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EFFECT OF CAMPUS BUILT ENVIRONMENT ON STUDENTS' SUSTAINABLE ACTIVITIES

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ABSTRACT

Exploring how campus environmental attributes affect student satisfaction and performance in higher educational institutions continues to be a critical initiative with less attention given by researchers in Nigerian universities. The aim of this paper is to examine the effect of campus development in enhancing student's sustainable activities by assessing the built environment of Bayero University, Kano. A total of 245 questionnaires were administered to students of seven (7) faculties with a view to assessing their satisfaction with campus environment, and 210 questionnaires (87.5%) were retrieved. The questionnaire had three sections: (a) respondents' demographic characteristics; (b) assessment of 15 attributes on the physical characteristics of outdoor spaces; and (c) assessment of 16 attributes of infrastructural development. The questions were structured based on 3-point Likert type scale with "Agreed = 3", "Neutral = 2" and "Disagreed = 1". Penalty scoring was assigned to the variables. Data collected were subjected to univariate analysis of descriptive and inferential statistics, while Relative Satisfaction Index (RSI) was used to analyze the scores. The study showed that students were more satisfied with the following outdoor attributes: *Good environmental conditions* (M = 2.090)*, well maintained environment* (M = 2.081), *good spatial arrangement* (M = 2.044). The respondents were dissatisfied with *sport facilities adequacy* which got M = 0.986; *secured living environment* (M = 0.945) and *lighting adequacy* (M = 0.911). On the infrastructural development, the students were satisfied with the *administrative building exterior for having an appealing skyline* (M = 2.090). *Campus enhanced development* (M = 2.044), *availability and adequacy of learning facilities* (M = 2.081). While they were dissatisfied with *reading on outdoor furniture* (M = 0.945); *availability of social infrastructure within hostels* (M = 0.911) and *provision of campus cafeteria* (M = 0.786). The study concludes that there is the need for proper integration of both outdoor spaces and infrastructural development for students' performance with improved comfort and well-being.

Keywords: built environment, campus sustainability, outdoor space, students' perception,

INTRODUCTION

Adeyemi & Igbineweka (2000), and Ikudayisi & Adegbehingbe (2017) relate the significance of physical infrastructures on the quality of academic environment, stating that inadequate physical infrastructures could result into overcrowding, stress, unruly behavior, distractions and gradual decay of symbolic things that help pattern students' behavior. The academic environment, which is an interface between indoor and outdoor spaces, that does not support the students learning activities, may end up not being appropriately utilized (Mohammad, 2008). No doubt BUK boasts of being one of the unique campuses in Sub-Sahara Africa. But its

physical campus development seems not to have taken into cognizance the sustainability of the learning environment that supports social interaction, quality of living and physical location where campus life or activities ultimately take place (Ikudayisi & Adegbehingbe, 2017; and Unah, 2020).

Unah and Raji (2020) opined that higher education institution (HEI's) buildings are designed to enhance the environmental operation for the wellbeing, satisfaction and safety of its users with less stress. The study of Unah (2020) emphasized that students and academic learning spaces are inseparable; as such, the outdoor learning environment should play a vital and integral role in everyday activities of the students. Ding and Guaralda (2013) opined that the university as a public place has to constantly strive to create well designed public gathering spaces that respond to user needs and aesthetic values that promote social interactions. Sustainable campus can be achieved when the current requirement is achieved without compromising the ability of future generations to meet their needs (Abd-Razak, et al., 2012). Therefore, Sustainable campus environment help enlarge student's perspective and knowledge of disciplines other than his own specialized fields of study. This has placed the sustainability of the HEI environment in a paramount discourse.

Bayero University, Kano (BUK) is one of the fastest developing institution of higher learning in terms of its physical infrastructure. In recent years, the university has grown from a homogenous campus to more of a heterogeneous one. The establishment of new programs led to the construction of new buildings such as lecture theaters, student hostels, administrative buildings, departments and faculties. Due to the dearth of ample greenery landscapes, such as open gardens for reading, recreation and for improving general campus sustainability, and the fact that classes and theatres are kept under lock and key at night, students are compelled to improvise reading spaces under street lights.

This paper intends to explore the sustainability of students' campus environment, in the way it supports higher education system in balancing between outdoor space design and students' behavior. The main objectives of the study are: (a) to study, using the literature and identify the economic, social and environmental characteristics of the outdoor built environment of BUK, New Campus, and (b) to evaluate the students' perception of the effects of basic facilities that support learning in the campus-built environment. The two main research questions the study seeks to answers are: (a) what factors of campus are affected by the impact of the socio-economic and environmental fabrics of the university? and (b) how do these environmental fabrics influence the sustainability of that campus?

LITERATURE REVIEW

Davis & Wolski (2009) opined that universities usually adopt three sustainability approaches in smooth running of their programs, these are the learning process, the campus environment and management approach. Abd-Razak, et al. (2012) posit that out of these three approaches, the implementation of a sustainable campus environment is the most effective way possible against the other two approaches. The study of Sohif *et al*. (2009) interpreted sustainable development as improving the quality of human life while living within the capacity of ecosystems and supporting the purpose and benefits of a balanced social, ecological and economic focus. Ramli and Zain (2018) described two factors that impact on student's campus sustainability /academic

performance, these are outdoor learning spaces (recreational, shopping,) and infrastructure (hostels, sporting facilities, parking & transportation). These factors were found to significantly impact about 51.5% on the students' academic achievement. The study of Rapoport (2004) described these environments as having several components, which are composed of structured and fixed elements (infrastructure and buildings), half-fixed (outdoors, trees, boundary elements, signs, billboards, street lights, benches etc.) and non-fixed elements (users, user actions and vehicles).

Dicle and Ummugulsum (2008) posited that university campus has similarities with the urban environment having composed of roads, buildings and open spaces, the components of which are considered in terms of the concept of improving the elements of the physical environment. Mitchell (2000) in his study opined that physical environment defines health, security, personal and community development as components that contribute to a better quality of life. Quality of life, on the other hand, can be used as one of the most general aim of sustainable campus development, as it hinges on the economic, social and environmental dimensions of the university's-built environment. Norton *et al*. (2007) and Streimikien (2015) opined that it is important to assess the sustainability of campus quality of life by evaluating its economic, social and environmental indicators, while Davis and Wolski (2009) thought that sustainable campus should encompass the learning process, the campus environment and management approaches. These campus indicators are very useful tools in evaluating development policies and monitoring the effectiveness of the essence of sustainable campus and the relationships between them and its users.

Franklin *et al.* (2003) pointed out that sustainable campus is a means of providing opportunities for higher education institutions to teach and be a model to the larger community by showing its progressive principles. Therefore, sustainable campus development refers to the meeting of the current needs and improving the quality of life without compromising the immediate and future needs of its users while focusing on a balanced environment. Among these three approaches, the implementation of a sustainable campus environment is one of the most effective way possible against the other two. However, the study of Isiaka Ho Chin (2008) and Norton *et al*. (2007) asserted that the development of any campus cannot focus on only one aspect of the three and ignore the other two, this is because these aspects are mutually dependent upon each other. Abd-Razak, et al. (2012) stated that the importance of sustainable campus development can be seen when universities commit to creating a 'green campus', which Bayero University has championed in the last two decades, by planting trees which form vegetative enclave in its environment. Campus sustainable learning environments are increasingly becoming important elements of students' learning experiences. This fundamentally changes the fabric upon which higher educational institutions develop and enhance students' learning abilities through sustainable campus development.

Ding and Guaralda (2013) postulates that sustainable development of HEI spaces is an important stage upon which the drama of student's life unfolded. It provides opportunity for users to have their recreational creativities and social interaction. The study further recognizes public spaces as essential counterparts to the more settled places and routines of everyday life, providing channels for movement, nodes for communication and

common grounds for play and relaxation. Such a space is often considered as green nucleus, voids or breathing spaces which give form to the ebb and flows of human exchanges. Bagoro (2015) opined that tertiary institutions offer significant services that are beneficial to the society regardless of where they are required to function. This shows that the establishment of a sustainable campus environment is an important basic development of human society that requires a broader horizon, this is because living and learning in an environmentally conscious campus, encourage students to learn and consider what impacts their everyday decisions (Alfieri *et al*. 2009). The quality of student campus environment is a critical and integral part of the overall educational experience (Muizz and Mohammad, 2016), as it establishes a sense of belonging essential to retain highly motivated and good-quality products.

Sustainability: The Development of Campus environment

The sustainable physical development of higher education institution (HEI's) campus environment is an essential asset to institutional management. Hence, campus environment should be in harmony with nature so as to be functional, legible, orderly and show high environmental qualities. This has revealed the importance for planning whose benefits can be achieved through the development of a sustainable campus that meets the crucial needs of student outdoor built environment. These benefits promote academic development to learn, teach, recreate and demonstrate progressively all the principles of sustainability. The study of Rufai and Maina (2018) shows that the provision of attractive facilities and landscaping elements that support the outdoor spaces in campus stimulate physical development in enhancing relaxation and leisure. The natural green scenery refreshes the mind and helps in relieving boredom by promoting walking and chatting with friends, colleagues, and other activities being exhibited on daily basis.

Sustainable development according to WCED (1987) is any form of development that meets the needs of the present without compromising the ability of future generation to meet their own needs when it arises. Higher education institution is meant to serve the learning community with the physical assets and pedagogic facilities as embraced by many nations around the world. Adedayo & Oqua (2016) suggested the need for education to achieve sustainability, but (Omole & Ozoji, 2014) posits that lack of vision and awareness has hindered its progress in Nigeria due to lack of proper planning and supervision as well as non-execution of well-made policies. The study of Abd-Razak (2012) has shown that planning a compact campus environment has enhanced campus life and activities which positively impacts on the three aspects of sustainability; environmental, social and economic development. Abd-Razak, et al. (2012) examine the effectiveness of campus physical development planning in Malaysia in creating a sustainable living on campus by assessing campus physical planning. The study revealed that a compact campus tends to create a sustainable life on campus. But on the contrary, the wide spread of higher education institution (HEI's) infrastructural development across the length and breadth of Bayero University New campus, for boosting academic performance, without giving priority to vertical development of its buildings contradicts this concept.

Neuman and Kliment (2004) suggested three aspects of sustainable campus planning as: accessibility, safety and community participation. Sustainable campus planning definitely reduces movement from place to

place, as this reduces dependence on the mean of transportation. Unah (2020) evaluates 13 outdoor learning space attributes such as: Waiting for lectures and Chatting /meeting friends were considered by the students as the two most important needs of the outdoor learning space within the university campus environment. Others activities are having group discussion, extra curriculum activities via Internet and assignment /project /research are some of the means of campus community participation. These compulsory tasks which are part of the everyday lifestyle of the students should be sustainable at every given outdoor space on the campus. Temple (2008) opined that the campus environment should provide flexible spaces, including informal meetings, to support learning through developing the wider landscape. He further examined the significant level and adequacy of this outdoor learning environmental conditions of safety at day time, cleanliness of environs, lighting, orderliness and quietness are perceived by the respondents to have high significance and are satisfying.

Outdoor environment enhances the students' learning ability as they share time with their colleagues by evaluating the learning outcome of the previous lectures. Participation in outdoor space also increases the positive effects on the physical, mental and social interaction of the students and improves the personal and behavioral skills of the students. The study of Ikudayisi and Adegbehingbe (2017) on academic environment focused on outdoor sustainability examining qualities, adequacy and level of usage of campus outdoor spaces and its infrastructures. The study found that the students perceived the campus outdoor spaces as well landscaped, well maintained and safe; however, they opined that the outdoor furniture, sport facilities and lighting are grossly inadequate, the study further posited that the outdoor spaces lack facilities that support learning, social connectivity and transportation system are not satisfactory and have low quality outdoor lighting.

The same study averred that the quality of campus outdoor spaces is dependent on adequacy of infrastructure and its level of usage and are the most important criteria in campus sustainability. While the study of Obaleye et al. (2021) from Covenant University Senate Building Façade, on visual quality assessment opined that it plays a major role in determining the decline in the quality of physical environment which underscores the visual relationship between people and their environment. The study of Adewunmi et al. (2011) on post-occupancy evaluation of a postgraduate hostel at the campus of the University of Lagos identified 29 performance criteria of deficiency, particularly in maintenance and facilitated the assessment of the overall performance of the building. The study of Oluwunmi and Akinjare (2012) on town and gown relations placed evident by the presence of huge diesel-powered generating plants dotting the university landscape in a bid to augment the epileptic effort of the Power Holding Company of Nigeria (PHCN), supplying the university and its host community with light and water and the use of watch towers for the constant monitoring of the campus and the immediate vicinity were applauded and rated second best.

Jamieson, et al. (2000) opined that higher educational buildings where formal teaching and learning take place must do more than appeal aesthetically to users, passers-by or judges of architectural awards in order to meet its primary purpose. This is vividly seen in the adage that "we shape our buildings and afterwards our buildings shape us". The study further observed that architecture is a social practice that impacts upon the production of

the built environment, clearly indicating the political implications of aesthetic control of spaces that has a performative aspect upon those who inhabits it. Another study on public space focusing on campus public areas by Ding and Guaralda (2013) found out the relationships between design elements and public activities that are more likely to happen in a space that is relatively well balanced with the design. These findings provide a better understanding of public space design by gaining deeper perception between design and user's behavior, consequently improving social activities and interactions in university campus public space design.

Jamieson and Taylor (2000) proposed some set of guiding principles for the development and sustainability of on-campus teaching and learning for universities'-built environments. Some of these principles are highlighted as follows: (a) *design space for multiple uses concurrently and consecutively,* this approach emphasizes on design of single functions within a facility, new learning environments need to allow for multi functionality and use in tutorial or small group areas/discussion, which also includes both teacher-centered and student-centered approaches, as well as formal, scheduled classes and informal students' use; (b) *design to maximize the inherent flexibility within each space,* this requires multi-functionality activities within and outside a class session, which requires quick re-organization of the available site for a particular activity. Increasing flexibility has been to divide a total area to allow for specific functions (e.g. formal class, group work, computing, etc.); (c) *design to integrate previously discrete campus functions,* this is done through designing facilities to overcome the present on-campus separation of functions and services. The availability and access to food/drink, communal areas for informal interaction and comfortable furnishings help to merge social interaction and individual activity for students and others who prefer such an environment; and *(d) Design to maximize alignment of different curricula activities,* having a range of diverse faculties, disciplines, curricula and non-academic activities, as evident on the university campus, requires a variety of learning settings, both formal and informal which are aimed at minimizing the larger special purpose laboratories that are generally underutilized and can also be a barrier to the introduction of alternative or functionally-enhanced pedagogies.

From the foregoing, it is obvious that there are little or no research efforts on the effect of the built environment on the student's campus sustainability in educational institutions in Nigeria. Hence, this research therefore seeks to undertake an in-depth evaluation on student's satisfaction with their academic environment.

MATERIALS AND METHODS

Bayero University is situated in Kano, in the North-West geo-political zone of Nigeria. The University has two main Campuses (Old and New). This study's targeted research population (which are students) is based on the New campus. The study administered questionnaires on respondents, and with the aid of observation checklists, collected data for quantitative analysis. Thirty-five (35) students were randomly selected from each of the seven (7) faculties: Agriculture (FoA), Arts and Islamic Studies (FAIS), Communication (FoC), Earth and Environmental Sciences (FEES), Education (FoE), Law (FoL) and Social and Management Sciences (FSMS). Two hundred and forty-five (245) questionnaires were administered with a view to investigating students' satisfaction with their campus

environment. Two hundred and ten (210) questionnaires (87.5%) were retrieved and used for the analysis.

The questionnaire has three sections:

- demographic and socio-economic characteristics of the respondents;
- condition of physical characteristics of outdoor spaces of the campus environment; and
- The third section was used to collect data on the extent to which the students were satisfied or not with the general campus environment.

The questions were structured based on 3-point Likert type scale with "Agreed = 3", "Neutral = 2" and "Disagreed =1". The evaluation was based on thirty–one (31) identified variables on campus environmental issues. Penalty scoring was assigned to the variables using a Likert-type scale ranging from '1' for very inadequate '2' for neutral; '3' for adequate. Similarly, another Likert type scale was coded with '1' for very dissatisfied to '3' for very satisfied was used to capture their significance (Vanduhe, 2012). Application of this is in three categories, which are Very satisfied (2.000 - 3.000), Neutral (1.500 - 1.999), Dissatisfied (0.000 - 1.499). These results showed the extent to which studied students of the New Campus are satisfied with their campus conditions as shown in Tables 2 and 3. Suggesting the most significant impact, significant impact and less significant impact respectively. Data collected were subjected to uni-variate analysis using descriptive and inferential statistics, while Relative Satisfaction Index (RSI) was used to analyze the scores of the environmental factors. The relative importance index (RII) is given by equation (1) thus:

$$\text{Relative Importance Index (Rii)} = \frac{\Sigma w}{AN} \qquad \text{Equation 1}$$

Where w is the weighting given to each factor by the respondents, ranging from 1 to 3, A is the highest weight (i.e. 3 in the study) and N is the total number of samples. The rating of all the factors for degree of significance was based on the value of their respective relative importance index (RII).

Respondents' Characteristics

- From Table 1 below, it is shown that 149 (70.95%) of the respondents were male and 61 (29.05%) were female.
- The percentage distributions of respondents' levels are shown as follows: levels 100, 200, 300, 400, 500, 800 and 700 and the percentages are 10.95%, 12.86%, 40.48%, 21.90%, 4.76%, 5.72% and 3.33 % respectively.
- The year / duration of study spent in the campus environment are as follows: 1-3 years 154 (73.34%), 4-6 years 37 (23.33%) and 7-10 years 7 (3.33%).
- The distribution of respondents by Faculty is as follows: FoA 33 (15.71%), FAIS 23 (10.95%), FoC 32 (15.24%), FEES 34 (16.10%), FoE 32 (15.24%), FoL 26 (12.38%) and FSMS 30 (14.29%).

Table 1: Respondents' (Students) Characteristic

Variables	Key Performance Indicators	Frequencies	Percentage (%)
Level Distribution of Respondents	100	23	10.95
	200	27	12.86
	300	85	40.48
	400	46	21.90
	500	10	4.76
	600	12	5.72
	700	7	3.33
	Total	210	100.00
Year / Duration Spent on campus	1-3	154	73.34
	4-6	37	23.33
	7-10	7	3.33
	total	**210**	**100**
Faculties of Respondents	Agriculture (FoA)	33	15.71
	Art and Islamic Studies (FAIS)	23	10.95
	Communication (FoC)	32	15.24
	Earth and Environmental Sciences (FEES)	34	16.10
	Education (FoE)	32	15.24
	Law (FoL)	26	12.38
	Social and Management Sciences (FSMS)	30	14.29
	Total	**210**	**100.00**
Gender of Respondents	Female	61	29.05
	Male	149	70.95
	Total	**210**	**100.00**

Source: Author's field work (2019).

RESULTS AND DISCUSSION

Students' Satisfaction with Campus Environment Characteristics

The study assessed the campus environment characteristic by considering 15 indicators to investigate student's perception /satisfaction derived from the studied features in the survey. Table 2 showed that the mean satisfaction score is 2.090 for 'Good environmental condition, Mean = 2.081 for *'Well maintained* environment', and Mean = 2.044 for '*Good Spatial arrangement'*. These are all attributes of outdoor environment, which no doubt boasts having a tropical vegetative greenery landscape. They are ranked 1st, 2nd and 3rd respectively and they all fall within the category of *Very satisfied* (2.000 - 3.000). This supports the study of Unah and Raji (2020) and Mohammad (2008) that Maintenance of green in open spaces is the most important element in an institutional environment.

Good transportation system has been a partner to an effective teaching and learning in campus, so it requires special attention and adequate sustainability. This includes: Commuters / bicycling / tri-cycling and motorcycles. Transportation is ranked 4th with a Mean of 2.865. The study of Neuman and Kliment (2004) suggested that campus planning definitely should reduce movement

from place to place, as this reduces dependence on the means of transportation, this negates the study of Ikudayisi and Adegbehingbe, 2017 on social connectivity and transportation in a HEI campus. Waste bins in open spaces is ranked 5th with a Mean=2.833 and falls within the satisfaction level of 2.500 - 2.990. Meanwhile the study of Ding and Guaralda (2013) and Mohammad (2008) buttress the clean environment "waste bins in open spaces" as an essential counterpart to the more settled places and routines of everyday life, providing the channels for common grounds for play and relaxation. Such space is often considered as green nucleus, void or breathing space which gives form to the ebb and flows of human exchange. These are essential component of the campus outdoor spaces in ensuring sustainable built environment.

Table 2. Campus Environment Characteristics

Indicators	N	Sum	Mean St. Dev.	R.I.I.	Rank
Good environmental condition	210	2.090	.0148	773	1st
649					
Well maintained environment	210	2.081	.0147	.770	2nd
647					
Good Spatial arrangement	206	2.044	.0147	.7761	3rd
627					
Transport (Commuter/bicycling /tri-cycling)	208	1.865	.0138	.716	4th
596					
waste bins in open spaces	210	1.833	.0130	.708	5th
595					
Designated spaces for formal activities	210	1.452	.0116	.613	6th
515					
Business / internet café	208	1.365	.0113	.591	7th
492					
Quality of Reading Environment	204	1.220	.0108	.555	8th
453					
Ease of circulation	210	1.205	.0105	.551	9th
463					
learning environment is provided with ICT	210	1.119	.0100	.527	10th
445					
Outdoor seating adequacy	210	1.095	.0099	.523	11TH
440					
Walkway adequacy	205	1.019	.0098	.505	12TH
414					
Sport facilities adequacy	210	0.986	.0094	.497	13TH
417					
living environment are well secured	201	0.945	.0096	.486	14TH
391					
Outdoor Lighting adequacy	203	0.911	.0094	.478	15TH
388					

Source: Author's field survey 2019

Based on findings exhibited in Table 2, majority of the respondents were not satisfied with the following aspects: "Designated Spaces for formal activities"; "Business /internet café"; "Quality of reading environment"; "Ease of circulation"; "learning environment provided with ICT"; "Outdoor seating adequacy" and Walkway adequacy and were ranked 6th - 12th and had Means between 1.452 and 1.019

simultaneously. These indicate neutrality (1.500 - 2.499). Other aspects such as: "Sport facilities adequacy";" living environment are well secured" and Outdoor lighting adequacy". These are ranked 13th, 14th and 15th, with Means =0.986, 0.945 and 0.911 respectively, which indicate Dissatisfied (0.000 - 1.499). As for "Ease of circulation", the research findings agree with Mohammad's (2008) findings but disagree with the research of Abd-Razak el at. (2012) who found that the "ease of circulation of road", "pedestrian's walkway adequacy" and "lighting adequacy", were rated lower than security aspect.

Walkway inadequacy, non-segregation between pedestrian walkways and lawns in accommodation areas, as well as long distances walked by the students, make the pedestrians and other road users feel unsafe by having to go through the risks of shaded vegetative enclaves. Students were found under street lights at night reading amid moving vehicles were constant sources of worry. The risk of non-provision of adequate reading environment really hindered the students' academic performances. It is noteworthy that classrooms and lecture theaters are always closed at the end of everyday lectures. These results clearly agree with those of Ramli and Zain (2018) on campus planning that showed E-learning System Management; Teaching Aids and Library Learning Environment; Hostels, Sports Facilities and Parking and Transportation system were all significant in impacting students' academic achievement. The study further disagrees with the findings of Jamieson et al. (2000) that the students in higher educational program were actively encouraged to take ownership of their own learning environments and to use the building in ways that best meet their goals all the time.

To reveal the effects of built environment in the campus surveyed, Table 3 below shows the results of inferential statistics (mean, standard deviation and Relative Satisfaction Index) of 16 items under study. The results reveal that there is a difference between the mean score of students' levels of satisfaction with the "Administrative building exterior's appealing skyline" as this has improved the campus environment compared to when they first arrived at the university (M = 2.090). "The campus is enhanced by new the development" (M = 2.044). Next is "Availability and adequacy of learning facilities" which is ranked second with a Mean score of 2.081, this signifies that the students were satisfied with the enhanced campus learning facilities. The Mean scores of 1.865 and 1.833 show that the respondents agreed to the "Adequacy of indoor building spaces" and "the external physical environment".

However, the respondents did not agree with views that the campus "Hostel outdoor facilities satisfy their social interaction" having a Mean score of 1.452 and neither with "Ease of movement within the buildings spaces" with a Mean score of 1.365. These are followed by "Landscape elements encouraging outdoor activities" with a Mean score of 1.220, so also was "Proximity of buildings relative to academic facilities" and "Opinion on overall building environment" with Mean scores of 1.205 and 1.119 respectively. These results suggest that there is need for physical change in building prototype that will encourage more vertical movement of academic buildings, as these have negative effect on the extent in which these academic buildings have impacts on the perception on the students.

Furthermore, the results show the possible impacts of built environment upon the respondents with emphasis of dissatisfaction with "Outdoor learning within the lecture area" with a Mean score of 1.095 and the

students were again not satisfied with the following: "Location of sports facilities being isolated from people; academic building exterior's appealing skyline; Reading on outdoor furniture; Availability of social Infrastructure within Hostels; and Provision of campus cafeteria" their corresponding Mean scores are 1.019, 1.019, 0.986, 0.986, 0.945, 0.911 and 0.786 respectively. This indicates that there is general decline in the levels of facilities that enhance student's physical environmental provision of leisure and relaxation. Similarly, outdoor readings units are not provided to accommodate the changing needs of the students, even though the need to do so avails itself.

Table 3: Effect of Built Environment on infrastructure development

Attributes	Mean	Std. Dev	R.S.I.	Rank
Administrative building exterior's appealing skyline	2.090	0.0148	0.773	1st
Availability and adequacy of learning facilities	2.081	0.0147	0.770	2nd
The campus is enhanced by new developments	2.044	0.0147	0.761	3rd
Adequacy of indoor building spaces	1.865	0.0138	0.716	4th
External physical environment is inclined	1.833	0.0130	0.708	5th
Hostel outdoor facilities satisfied social interaction	1.452	0.0116	0.613	6th
Ease of movement within the buildings' spaces	1.365	0.0113	0.591	7th
Landscape element encourages outdoor activities	1.220	0.0108	0.555	8th
Proximity of the buildings relative to academic facilities	1.205	0.0105	0.551	9th
Opinion on overall building environment	1.119	0.0100	0.527	10th
Outdoor learning within the lecture area	1.095	0.0099	0.523	11TH
Location of sport facilities being isolated from people	1.019	0.0098	0.505	12TH
Academic building exterior's appealing skyline	0.986	0.0094	0.497	13TH
Reading on outdoor furniture	0.945	0.0096	0.486	14TH
Availability of social Infrastructure within Hostels	0.911	0.0094	0.478	15TH
Provision of campus cafeteria	0.786	0.0085	0.447	16TH

Source: Author field survey 2019

The Effect of Built Environment on Sustainable Students Campus

The results reveal the extent to which the university infrastructures affected the students' sustainability on campus and the built environmental aspects studied. This has also identified the student's perception on the effect on which the campus environment has impacted on their sustenance. The outdoor learning and social fabric of the campus were found not to have impacted positively on the respondents, nor do they meet the student's satisfaction needs. These findings were in agreement to the studies of Unah (2020), Rufai & Maina (2018) and Ikudayisi & Adegbehingbe (2017) which noted that outdoor learning environments exhibit total dissatisfaction from lack of basic facilities to sustain campus life and social interaction. Similarly, from the studies of Unah (2020) and Ikudayisi & Adegbehingbe (2017) students were mostly dissatisfied with the "Location of sport facilities being isolated from people, Reading on outdoor furniture and Availability of social Infrastructure within Hostels". However, they opined that the outdoor furniture, sport facilities and lighting were grossly inadequate, stating that these are facilities that could support learning

and social connectivity towards achieving sustainable campus environments.

This implies that this Higher Educational environment has generally failed to meet the needs and aspirations of the users that could enhance learning and encourage social interactions. However, it was observed that there was a positive effect of the campus built environment on students in relation to "Administrative building exterior's appealing skyline", this has improved the campus environment together with "Availability and adequacy of learning facilities, "Adequacy of indoor building spaces" and "the external physical environment". The results also reveal that the administrative buildings raising the satisfaction levels range from the Senate building, Dangote business school, Ultra-modern Hostel and Research center built by CBN and the new International conference centre under-construction. This is evident in the greater proportion of the respondents expressing desire that the university management should add more similar edifices to the campus in order to raise the levels of user satisfaction.

CONCLUSION

This study has evaluated distinct attributes of campus planning, issues in architectural building design of outdoor spaces in higher education institution on the one hand and infrastructural campus planning of buildings on the other. Both are considered to provide appropriate amounts of satisfaction to respondents and define uses in the context of effect of the built environment. The study has applied the knowledge of students' perception and established campus sustainability as it affects both the HEI's environmental analysis for design for impacting on the student wellbeing in the campus of Bayero University, Kano. It has provided a preliminary understanding of the interrelation between architectural design and use of landscaping elements to ensure the identity of the built environment from the students' perception. It gained a deeper perception between the campus space and the user's responses, with the aim of consequently improving social activities and interactions in the university-built environment

It has brought out more information to the future designers of higher education learning spaces with a view to facilitating the changing pedagogical practices needed to support higher education environment with its greater student diversity. The variables of the study such as: good, well maintained and cared-for environmental condition of building spaces and adequate lighting appear to provide psychological benefits which are important aspects of campus sustainability that craves for safety and security of students, especially at night and enhance social activities. These endure feelings of belonging and therefore are prerequisites commitment to learning. Building designs and internal environment of administrative areas –which are very essential in any campus - have produced better outcomes for both learning and student satisfaction. This has further provided significant impact to the user's behavior in campus environment, which are important aspect of social sustainability, should therefore be of great concern to university managements in the day-to-day activities of the campuses.

Furthermore, the student responses that the elements of the learning environment and the provision of social infrastructure such as sports related facilities, hostel accommodation and cafeteria have largely been treated in isolation from campus developments, however these have big impact on accessibility and circulatory system that sustain campuses. The creation of more flexible outdoor and reading spaces, capable

of being laid-out in different ways, and better micro-design of street furniture are further examples of responses to new pedagogic requirements. The implications for the design of campus spaces seem to be underutilized, however, flexibility in space design should be of priority considering the rapid and unanticipated growth of wireless-enabled laptops using broadband networks for ICT spaces, as technological advancement is said to be affecting the nature of learning itself. The university-built environment, space and learning activities are intimately linked together and have greater interactions that seem to sustain students' life on campus.

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