian walkways	66(264)	56(168)	3(6)	0(0)	438	3.50	Accepted
Fence	61(244)	64(192)	0(0)	0(0)	436	3.49	Accepted
Rocks/Hills	1(4)	35(105)	62(124)	27(27)	260	2.08	Rejected
Drainage	67(268)	56(168)	2(4)	0(0)	440	3.52	Accepted
Fountains/Pools	1(4)	8(24)	70(140)	46(46)	214	1.71	Rejected
Note: VMA = Very much available; A = Available; NA = Not available; NS = Never seen (Mean score > 2.5 = high determinant factor). Source: Field survey, 2020							

Extent to which landscape elements are used
Table 4 shows the mean score on the information gathered on extent to which landscape element has been used in Chalim housing estate. An item sought the assessment of respondents in which the question was accepted. The result therefore reveals that landscape element has been used in Chalim housing estate.

Table 4. To what extent has landscape elements been used in Chalim Housing Estate?

ITEM (n = 125)	VWU (4)	WU (3)	FU (2)	NU (1)	Total	Mean	Decision
Extent to which landscape element has been used in Chalim housing estate	57(228)	60(180)	8(16)	0(0)	**424**	**3.39**	**Accepted**
Note: VWU = Very well used; WU = Well used; FU = Fairly used; NU = Not used (Mean score > 2.5 = high determinant factor). Source: Field survey, 2020							

The need for improved landscaping in Chalim housing estate
Result on Table 5 shows the mean score on the information gathered on the need for improved landscaping of Chalim housing estate. An item sought the assessment of respondents in which the question was accepted. The result thus shows that there are needs for improved landscaping of Chalim housing estate.

Table 5. Do you agree there is need for better landscaping of Chalim Estate?

ITEM (n = 125)	SA (4)	A (3)	D (2)	SD (1)	Total	Mean	Decision
Need for better landscaping of Chalim Estate	42(168)	82(246)	1(2)	0(0)	**416**	**3.33**	**Accepted**
Note: SA = Strongly Agreed; A = Agreed; D = Disagreed; SD = Strongly Disagreed (Mean score > 2.5 = high determinant factor). Source: Field survey, 2020							

Implementing better landscape(s) encourages individual stay in Chalim housing estate
Table 6 indicates that majority of the respondents 90 (72%) agrees that implementing better landscape will encourage individuals to stay more in Chalim housing estate while 35 (28%) of the respondents did not agree to the fact that implementing better landscaping will encourage them to stay more in Chalim estate.

Table 6. Will implementing better landscaping encourage you to stay more in Chalim Estate?

Respondent n = 125 Characteristics	Variables	Frequency (F)	Percentage (%)
Implementing better landscape encourage more stay at home in Chalim Estate	Yes	90	72
	No	35	28
	Total	**125**	**100**
Source: Field Survey, 2020.			

Role of Landscaping on the quality of Tenants' Health
Table 7 shows the mean score on the information obtained on the role of landscaping on quality of tenant's health. Several roles were identified as to effect of landscaping on tenant's health quality. Four items sought the responses of the respondents in which all the four variables were accepted. The first item that translate into mean of 3.52 shows that good landscape has the ability to promote and support health and well-being. The second item that translates into 3.38 mean shows that landscaping provide relief from stressful environment. Result, which translates to a mean of 3.46, also shows that landscapes are a source of rehabilitation. While the last item translated into 3.47 table mean reveals that landscaping heals and support the local environment.

Table 7. Role of landscaping on the quality of tenant's health

ITEM (n = 125)	SA (4)	A (3)	D (2)	SD (1)	Total	Mean	Decision
Good landscape has the ability to promote and support health and well-being	66(264)	58(174)	1(2)	0(0)	**440**	**3.52**	**Accepted**
Landscaping provide relief from stressful environment	49(196)	75(225)	1(2)	0(0)	**423**	**3.38**	**Accepted**

Landscapes are a source of rehabilitation	62(248)	58(174)	5(10)	0(0)	**432**	**3.46**	**Accepted**
Landscaping heal and support the local environment	61(244)	62(186)	2(4)	0(0)	**434**	**3.47**	**Accepted**
Note: SA = Strongly Agreed; A = Agreed; D = Disagreed; SD = Strongly Disagreed (Mean score > 2.5 = high determinant factor). Source: Field survey, 2020							

Role of Landscaping and its Impact on the Environment

Table 8 shows the mean score on the information obtained on the role of landscaping and impact on the environment. Several roles were identified as to landscaping effects and its impact on the environment. Five items sought the responses of the respondents in which all the five variables were accepted. The first item that translate into mean of 3.48 shows that landscaping do enhance the quality of the physical environment. The second item that also translates into 3.47 mean shows that aesthetic value can be derived in designed landscapes.

Result, which translates to a mean of 3.55, shows that landscaping can facilitate sustainable development in residential areas. This is followed by an item which translates to a mean of 3.45 and thus shows that poor physical environments in Jos are due to lack of designed landscape while the last item translated into 3.40 table mean encourages social and spiritual integration between human and environment.

Table 8. Role of landscaping and impact on the environment

ITEM (n = 125)	SA (4)	A (3)	D (2)	SD (1)	Total	Mean	Decision
Landscaping do enhance the quality of the physical environment	66(264)	53(159)	6(12)	0(0)	**435**	3.48	**Accepted**
There is aesthetic value in designed landscapes	62(248)	60(180)	3(6)	0(0)	**434**	3.47	**Accepted**
Landscaping can facilitate sustainable development in residential areas	72(288)	50(150)	3(6)	0(0)	**444**	3.55	**Accepted**
Poor physical environments in Jos are due to lack of designed landscape	63(252)	55(165)	7(14)	0(0)	**431**	3.45	**Accepted**
Encourage social and spiritual integration between human and environment	59(236)	57(171)	9(18)	0(0)	**425**	3.40	**Accepted**
Note: SA = Strongly Agreed; A = Agreed; D = Disagreed; SD = Strongly Disagreed (Mean score > 2.5 = high determinant factor). Source: Field survey, 2020							

Chi-Square Analysis on the Perception of Sex (Male and Female) To the Role of Landscaping on the Quality of Tenants' Health

Chi-square was performed to answer the question on the perception of sex to the role of landscaping on the quality of tenant's health. Despite the different views of landscaping role

on the quality of tenant's health, a non-significant difference was noticed among responses from respondents in the study area thereby suggesting all respondents in Chalim housing estate are having common view on the role of landscaping to tenant's health quality (See Table 9a-d).

Table 9ᵃ. Sex * Good landscape has the ability to promote and support human health and well-being

		Disagreed	Agreed	Strongly agreed	Total
Sex	Male	1	36	46	83
	Female	0	22	20	42
Total		1	58	66	125

Chi-Square Tests			
	Value	df	Asymptotic Significance (2-sided)
Pearson Chi-Square	1.315ᵃ	2	0.518ᴺˢ
Likelihood Ratio	1.624	2	0.444
Linear-by-Linear Association	.453	1	0.501
N of Valid Cases	125		
NS = Not Significant, Source: Field survey, 2020			

Table 9ᵇ. Sex * Landscaping provide relief from stressful environment

		Disagreed	Agreed	Strongly agreed	Total
Sex	Male	1	53	29	83
	Female	0	22	20	42
Total		1	75	49	125

Chi-Square Tests			
	Value	df	Asymptotic Significance (2-sided)
Pearson Chi-Square	2.262ᵃ	2	0.323ᴺˢ
Likelihood Ratio	2.554	2	0.279
Linear-by-Linear Association	2.112	1	0.146
N of Valid Cases	125		
NS = Not Significant; Source: Field survey, 2020			

Table 9ᶜ. Sex * Landscape are a source of rehabilitation

		Disagreed	Agreed	Strongly agreed	Total
Sex	Male	4	37	42	83
	Female	1	21	20	42
Total		5	58	62	125

Chi-Square Tests			
	Value	df	Asymptotic Significance (2-sided)
Pearson Chi-Square	0.641ᵃ	2	0.726ᴺˢ
Likelihood Ratio	0.678	2	0.712
Linear-by-Linear Association	0.003	1	0.960
N of Valid Cases	125		
NS = Not Significant; Source: Field survey, 2020			

Table 9ᵈ. Sex * Landscaping heal and support the local environment

		Disagreed	Agreed	Strongly agreed	Total
Sex	Male	1	41	41	83
	Female	1	21	20	42
Total		2	62	61	125

Chi-Square Tests			
	Value	df	Asymptotic Significance (2-sided)
Pearson Chi-Square	0.261ᵃ	2	0.878ᴺˢ
Likelihood Ratio	0.248	2	0.883
Linear-by-Linear Association	0.086	1	0.769
N of Valid Cases	125		
NS = Not Significant; Source: Field survey, 2020			

Chi-Square Analysis of the Perception of Sex (Male and Female) To the Role of Landscaping and Its Impact on the Environment

Table 10(a-e) below shows the chi-square result on the perception of sex to the role of landscaping and its impact on the environment. The result thus reveals a non-significant difference among responses from respondents in the study area. This suggest all respondents in Chalim housing estate have a common view on the role of landscaping and its impact on the environment.

Table 10ᵃ. Sex * Landscaping do enhance the quality of the physical environment

		Disagreed	Agreed	Strongly agreed	Total
Sex	Male	3	39	41	83
	Female	3	14	25	42
Total		6	53	66	125

Chi-Square Tests			
	Value	df	Asymptotic Significance (2-sided)
Pearson Chi-Square	2.491ᵃ	2	0.288ᴺˢ
Likelihood Ratio	2.492	2	0.288
Linear-by-Linear Association	0.348	1	0.555
N of Valid Cases	125		
NS = Not Significant; Source: Field survey, 2020			

Table 10ᵇ. Sex * There is aesthetic value in design landscapes

		Disagreed	Agreed	Strongly agreed	Total
Sex	Male	2	39	42	83
	Female	1	21	20	42
Total		3	60	62	125

Chi-Square Tests			
	Value	df	Asymptotic Significance (2-sided)
Pearson Chi-Square	0.103ᵃ	2	0.950ᴺˢ
Likelihood Ratio	0.103	2	0.950
Linear-by-Linear Association	0.081	1	0.776
N of Valid Cases	125		
NS = Not Significant; Source: Field survey, 2020			

Table 10^c. Sex * Landscaping can facilitate sustainable development in residential areas

		Disagreed	Agreed	Strongly agreed	Total
Sex	Male	1	30	52	83
	Female	2	20	20	42
Total		3	50	72	125

Chi-Square Tests			
	Value	df	Asymptotic Significance (2-sided)
Pearson Chi-Square	3.482^a	2	0.175^NS
Likelihood Ratio	3.385	2	0.184
Linear-by-Linear Association	3.237	1	0.072
N of Valid Cases	125		
NS = Not Significant; Source: Field survey, 2020			

Table 10^d. Sex * Poor physical environments in Jos are due to lack of designed landscapes

		Disagreed	Agreed	Strongly agreed	Total
Sex	Male	5	35	43	83
	Female	2	20	20	42
Total		7	55	63	125

Chi-Square Tests			
	Value	df	Asymptotic Significance (2-sided)
Pearson Chi-Square	0.365^a	2	0.833^NS
Likelihood Ratio	0.365	2	0.833
Linear-by-Linear Association	0.066	1	0.797
N of Valid Cases	125		
NS = Not Significant; Source: Field survey, 2020			

Table 10^e. Sex * Encourage social and spiritual integration between human and environment

		Disagreed	Agreed	Strongly agreed	Total
Sex	Male	4	34	45	83
	Female	5	23	14	42
Total		9	57	59	125

Chi-Square Tests			
	Value	df	Asymptotic Significance (2-sided)
Pearson Chi-Square	5.686^a	2	0.058^NS
Likelihood Ratio	5.683	2	0.058
Linear-by-Linear Association	5.636	1	0.018
N of Valid Cases	125		
NS = Not Significant; Source: Field survey, 2020			

Summary of Findings
The result of the study are summarized below:
- ✓ Majority of the tenants' (80%) are well aware of what landscaping is.
- ✓ The study showed that age affects knowledge on the impact of landscaping on health and environment as those between 26-35 years and have stayed for more than 5 years have

better knowledge and practical experience on importance of a well landscaped environment.
✓ More so, education and occupation is a major determinant of the level of awareness of general landscape issues as those with tertiary education, students and civil servants are better informed.
✓ Perception of tenants' Sex (Male and Female) on the role of landscaping on the quality of tenants' health, had a non-significant difference as was noticed from responses.
✓ Landscaping has a positive effect on tenants' health and the environment in residential estates.

Conclusion

As stated earlier by Barmelgy, (2013) landscape architecture is both research and practical oriented to the shaping of the outdoor environment, based on peoples' needs. Landscape can be viewed as a form of applied art, with a target for promoting health. This art is given shape based on its ability to create integration between the design process and the needs and expectation of the users; thus creating the required environment.

Recommendations

The study recommends the following:
✓ There is the need to inculcate more studies on the importance of landscaping, landscape planning and other environmental issues into the primary, secondary and tertiary curriculum.
✓ Professionals in landscape planning and other related disciplines (Horticulturists, landscape planners) should be employed in the Planning and Horticulture unit to handle issues of landscape design and planning in development of housing estates in the city.
✓ There should be continuous and a well-structured maintenance schedule of landscape elements of the housing estates to sustain the beautification of the environment.
✓ There is need for adequate funding of landscape projects as well as sensitization to residents on the importance an aesthetic environment as well as compel residents to show more concern and respect for the environment.

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