Linkage between the Physical Characteristics of the Architectural Design Studio and Students' Learning Experience

Ekpo, Emma S.
Department of Architecture, University of Lagos, Nigeria.
+2348033110456.
emma_dreks@yahoo.com, eekpo@unilag.edu.ng

Adebamowo, M.
Department of Architecture
University of Lagos
Akoka, Lagos, Nigeria
Phone: +2348023247061
E-mail: madebamowo@unilag.edu.ng

ABSTRACT

The physical environment in which learning takes place, has become a growing area of academic interest and discuss over the past decades globally. Similarly, in the field of architecture, the learning environment remains one critical factor in understanding students' learning experiences which is an important parameter for an architectural education that is qualitative. This paper examines the relationship between the physical characteristics of the architectural design studio and the students' learning experiences in the University of Lagos, Nigeria. The methodology adopted for this study is a quantitative and qualitative approach based on participant–observation, documenting the studio under consideration with pictures, and supported by a secondary data. The sample size of 30% which was drawn from a total of 62 students in the 600level studio (Master's class 2) through a random purposive technique was engaged for data collection through the use of structured questionnaire. Basic statistical method was used in finding the mean of each item that makes up the physical characteristics and the students' learning experiences. The descriptive data was subjected to Spearman Correlation analysis which showed that the physical characteristics of architectural design studio and students' learning experiences were significantly correlated. The study concluded by recommending that the physical characteristics of the architecture studio should be further enhanced and properly maintained in order to boost the students' learning experiences.

Key words: Architecture, Design studio, Learning experience, Physical characteristics, & Environment.

ISTEAMS Cross-Border Conference Proceedings Paper Citation Format
Ekpo, Emma S. & Ademowo, M. (2017): Linkage between the Physical Characteristics of the Architectural Design Studio and Students' Learning Experience. Proceedings of the 9th iSTEAMS Multidisciplinary Conference, University of Ghana, Legon, Accra Ghana. Pp 275-282

1. BACKGROUND TO THE STUDY

Human learning process has been seen to be influenced by both internal and external conditions which involves an individual's experience as postulated by (Kearsley,1994). In keeping with this, (Chukwuma-Uchegbu, 2011) asserted that an optimum learning space lends a great deal of support to the quality and quantity of learning experienced by students. Again, a high quality of the design of the interior space does not only improve the function of a learning environment, but also the overall experience that the teaching and learning might afford the user, (Webber, Marini,& Abraham 2000). Therefore, learning experience can be considered as the outcome of an individual who is constantly active and interactive with his or her environment, (Kurt, 2009).

The architectural design studio 'the heart of architectural education' is a place of design teaching/ learning activities, where interactions between the students/students, students/tutors occur, and also spend a large amount of their time, (Obeidat & Al-Share 2012). The studio space remains one critical feature in understanding students' learning experiences which is an important parameter for an architectural education that is qualitative, (Prayoonwong & Nimnuan, 2010).

It therefore means that the educational environment determines the success of curricula and the effectiveness of learning,(Oluwatayo, Aderonmu & Aduwo, 2014). A learning environment such as this requires such physical characteristics that satisfy the minimum requirement of making the students' learning experiences worthwhile, (Webber, Marini & Abraham 2000). Learning takes place in a physical environment with quantifiable and perceptible physical characteristics, and the richness is its ability to preserve the experience within the users, (Ream & Ream 2005). The architecture course in University of Lagos is a two tier programme covering four years Undergraduate level and a two year Masters level for a complete award of Masters Degree in environmental design. The architectural design studio for the 600 level (Masters class 2) engaged for this study has an open studio which seats sixty two students both (male & female), has individual work stations/movable seats, storage, interactive boards/projectors, fenestrations for natural ventilation and lighting, means of mechanical ventilation, light fittings to enhance lighting in the studio (as shown in Plate 1&2).

This studio environment creates a learning ambience for the students, who have gone through their studies in six years with the view to becoming future professionals. Their entire learning experiences have revolved around many factors in which the physical characteristics of the studio space is of utmost importance. This is supported by a previous study which states that the physical learning environment has a direct impact on the user's experience, (Obeidat & Al-Share 2012). Therefore, the physical characteristics of the architectural design studio, university of Lagos was investigated in relation to comfort, furniture arrangement, air quality, finishes, noise control, circulation, adequacy of storage and space, safety, lighting and ventilation. The results obtained ascertained that the physical characteristics of the architectural design studio and the students learning experiences were significantly correlated. Hence, the studio environment has an enormous effect on the students learning experiences.

Plate1: Pictures showing the interior view of the architectural design studio for the Masters Class 2 with the individual work stations/movable seats, storage, interactive boards/projectors, fenestrations for natural ventilation and day lighting, means of mechanical ventilation, light fittings to enhance lighting in the studio, sufficient head room.


Plate 2: Other interior views of the studio showing specifically, the storage spaces, interactive board, and large window opening to allow for enough daylight and natural ventilation.

1.1. Statement of Research Problem

An increasing number of both educators and design professionals are becoming aware of the important role that physical space plays in educational settings. Cleveland & Fisher(2014) Upitis 2010; Newton and Fisher 2009; Taylor 2009; Wall et al. 2008; Lippman 2007; Stevenson 2007; Hartnell-Young 2006; Buckley et al. 2005; Higgins et al. 2005; Monahan 2005 Heppell et al. 2004; Clarke 2001; Edwards and Clarke 2002; Beare 2000. Again, (Webber et.al. 2000) noted that there are several aspects of the classroom environment such as the physical surroundings that may affect teaching- learning activity.

Similarly, it has been recognised that due to the importance and the much time allocated for the design course, architectural design studios serve a highly educational purpose, (Sener & Sener, 2003) which has great relevance in the studying of architecture. This effect must not be over looked. However, despite the centrality of the studio space to architecture education, the study finds impetus in the lack of research data relative to the relationship between the physical characteristics of the architectural design studio and the students' learning experiences in the University of Lagos, Nigeria. Hence, this stands as a gap in literature. Therefore, this research was set to investigate the significance of the studio characteristics in relation to the learning experiences acquired by these students over the period of their study.

1.2 Aim and Objective

The main aim of this study is to investigate the relationship between the physical characteristics of the architectural design studio and the students learning experiences with the view to enhancing the existing environment. In order to accomplish the aim, the objective will be to examine the various physical characteristics of the architectural studio space, and also determine the students learning experiences in the architectural design studio.

2. METHODOLOGY

2.1: The Research Design

The study adopted a mixed method of a quantitative and qualitative research approach. Observation and Questionnaire Survey (with structured Likert-scale questions and semi-structured interviews) was used for the data collection. Also, participant-observation which involved documenting the studios under consideration with photographs was also employed. The sample for this research was taken from a sample size of 30% of a total of 62 students in the 600level studio (master's class 2) through a random purposive technique. The questionnaire was designed based on literature review on the current state of relevant physical indicators of design studio that can fulfil students learning experiences.

The students were given a set of questionnaire which was base on the evaluation of the physical characteristics of their studio environment and the students' learning experiences. The number of architecture learners who participated in the survey was 20. In the first section, the students were required to rate their physical studio environment indicators (the independent variables). This rating was measured by using Likert-scale questions ranging from the lowest point 1(strongly disagree) to highest point 5 (strongly agree) The Designs Patterns were described in this study followed the Tanner (2000)'s patterns such as functionality, adequacy, safety, and quality, under which, several physical design indicators could be grouped. They were 20 indicators classified under patterns such as functionality, safety, comfort, furniture arrangement, finishes, noise control, safety, lighting, ventilation, adequacy of space and storage. The questionnaires were given to identify the students' current setting of the studio space and environment. These item variables were evaluated through a descriptive statistics in order to confirm the mean value. Then, the factors were used to correlate with the overall students' learning experiences in the architectural design studio.

3, DATA PRESENTATION & DISCUSSION OF FINDINGS

3.1: Types of Data

Primary and secondary data were adopted in this study. Primary data were collected using questionnaires and structured interview conducted in the research area. Based on the research approach, a set of questionnaire was developed using literature review on physical learning environment, architectural education and architectural design studio environment. The secondary data were obtained from journals, textbooks, seminar papers, and other research publications. Questionnaires were administered to the students in their studio by hand delivery. Also, structured interviews were conducted in order to solicit information on their subjective opinion about the physical characteristics of the studio.

Table 5.1: To examine the physical characteristics of the architectural design studio environment.

The physical characteristics of Architectural design studio were examined by finding the mean of each item that makes up physical characteristics and thus the overall mean. The mean of the physical characteristics of the architectural studio is presented in the table below.

PHYSICAL CHARACTERISTICS	1	2	3	4	5	TOTAL	MEAN	RANK
Overall Physical Characteristics	**40**	**117**	**90**	**133**	**19**	**399**	**2.94**	
I feel secure working in the studio.	0	0	3	13	4	20	4.05	1.0
I am satisfied with the arrangement of the studio.	0	1	6	11	2	20	3.70	2.0
I am satisfied with the space available to me for work in the studio.	1	1	5	12	1	20	3.55	3.0
Generally, things are safe to keep in my studio.	0	2	7	9	2	20	3.55	3.0
The studio space is the best place to do my work.	0	3	5	11	0	19	3.42	5.0
The studio is cool and comfortable enough to work in at all times	0	5	3	11	1	20	3.40	6.0
I am pleased with the cleanliness of this studio space.	1	2	8	8	1	20	3.30	7.0
My studio space smells good.	0	3	8	9	0	20	3.30	7.0
My chair in the studio is comfortable while sitting to do my work.	2	4	3	9	2	20	3.25	9.0
The noise level in the studio is comfortable.	0	1	14	5	0	20	3.20	10.0
The studio space helps balance students' work and home life.	0	6	5	9	0	20	3.15	11.0
The studio space does not accommodate all the necessary	0	8	7	4	1	20	2.90	12.0

activities.

The storage spaces are sufficient to keep my properties for studio work.	3	9	1	6	1	20	2.65	13.0
I do not have the necessary equipment to carry out my work in this studio.	2	10	4	2	2	20	2.60	14.0
I do not like the combination of the colours use in the studio space.	3	10	2	4	1	20	2.50	15.0
The environment of this studio does not allow me to concentrate on my work.	3	9	4	4	0	20	2.45	16.0
The furniture in the studio is not suitable for my work.	2	13	2	2	1	20	2.35	17.0
It is not easy to move freely within this studio.	5	12	2	1	0	20	1.95	18.0
The toilet /bathroom are adequate for my use when working in the studio.	10	7	1	2	0	20	1.75	19.0
The general lighting is not sufficient for the studio.	8	11	0	1	0	20	1.70	20.0

3.2 Discussion of Findings

As earlier stated, the respondents for this study were the students in the 600 level studio (Masters Class 2), both male and female. Thereafter, a Cronbach's alpha test was carried out to investigate the reliability of the 20 items used in measuring the physical characteristics of the architectural design studio; a value of 0.80 was obtained. This test was also done for 23 items used in measuring the students' learning experiences; a value of 0.826 was obtained. These are acceptable values ranging between 0.7-1(George and Mallery,2003).

Note: 1.00-1.49 for 1, strongly disagree; 1.50-2.49 for 2, Disagree; 2.50-3.49 for 3, undecided; 3.50-4.49 for 4, Agree and 4.50-5.00 for 5, strongly agree. (Source: Field Survey 2017). Table 5.1 shows the means of the physical characteristics of architectural design studio environment. Various statements indicating physical characteristics were made and respondent were asked to rate their level of agreement using (1 for strongly disagree, 2 for disagree, 3 for neutral, 4 for agree and 5 for strongly agree). The mean for each physical characteristic was then calculated and used for determining the predominance of the physical characteristics in their architectural design studio.

The ranking on the table above shows the predominant physical characteristics of the architectural design studio. Individually, notable result shows that students ranked 'I feel secure working in the studio' first with highest mean value of 4.05. This is an implication that this physical characteristic relating to the safety of the studio environment has a substantial impact on the students' learning experiences. It is followed by 'I am satisfied with the arrangement of the studio' with mean value of 3.70.

Meaning that, the arrangement of the space gives them a good working environment. The least ranked physical characteristic is 'the general lighting is not sufficient in the studio' with mean value of 1.70. Here, the students disagree about the predominance of 'no sufficient lighting in the studio'. This means that they agree that there is enough light sufficient in the studio for their work. This seems logical as they agree that they are comfortable with their work space generally. Submission from the students that participated in the survey reveals that the architectural design studio possesses various physical characteristics. This is an indication that the physical characteristics of the design studio may have a relationship with the learning experiences of the students.

Table 5.2: To examine the students' learning experiences in the architectural design studio

The students' learning experiences in the architectural design studio were examined by finding the mean of each item that makes up the students' learning experiences and thus the overall mean. The mean of the students' learning experiences in architectural design studio environment is presented in table 5.2 below.

Table 5.2 The students' learning experiences in the architectural design studio

THE STUDENTS' LEARNING EXPERIENCES	1	2	3	4	5	TOTAL	MEAN
OVERALL STUDENTS' LEARNING EXPERIENCES	**6**	**73**	**85**	**204**	**92**	**460**	**3.61**
The studio is where I can show knowledge of the various courses which helps me to develop my design skills.	0	1	5	11	3	20	3.80
I always look forward to lecture periods in my studio because it allows for more of interactive sessions between students and tutors.	0	1	7	8	4	20	3.75
Studying architecture in this environment has given me very positive learning experiences.	0	1	5	13	1	20	3.70
Managing time and planning my studies around the studio activities is the most challenging thing for me.	0	2	5	8	5	20	3.80
I derive a lot of benefits from discussing my work with colleagues in the studio.	0	0	1	12	7	20	4.30
I feel psychologically fulfilled learning and spending time in the architectural design studio.	0	2	2	11	5	20	3.95
The studio environment provides opportunities for the students to engage in many learning activities.	0	1	3	12	4	20	3.95
Tutors in this department are responsive to students' feedback especially during design studio periods.	0	3	3	12	2	20	3.65
The tutors always facilitate, guide and conduct the learning process effectively in order to create a positive learning experience.	0	2	7	7	4	20	3.65
The teaching approach by the tutors is more student- focused than the teacher- centered.	0	4	6	8	2	20	3.40
My learning experience does not differ from one year to another.	3	15	2	0	0	20	1.95
My learning is self- driven but with more encouragement from my tutors and peers.	1	0	3	11	5	20	3.95
My jury/ critique sessions represents one of the best learning experiences for me	0	4	3	9	4	20	3.65
The time table is adequately spaced to allow for flexibility and also reduce the intensity of the workload.	1	1	6	8	4	20	3.65
My studio is always crowded and noisy and this affects my learning and working there.	0	11	4	3	2	20	2.80
My early years of learning in the architectural program were very confusing and frustrating.	0	8	2	7	3	20	3.25
The University environment does not have sufficient infrastructure and facilities that enhance my learning as a whole.	0	6	2	6	6	20	3.60
The environment within and around the department of Architecture does not provide the students with good learning experiences.	1	1	3	10	5	20	2.70
The design studio environment is rated as one of the best learning spaces to be in the department.	0	2	5	8	5	20	3.85
Students of architecture always feel isolated from the larger University community.	0	2	5	8	5	20	3.80
The learning and teaching interaction helps me to learn better in the studio	0	1	2	15	2	20	3.90
The studio is most important to me in this University.	0	4	1	9	6	20	3.85
My entire learning experience in this University is quite rewarding.	0	1	3	8	8	20	4.10

Note: 1.00-1.49 for 1, strongly agree; 1.50-2.49 for 2, Disagree; 2.50-3.49 for 3, undecided; 3.50-4.49 for 4, Agree and 4.50-5.00 for 5, strongly agree. (Source: Field Survey 2017)

Table 5.2 presents the mean for the students' learning experiences in architectural design studio. The overall mean value for students learning experiences is 3.61. This implies that students generally agreed that they all have the listed learning experiences. Individually, notable result is 'I derive a lot of benefits from discussing my work with colleagues in the studio' with the highest mean value of 4.30. This implies that the studio environment is conducive for students to study and interact with one another. It is followed with 'I feel psychologically fulfilled learning and spending time in the architectural design studio' and 'the studio environment provides opportunities for the students to engage in many learning activities'; both with a mean value of 3.95. This implies that the students' learning experiences are enhanced by the studio environment and the physical characteristics of the studio. The result therefore shows how important the studio environment is to the students' learning.

Table 5.3 Relationship between Place Characteristics and Students' Learning Experiences

Variables Correlated		Physical	Activities	Students' Conception	Place Characteristics	Students' learning
Physical	Correlation Coefficient	1	.599**	.754**	.883**	.629**
	Sig. (2-tailed)	.	0.005	0	0	0.003
	N	20	20	20	20	20
Activities	Correlation Coefficient	.599**	1	.679**	.798**	.632**
	Sig. (2-tailed)	0.005	.	0.001	0	0.003
	N	20	20	20	20	20
Students' Conception	Correlation Coefficient	.754**	.679**	1	.914**	.727**
	Sig. (2-tailed)	0	0.001	.	0	0
	N	20	20	20	20	20
Place Characteristics	Correlation Coefficient	.883**	.798**	.914**	1	.710**
	Sig. (2-tailed)	0	0	0	.	0
	N	20	20	20	20	20
Students' learning	Correlation Coefficient	.629**	.632**	.727**	.710**	1
	Sig. (2-tailed)	0.003	0.003	0	0	.
	N	20	20	20	20	20

** Correlation is significant at the 0.01 level (2-tailed).

Table 5.3 shows the correlation between place characteristics and students' learning experience. However, on this table 5.3, it is important to note that; relevant to this study is the aspect of the correlation between the physical characteristics of the architectural design studio and the students' learning experiences. For the purpose of this paper, this area of study was extracted from a wider study on the place characteristics and students' learning experience, an on-going research. The finding shows that, the Physical characteristics and students' learning experiences were significantly positively correlated ($r = 0.629$, $p = 0.003$), thus the hypothesis which states that there is no significant relationship between physical characteristics and students' learning experiences was rejected with p-value < 0.05. It can therefore be inferred that there is a statistically significant positive relationship. This implies that physical characteristics of architectural design studio influences students' learning experiences and increase in physical characteristics of architectural studio will result in increase in students' learning experiences.

6. CONCLUDING REMARK

Finally, findings from this study suggest that the physical learning environment has a direct impact on the user's experience, as stated by (Obeidat & Al-Share 2012) in a previous study. Therefore, the findings of the study provide empirical evidence for the relationship between the physical characteristics of the architectural design studio and the students' learning experiences. Again in this study, students' preferences and tendencies about the design studio they work in are clearly expressed. Establishing criteria for examining a learning environment such as this for their intended outcomes should challenge the institution to work collaboratively and focus on how the space within their environment reinforces their academic and institutional objectives (Hunley & Schaller, 2006; Temple, 2007).

Based on the Literature Review and the research findings of this research, the study identified aspects of the physical characteristics in the studio learning environment which the architectural educators and the stakeholders can put in place to enhance and maintain the studio environment. This should be done in order to keep up with the students' learning experiences for high academic performance. There should be more awareness for the students on how the learning environment impacts positively on their learning experiences. This can in turn give them a more sense of responsibility to protect their studio space and even the environment around them.
The limitations to this study include the fact that samples were taken from only one architectural school, University of Lagos, Nigeria. However, these findings cannot be generalized because the context in other schools of architecture might differ, but might be used as a basis for similar researches in this field of study. A wider study might be required to reach such generalizations.

REFERENCES

1. Chukwuma-Uchegbu,M.I.(2011).creating a development based architectural education through experience based learning: a case for SIWES. Social Studies Vol.iv 2011.
2. George,D & Mallery, P (2003). SPSS for windows step by step: A simple guide and reference.11.0 Update (4th ed.). Boston: Allyn & Bacon.
3. Dunley,S.A.&Schaller,M.(2006).AssessingLearningSpaces. http://www.educase.edu/edu/learningspaces.
4. Kearsley, G. (1994). Explorations in learning & instruction: The theory into practice database. [Online]. Available: http://www.gwu.edu/~tip/ [December 1, 1999].
5. Obeidat, A., & Al-Share, R., (2012). Quality Learning Environments: Design-Studio Classroom. Asian Culture and History, vol.4, No. 2
6. Prayoonwong, T., & Nimnuan, C.(2010). Dental Students' Perceptions of Learning Environment. South-East Asian Journal of Medical Education, 4(1), 49-54.
7. (Oluwatayo, A., Aderonmu, P. & Aduwo, E. (2014) Architecture Students' Perceptions of their Learning Environment and their Academic Performance. Learning Environment Research (An International Journal. Vol.17 No. 3 ISSN1387-1579
8. Ream,T.C & Ream, T.W. (2005). From Low- Lying Roofs to Towering Spires: Towards a Heideggerian understanding of Learning Environments. Educational Philosophy and Theory.
9. Sener, E. & Sener, S. (2003).The effects of Design Studio's Physical Environment on Architectural Environment, Engineering Education in the world of no frontiers,eds,C. da Rocha Brito,M.M. Ciampi- Councel of Researches in Education and Sciences, Sao Vicente/Santos,ISBN85-89120-05-2.
10. Tanner, C. K. (2000). The Influence of School of Architecture on Academic Achievement. Journal of Educational Administration. Vol. 38(4): 309-330.
11. Temple, P. (2007). Learning Spaces for the 21st Century: A review of the Literature. The higher Education Academy, 1-79.
12. Webber,L., Marini, M.,& Abraham, J. (2000). Higher Education Classrooms fail to meet the needs of Faculty and Students. Journal of Interior Design, 26(1). 16-34.