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CONTEMPORARY ISSUES AND SUSTAINABLE PRACTICES IN THE BUILT ENVIRONMENT

EDITORS:
Asimiyu M. JUNAID
Olatunde F. ADEDAYO
Richard A. JIMOH
Luqman O. OYEWOBI

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ASSESSMENT OF USER CENTERED DESIGN APPROACH IN SCHOOLS OF ARCHITECTURE, NIGERIA

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The study of architecture compared to other course of study, requires certain disciplines which permit for conceptualization and conversion of ideas for acceptance. This results in long working hours, focus, and eye for details. Therefore there is the need to identify the basic need of the students of architecture in their built learning environment that will enhance sustainable learning process. A case study approach was used in the research where five (5) institutions were used and the respondents were randomly selected students. The research implored a quantitative (questionnaire) method of data collection and a sample population of two hundred (200) students, responded to the questionnaire. The data was analyzed using statistical tools such as the mean score and were presented in tables and figures. From the finding Natural/Artificial Lighting ranked first with mean score (MS) of 4.25. Ergonomics which has to do with the designing or arranging the classroom and drawing studios ranked second with MS of 4.14. The research concludes that From the result findings its can be clearly seen that all the seventeen (17) needs of students of Architecture in their built learning environment identified are all of significant importance, with Natural/Artificial Lighting as the most significant and therefore recommends that the management of architectural schools /departments should put into considerations their student needs in the considerations of planning and designing of the their built environment, especially as it concerns Natural/Artificial Lighting, the use of glass materials or other transparent/translucent materials for the passage of light is important.

Keywords: Architecture, Enhancement, Interaction, Isolation, Learning, Perception, Schools, User, Visual

INTRODUCTION

Design of built spaces should be based on the needs of the eventual users for it to be functional and to adequately provide the intended requirements (Preece and Rogers, 2002). Interaction amongst students among other tools of impacting knowledge is very important in every learning environment. What is impacted in the class room is often times generic and subject to further study either individually or through interaction. A learning environment such as a university should incorporate in its architecture by means of design and application of favorable building materials schemes to encourage interaction that foster or encourages learning. Architecture alongside other Art courses involve practices such as drawing, painting, modelling and so on and individual efforts at learning these is often times not enough. Some students are naturally cut-out for learning in such an environment while others have the ability deep down within them and require interaction to bring them out (Jimoh, & Banuso, 2008). Architecture from studies, require a lot of interaction to master its Art and even science. In most universities, bulk of the activities that happen during learning is done in the design studio and workshop. From observation, the interaction amongst students at this level is confined to students of the same level or cadre. Interaction should not be only limited to students in a particular level but should sprout out to students of other levels, higher or lower.

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This confinement or isolation of students that hinder maximum interaction for better learning can be traced to the Architecture of the space. Every user of a built space has a natural response to such an environment (Dudek, 2000). Different behaviors or psychological response of users emanate as they utilize different spaces. This psychological response of students of Architecture in their learning environment should be to want to interact since it has been proven to make learning easier (Heitor, 2005)

Every feature of the Architectural learning built environment should induce responses that make learning easier and more efficient. Features of modern built environment such as Lighting, thermal comfort plays a major role in stirring psychological response to learning. From observation, higher levels of learning centers in Nigeria take a generic approach in both design and adoption of the necessary building materials and rarely take into account the specific needs of the prospective users. This has allowed for after-math approach in forcing the space to work for the users. The approach to learning centers of kindergarten, crèche, Nursery schools, few Primary schools and even fewer secondary take into account the needs of the users so much that when one steps into such environment, a natural feeling of the impact the built environment has on the users is immediately felt. Therefore it is important to assess the need of students of architecture in their built learning environment

LITERATURE REVIEW

Architecture can be defined as the following for better clarity and also in different schools of thoughts.

- Generally speaking, Architecture can be defined as a general term used to describe buildings and physical structures.
- Architecture can be defined more specifically as an Art and Science of designing buildings and executing them in reality.
- The style of design and method of construction of buildings and other physical structures. (Allen, 1880)
- In professional practice, Architecture could mean offering professional services that has to do with design and construction of structures or even an entire built environment.
- The design activity or operations of the architect, from inception or macro-level (urban design, landscape architecture) right up to the micro-level which entails construction details and finishing.

From all the definition given above one can say that Architecture, has to do basically with designing and planning of forms, spaces and living ambient (built up environments) to both reflect functionalism and aesthetics and other technical aspects of construction (Allen 1880). To achieve these, creative maneuverings and putting together of valuable material and technology must come into play. Very often, there is usually a conflict between the different requirements and this must be resolved to adequately produce and Architectural Edifice. Architecture in its practice also involves aspects that are pragmatic in nature to achieve its set goals, some of which are; cost estimation, Building Administration and building material scheduling. The structure/Physical construction is the usually defined by documentation by the Architect such as Plans, Structural details and so on. Architecture as a word has also been adopted to be used in other fields such as information Technology to mean the same thing except in this case, designing and construction are virtual.

Theory of Architecture

One of the oldest surviving works on Architecture is called "De Architectura". It was authored by a Roman Architect called Vitruvius in the very early 1st Century A.D (Howe, et al. 2008). According to the thoughts of his works, every good building must out of necessity satisfy these three principles of "FIRMITAS, UTILATAS AND VENUSTAS" Which means Firmness, commodity and delight in direct translation. In modern English though, they mean.

1. Durability: Every Building must be robustly upright
2. Beauty: A building should be physically appealing
3. Utility: A building must be functional for what it was intended for.

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Conceptualizing a learning environment

The idea behind this concept is nothing order than providing with learners an environment that assists their quest to learn. The "learning environment" should be center for lifelong learning. A learning center should at a glance represent the kind of learning done in it. The OECD (2009) defines an educational space as a physical space that allows a variety of teaching and learning programmes. It is one that demonstrates from its physical appearance the kind of learning don there. Going by that definition, it can be concluded that a learning environment that doesn't have a special touch to it that portrays the kind of activity that goes on it is incomplete (Wolff, 2002).

The concept of the physical learning environment that relates to physical structures has a lot to do with spaces, instruments/equipment and tools within the learning center. Lehtinen (1997) proposed that this concept of learning spaces has evolved into an even more complex structure that includes teaching aids such as equipment, sources of information and events outside of center, where participants have the freedom to involve themselves in the learning process either directly or virtually. The introduction of the Internet alone has contributed immensely to the significant changes seen in schools today (Sanoff, 2001).

According to Lackney, (2001), the quality criteria for school building and design, the key actors are students; requirements are determined by

1. Specific age
2. Nature of school
3. Needs of the society
4. Needs of the students (Psychological and social)
5. Societal and environmental influences (Psychological and social)

Learning at higher cadre such as undergraduate and post-graduate learning environments deviate more and more from the conventional classroom setting and more into isolated but guided learning (Fisher, 2005). It is due to this that the environment for learning at this level should incorporate in every way, interaction and visual enhancing aids that the environment of learning alone can provide. Architecture alongside other courses of study that require visual stimulation to actualize one's desired idea should be learnt in an environment that sponsors such (Lackney, 2001).

Architectural Education

Architectural education is one of the most unique branches of science and art related education that requires a lot of creative ability, whether naturally gotten or influenced. Architecture students are trained to be extremely analytical and imaginative. Architecture is both a mixture of science and Art. The scientific aspect requires one to be able to proffer solutions to the wide variety of clients or potential client's preference as it regards built up spaces while the Art side of it requires the Architect to represent this scientific solution in a manner that captures the fancy. This is the reason why the requirements for admission for Architecture is a mixture of science and Art courses. The training of Architects in most institutions is a very rigorous one that saps the student both physically and mentally thereby equipping them for the challenges of the real world. After obtaining the first degree, it is still not enough grounds to practice Architecture full-fledged. There are regulatory bodies and trade unions that set the standard for anyone intending to practice Architecture. In Nigeria, ARCON (Architect's Registration council of Nigeria) is the body recognized by the government to regulate and set examinations for intending Architects. The trade union of Architects is called (NIA- Nigeria Institute of Architects) as earlier mentioned, this body is merely a trade union and cannot sanction defective Architects but only set in place to protect the common interest of practicing and prospective Architects.

Architectural student Interaction in the Built Environment

The psychological response of being in a learning environment should vary from being in any other environment (Moon, 2006). A learning environment should induce readiness to learn even when it is not there initially. A lot of carefulness must be given to design of these learning spaces especially for unique cases such as architectural students, where there is so much emphasis on precision and accuracy of work. Consultants ranging from academicians to psychologists should be brought on board to assist in achieving an environment that

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encourages or fosters learning. Studies show that more efforts have been put into this endeavor of creating an environment that induces readiness to learn in formative learning environments more than higher learning. Crèche, kindergarten, most Nursery school, few secondary schools and fewer tertiary learning environments have adopted this approach. More care is given to the conceptualizing the learning environment for formative learners than higher learners which should not be. According to Norman and Draper (2004) it is worthy of note that visual enchantment is important for students in a tertiary learning environment. However other considerations for architectural student needs in the Built Environment as seen by other authors (Roberta, 2005, Routledge et, al 2012 and Peter, 2013) are:

1. Space adequacy
2. Separate lecture rooms
3. Separate cad studio
4. Enough convenient space
5. Drawing storage space
6. Workshop spaces
7. Learning Comfort
8. Natural/Artificial Lighting
9. Natural/Artificial Ventilation
10. Outdoor and indoor relaxation
11. User Needs Variables
12. Human Factor
13. Design
14. Ergonomics
15. Accessibility of functions
16. utility
17. Variables Assessment Criteria

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RESEARCH METHODOLOGY

This study employed the grounded theory and interpretive ethnography to identify and describe students' perceptions of their learning spaces. The advantage of the grounded theory approach in this regard is that because the theory is drawn from data, it is more likely to offer insight and enhance understanding, and provide a meaningful guide to action. (Groat & Wang 2002). An ethnographic approach was also employed as it is intended to capture and understand lived experiences. (Denzin, 1997)

Sources of Data Collection

Data analyzed in this research was obtained from primary and secondary data sources. The quantitative methods of data collection and analysis were employed systematically, in order to provide answers to the research questions. The quantitative research method was adopted in this research to ascertain some underlining questions as to the student needs in the Built Environment. It was very helpful in understanding the problem and how to develop constructive ides in solving them. The quantitative research method was also used to statically and numerically understand the data and achieving mathematical solutions. The two methods were therefore necessary to both obtain the opinions of the persons being researched on and gain statistical numerical data necessary for this research (Kronengburg, 2007).

Population

The survey consisted majorly of two (2) stages. The first involved compiling a list relevant institution to this research. The preliminary survey gave room and informed the need for which institution will give the desired data to be gathered. The population of the study is students of architecture in the following institutions.

Table 1 **Local Case studies visited by researcher**

S/No.	Institution and Location	Population
1.	Department Of Architecture, Federal University Of Technology, Minna, Niger State.	286
2.	Department Of Architecture, Ahmadu Bello University, Zaria, Kaduna State.	334
3.	Department Of Technology, Covenant University, Ota, Ogun State	157
4.	Department Of Architecture, Kaduna State University, Kafanchan, Kaduna.	96
5.	Department Of Architecture, Kaduna Polytechnic, Barnawa, Kaduna.	135
	Total	**1008**

Source: Researcher's Field work, 2016

Sample Population

The following equations were used to define the appropriate sample size from its order to make findings that are applicable to the entire population as advanced by (Kapoor, 2010).

$n = no / [(1 + no / N)]$ ..... (1)

$no = (p*q) / v^2$ ..... (2)

Where;

no = Sample size from a finite population

p = Proportion of the characteristics being measured in the target population

q= complement of p, i.e. 1-p

V = maximum standard error allowed

N = population size

n = sample size

To maximize the sample size n, the value of p was set at 0.5 and q at 1- 0.5; the target population N is 1008; maximum standard error V was set at 5% or 0.05. Substituting the values into equations 1 and 2 above, the minimum required sample computed for the research is two hundred and six (206) respondents.

Method of Data Analysis

When the entire survey questionnaires were collected, the research used statistics to analyze all the data using the percentage to determine the magnitude of the responses to the questionnaire.

Tables, means, percentages and chart were used to express the statistical result concerning the demographic data of the respondent.

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$$\textbf{Mean Score} = \frac{TS}{N} \quad (3)$$

Where,
TS = is the total weight given to each attributes by the respondents.
N = is the total number or respondents in the sample.

Ranking of the items under consideration was based on their Mean Score, as any mean equal to or above 3.0 is considered significant.

DATA PRESENTATION, ANALYSIS AND RESULTS

The demographic data collected indicated that, 206 questionnaires were administered to the architectural students of the study areas. Table 2 represents the number of questionnaires administered to the students. A total of 200 questionnaires was properly filled and retrieved forming a percentage of 97.1

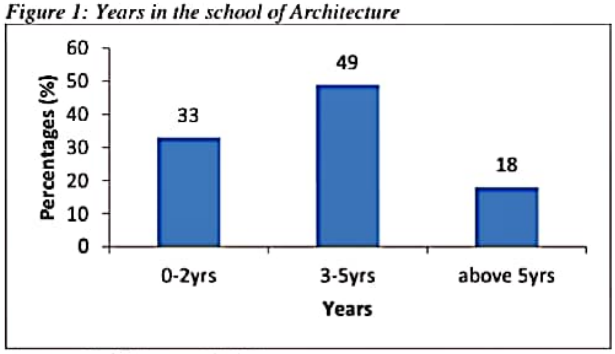
Table 2: Demographic Data of the Respondent

Administered	**206**	**Percentage (%)**
Returned	200	97.1
Not Returned	6	2.9
Total	**206**	**100**

Source: Field Survey, (2016)

Figure 1 shows the number of years the respondents have been a student in the school of architecture. This is relevant to their level of knowledge of the activities and involvement in the school of architecture. 49% of the respondents have been in the school for about 3 to 5 years, 33% have been in the school for 0 to 2 years, while 18% have above 5 years stay in the school. Therefore from the data it is indicative that the students have considerable number of years in the school to enable them respond adequately to the questionnaire.

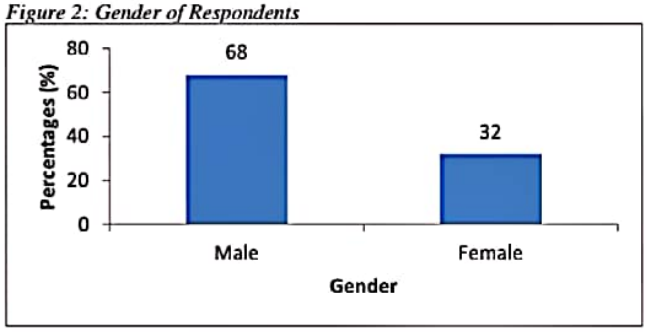
Figure 1: Years in the school of Architecture



Source: Field Survey, (2016)

It is important to identify the gender of the respondents, since each of the gender responds differently to situations, due to physiological and psychological orientation that exist in them. 68% percent of the respondents are male, while 32% of the respondents are female. This further goes to show that male students are more populated in the schools of architecture.

Figure 2: Gender of Respondents



Source: Field Survey, (2016)

Needs of Students of Architecture in Their Built Learning Environment

Table 3 shows the Needs of Students of Architecture in Their Built Learning Environment. A number of needs were identified from the review of a several literatures; this constituted the items in table 3. The items were ranked on the basis of their importance as seen. Natural/Artificial Lighting ranked first with mean score (MS) of 4.25. Ergonomics which

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has to do with the designing or arranging the classroom and drawing studios ranked second with MS of 4.14. Workshop spaces ranked third (3rd), Natural/Artificial Ventilation and Learning Comfort both ranked fourth (4th) with MS of 4.03. Space adequacy ranked sixth (6th), with MS of 4.02. Separate lecture rooms ranked seventh (7th) with MS of 3.94. Variables Assessment Criteria and Outdoor and indoor relaxation both ranked least (16th) with MS of 3.68.

From the result findings its can be clearly seen that all the seventeen (17) needs of students of Architecture in their built learning environment identified are all of significant importance, with Natural/Artificial Lighting as the most significant. This can be attributed to the key activity of architectural students, which is designing.

Table 3: Architecture Students Need

s/n	Need	Frequency of Response					N	TS	MS	Rank
		5	4	3	2	1				
1	Space adequacy	76	72	32	20	0	200	804	4.02	6th
2	Separate lecture rooms	64	80	36	20	0	200	788	3.94	7th
3	Separate cad studio	60	76	36	24	4	200	764	3.82	10th
4	Enough convenient space	52	92	36	20	0	200	776	3.88	8th
5	Drawing storage space	40	92	64	4	0	200	768	3.84	9th
6	Workshop spaces	56	96	48	0	0	200	808	4.04	3rd
7	Learning Comfort	84	64	34	10	8	200	806	4.03	4th
8	Natural/Artificial Lighting	92	84	10	10	4	200	850	4.25	1st
9	Natural/Artificial Ventilation	72	72	46	10	0	200	806	4.03	4th
10	Outdoor and indoor relaxation	32	104	32	32	0	200	736	3.68	16th
11	User Needs Variables	44	92	32	32	0	200	748	3.74	13th
12	Human Factor	48	92	32	28	0	200	760	3.8	11th
13	Design	56	84	28	28	4	200	760	3.8	11th
14	Ergonomics	108	44	16	32	0	200	828	4.14	2nd
15	Accessibility of functions	44	80	52	20	4	200	740	3.7	14th
16	Utility	44	88	40	18	10	200	738	3.69	15th
17	Variables Assessment Criteria	40	84	48	28	0	200	736	3.68	16th

Where 5=very important, 4=important, 3=neutral, 2=unimportant, 1=very unimportant
Source: Field Survey, (2016)

CONCLUSION AND RECOMMENDATION

The research identified that the students of Architecture in their built learning environment have certain basic needs that will aid in their learning process. These basic needs identified were classified into seventeen, with Natural/Artificial Lighting as the most significant. Therefore the research recommends that deans, heads of departments and the management of architectural schools /departments should put into considerations their student needs in the considerations of planning and designing of the their built environment, especially as it concerns Natural/Artificial Lighting, the use of glass materials or other transparent/translucent materials for the passage of light is important. There should be the use of ergonomically acceptable chairs and tables to avoid health related issues as a result of long duration of working.

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