

Evaluation of the Building Performance and Environmental Sustainability Principles of University Buildings in South-East Nigeria

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Abstract: - The purpose of this paper was to evaluate the extent to which functional and environmental measures/indicators are expressed in the performance of Educational buildings in Universities of South East Nigeria viz: (Nnamdi Azikiwe University Awka, (UNIZIK), Federal University of Owerri, (FUTO), University of Nigeria Nsukka, (UNN), Federal University of Agriculture, UMUDIKE, Alex Ekwueme Federal University Ndufu Alike Ikwo, (AE FUNAI) and recommend measures for improved understanding and practice. Literature review was used to provide a clear understanding of the constructs of functionality and environmental performance in buildings. A questionnaire relating to the diverse contents of these constructs was developed and administered to a convenient sample of staff and students of some Federal universities under investigation. Data generated from the questionnaire were analysed using tables. The study suggests that majority of the respondents (staff and students) were generally displeased with the functional and environmental performance of their building facilities. Information about the design and use of specific buildings were inaccurate and therefore not usually identified in the institutions studied. The functionality and environmental concerns of most of the building spaces such as classrooms, offices and residential accommodations were found to be poor. Hence, the interaction between users and building spaces did not add value to learning and working experiences. The findings point to the conclusion that functional efficiency and environmental performance goals seem not have been explicitly expressed in the design of most buildings investigated. The study points to the need for designers and facilities managers in these institutions to acquire skills on critical aspects of building performance evaluation, particularly, the recognition of environmental and functional concerns/indicators as means of meeting the increasing demand for higher quality by stakeholders in the education sector.

Key Words: — *Building, Environmental, Evaluation, Performance, Sustainability.*

I. INTRODUCTION

Buildings are expected to function effectively throughout their expected life span. Precisely, a building must function to accommodate the activities for which it is built, and provides comfortable indoor and outdoor climates to its occupants (Ogunoh 2014). Educational buildings are designed and built to meet specific or group of needs already determined to a large extent before implementation. Educational buildings are buildings that are designed to accommodate activities that tend

to educate students from various levels education. Bayraktar (2013) asserted that educational spaces accommodate activities such as studying maps, reading, writing, and drawing as well as monitor display. The quality of indoor environment directly affects the health and performance of mental concentration that is required for the activities made by students. Sustainable building practices provide optimally safe, healthy, comfortable, and productive learning environments for students and pleasant working environments for faculty and staff. If students are uncomfortable or distracted by poor lighting, heating, cooling and ventilation noise, their ability to learn will suffer. This can only be solved by providing a safe, healthy, comfortable environment for students, teachers, and staff will benefit student performance (Stephen and Shana, 2013).

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Okolie and Ogunoh (2014) observed that Universities in Nigeria have recorded an unprecedented increase in students' population that poses an incredible challenge to the universities in terms of building facilities, funding and environmental concerns. To deal with this challenge, the universities must not only rely on the procurement of new buildings, they must also be concerned with improving the functional and environmental performance of existing buildings to maximize the return on investment in both facilities and people.

The evaluation of environmental and functional performance of educational buildings ensures that buildings meet the infrastructural challenges of educational institutions by supporting it as an enabler. It also ensures that the effectiveness of buildings is maximized not just in terms of occupancy costs but also with respect to user satisfaction.

II. LITERATURE REVIEW

Learning and other academic activities take place in an indoor environment. Building services (such as lighting, air conditioning, etc.) are provided in learning spaces so as to improve comfort, health and safety of the occupants, and enable the learning procedure between the teacher's and the students. Practical evidence from previous studies has shown that the quality of building facilities has a significant influence on staff and students' comfort, satisfaction and the school image (Abisuga, Famakin and Oshodi, 2016).

Also, Simpeh (2013) admits that lighting, ventilation, cleanliness, structural safety, temperature, sound control, fire safety and aesthetics were factors whose failure affects health and safety in an academic environment. Therefore, it is apparent that educational buildings and associated facilities have a significant effect on occupants.

A. Concept of Sustainability and sustainable construction

The ontology of the word 'sustainability' is a Latin word 'Sustinere' which means the ability to sustain, maintain or support something (Bob and Dencsak, 2010). Sustainability covers broad range of complex relationships. These include social, environmental and economic system with diverse multifaceted priorities that must be carefully thought-out (Raslanas *et al.*, 2013). Sustainability means that lifecycle (social, economic and the environment) is the primary criterion guiding the process of creation and management of the built environment (UNEP Report, 2002).

Sustainable construction is a broad and complex concept, which has grown to be one of the major issues in the construction industry. It is a rising concept that aims to incorporate the general principles of sustainability current practice of the construction industry. Omane, (2015) asserted that Sustainable construction is very important so far as the world's population continues to grow. Sustainable construction will create an avenue that will encourage educational buildings to use construction methods to increase economic growth as well as reduce the impact of construction on the environment. This will bring attendant benefits such as comfortable and a much healthy environment. Among the vast social and economic impacts of building, their contributions to environmental problems are also influential. Poorly designed and unethically procured buildings therefore have negative implications on health, welfare, and economic prospect of businesses and communities (Cole, 2007).

According to Akadiri *et.al* (2012), Sustainable building approach is considered as a way for the building industry to move towards achieving sustainable development taking into account environmental, socio and economic issues.

B. Functional and Environmental aspect of a building

According to Okolie and Ogunoh (2013), Functionality is a property given to an object in order to create a practical effect. This vital effect can be defined as space use. An existing building is defined as 'fit for purpose when it answers the question "How well is the building suited for the activities of the user"? The functional elements deals with the fit between the building and its activities. It relates to how well the building directly supports activities within it while being responsive to the specific needs of the organization and its occupants both qualitatively and quantitatively. Functionality of educational buildings relates to space needs and requirements, system performance as well as durability and efficient maintenance of building elements. The key subjects in the evaluation are space design and internal logistics. This implies that the critical indicators in the evaluation process include effective and holistic space management/operations, initial investments in capital, maintenance and repairs, provision of feedback loops between the building brief and completed building, learning spaces, support facilities to accommodate at least 95% of the student enrolment and workspace for staff and school administration(OECD, 2006).

On the other hand, Environmental performance refers to the environmental sustainability of building elements and approaches. It is concerned with the role of buildings and their

impact on the users, the community and the ecological environment. Indicators in this category include monitoring against prescribed sustainability targets at national, state, and project levels. Other issues to be considered include environmental impact, health, safety and security (Okolie, 2013).

Principles of Environmental Design of Buildings:

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The environmental design aspects of buildings tend to improve the indoor environment quality as well as save energy (Anber, 2018). The main concern in today's energy conscious domain is the design of buildings that are environmentally responsible. Okolie and Ogunoh (2013) state that sustainable building designs should demonstrate a commitment to innovation, use of passive design elements and active systems, materials, finishes and selections with the ultimate goal of eliminating any foot print on the environment.

Educational institutions, especially universities, therefore, have responsibilities to provide well-developed and adequate functional educational buildings that will enhance teaching, learning as well as conducive working environment. The success of educational building is assessed by the extent the building is functioning, and how the teachers, students and staff are utilizing the space and the impact on academic activities (Okolie, 2011).

C. The effect of Environmental Design of Educational buildings on students' performance

The process of designing buildings requires meeting some criteria; budget, time schedule, functional requirements, energy codes and safety regulations. The satisfaction of users and their comfort is a crucial matter that should also be

considered in the design process (Anber and Esmail, 2018). He asserted that Passive cooling strategies that achieve ventilation are important as they provide comfortable and healthy educational spaces. Natural ventilation strategies decrease energy consumption and provide spaces with the required amount of fresh air for the satisfaction of the occupants.

Educational buildings strongly emphasize stimulating and adaptable learning environments with spaces that support various styles of teaching and learning. To achieve this, the role of architecture is very crucial. In a recent study of selected educational buildings in Australia, Robinson and Robinson (2009) emphasize the role of architecture in creating a stimulating learning environment and community of excellence. Robinson and Robinson (2009) maintain that delivering a successful educational building entails a close collaborative relationship between the architect and all the key stakeholders from initial briefing through to the project handover.

III. METHODOLOGY

A questionnaire was developed from both primary and secondary data and administered to a convenient sample of about 180 staff and students of some selected universities in South East Nigeria. The questionnaire was designed to obtain representative views of the respondents on the levels of performance and relative impact of each attribute of functional and environmental aspects of buildings within a set of attributes being rated.

Likert scales were provided on a rating scale (1-5) to measure the varying degrees of respondents' opinions about the relative worth of the attributes in the subsets. However, the questions were structured to explore the respondents' reactions to the buildings on campus and further reveal insights about the respondents' wellbeing in the universities' environment.

Out of 180 questionnaires distributed to the respondents, 100 were completed and returned which corresponds to a response rate of about 56 percent. Data obtained from the questionnaires were analysed using tables. The results and interpretations shown in tables are presented as findings in section 4.0. Based on the response rate and findings of the study, the conclusion drawn may be deemed indicative of the level of functional performance and environmental quality of buildings in the study context.

IV. FINDINGS AND DISCUSSIONS

The findings and discussions in this study are shown in Tables 1 to 14.

Table.4.1 Population distribution of questionnaires and percentage response for each institution

Case Organization	No of questionnaires distributed	No of questionnaires received (No of respondents/responses)	Percentage contribution to total responses
University A (UNIZIK)	42	30	30
University B (UNN)	43	26	26
University C (FUTO)	40	20	20
University D (UMUDI KE)	30	14	14
University E (FUNAI)	25	10	10
Total	180	100	100

Table 4.1 reveals that the highest proportion of respondents came from university A. This can be explained by the relatively high students and staff population of the university compared to other universities in the study.

However, there is no doubt that the differences and apathy observed could have resulted from geographical variations in the opinion of respondents about poor and inadequate infrastructural facilities in these institutions. The researcher observed that stakeholders, particularly staff and students show widespread dissatisfaction about inadequate building spaces with most complaints coming from university E. The low response rate from this University (10 Percent) attests to this statement.

Table 4.2: Number of time (in hours) spent in offices

Type of space	Time (Hours)				
	0-2hrs	3-4hrs	5-6hrs	7-8hrs	Unsure Hours
	Ratings (%)				
Office	28	13	11	9	39

Source: Researcher's computation from field survey, 2019

Table 4.2 shows that about 28 percent spend between 0-2 hours; those that spent 3 to 4 hours were about 13 percent and those that spent 5 to 6 hours were 11 percent, and 9 percent spend 7-8 hours. About 39 percent of the respondents were not sure about the number of hours they spend in their offices on a daily basis, this can either be explained by the fact that the staff do not spend quality time in their offices or do not bother about time spent in the offices.

The respondents in these categories are mostly staff who use office spaces to perform their duties and if the offices are not conducive, the lecturers may prefer to be more in the classrooms than their offices. The relatively low number of respondents who spent more hours in their offices indicates an appreciable loss of productivity in the university system. It also points to the conclusion from the interviews that space efficiency is poor and this might be responsible for high level of absenteeism in the offices.

Table.4.3. Number of time (in hours) spent in Lecture/Classroom

Type of space	Time (Hours)				
	0-2hrs	3-4hrs	5-6hrs	7-8hrs	Unsure Hours
	Ratings (%)				
Lecture/classroom	21	18	29	21	11

Source: Researcher's computation from field survey, 2019

From table 4.3, it shows that 21 percent spent between 0 to 2 hours; 18 percent spent 3 to 4 hours; 29 percent spent 5 to 6 hours; 21 percent spent 7-8 hours; 11 percent of the respondents were unsure of the number of hours they spent in classrooms. The conclusion can once again be drawn that most of the respondents (29 percent) spent more time in classes than those who do not. This can be understood because classrooms provide spaces for teaching and learning.

Table.4.4. Number of time (in hours) spent in Laboratory/ Workshop spaces

Type of space	Time (Hours)				
	0-2hrs	3-4hrs	5-6hrs	7-8hrs	Unsure hrs
	Ratings (%)				
Laboratory/workshop	40	14	10	6	30

Source: Researcher’s computation from field survey, 2019

As displayed in table 4.4 above, most of the respondents (40 percent) spent little time (0 to 2 hours) in the laboratories. This is a surprise because laboratories include the computer laboratories where staff and students spend most of their time. The explanation to this may be lack of adequate laboratory facilities. Again, the workshops are usually not used on a regular basis and so the respondents are not likely to spend more time in them or may be that the final year students’ syllabi do not include a lot of laboratory work.

Table.4.5. Number of time (in hours) spent in Libraries

Type of space	Time (Hours)				
	0-2hrs	3-4hrs	5-6hrs	7-8hrs	Unsure Hours
	Ratings (%)				
Libraries	40	14	10	6	30

Source: Researcher’s computation from field survey, 2019

Table 4.5 shows that most respondents (40 percent) spent few hours (0 to 2 hours) in the libraries which could seem slightly odd when you think that most people spend more time in the libraries. This indicates a poor reading culture among the respondents in the universities. Only about 6 percent of the respondents spent more than 7 to 8 hours per week in the libraries. A library that is not properly designed and equipped cannot be conducive for learning. The underutilization of library facilities by the respondents is an indication of the absence of functional library facilities. This state of affairs does not in any way enhance teaching and learning.

Table.4.6. Number of time (in hours) spent in Hostels/Residences

Type of space	Time (Hours)				
	0-2hrs	3-4hrs	5-6hrs	7-8hrs	Unsure hrs
	Ratings (%)				
Hostels/Residences	8	12	10	40	30

Type of space	Ratings (%)				
	0-2hrs	3-4hrs	5-6hrs	7-8hrs	Unsure hrs
	Ratings (%)				
Hostels/Residences	8	12	10	40	30

Source: Researcher’s computation from field survey, 2019

Table 4.6 also indicates that most of the respondents (40 percent) spent most of their time (7 to 8 hours) in their hostels/residences. Only about 8 percent of the respondents spent relatively few hours (0 to 2 hours) in the hostels/residences. This reflects the behaviour of users in the universities as observed by the researcher during the field investigation. Most students and staff quickly return to the hostels/residences when there were no lectures or any social engagements on the campus and most times there were none.

Table.4.7. Number of time (in hours) spent in Spats/Gymnasiums

Type of space	Time (Hours)				
	0-2hrs	3-4hrs	5-6hrs	7-8hrs	Unsure hrs
	Ratings (%)				
Spats/Gymnasiums	28	2	1	0	69

Source: Researcher’s computation from field survey, 2019

This shows that most respondents (69 percent) were unsure about the time they spent in spats and gymnasiums. Only few hours are spent (0 to 2 hours) by about 28 percent of the respondents in these facilities. The rest of the respondents spent little or no time on these facilities. Staff and students need for these facilities are sometimes not met. The few hours spent in these facilities by 28 percent of the respondents can be explained by the fact that most of the universities in the study have space for such facilities but students and some staff do not show interest in making use of them. The inadequate provision of space for spats and gymnasiums in some of the universities shows that the physical well-being of staff and students in the universities are not given enough priority. Physical exercise in an educational environment is very important for effective teaching and learning.

Table.4.8. Number of time (in hours) spent in Auditoriums

Type of space	Time (Hours)				
	0-2hrs	3-4hrs	5-6hrs	7-8hrs	Unsure hrs
	Ratings (%)				
Auditoriums	40	14	10	6	30

Auditoriums	51	13	1	0	34
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Source: Researcher's computation from field survey, 2019

From the table a conclusion can be drawn that more than half (51 percent) of the respondents spent between 0 to 2 hours in auditoriums. Less than half of the respondents share the remaining hours. It can also be observed that a greater percentage (34 percent) of the rest of the respondents were unsure of how much time they spent in auditoriums. The explanations for this are that auditoriums are usually used for large classes and because the respondents were drawn from final year students and staff who seldom use the spaces, the responses may not be a true reflection of the use of these auditoriums. Besides, large classes occur more in lower classes; if the sample size included lower classes (which does not fall into the selection criteria), the situation might have been different.

A. Building spaces and the respondents' learning and working environment

To determine the extent to which the building spaces enhance/make work easy or hinder/make work difficult, the respondents were asked to rate the spaces on a Likert scale (1=Difficult to 5= easier). The scale 3 (unsure) is an undecided or neutral option and in most cases in the subsequent analysis, it was ignored. The responses to the question regarding building spaces are presented and analyzed in Table 4.9.

Table.4.9. Rating of building spaces for respondents' studies/work (in percent)

Type of space	Difficult..... .Easier				
	1	2	3	4	5
	Ratings (%)				
Office	12	22	48	8	6
Classrooms	16	28	32	17	7
Lab/Workshops	20	38	22	10	10
Library	23	28	25	14	10
Hostel/Residence	8	7	25	31	29
Spats/Gym	17	19	58	3	3

Source: Researcher's computation from field survey, 2019

From the answers displayed in Table 4.9, it can be seen that the respondents felt that it was difficult to work or study in the offices (12+22=34 percent), classrooms (44 percent),

laboratories/workshops (20+38=58 percent); libraries (51 percent); respectively. It was also difficult to work/study in spats/gyms (36 percent). According to the respondents, it was more difficult to work in library (highest rating of 23 percent) than other spaces. The respondents also believed that it was easy to work or study in hostels/residences and this was also rated highly (60 percent). This is to show from the respondents' opinion the inadequate and poor space efficiency of buildings in the universities under study.

Aspects of the building environment that contribute to safety (in percent):

On a scale of 1(not significant) to 5 (very significant) the respondents were asked to rate how significant some aspects of a building environment contribute to feeling safe. The responses to this question are tabulated and analyzed as follows:

Table 4.10: Shows that presence of security personnel; both access control and presence of security personnel and lighting make very significant contributions to feeling safe in the building environments.

Although access control to parts of the building was rated highly (42 percent) and considered significant, the highest-rated aspect of the building environment which makes very significant contribution to the respondents' safety was the presence of security personnel in the building.

Table.4.10. Contribution of building aspects to feeling safe by the respondents (%)

Aspects of building	Not significant..... Ver y Significant				
	1	2	3	4	5
	Ratings (%)				
Access control to building	1	4	17	36	42
Presence of security personnel	2	2	18	24	54
Lighting	2	3	13	33	49
Spatial config/relativel y large space	8	14	20	28	30
Access control to parts of building	4	8	20	40	28

Both access control and security personnel	2	2	15	31	50
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Source: Researcher’s computation from field survey, 2019

It is notable that spatial configuration or relatively large space was also rated highly and considered significant by the respondents. The conclusion is that all aspects of the building provided in table 4.10 either make significant or very significant contributions to the respondents’ feelings of safety.

Accessibility to the buildings:

The respondents were asked to rate the accessibility of the buildings on a scale of 1 (not accessible) to 5 (very accessible). The responses are presented and analyzed in table 4.11.

Table.4.11. Rating of building accessibility by the respondents (in percent).

Aspects of building	Not accessible.....Very accessible				
	1	2	3	4	5
	Ratings (in percent)				
Accessibility into and around the building (lifts, maps, way finding, lighting etc.)	40	35	14	6	5

Source: Researcher’s computation from field survey, 2019

In table 4.11, the respondents feel that most of the buildings are not accessible. This means that accessibility into and around the buildings is poor. Accessibility is an important aspect of sustainable building performance and buildings that are not accessible to all users cannot be said to be performing well. The implication of the responses in table 4.11 is that people with disabilities or the physically challenged were not considered in the design of the buildings and therefore excluded from effectively using or operating in them. The respondents/users in this regard need more functional and accessible buildings in the university system.

Cleanliness of the buildings:

Respondents were asked to rate the cleanliness of the buildings on a scale 1 (very dirty) to 5 (very clean) based on the

description given. Answers to the question are presented and analyzed in Table 4.12

Table 4.12: Cleanliness of the buildings (in percent)

Description	Very dirty.....Very clean				
	1	2	3	4	5
	Ratings (in percent)				
How clean is the building?	14	36	28	13	9

Source: Researcher’s computation from field survey, 2019

Table 4.12: Shows that most of the buildings were dirty with 36 percent rating. This implies that most of the respondents feel that the buildings are not clean. The table to some extent explains why most of the respondents spent few hours in the buildings as shown in the table.

Indoor environmental quality of the buildings:

The respondents were asked questions relating to the indoor environmental quality. This is to ascertain whether the buildings are performing to the desired level and address such environmental issues as air quality, temperature, ventilation, room acoustics and lighting. Respondents were required to rate each variable or aspect of the indoor building environment on a Likert scale (1-5) as it affects or applies to them. The responses are presented and analyzed in the following tables:

Table.4.13. Effect of air quality on work performance (in percent)

Aspects of indoor building environment	Not significant.....Significant				
	1	2	3	4	5
	Ratings (%)				
Effect of air quality on your work performance	2	2	8	25	63

Table 4.13 Shows that air quality has very significant effect (63 percent) on the work performance of the respondents. This is not surprising because the quality of air does affect work performance and well-being of individuals bearing in mind that

people spend about 90 percent of their time in closed indoor building environments (Okolie *et al.*, 2011).

Building comfort:

Respondents were asked to rate the comfortability of the indoor building environments to obtain their reactions to the various aspects of the indoor environment. The responses are presented and analyzed in Table 4.14

Table.4.14 Rating of the building comfort by the respondents (in percent)

Aspects of indoor building environment	Uncomfortable.....Comfortable				
	1	2	3	4	5
	Ratings (%)				
Temperature comfort	39	24	16	15	6
Ventilation comfort	36	32	10	13	9
Discussion privacy and distraction from noise	38	32	20	8	2
Visual privacy	26	30	27	12	5
Artificial lighting comfort	15	16	23	16	30
Natural lighting comfort	8	9	25	20	38
Room acoustics	22	23	40	14	1
Colour	17	22	34	22	5

Source: Researcher's computation from field survey, 2019

Table 4.14 shows that the most uncomfortable aspect of the indoor building environment is temperature (39 percent). This is followed by ventilation (36 percent) and discussion privacy and distraction from noise (38 percent). Most of the respondents view natural lighting to be almost comfortable with the highest rating of 38 percent. According to Okolie (2013), design for

ventilation must support day lighting features but this is not reflected in the above situation. The temperature discomfort can be understood because of the tropical weather in the study area. Artificial lighting was rated highly as almost comfortable (30 percent) while visual privacy was also rated badly (30 percent) as almost uncomfortable. Room acoustics is almost poor (23 percent). This means that the sound-carrying ability of the rooms is not acceptable and therefore needs improvement. The respondents' opinion explains why discussion privacy and distraction from noise were rated high and uncomfortable. The general conclusion that can be drawn from Table 4.14 is that none of the aspects of indoor building environment is actually comfortable. This does not encourage effective teaching and learning in the university system.

Concerning the question on colour, it can be seen from the same table that the respondents' opinion about colour is split between almost poor (22 percent) and good (22 percent). Modern universities must design buildings and create spaces that attract students; similar to the way supermarkets attract customers. One of the physical characteristics of a teaching and learning environment is the use of colour. The best use or choice of colours is dependent on age and gender. The youths which constitute a larger proportion of the university community, admire bright and soft colours, particularly the females (Okolie, 2011). It is obvious from the respondents' responses that the building colours in the universities should be made more attractive.

V. SUMMARY AND DISCUSSION

This study arrests the opinions, feelings and experiences of respondents (staff and students) about the performance of existing buildings in the institutions and therefore reveals the functional and environmental inadequacies of building performance in the universities under investigation. Generally, the respondents' experiences and feelings show that interaction between them and building facilities in the universities do not add value to their learning and working experiences. The responses indicate worries concerning such building performance issues as poor space conditions and management, poor accessibility, poor environmental quality in terms of comfort, uncomfortable noise levels, lack of privacy, and poor safety, health and security conditions in the buildings studied.

This study forms the reflect image of the extent to which educational buildings meet the needs of the user and building

performance evaluation practices in the chosen context. The poor performance of building facilities in this study likens with the findings in earlier studies by Buys (2009) which reveals that the performance levels of physical facilities in South African and United Kingdom tertiary institutions were all below benchmark ratings identified in the study. This state of affairs throws up a great challenge to facilities and construction management professionals and re-enforces the need for improved performance of buildings in higher education built asset management.

The key contribution of this paper is the identification of functional and environmental measures as a missing link in the performance of educational buildings; this is a gap between building users and design practices in Universities of South East Nigeria. The consequence here is that facilities managers in these institutions should maintain and implement an effective response instrument from the user to the designer. This will enable the design and building teams address inadequate performance aspects in the future.

VI. CONCLUSION

Buildings in the South-Eastern Universities has been analysed in terms of the functional and environmental concerns. The literatures examined in the study has revealed key functional and environmental issues that must be considered for the effective performance of educational buildings. These include space efficiency/adequate spaces and fittings, adequate day lighting, sustainable methods and materials, enhancement of indoor environmental quality and optimal maintenance practices, protection, conservation of water and energy use.

However, analyses of data in this study showed that building performance in the case organisations did not meet most of the above criteria. Space efficiency in most of the buildings such as classrooms, offices and residential accommodations were found to be poor and from the findings, it was apparent that the interaction between users and building facilities in the universities did not add value to learning and working experiences. Apparent lack of a performance evaluation database and standards for building was observed in the institutions studied. The authors also observed that the level of perception and awareness of evaluation is low and building performance generally seems to be unpredictable in terms of quality standards and user expectations. Furthermore, building performance and environmental sustainability principles evaluation constructs and related concepts are not well

established in the case organisations. The lack of adequate and functional building facilities in the University system constitutes enormous threats to educational effectiveness and system performance. Consequently, the standards and quality of education, to some extent may be compromised.

It is therefore recommended that evaluation of building facilities in terms of functional and environmental performance in Nigerian universities be given significant attention to address the issue of low awareness of the importance of this tool for organisational effectiveness. Facilities managers and other building service consultants should create the awareness by informing top management of the importance of building performance evaluation as a facilities management function, particularly, its role in supporting the core business of the university system and achievement of educational goals.

Evaluation of Building performance should be part of the procurement process. This would enable the design and construction teams to examine or evaluate the extent to which completed buildings meet the performance objectives. It is further recommended that a performance evaluation database for buildings in educational institutions be developed in Nigeria. This would offer information on performance standards and cost of performance evaluation activities thereby helping to improve the usefulness of design and evaluation process. This study will help to determine the design and performance directions in building service delivery.

Nevertheless, the user- need wonder identified in the study forms the starting point for further study in this field of knowledge.

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