European Journal of Sustainable Development (2022), **11**, 4, 32-46 ISSN: 2239-5938
Doi: 10.14207/ejsd.2022.v11n4p32

Pedagogical Challenges of Architectural Education in Nigeria; Study of Curriculum Contents and Physical Learning Environment

By Nicholas I. Obi[1], Joy Sylvia C. Obi[2], Francis O. Okeke[1*] and Rosemary C. Nnaemeka-Okeke[1]

Abstract
The current curriculum design, program and the state of the physical learning environment in the Nigerian schools of architecture seem inadequate and ineffective. The study examined the teaching of architecture in Nigerian tertiary institutions. The aim is to ascertain the state of the present curriculum contents and learning facilities. Major Challenges identified in this study include dearth of learning facilities, inability to reform the curriculum contents and limited financial resources allocation to run the schools. Also increasing unemployment for architecture graduates and unskilled nature of practicing graduates were also included. Highlighted in the discussion for necessary intervention by stakeholders of Nigerian tertiary institutions includes review and upgrading of existing curriculum, efficient time-management skills and collaborative teaching and learning techniques. For physical learning environment, literature points that a clean, bright, organized and open-plan ventilated space strengthens learning by motivation. The result from the survey carried out on physical classroom environment among students of tertiary institutions, indicates that the level of satisfaction was fairly satisfactory and that the students expressed that large halls, large corridors were the most available facilities (63.2% and 52.8% respectively). The major equipment in the classroom were whiteboards (100%), personal computers (47.2%) and digital projector or smart board (30.4%), while the available facilities for pleasant environment were attractive surroundings (100.0%). Adjustment of training methodology, improving training skills, retraining the trained, upgrading infrastructure and facilities; expansion of the curriculum and training program were recommended in order to comply with the current global trends.

Keywords: curriculum contents, architecture, global trends, learning environment, practicing graduates

1. Introduction

Architectural Education came into prominence in Europe during the Seventeenth Century. Before that period, Architects were regarded as either master builders or craftsmen because there were no formal school for the study of architecture. Learning of architecture was done in form of apprenticeship under the tutelage of the master builders or craftsmen. The establishment of Ecole des Beaux-Arts in 1795 marked the beginning of formal teaching of architecture in Europe which later extended to North America (Ockman, 2012). Emphasis was then laid on visual design, historic architecture and later more subjects were taught in the area of mathematics, geometry, mechanics, construction and theory of architecture. The Bauhaus later followed and flourished in Germany, the

[1]Department of Architecture, University of Nigeria, Enugu Campus
[2]Department of Guidance and Counselling, Nnamdi Azikiwe University, Awka, Nigeria;
*Corresponding Author

native home of its founder Walter Gropius. The Bauhaus revolution extended to other parts of Europe to North America and other parts of the world. This was then generally known as European/American Architecture Model (Adeyemi, 1996). Architecture programs in architecture schools in Nigeria took root from the British/American models, firstly by the British who founded the first school of Architecture in the city of Zaria, secondly, by the first crew of Nigeria architects who had their initial training abroad (Adeyemi, 2000). The continued reliance to the British and American model of architectural education has had its short falls and had been subject of serious discussion during Conferences and General meetings of the professional bodies of Architecture: (N.I.A, CAA, AUA, AARCHES), (Olotuah, 2002). The teaching of architecture in the Nigerian College of Arts, Science and Technology founded in 1952 marked the establishment of the first school of architecture in Nigeria. The first set of its students graduated in 1961. A year later (1962), the college was elevated into a university now known as Ahmadu Bello University, Zaria. The curriculum restructuring took effect that same year with the award of Bachelor of Architecture (B.Arch.) to the graduates. Also in the same year, (1962) when the University of Nigeria, Nsukka was founded, it became the second citadel of learning offering architecture in Nigeria, while the University of Lagos established in 1970 became the third offering the course. It is interesting to note that presently, Nigerian universities offering architecture are up to twenty-four and twenty-two polytechnics/colleges of technologies. The increase in number was due to many private institutions springing up in the country in the recent time. In essence, the Nigerian architectural education was tailored after the British education and to a larger extent in line with their program curriculum. Up till 1968, the course program was re-structured in accordance with the Royal Institute of British Architects' (RIBA's) system of Bachelor of Science (BSc) and Master of Science (MSc) degrees in architecture. The Nigerian architectural education took a dramatic turn after the famous United Nations Conference on Environment and Development termed "Earth Summit" which took place in Rio de Janeiro in 1992 were Sustainable development for human settlements was discussed on the international scale. Issues such as natural environment, energy consumption, use of environmentally friendly materials and design concepts were subjects of discussion in the conference where Architects, Planners, Environmentalists and Engineers were advised to adopt the principles of sustainability in design and practice. Continuing professional development according to Vail, (2013), became a way forward with the university teaching staff and the professional bodies inculcating in their various programs the need to upgrade learning opportunities in order to cope with the constantly changing world and embrace the technological revolution covering the internet, the world market and the new world economic well-being (Harris and Sass 2011). Within the Nigerian scene, there is need to evaluate the architectural curriculum to make it relevant to the principles of sustainability. However, the National Universities Commission NUC stipulate minimum standard guidelines for use by schools of architecture in Nigeria.

Consequently, the original program are changed regularly to reflect current needs of the nation because evaluation of curriculum is ran regularly in order to determine the degree of success of the program's objectives. Viewed from this angle, courses are spread into seven modules – humanities and social sciences, environmental control systems and physical sciences, architectural design, building systems, technology. The pool of

underemployed and unemployed Nigerian graduates continues to rise and architecture graduate are caught up in the web. Indeed, the unemployable nature of architecture graduates was due to the fact that the existing curriculum contents were not adequate enough to equip them face the realities of the 21st century challenges. This stems from the fact that architectural education of present is limited to only single discipline system with topics arranged by regulatory authorities. In Nigeria, to the best of the researcher's knowledge, it has not been documented if the National Universities Commission (NUC), National Board for Technical Education (NBTE), Architects Registration Council of Nigeria (ARCON) have fully integrated the phenomenon of sustainability in architectural education and curriculum development. There have not been any major studies to justify any curriculum review and development. In fact, there is no documented evidence if architectural education is capable of equipping prospective architects with all the necessary requirements needed for resolving urban and environmental issues especially in the face of today's climate change phenomena. Generally, the problems facing architectural education can be enumerated thus: inability to determine the adequacy of existing curricula to deal with emerging environmental, urban and rural problems; inability to adopt architectural education in the changing socio-economic and cultural life of the people. In fact, the global urbanization and consequent depletion of existing environments have led to increase on social and natural degradation of many human settlements (Okeke et al., 2020). The methods of education and training for architects seem to be inadequate and incapable of meeting up with the changing demands and requirements of the end users, the construction industry and the architectural profession. This gap needs to be filled by implementing sustainable principles and green building phenomena in the course content of architectural education. This study therefore aims to identify the current pedagogical and professional challenges of architectural education in Architecture Departments of Nigerian Tertiary Institutions. To achieve this aim, the following objectives are pursued, (i) to identify the major challenges of architectural education in Nigeria, (ii) to examine the nature of the existing curriculum/course contents, (iii) to identify the means by which students will be equipped with the knowledge and skills of solving current environmental problems, (iv) to assess the effects of the physical working environment in which education takes place. This study is considered significant because adoption and integration of sustainable architectural education in curriculum development program will bridge the gap between the societal demands and training of architecture professionals to address these demands. This will improve the quality of architectural education and its relevance today and in the future.

1.1 Context of Study

Contextually the study was conducted in the Southeast Nigeria and geographically, is one of the six geopolitical zones in the country known for its high literacy level. The zone is made up of five States: Abia, Anambra, Ebonyi, Enugu and Imo as shown in Figure 1. Culturally, Igboland encompasses the great majority of the region. Despite being the smallest geopolitical zone, the South East contributes significantly to the Nigerian economy due to natural gas and oil reserves, as well as an expanding industrialized economy. The southeast zone contains approximately ten commercial cities as well as numerous educational institutions. The study area comprised the Architecture

departments in five universities in South east Nigeria. Namely; UNEC-University of Nigeria, Enugu Campus; (Enugu State) IMT – Institute of Management and Technology; (Enugu State) ESUT- Enugu State University of Science and Technology (Enugu State) ABSU- Abia State University; (Abia State) NAU – Nnamdi Azikiwe University, (Anambra State). These tertiary institutions have produced a large number of architecture graduates spread across various states in the country since their inceptions.

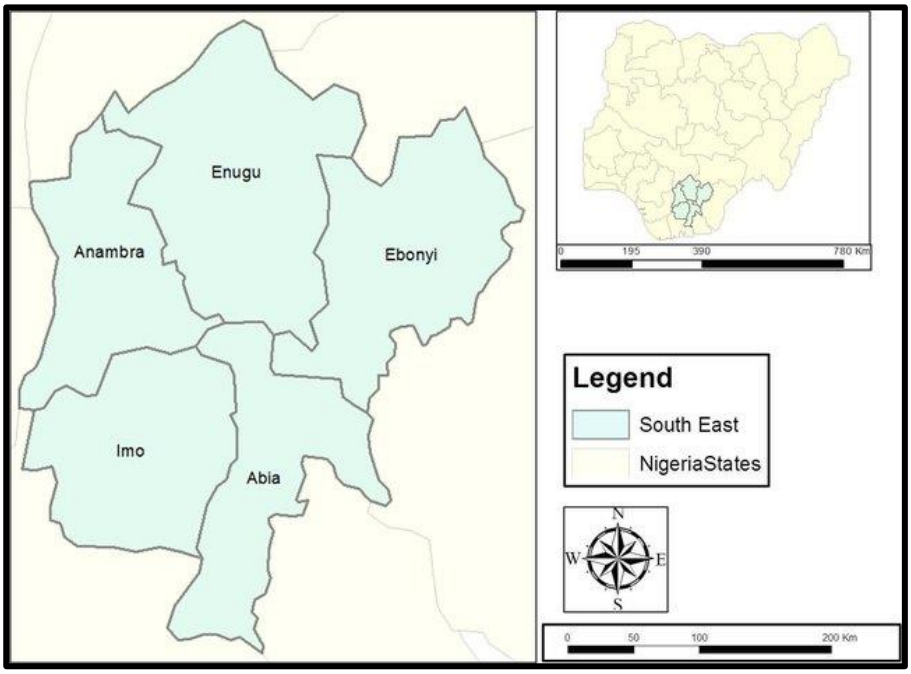

Figure 1. Map of South East Geopolitical Zone of Nigeria
Source: Geographical Map of Nigeria (2020)

2. Theoretical Framework

2.1 Concept of Curriculum

The word curriculum has a Latin origin "currus" which means "course" and by the 19th century, the word curriculum had come to be used in reference to education (Oliver, 2005; Nakpodia 2010). Oliver (2005), posited curriculum as a set of planned program of activities designed to offer learning experiences to students under the guidance of a school which is designed so that students will attain, as far as possible, certain educational ends or objectives.

However, Kerr (1968) had earlier defined curriculum as "all learnings including its planning which can be grouped together with a school guide and can be done individually in groups in the school or outside of it. But in general terms, as stated by Onwuka (1981), curriculum means the processes, and products including all activities of man meant for the realization of the aspirations of the society through school programs. This is similar to the view postulated by Stone and Nielsen (1982), who asserted that curriculum is a set of integrated

courses and school activities developed in order to respond to the requirement of the school so as to improve human habitat.

Significantly, the importance of curriculum development cannot be ignored in formal education, because of the need to withstand the dynamic changes that occur in the society. Therefore, in its broadest sense, as stated by Bilbao et al., (2008), curriculum refers to the "total learning experiences of individuals not only in school but the society at large." Its ability in handling arising urban issues and its adaptability to socio economic changes in the country is a subject of critical assessment by Olotuah, and Ajenifujah, (2009) as well as Ornstein and Hunkins (2004) who were of the view that to make a new curriculum is dependent on how well the planners have made it including how its development and its implementation have taken cognition of the students who may likely be constrained to adaptation to the new changes. It is in line with this view that part of this study sets out to identify curriculum contents that will be most acceptable for entrepreneurship education for tertiary institutions in the country. Abubakar, (2012) in his view, suggested that for the effective implementation of the curriculum, there is need to provide adequate human and material resources, expand the existing curriculum, to accommodate new areas of specialization, ICT, management and entrepreneurship drive, considering our local environment. Curriculum development is useful in determining the principles and procedures that educators use in the selection and arrangement of instructional programs, assessment, changes and procedures to be taken (Bilbao et al., 2008). Thus, according to Masaruf and Muhammad, (2016), the architectural design studio as a course is subjected to training students on environmental problem-solving skills.

Literature points out a distinct curriculum development in architecture, namely, Subject-centered curriculum which deals with design quality that is capable of being produced by professionals from architecture schools and capable of satisfying the surrounding environment (Bilbao et al., 2008). Thus, Adedeji et al, (2011) was of the view that architects of the 21st Century, including their education should be appropriate for the realization of the dream of indigenous African school of architecture and this should be a major contributing factor in re-designing architectural curriculum. Dauda et al., (2010) also viewed that architectural education need to be geared towards the development of a designer that is capable of making designs that will solve environmental problems. Abubakar (2012), suggested the need to initiate a change in architectural education that incorporates sustainability in order to tackle issues associated with resource depletion, climate change and ecological destruction.

2.2 Environmental Sustainability

Sustainable environment has become a global issue and should not be left out in this discussion. Judging from the environmental point of view, authors like Ray-Jones, (2000); Okeke et al., (2017); Okeke et al., (2019) suggested sustainable architecture as a way forward of energy utilization system in building construction that are comfortable and conducive for human habitation without environmental pollution and resources exploitation for future generation. Therefore, for architectural education to be meaningful, its reforms must integrate the principles of sustainability. Every school of architecture is expected to make a reasonable contribution and progress to achieve this objective. Although, as posited by Norhati (2008), the incorporation of sustainability principles in

any school's curriculum agenda, will be dependent on its philosophy, pedagogical approaches and the ability to cope with innovations, the creation and dissemination of knowledge has speeded up as a result of advances in sciences and information technology. As a matter of fact, policy enforcement, monitoring, awareness, funding, training, research, sustainability strategies, practices and programs must be implemented consciously.

2.3 Physical Environment

The term physical environment refers to the overall design and layout of a given classroom and its comfort of the school's physical building and its location within the community. Effects of physical environment on students' learning habit were enumerated in the literature by some scholars such as Rehman & Haider (2013), who posited that a clean, bright, organized space strengthens learning by providing a sense of accomplishment which translates into motivation, and that it gives time to think about or organize students' activities. Working in open-plan spaces within the classroom was found to promote the sharing of skills amongst teachers and allow for team-teaching (Samani et al., 2017). Previous studies on physical environment for learning made emphasis on indoor air quality. For example**,** Urlaub et al, (2016) stated that improving indoor air quality with better ventilation and an adequate amount of daylight support the learning progress; viewed against insufficient physical conditions that promote distraction. Klatte et al, (2013)**,** argued that levels of external noise may have a negative effect on students' performance because non-auditory tasks such as short-term memory, reading and writing are impaired by noise**.** Stress resulting from background noise, are known to decrease higher brain function, impairing learning and memory as explained by Andrews, (2010). More evidences from literature, for example (Shield and Dockrell, 2003), have revealed that the effect of noise in the classroom can also make several disorders in students hearing, communication and intelligence. Against this background, some researchers, Kuo, et al (2018), suggest that including more nature in formal education could boost overall concentration, thereby improving academic performance. Other studies, such as Burns, (2011), identified digital learning environments to largely provide students with autonomy and flexibility without the requirement of having a teacher on-call to support students. In view of all these contributions by previous authors on the subject, one can generally, conclude that physical learning environment can be quantified from the qualitative point of view from the six factors: lighting, ventilation, temperature, inner classroom acoustics, external noise proofing, and spaciousness**.** It is therefore necessary to provide a well-maintained and safe physical environment in order to boost students' ability to learn and exhibit appropriate behavior.

3. Literature Review

3.1 The Nature of the Existing Curriculum/Course Contents

This was highlighted based on stipulated regulations of NUC under decree No. 1 of 1974, and decree No. 16 of 1985 by which universities became rated on specific criteria such as academic status, compliance with varying capacity; proportion of an academic staff at professional level; foreign contents (staff), proportion of foreign students; research output; PhD graduate output; student to teacher ratio; students to-computer ratio; and

stability of university calendar. Different course titles are categorized into seven instruction modules spread into a 6-year duration, running into a 2-tier system (BSc and MSc), placing more emphasis on design modules, meaning that more credits (40%) are required to be earned in the architectural studio (Olotuah, 2000).

3.2 Major Challenges of Architectural Education in Nigeria

The challenges of architectural education were highlighted, pointing to the need for review of colonial modeled type of architectural education to pave way for the new methods that embrace the socio-cultural context of the society and sustainability demands. The dearth of learning facilities and architect educators to amend, adopt and implement a new curriculum in architecture schools in Nigeria were implicated as the greatest challenge. New skills acquisition and changes in the instruction of construction methods were also highlighted as imminent for sustainability challenges. Although, sustainability challenges are multifaceted, key issues identified in the context are enumerated below; first, for Architectural Schools, international competition among schools are on decline, also limited financial resources allocation to school of architecture constitutes another hindrance, increasing unemployment for architect graduates and upgrading skills of those already out of formal school are the challenges that need attentions of government and the private sector. This study views that adjustment of education and training methodology to meet the rapidly and constantly changing needs of the society, improving training skills, retraining the trained, upgrading infrastructure and facilities are necessary to tackle these challenges. Second, for Government, a new challenge emanates from the creation and dissemination of knowledge which has speeded up as a result of advances in sciences and information technologies leading to greater globalization. Increasing private sector investment in education provision due to limited financial resources from the public sector was proposed. In addition, meeting up the Challenges requires adoption of the three core areas: - *i. Stock Challenges;* which requires skill upgrading and retraining of those already out of school through continuing professional development. ii. *Flow challenges;* which requires expanding, increasing and improving quality of existing standards for better teaching and learning pedagogies in more skill areas. iii. *Dynamic challenges;* which requires education and training to cope with the rapidly and constantly changing world by upgrading the content curriculum in order to make it relevant to changing needs. Also, the rapid growing private universities and training program need to be controlled within acceptable standards. Based on these, it is suggested that government has major role to play in this regard by co-operation and collaboration with non-governmental partners and scholarship agencies and organization for grants and loans schemes to run effectively the tertiary institutions**.** Based on current issue, regulation of quality of architectural education requires review of existing curriculum, in view of the new world order, because a new curriculum of architectural education should encourage the appropriate use of materials and embrace an ecologically balanced and sustainable development of the built and natural environment.

3.3 Means of equipping students with the knowledge and skills of solving current environmental problems

Wilson, et al, (1995), posit that encouraging contact between students and faculty is necessary in order to build rapport with students because such contacts make students

to succeed both in academic works and building career opportunities. Also, adoption of efficient time-management policy helps student work within stipulated deadline. This calls for progressive timeframe for projects and assignments, because, according to Jacobs, et al, (1992), respect of diverse talents and ways of learning is of crucial importance whereby, students should be encouraged to speak up when they do not understand. They concluded that collaborative teaching and learning techniques and pairing of students is a way they complement each other's abilities.

4. Materials and Methods

The methodology covered two sections. The first involved analysis of existing literature on the study objectives but with particular reference to the curriculum content. The second section covered survey research on the effects of physical learning environment which covered five tertiary institutions in Southeast Nigeria. A structured questionnaire was administered by hand by the researchers on five tertiary institutions namely; University of Nigeria, Enugu Campus (UNEC), Institute of Management and Technology (IMT) Enugu, Enugu State University of Science and Technology (ESUT), Abia State University (ABSU) and Nnamdi Azikiwe University (NAU) awka all in Southeast geopolitical zone of Nigeria. This was based on convenience sampling technique. the variables identified from literatures as relevant for the study, constitutes four sections of the structured questionnaire. It includes (i) demographic statistics of respondents (ii) Level of Satisfaction with Physical Classroom environment (iii) Level of availability of Facilities related to Physical Classroom environment (iv) Perception on Factors Related to Physical Environment. Twenty-nine questionnaires were distributed to each individual school of architecture and in total one hundred and forty-five (145) copies of the questionnaires were administered and only one hundred and twenty-five (125) were correctly filled and returned representing a response rate of 86%. However, this is not a probabilistic representative sample, given the low number of respondents. The successfully completed copies of the questionnaire were analyzed and their interpretations were presented. The data were analyzed item by item using descriptive statistics on SPSS as elucidated in the result section.

5. Results

In line with the stated objectives of the present study, the results are grouped under to headings and summarized as follows;

5.1 Results from reviewed literature

i. *Nature of the Existing Curriculum/Course Contents.* Existing literature, points that many different courses are grouped into seven modules from which credit units are spread to cover a period of six years divided into two-tier system (BSc an MSc), namely: - Architectural design; Arts and Drawing; Historical and Theoretical studies; Building Systems Technology; Humanities and Social Studies; Environmental Control System; and Physical Sciences. Greater emphasis is placed on the architectural design module with 40% assigned to studio work because students are required to proffer solutions to problems of the built environment.

ii. *Challenges of architectural education.* In line with the reviewed literature, major challenges of architectural education in Nigeria were identified to include dearth of facilities for learning and inability of architect educators to review, amend adopt and implement a new curriculum in schools of architecture. Also included are; curriculum content reform to be more responsive to the socio-economic needs and sustainability challenges, lack of international competition among schools and limited financial resources allocation to run the schools. Increasing unemployment for architect graduates and upgrading skills of those already out of formal school were identified to constitute other challenges that need government and the private sector intervention in the face of advances and globalization trends in sciences and information technologies.

iii. *Equipping students with the knowledge and skills of solving current environmental problems.* In this area, it was suggested that it is necessary to establish contacts between the faculty staff and the students because such contacts improve students' success in terms of course programs and career opportunities. Efficient time-management skills and collaborative teaching and learning techniques were found to be critical for effective learning and teaching. Furthermore, the covid 19 pandemic has brought into limelight the Open Education Resources (OER) with benefits which include: increased access to learning for students all over the world through low-cost material distribution, supplemented by complementary textbooks and lecture notes to compensate for potential deficiencies; and new innovation can reach a wide audience who may learn of faculty research interests and expertise

5.2 Results of survey of Physical classroom environment.

From the survey carried out on physical classroom environment among students of tertiary institution, the results are shown below.

Table 1: Socio-Demographic Characteristics of the Respondents (n = 125)

Variables	Options	Frequency (N)	Percentage (%)
Gender	Male	89	71.2
	Female	36	28.8
Age (years)	21 - 25	90	72.0
	26 - 30	29	23.2
	Above 30 years	6	4.8
Mean age (± SD)	***23 (± 2.6)***		
Institutions	UNEC	27	21.6
	IMT	23	18.4
	ESUT	25	20.0
	ABSU	24	19.2
	NAU	26	20.8

UNEC-University of Nigeria, Enugu Campus; IMT – Institute of Management and Technology; ESUT- Enugu State University of Science and Technology ABSU-Abia State University NAU – Nnamdi Azikiwe University,

Table 1, revealed the demographic characteristics of the respondents. Findings shows that their mean age was 23 (± 2.6) years. More than half (71.2%) were males while a lesser proportion were females (28.8%) attributed to the masculine nature of the profession. All the schools were proportionately represented in the study.

Table 2: Level of Satisfaction with Physical Classroom environment (n = 125)

Items	Satisfactory N (%)	Fairly Satisfactory N (%)	Non Satisfactory N (%)
Fluorescent lights in the ceiling	22 (17.6)	**64 (51.2)**	39 (31.2)
Varied daylight	41 (32.8)	**59 (47.2)**	25 (20.0)
Good air quality from artificial ventilation at full capacity whole day	25 (20.0)	**47 (37.6)**	53 (42.4)
Good air quality from natural ventilation at full capacity whole day	25 (20.0)	**53 (42.4)**	47 (37.6)
Inner lecture room acoustics	18 (14.4)	**46 (36.8)**	61 (48.8)

Table 2, revealed the students' level of satisfaction with the physical classroom environment. Results showed that the students highest level of satisfaction with varied daylight (32.8%), air quality from artificial ventilation (20.0%) and air quality from natural ventilation (20.0%). Generally, it can be suggested that the level of satisfaction was fairly satisfactory with highest being fluorescents light in ceiling (51.2%), varied daylight (47.2%) and air quality from artificial ventilation (42.4%).

Table 3: Level of availability of facilities related to Physical classroom environment (n = 125)

Facilities	Available N (%)	Available only when the need arises N (%)	Not available N (%)
Audio aid and public address systems	0 (0)	**32 (25.6)**	93 (74.4)
Digital library	14 (11.2)	**46 (36.8)**	65 (52.0)
Printing and plotting	21 (16.8)	**49 (39.2)**	55 (44.0)
Laboratory with specialized equipment	13 (10.4)	26 (20.8)	86 (68.8)
Courtyard of outdoor area for learning	*34 (27.2)*	21 (16.8)	70 (56.0)
Spaces for students with special disability	0 (0)	7 (5.6)	118 (94.4)
Large halls or auditorium	**79 (63.2)**	30 (24.0)	16 (12.8)
Divisible door spaces	30 (24.0)	31 (24.8)	64 (51.2)
Large corridors	**66 (52.8)**	9 (7.2)	50 (40.0)
Photography laboratory	6 (4.8)	0 (0)	119 (95.2)
Fire extinguishers	13 (10.4)	30 (24.0)	82 (65.6)
Stand-by power generators	20 (16.0)	**49 (39.2)**	56 (44.8)

Table 3 revealed the level of availability of facilities related to physical classroom environment. Results showed that the students expressed tha**t** large halls or auditorium and large corridors were the most available facilities (63.2% and 52.8% respectively). However, printing and plotting (39.2%), stand-by generators (39.2%), digital library (36.8%) and audio aid and public address systems (25.6%) were the facilities that were available when there were need for them. Facilities that were Not available are Spaces for students with special disability (94.4) and Photography laboratory (95.2)

Table 4: Perception on Factors Related to Physical Environment (n = 125)

Characteristics	Frequency	Percent (%)
Temperature		
Smooth for classroom	16	12.8
Uneven – weather dependent	**60**	**48.0**
Generally uncomfortable	49	39.2
External noise proofing		
Never interferes	15	12.0
Seldom interferes	7	5.6
Often interferes	**103**	**82.4**

Characteristics	Frequency	Percent (%)
Room spaciousness and freedom		
Good – can easily reach all students	26	20.8
Limited – cannot freely reach all students	40	32.0
Not good enough for study and easy movement	**59**	**47.2**
Seating layout		
Individual desks in row	40	32.0
Cluster of desks	**111**	**88.8**
Available equipment in classrooms		
Black/whiteboards	**125**	**100.0**
Display boards or wall space for display	0	0
A music system/speaker	0	0
Digital equipment		
Digital projector or smart board	38	30.4
Personal computers	**59**	**47.2**
Work stations	20	16.0
Facilities for pleasant environment		
Drinking fountain	0	0
Music room	0	0
Attractive surroundings	**125**	**100.0**

Table 4 revealed the students' perception on elements related to physical environment. Almost half (48.0%) opined that the temperature in the classroom was weather dependent; more than half (82.4%) stated that external noise often interferes; almost half (47.2%) stated that the room was not spacious enough for study and easy movement while majority (88.8%) revealed that the reading layout was made of rows of desks. The major equipment in the classroom were whiteboards (100%), personal computers (47.2%) and digital projector or smart board (30.4%). The available facilities for pleasant environment were attractive surroundings (100.0%).

6. Discussion

The aim of this study was to identify the current pedagogical and professional challenges of architectural education in Architecture Departments of Nigerian Tertiary Institutions. From the result of the study the challenges facing architectural education in Nigeria today range from inconsistent policies, inadequate research and planning, while the curriculum design lacks issues pertaining to sustainability. This shortfall according to Olotuah, (2002), partly emanated from the continued reliance to the British and American model of architectural education. In fact, this had been subject of serious discussion during Conferences and General meetings of the professional bodies of Architects and Planners as well as Engineers and Environmentalists were sensitized to embrace in their decision making, issues pertaining to energy utilization, application of materials that are environmentally friendly as well as sustainable design concepts with less environmental impacts. Continuing professional development was seen as a panacea to the issues at hand as reported by Vail, (2013), with the university teaching staff and the professional bodies enforcing on the learners the upgrading of existing curriculum in order to cope with the new world order. Consequently, the areas to focus at the global scene as proposed by

Harris and Sass (2011), include current teaching and learning methods making use of new technology revolution, the internet and the global market and the new world economic well-being of the teaming population. This is informed by the unemployable nature of many graduates of architecture from the schools because the existing curriculum was not adequately prepared to capture the reality of the 21st century. In fact, architectural education presently is limited to single discipline system with topics arranged by regulatory authorities. There exists no documented evidence to prove that the National Universities Commission (NUC) and Architects Registration Council of Nigeria (ARCON) have fully integrated the phenomenon of sustainability in architectural education and curriculum development. There have not been any major studies to justify any curriculum review and development. Therefore, equipping new graduates of architecture adequately to have the ability to solving the complexity of urban and environmental problems especially in the face of today's climate change becomes a reality. The need to meeting up with the changing demands and requirements of the end users, the construction industry and the architectural profession constitutes a gap that needs to be filled by implementing sustainable principles in architectural education. The importance of curriculum development was highlighted by ensuing literature hence Bilbao et al., (2008), refers curriculum as "total learning experiences of individuals not only in school but the society at large. Abubakar, (2012) suggested that effective implementation of the curriculum, entails adequate human and material resources, expansion of the existing curriculum to accommodate new areas of specialization, ICT, management and entrepreneurship drive, in line with our local environment in order to establish conducive human habitat. Judging from environmental view point, Ray- Jones, (2000) suggested sustainable architecture as a way forward for comfortable and conducive for human habitation without environmental pollution and resources exploitation for the future generation. Therefore, architectural education will be meaningful, if its reforms integrate the principles of sustainability by every school of architecture. Although, as posited by Norhati, (2008), the incorporation of sustainability principles in any school's curriculum agenda, requires pedagogical approaches and the ability to cope with innovation because the creation and dissemination of knowledge has speeded up in line with the advent of green architecture and the existing rating systems on the international level. To achieve sustainable architectural education, lecturers are implored to take a leadership role in training, research, practices and programs for its effective implementation with more emphasis on the architectural studio design modules because students are required to proffer solutions, more to problems of the built environment. Major Challenges faced by architectural education in Nigeria were identified to include dearth of learning facilities, inability to reform the curriculum content to respond to the socio-economic needs and sustainability challenges, as well as limited financial resources allocation to run the administration were also identified to constitute other challenges that need government and the private sector intervention. Means of equipping students with the knowledge and skills of solving current environmental problems will require efficient time-management skills and collaborative teaching and learning techniques. Effects of physical environment on students' learning habit were highlighted in the literature. Rehman & Haider, (2013) posited that a clean, bright, organized space strengthens learning by motivation, while Samani, et al, (2017) suggested that working in open-plan spaces was found to promote the sharing of skills amongst

teachers. Physical environment according to Urlaub et al, (2016), with improved indoor air quality, better ventilation and adequate amount of daylight support the learning progress. The result from the survey carried out on physical classroom environment among students of tertiary institution, indicates that the highest level of satisfaction was on Varied daylight (32.8%), fairly satisfied with fluorescent lights in the ceiling (51.2%) and not satisfied with the Inner lecture room acoustics (48.8%); large halls, large corridors were the most available facilities (63.2% and 52.8% respectively) in the studied schools of architecture. Also, major equipment in the classroom were whiteboards (100%), personal computers (47.2%) and digital projector or smart board (30.4%), while the available facilities for pleasant environment were attractive surroundings (100.0%). These statistics do not meet recommended global standard for teaching and learning of the architecture profession, hence constitute a major hinderance and pedagogical challenge of architectural education in Nigeria.

7. Conclusion and Recommendations

This paper has reviewed the challenges of architectural education, emphasizing on the nature of the existing curriculum/course contents, means of equipping students adequately for the purpose of solving current problems pertaining to environment and sort opinion of students on the physical learning environment in which education takes place. As researchers' observation on the issue, review of curriculum is part of its development especially when focused on evaluation/assessment of existing curriculum content. The structure of the current curriculum is not in line with principles of sustainability and the needs of the society causing a hindrance to the architects in question. Furthermore, the students surveyed have expressed dissatisfaction with the state of facilities and their learning environments. It is recommended therefore; that it is very necessary for the professional bodies of the built environment to carry all the stakeholders along in every process of curriculum review. Currently, the incorporation of sustainability principles into architectural education has not been fully absorbed. This study views thus; Training methodology needs to be adjusted, training skills improved, those out of school retrained and infrastructure and facilities upgraded to meet the rapidly and constantly changing needs of the society in order to tackle challenges facing architectural education. Open Education Resources (OER) has potentials for pedagogically sound teaching and learning, such as technological support-via Information and Communication Technology (ICT), Open Distance Learning (ODeL) that increases access to educational opportunities. Increasing private sector investment in education provision is proposed to tackle limited financial resources from the public sector. In this regard, government's co-operation and collaboration with non-governmental partners, scholarship agencies and organization for grants and loans schemes is proposed for effective running of tertiary institutions. International and local partnership, dialogue and collaboration among the built environment professionals, academics and students are vital because it creates room for ideas exchange, study tours, joint research and exchange programs. The use of external examiners and exchange program are also necessary so as to achieve and maintain comparable national and global standard.

References

Abubakar, A. (2012). Perception of Education and Practitioners on the Relevance of Architectural Curriculum of Nigerian Universities to the Building Industry Proceedings 4th West Africa Built Environment Research (WABER) Conference, 24-26 July, 2012, Abuja, Nigeria, pp. 1-7.

Adedeji, Y. M. D., Taiwo, A. A., Olotuah, A. O. and Fadairo, G. (2011). Architectural Education and Sustainable Human Habitat in Nigeria. In: C.A. Brebbia E. Beriatos Sustainability today, Wessex Institute of Technology, Arhurst, New Forest, United Kingdom, pp. 89-99.

Adeyemi, E. A. (1996). The appropriate Direction of Architectural Education in African Region, ARRCHES Journal J. I. (3) Jan. pp. 38-41.

Adeyemi, E.A. (2000). A tribute to Prof. E. A. Adeyemi, lest we forget. Text of the keynote address to the 7th Annual General Meeting! National Workshop of the AARCHES, 24-27 February, 2000, FUT, Akure.

Andrews M A. W, (2010). Director and professor of physiology at Lake Erie College of Osteopathic Medicine at Seton Hill University in Greensburg, Pa., Scientific American, January 1, 2010

Bilbao, P.P., Lucido, P. I. Iringan, T. C., and R.B. Javier (2008). Curriculum development. Philippians: Lorimar Publishing, Inc.

Burns, M (2011). Distance Education for Teacher Training: Modes, Models, and Methods Education Development Center, Inc. Washington, DC

Dauda A. S. Waziri, G. Ajufoh M. O. (2010). Towards a more Sustainable Architectural Curriculum of Higher Institutions in Nigeria. Journal of Research in Education and Society. Vol. 1, Nos. 2/3, 2010.

Harris, D. N. and Sass, T. R. (2011). Teacher Training Teacher Quality and Student Achievement. Journal of Public Economics, 95(7), pp. 798-812.

Jacobs, L. C. and Chase, C. I. (1992). Developing and Using Tests Effectively: A Guide for Faculty. San Francisco, C. A. Jossey-Bass.

Kerr, J. F. (1968). Changing the curriculum. London: University of London Press. "National Unity" Arts and Social Sciences Forum Journal, pp. 45-56.

Klatte, M Barnstorm K and Lachmann T (2013). A short review on noise effects on cognitive performance in children. Center for Cognitive Science, Cognitive and Developmental Psychology Laboratory, University of Kaiserslautern, Kaiserslautern, Germany. Mini Review Article Front. Psychol., 30 August 2013 https://doi.org/10.3389/fpsyg.2013.00578

Kuo, M, Browning, M H. E. M and Penner, M L. (2018). Do Lessons in Nature Boost Subsequent Classroom Engagement? Refueling Students in Flight. Front. Psychol., 04 January 2018 | https://doi.org/10.3389/fpsyg.2017.02253

Masaruf, M. & Muhammad S. I. (2016). The Architectural Education Curriculum in the Nigerian Schools of Architecture. IOSR Journal of Research & Method in Education 6(6), (Nov. – Dec. 2016), pp. 13-17. DOI:10.9790/7388-0606081317.

Nakpodia E. D. (2010). Culture and curriculum development in Nigerian schools African. Journal of History and Culture (AJHC). Vol. 2 (1), pp. 001-009. January, 2010. Available online athttp://www.academicjournals.org/ajhc ©2009 Academic Journals.

Norhati I. (2008). Sustainability and the Architectural Education: Are We There Yet? SENVAR + ISESEE 2008: Humanity + Technology.

Ockman, J. (2012) Architecture School; three centuries of educating architects in north America. Published in Metalocus, Pedro Navarro: February 17, 2012. ISBN: 9780262017084. pp 400.

Okeke, F. O., Eziyi, I. O., Udeh, C. A., & Ezema, E. C. (2020). City as habitat; assembling the fragile city. Civil Engineering Journal (Iran), 6(6), 1143–1154. doi:10.28991/cej-2020-03091536.

Okeke, F. O., Okekeogbu, C. J. and Adibe, F. A. (2017). Biomimicry and Sustainable Architecture: A Review of Existing Literature. Journal of Environmental Management and Safety Vol. 8, No. 1, (2017) pp12,18

Okeke, F.O., Chukwuali, B.C. and Idoko, A.E. (2019), Environmentally-responsive design; A study of Makoko floating school building. International Journal of Development and Sustainability. 8(8), pp. 476- 487 IJDS18070302.

Oliver A. (2005). Curriculum Improvement: A Guide to Problems. Principles and Procedures, New York: Dodd, Mead and Company LTd.

Olotuah, A. O. & Ajenifujah, A. O. (2009). Architectural Education and Housing Provision in Nigeria. CEBE Transactions, Vol. 6, (1): 86-102.

Olotuah, A. O. (2000). "Architect-Educators and the Curriculum in Architecture: Roles and Expectations in the 21st Century". AARCHES J. Vol. 1, No. 5, pp. 29-32.

Olotuah, A. O. (2002). "Architecture and Cultural Sensibilities: The Implications for National Unity" Arts and Social Sciences Forum Journal, pp. 45-56.

Onwuka U. (1981). Curriculum development for Africa. Africana Feb, Publishes Ltd. Onitsha, Nigeria.

Ornstein, A. C. and Hunkins, F. P. (2004). Curriculum. Boston: Pierson 4th Edition, 304-320.

Ray-Jones, A. (Ed.) (2000). Sustainable Architecture in Japan: The Green Buildings of Nikken Sekkei. GB: Wiley Academy RIBA. (2003).

Rehman A, and Haider, K (2013). The Impact of Motivation on Learning of Secondary School Students in Karachi: An Analytical Study Educational Research International Educational Research International, Hamdard Institute of Education and Social Sciences, Hamdard University Karachi, Pakistan. ISSN-L: 2307-3713, ISSN: 2307-3721 Vol. 2 No. 2 Vol. 2 No. 2 October October 2013

Samani, S., Noor, P., Zaleha, S., Rasid A (2017). The Effect of Workspaces on Employees Behavior and Outcome Universiti Teknologi Malaysia Saudah Sofian Universiti Teknologi Malaysia Available DOI:10.1002/joe.21779

Shield B. M. and Dockrell J. E., (2003). The Effects of Noise on Children at School: A Review, Journal of Building Acoustics, 10(2), 97–116.

Stone, D. R. and Nielsen, E. (1982). The development of teaching skills. The architectural education curriculum in the Nigerian Schools of Architecture. Educational Psychology: Published 1982.

Urlaub, S, Grun, G Foldbjer, P and Sedbauer, K.P (2016): The Impact of Ventilation and Daylight on Learning in Schools – A Summary of the Actual State of Knowledge. July 2016. Conference: Indoor Air. At: Ghent

Vail, J. (2013). De-professionalizing teachers. Retrieved from http://www.educationshift.net/2013/05/de-professionalizing-teachers.html. on 23/02/2022

Wilson, R. C., Gaff, J.G., Dienst, L. W., and Bavry, J. L. (1975). College Professors and their impact on students. New York, NY: John Wiley.