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PERFORMANCE ASSESSMENT OF TERTIARY EDUCATION BUILDINGS IN OGUN STATE: CHALLENGES AND PROSPECTS

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ABSTRACT

Tertiary education is an avenue for the expansion and revolution of any nation. Adequate provision for educational buildings and facilities is required because teaching and learning cannot take place in a vacuum. Effectiveness of buildings and infrastructure can have a positive impact on educational goals. This study has examined the challenges and prospects of systematic assessment of building performance of educational buildings in tertiary institutions in Ogun State. Employing a qualitative research approach using content analysis, the study developed a conceptual framework for the relationship between building design features and architectural elements and building performance or effectiveness. Findings from the study enumerated some challenges faced by the tertiary institutions in undertaking BPE. The study concluded that BPE can assist tertiary institutions in ensuring a sustainable built environment. It further assists to provide feedback on environmental issues related to building and inform planning and management through the life cycle of the building. The study recommended that building Performance evaluation (BPE) can be a tool used for formulation of government policies, development of new theories or research tools and dissemination of information on the performance of buildings to relevant stakeholders in tertiary institutions.

Keywords: **Tertiary Education Institutions, Educational Buildings, Performance Elements, Building Performance Evaluation, Sustainable Built Environment**

1.0 INTRODUCTION

Buildings are critical to the operation of tertiary educational institutions on a daily basis (Hassanain, Sanni-Anibire, Mahmoud & Ahmed, 2020). The provision of sustainable and performance-based buildings and facilities for tertiary institutions has become a priority in order to enable functional and productive performances (Khalil & Nawawi, 2008; Olatunji, 2013; Norazman, Nashruddin & Ani, 2020). Tertiary educational institutions must have buildings and environments that add value, improve performance, and provide satisfactory occupancy for the community of users (Amaratunga & Baldry, 2016 and Ibrahim, Osman, Bachok & Mohamed, 2016). For effective operation and productivity, educational buildings must be given the highest priority (Ojogwu & Alutu, 2009; Olatunji, 2013; Mustafa, 2017). The state of buildings and spaces in an educational setting can influence teachers and learners conduct (Olatunji, 2013; Abisuga, Wang & Sunindijo, 2019). Tertiary educational buildings and facilities are high-impact structures whose performance must be prioritized due to the benefits they can provide, such as increased efficiency and productivity, cost effectiveness in terms of planning, design, and management, and, most importantly, meeting users' needs, expectations, and aspirations. Tertiary educational institutions must build appropriately to improve performance and support their core mission of providing qualitative higher education that is globally competitive. Individuals and corporate bodies all over the world have used performance-based approaches to acquire and evaluate their built facilities (Amaratunga & Baldry, 1999; Khalil & Nawawi, 2008; Norazman *et al.*, 2020). Building performance evaluation (BPE) can greatly improve the quality of buildings and facilities in higher education institutions and other learning environments. According to Okolie (2011) and Tookaloo and Smith (2015), the purpose of evaluation of educational buildings is to improve efficiency and productivity. Educational buildings are valuable assets, and the physical aspects of these important buildings must be evaluated from the perspectives of their users in order to determine the extent to which they satisfy intended usage and the degree to which they support the educational process of the institutions. To achieve this goal, educational buildings and facilities should be designed to meet the functional, technical, and behavioral requirements that affect the efficiency and productivity of their occupants. The efficient operation and productivity of educational buildings must be prioritized, as the quality of educational buildings and facilities is important in attracting and retaining students (Hassanain *et al.*, 2020). However, adequate literature is lacking on the importance and appropriate strategies for building performance

evaluat ion necessary to improve the effectiveness of educational buildings for the realisation of educational goals and objectives.

1.1 STATEMENT OF THE RESEARCH PROBLEM

The state of buildings in many tertiary educational institutions is that they are unable to meet the needs and expectations of intended users. Indoor environmental quality issues, poor circulation and accessibility, noise pollution from both humans and vehicular intrusion as a result of uncontrolled physical developments and deviation from the original master plans are common occurrences (Akanmu, Nunayon & Eboson, 2021; Singh & Mishra, 2021; Aliyu & Makun, 2022). As a result of increasing student population, the initial designed capacity of many reading rooms has been exceeded and is overcrowded, making reading rooms uncomfortable for students and staff. It is also clear that many educational buildings lack green features and are not environmentally friendly. Users face challenges as a result of poor design and construction of both internal and external environments (Kulkarni, 2018; Singh & Mishra, 2021). Many complaints from student and staff community are attributed to flaws and shortcomings in the design, construction, and operation of the buildings. Other issues confronting users of educational buildings include insufficient ventilation, poor luminance, poor thermal comfort, poor acoustics and user controls. Other factors include landscaping, topography and landform, accessibility to the physically challenged, parking spaces, security and safety, physical spatial configuration and distribution, visual sensory elements in conjunction with ambient factors (Hohmann, 2006; Sufar, Talib & Hambali, 2012; Ismail & Chi, 2019). In many tertiary educational institutions, development projects are politically influenced and do not follow due process in their procurement. End users such as students and faculty are rarely involved in the design and construction of these educational buildings (Olatunji, 2013). Surprisingly, buildings are not assessed during occupation to evaluate their actual performance after construction. As the entire design and construction processes are done without the involvement of the direct users of the buildings, there is a gap between what the users wanted and what the architects are designing. There are ample evidences that non-functional buildings and facilities has led to unproductivity of learning environments in Nigeria (Ojogwu & Alutu, 2009; Okeke *et al.*, 2016).

1.2 AIM AND OBJECTIVES

The aim of the study is to examine the challenges and prospects of building performance evaluation of educational buildings and facilities for tertiary institutions in Ogun State.

The specific objectives are to:

i. Appraise the goal and objectives of tertiary education in Ogun State
ii. Establish a connection between building performance evaluation and tertiary educational buildings
iii. Develop a conceptual framework for the relationship between building performance elements and performance of educational buildings in the study area

2.0 LITERATURE REVIEW

2.1 Tertiary Education in Ogun State

Tertiary education is an avenue for the expansion and revolution of any nation, and adequate provision for educational buildings and facilities is required because teaching and learning cannot take place in a vacuum (Joel & Ayinla, 2015). Adequate provision of learning materials and infrastructure can have a positive impact on educational goals. The national policy on education (FGN, 2004) has highlighted the fundamental concept of tertiary education in Nigeria. It entailed the acquisition of functional education that enables students key into the strategic goals of sustainable development. Tertiary institutions are expected to focus majorly on pedagogical techniques, research and innovation and vocational and technical education. According to Okolie (2011), the philosophy is based on developing the individual into an effective citizen capable of fully integrating into the Nigerian community.

The National Policy on Education (FGN, 2004) also enumerated the tertiary education goals, which include contributing to national development through higher level relevant manpower training, developing and instilling values for the sustenance of the individual and society and developing an individual's intellectual capacity to understand and appreciate their local and external environment. It included the acquisition of both physical and intellectual skills that will enable individuals to be self-reliant and useful members of society, encouragement of scholarship and national unity and promotion of national and international understanding and interaction. According to Ojogwu and Alutu (2009), and Joel and Ayinla, (2015), knowledge management is critical to rapid technological change and sustainable development. As such, achieving these goals required that the educational environment be given the highest consideration for effective functioning and productivity. Okeke and Osuala (2016) argued that governments should make adequate resources available to make tertiary education available at all levels, and be able to meet the nation's educational manpower and development needs.

2.2 Challenges of Tertiary Education in Ogun State

According to studies, tertiary educational institutions face enormous challenges due to underfunding and inadequate infrastructure, making it impossible for them to fulfill the responsibilities of achieving the previously stated goals (Isa & Yosuff, 2015; Okeke & Osuala, 2016). Over time, stakeholders have expressed growing concern about the quality of education in Nigeria, and that if long standing challenges such as funding, inadequate human and material infrastructures, poor management, and so on are not addressed, the general goals and objectives of national educational policies may not be achieved or thwarted. Some of these challenges are discussed in greater detail below:

2.2.1 Underfunding: Underfunding is a major issue confronting the educational sector. The recent deplorable state of the economy as a result of reduced oil revenues, global pandemics, rising debt profile, and other factors had negatively impacted on the quality of education in Nigeria. Teaching and learning, as well as conducting research, have become nearly impossible in tertiary educational institutions due to reduced funding, and educational buildings and facilities are begging for attention. Education is known to be capital intensive with significant financial investment, and the minimum budgetary allocation for education in a developing country like Nigeria cannot be less than 26% (Okeke & Osuala, 2016). However, Nigeria has not surpassed 10% fiscal quota to education, and successive government funding has not been guided at any time by any criteria related to strategic plans or priorities, nor for purposes related to a public good (Okolie, 2011). Allocations to all levels of education, including tertiary institutions, have been grossly inadequate in the face of increasing student enrolment, and it is clear that more resources are required by the sector to maintain the required quality of education. It is obvious that funding constraints may not result in the overall development of education in Nigeria. The impact of dwindling funding can be seen in a variety of curtailment strategies that are not adding value to educational quality.

2.2.2 Inadequate buildings and facilities: Higher education is critical to the progress and achievement of any nation, emphasizing the importance of providing adequate educational buildings and facilities (Isa & Yosuff, 2015; Altbach, Reisberg & Rumbley, 2019). The essence of teaching and learning is to effect desired change in learners and to enable learners to engage in critical thinking. The processes of teaching and learning cannot take place in a poor environment but rather in an appropriate learning environment. According to research, the conditions of learning environments can influence the performance of teachers and students in

terms of educational outcomes (Olatunji, 2013; Isa & Yosuff, 2015; Ibrahim *et al.*, 2016). They also stated that if educational buildings and facilities are inadequately provided and dysfunctional, learning processes may be hampered, as well as the efficiency and productivity of the institutions.

Educational facilities include a variety of structures for a different purposes and activities, as well as areas for sports and recreation, landscaping, farms, and gardens. Others include transportation vehicles, information and communication equipment, specialized equipment and facilities, and so on. According to studies, inadequate buildings and facilities can have a negative impact on the output of teachers and students in tertiary educational institutions. Students and staff have complained about issues such as poor performance and functional deficiencies, poor accessibility, poor space distribution and configuration, uncleanliness, insufficient ventilation and day lighting, a poor indoor thermal environment, a lack of security and safety provisions, and so on. According to Okolie (2011), the state of physical and nonphysical facilities in Nigerian tertiary educational institutions poses a significant threat to the achievement of national educational goals and objectives.

2.2.3 Unfavourable working conditions: The working environment in Nigerian tertiary educational institutions has been so deplorable over the years that improved performance may be impossible. The working environment has been described as inefficient, unproductive, unappealing and unhealthy with decaying and dilapidating structures (Ojogwu & Alutu, 2009; Iruonagbe, Imhonopi & Egharevba, 2015). This situation emphasizes the urgent need to conduct building and facility performance evaluation as the work environment provided by these facilities cannot respond to the challenges of varying needs, preferences and knowledge demand of prospective students, teaching and administrative staff. It may be difficult to establish a sustainable tertiary education system if the current working environment is not improved.

2.2.4 Increase in students' population: Recently, the growing desire and aspiration for tertiary education has had an impact on the quality of tertiary education in Nigeria. This has resulted in the rapid expansion and proliferation of tertiary educational institutions without regard for accreditation from relevant government agencies. Furthermore, the student population had grown beyond the number of students who could be admitted to various programs as specified by statutory bodies. This is an unethical approach in educational institutions. Stakeholders agreed that facilities are already overburdened and cannot support and facilitate effective and efficient academic performance, nor can they positively respond to

the knowledge demands of facility users. Quality education will ensure that students develop better values for themselves and their country (Okeke & 0suala, 2016).

2.2.5 Management and Leadership: Tertiary educational institutions, now more than ever, require proactive and quality management styles capable of addressing some of these challenges in novel ways (Okolie, 2011). This includes administrative structures that can aid in the positive resolution of a wide range of institutional problems. Okolie (2011) agreed that many tertiary educational institution management personnel lack the necessary skills and capabilities to provide effective leadership, as well as the ability to supervise and monitor institutional programs and activities. Academic and non-academic engagements have both been treated casually by educational staff. As a result, academic and research output has been very low, and many scholars have been unable to obtain research grants. Staff welfare and other entitlements or benefits are being neglected and unattended to by tertiary educational institution managements, and many academic and non-academic staff members are willing to seek greener pastures elsewhere, according to evidence. This situation has reduced staff retention and overall commitment in the institutions. The lack of professionalism in tertiary education administration has hampered the development of tertiary education in Nigeria.

2.3 Tertiary Education Institutions in Ogun State

Ogun State, which was early influenced by missionary activities, is historically one of Nigeria's most educationally advanced states. Between 1900 and 1914, the number of her primary schools increased from 24 to 90. Her educational policy is in conformity with the Nigerian National Policy on Education. The policy's main goal is to provide free and high-quality education to all in the state. Tertiary education in Ogun State aims to develop the high-level manpower required for the state's overall social and economic development. There are currently 29 government-accredited tertiary educational institutions in the state. Ogun State is home to fourteen universities, including a federal university of agriculture, two state-owned universities, and eleven privately owned universities as shown in table 2.1. Ogun State has ten polytechnics. One federal polytechnic, six state-owned polytechnics, and three privately owned polytechnics spread throughout the state as shown in table 2.2. As shown in Table 2.3, there is one federal college of education, one state owned college of education, and three privately owned colleges of education.

Table 2. 1: List of Universities in Ogun State

S/N	NAME OF UNIVERISTY	LOCATION	OWNERSHIP
1.	Federal University of Agriculture	Abeokuta	FEDERAL
2.	Olabisi Onabanjo University	Ago Iwoye	STATE
3.	Tai Solarin University of Education	Ijebu Ode	
4.	Bells University of Technology	Sango-Ota.	PRIVATE
5.	Babcock University	Ilishan, Remo	
6.	McPherson University	Lagos/Ibadan Expressway	
7.	Crescent University	Adeun, Abeokuta	
8.	Covenant University Idiroko	Sango-Ota.	
9.	Crawford University Faith City	Igbesa	
10.	Chrisland University	Obalende, Abeokuta	
11.	Mountain Top University	Lagos/Ibadan Express way	
12.	Christopher University	Mowe	
13.	Southwestern University	SaOkunowa	
14.	Hallmark University	Ijebu-Itele	

Source: aboutnigeria (2023)

Table 2. 2: List of Polytechnics in Ogun State

S/N	NAME OF POLYTECHNIC	LOCATION	OWNERSHIP
1.	Federal Polytechnic	Ilaro	FEDERAL
2.	Moshood Abiola Polytechnic	Abeokuta	STATE
3.	Ogun State Institute of Technology	Igbesa	
4.	Gateway ICT Polytechnic	Saapade	
5.	D.S Adegbenro ICT Polytechnic	Itori	
6.	Ogun State College of Health Technology	Ilese, Ijebu	
7.	Gateway Industrial and Petro-Gas Institute	Oni, Waterside	
8.	Abraham Adesanya Polytechnic	Ijebu Igbo	PRIVATE
9.	Owu College of Management Technology	Wasimi, Ewekoro	
10	Allover Central Polytechnic	Sango Ota	

Source: aboutnigeria (2023)

Table 2. 3: List of Colleges of Education in Ogun State

S/N	NAME OF COLLEGE	LOCATION	OWNERSHIP
1.	Federal College of Education	Osiele	FEDERAL
2.	Tai Solarin College of Education	Omu Ijebu	STATE
3.	Yewa Central College of Education	Rounder, Abeokuta	PRIVATE
4.	Awori District College of Education	Konifewo, Ota	
5.	Piaget College of Education	Abeokuta	

Source: aboutnigeria (2023

The federal institutions are significantly developed, whereas the state institutions are in various stages of development. The private institutions are also at various stages of development. Apart from a few that are affiliated with long-established missionary and religious organizations, the majority of them have only been operating from temporary locations after acquiring large parcels of land for permanent operations. Ogun State and its citizens have been blessed with a large number of tertiary educational institutions. However, the issue is the quality and adequacy of educational buildings and facilities, as well as the relevance of graduates to the needs of the economy. In general, inadequate and poor educational infrastructure have severe impact on the people. Inadequate infrastructure can lead to overcrowded classrooms, making it difficult for teachers to teach. Inadequate facilities and infrastructure also mean that many students will be excluded from school because there is not enough room for them.

2.4 BPE and Tertiary Education Buildings

Building performance evaluation is the procedure of methodically comparing the current performance of a building to explicitly planned, designed and documented performance criteria (Preiser and Vischer, 2005). Evaluation entails quantifying the worth of something in order to improve its effectiveness. It is the procedural validation of a building's value, worth, and significance using a set of standards. Evaluation is a practical activity concerned with making judgement about how effective or otherwise of an existing building in use (Francescato, Weidemann, & Anderson, 1989). Performance evaluation contributes immensely to improving the quality of buildings and building project delivery process.

For educational buildings, there is a significant link between building performance evaluation (BPE) and tertiary institutions. BPE provides a platform where various aspects of performance can be measured such as indoor environmental quality, energy efficiency, user satisfaction,

functionality and usability and so on. BPE also assists to optimise the performance of tertiary educational buildings by contributing to their operational effectiveness, comfort, satisfaction and wellbeing of occupants and sustainability of the built environment.

Building performance evaluation helps to determine whether the users are satisfied with the overall performance. According to Ibem *et al.* (2013), the primary purpose of building performance evaluation is to seek to improve the quality of design, construction and management of buildings and by extension promoting a sustainable built environment. It would also help in the understanding of how occupants feel about their buildings by providing important information on users' needs, preferences and satisfaction with the building. Furthermore, according to Olatunji (2013), "educational buildings, facilities and their environment must be accorded with the highest premium for effective functioning and productivity". "A completed and designed educational building should be able to perform its function in the manner that will ensure satisfaction for its occupants and ensure effective function at all times" (Nawawi & Khalil, 2008). Mustafa (2017) established that architects rarely obtain useful feedback regarding the effectiveness of completed buildings except from satisfied or dissatisfied users. Appraisals conducted from the view point of the actual building users is very important for improving building quality and overall performance (Ilesanmi, 2010).

Norazman *et al.* (2020) in his study on school buildings in Malaysia agreed that BPEs are beneficial to improve the quality of life, comfort and productivity of school buildings and that its application in school buildings will enhance the teaching and learning environment to be more comprehensive. Norazman *et al.* (2020) also believed that building performance is essential for optimization in school design and that the relationship between tertiary educational building performance and academic achievement is very significant to ensure occupants satisfaction. This may further assist in identifying the criteria to be implemented for building performance evaluation in current practices. Amaratunga and Baldry (2016) agreed that performance evaluation will play an ever-increasing role in building design as external and internal factors place more demands upon the facility. They further argued that for institutions that can be able to utilise their funding judiciously, it is hoped that the collection, interpretation and analysis of information about performance measures of facilities will provide the key to better planning and design in the future.

Sanoff (2011) argued that the "design of modern educational buildings should strongly emphasize stimulating and adaptable learning environments with spaces that support various styles of teaching and learning". That means educational buildings should be adaptive and

flexible to accommodate required functional change within the building envelope and its environment. Tookaloo and Smith (2015) have also argued that "it is in response to many problems experienced in building performance with significant emphasis on the building users' perspectives within the educational environment that some major regulations were introduced as the aftermath of conducting POEs. They posited that, "BPE is most concerned with the degree to which the building supports the goals of the educational process by measuring the physical environment's educational capability". Tookaloo and Smith (2005) added that "educational adequacy is the degree to which the school facilities effectively support educational goals and activities based on user needs, experience and value". The outcome of BPEs will assist in enhancing the teaching and learning environment to be more comprehensive (Norazman *et al*., 2020; Ejoor *et al*., 2021).

Currently, due to high operating costs, increasing competition and rising user expectations, academic institutions, must necessarily maximize funding on buildings. Amaratunga and Baldry (2000), Sanoff (2000; 2011) and, Olatunji (2013) agreed that "educational buildings and facilitates through the conduct of performance evaluation will fast track the realization of this objective". According to Mayaki (2005), "ability of the building to successfully accomplish the purpose for which it is designed makes it successful". For educational buildings, the results from the evaluation will help to identify a measurable link between building quality and educational outcomes. According to Nawawi and Khalil (2008), "a performance evaluation study conducted at Marlborough School Technology Centre in New Zealand found that the facility has successfully supported students' learning and produced key recommendations for the future". The recommendations from the study was to identify design modifications to improve noise control and to change the teaching culture to suit technology curriculum. The outcome of that evaluation will help to improve building performance when similar buildings are to be developed.

Amaratunga and Baldry (2000) further established that the assessment of performance of buildings and facilities of higher educational institutions delivering higher educational services has become a matter of particular interest to governments and operators seeking to increase the effectiveness of educational provision in order to maximize value for money.

For higher educational institutions, Amaratunga and Baldry (2000) agreed that, "performance evaluation will play an ever-increasing role in building design in the face of more demands from internal and external factors". More so, as the future for their buildings and facilities is not totally predictable due to increasing rate of change, primarily through technological and economic influences. Tookaloo and Smith (2015) agreed that "one of the purposes of POE in

higher educational institutions is to determine whether facilities management is meeting the goals of the educational vision of the university". BPEs will ensure the harnessing and reviewing of occupant satisfaction, space utilization and resource consumption of completed buildings and facilities after occupation to identify key occupancy and building performance issues. BPEs can also be used to analyze development trends over time, and to identify ways of improving both processes and outcomes. Implementing evaluation processes increases accountability for facilities managers, standardizes best practices and helps tertiary educational institutions to improve existing buildings and to explore opportunities for future project enhancement.

Amaratunga and Baldry (2000) believed that "performance evaluation provides a mechanism to learn from the past and evaluate contemporary trends in the use of educational buildings and that, the analysis of information about performance measures of facilities will provide the key to better planning and design for the future such that, higher educational institutions can responsibly utilize their resources'. BPE is not only applicable to constructed buildings but, can also be applied to new buildings as well as to ascertain total building delivery cycle (Re Cecconi, Moretti & Claudio Dejaco, 2019). BPE tools can also be used to improve building design quality, user satisfaction and maximize profit in tertiary educational institutions (Rosi & Behzad, 2017). Essentially, BPEs are carried out by tertiary educational institutions to remain competitive and cost effective. For educational institutions that are responsible for construction and management of their assets through public funding, performance evaluation can be used to ascertain outcome of constructing a facility and also to establish accountability of the services provided towards ensuring satisfaction of users.

3.0 METHODOLOGY

3.1 Conceptual Framework for Building Performance Evaluation (BPE)

Based on extensive literature review, this study has developed a building performance evaluation conceptual framework as shown in figure 3.1. The framework established a direct influence of the respective performance elements (functional, technical and behavioural) on the effectiveness of the performance of educational buildings in the study area. Furthermore, there is established an indirect influence of the moderating factor (socio-economic characteristics of users i.e. age, gender, marital status, educational qualifications etc.) on the effectiveness of the performance of educational buildings. Meanwhile, the moderating factors such as age, gender, marital status, educational qualifications etc. could vary the effect of the

performance elements on the effectiveness of the buildings. For instance, the age and gender categories of the users, young and old could influence their preferences and perception on the technical, functional and behavioural performances as characterised by the building.

A previous study by (Nawawi & Khalil, 2008), agreed that occupants' satisfaction with the building elements highly correlates with the performance of public buildings". That is to say, satisfaction has a direct relationship with the overall performance of buildings in meeting the needs and expectations of users (Rosi & Behzad, 2017). As such, satisfaction with the behavioural, technical and functional elements or aspects of building (Khair *et al.*, 2012), as expressed in the design objectives and user requirements is a function of the level of effectiveness of the buildings. Satisfaction of users is measured based on user requirement that are related to the building performance attributes (Liu, 1999; Ilesanmi, 2010; Ibem *et al.*, 2013; Gopikrishnan & Topkar, 2017; Seshadhri & Paul, 2018). This study has adopted the investigative approach in the assessment framework and integrated building performance attributes for educational buildings in the study area. Performance evaluation of educational buildings can be considered under the three classifications of performance elements: behavioural, technical and functional elements of performance (Dursun & Ozsoy, 2008; Shika *et al.*, 2013; Shehadhri, 2018; Ejoor *et al.*, 2021).

3.2 Technical Performance Element

The technical performance addresses survival attributes such as security, structural adequacy, cleanliness and sanitation, fire safety; that is fire resistance of the major structural elements of a building, fire extinguishment and containment, flame spread, smoke generation, ease of egress in case of fire, ventilation and health of occupants. Technical performance addresses issues pertaining to indoor environmental qualities (IEQ) elements such as, comfort health, and productivity of occupants (Choi & Moon, 2017; Mustafa, 2017). Indoor environmental quality elements include thermal comfort consideration (HVAC system and natural ventilation system), indoor air quality, visual comfort (the quantity and quality of lighting, glare, control of shadows, and adequate luminance. Acoustic comfort conditions in a building that relates primarily to providing conditions in a building that provides for a clear communication of speech between users and noise control through walls, floors, windows, doors and other openings that ensure adequate reduction of sound from other activity areas.

3.3 Functional Performance Element

The functional performance deal with the functionality and efficiency level of the design and architectural features in the academic educational building. Functional elements include accessibility, size or spatial capacity for activities, arrangement of spaces, order of spaces and spatial relations, adequacy of necessary facilities. Other elements include utilities, telecommunications, responsiveness to change overture and efficiency of communication and circulation. Functional performance has to do with elements that are directly connected to the activities within a building. They are expected to be in conformity to the specific needs and user requirements of the building occupants. Mustafa (2017) and Preiser *et al*. (2015), established that the direct connection between a building's functional aspects and the needs of its users is an important reason for its relevance in post occupancy evaluation studies.

3.4 Behavioural Performance Element

The behavioural performance aspect attempts to create a connection between occupant's activities and the physical environment. Scholars believed that people and human settings are inseparable components and that, settings can determine the display of satisfaction or dissatisfaction behaviour on the part of users of buildings or services (Bitner, 1990; Azila-Gbettor *et al,* 2013). Evaluation is based on individuals' expressions in relation to comfort and aesthetic issue. It is also referred to as social interaction that are subjective and reflect individual tendencies (Dursun & Ozsoy, 2008). Mustafa (2017) described it to include the effect of area size and number of persons that share a space upon a building occupant and the effect of functional distance between spaces upon the frequency of use. Behavioural performance also includes factors of occupants' comfort and satisfaction as affected by spatial configuration of circulation routes and impact on social interaction and features that affect the building's image and outlook (Preiser *et al*., 2015). Behavioural aspects can have much influence on user satisfaction with building performance and perceived service quality.

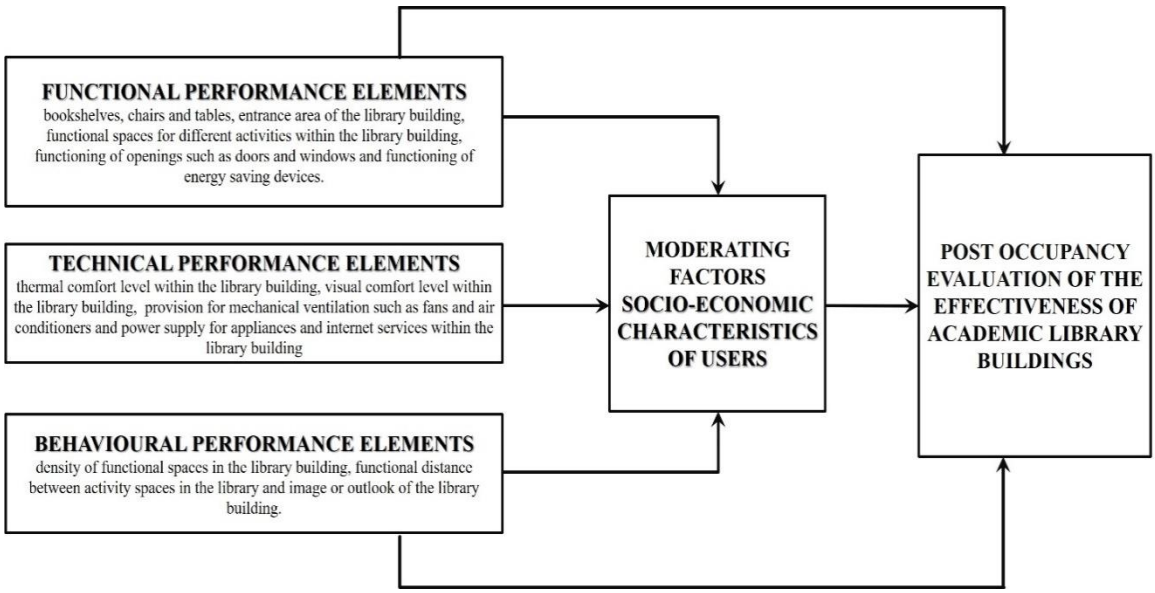


Figure 3.1: Conceptual Framework for performance evaluation of buildings in Tertiary Institutions in Ogun State, Nigeria

Sources: Researchers field work, 2023

4.0 FINDINGS AND DISCUSSION OF FINDINGS

Findings from the study has established a direct influence of the respective performance elements (functional, technical and behavioural) on the effectiveness of the performance of tertiary educational buildings in the study area. Furthermore, there is established an indirect influence of the moderating factor (socio-economic characteristics of users i.e. age, gender, marital status, educational qualifications etc.) on the effectiveness of the performance of educational buildings. Meanwhile, the moderating factors such as age, gender, marital status, educational qualifications etc. could vary the effect of the performance elements on the effectiveness of educational buildings. For instance, the age and gender categories of users of educational buildings either young or old could influence their preferences and perception on the functional, technical and behavioural performances as characterised by the educational buildings. Findings have further suggested that it is very crucial to factor users' perspectives into the planning and design processes in order to create a positive attitude towards the educational buildings in the study area.

Also, with regards to the health condition of users, findings have supported the positive relationship between the indoor environmental quality of educational buildings and the health of users in terms of impacts on productivity and efficiency (Akanmu *et al*., 2021). Also, findings have shown a paucity of literature related to users with disabilities and that most educational buildings in the study area were designed not considering the disabled. This may

probably be due to inadequate knowledge of the needs of the few disabled who use tertiary educational buildings (Ekwelem, 2013).

Globally, it is expected that appropriate measures be made on equal basis to provide access to tertiary educational buildings by all categories of users. Empirical studies have shown that the value of tertiary educational buildings also depend on user satisfaction regarding their effectiveness including their physical environment (Mustafa, 2017).

5.0 CONCLUSIONS

Performance evaluation contributes immensely to improving the quality of buildings and building project delivery process. Apart from ensuring a sustainable environment, it provides feedback on environmental issues related to building and inform planning and management through the life cycle of the building. Building Performance evaluation (BPE) is a tool used for formulation of government policies, development of new theories or research tools and dissemination of information on the performance of buildings to relevant stakeholders (Ibem *et al*., 2013).

6.0 RECOMMENDATIONS

Sequel to the findings of this research, the following recommendations have been brought forward:

i. It is recommended that adequate consideration be given to those common indicators of technical, functional and behavioural performances that have contributions to effectiveness as feedforward in improving existing buildings and into the production process of new educational buildings for the achievement of sustainable learning environment.
ii. There should be significant improvement in the planning, designing and management of educational buildings at the federal, state and privately owned tertiary educational institutions.
iii. Adequate consideration and priority should be given to accommodating the physically challenged through universal design and inclusiveness in the design, planning and construction of educational buildings in all tertiary institutions in Nigeria.
iv. All regulatory agencies of tertiary education under the Federal Ministry of Education in Nigeria and the physical planning departments of respective tertiary educational institutions should ensure conformance to planning and designing standards and requirements of their buildings and facilities for the achievement of sustainable learning environment.

v. Tertiary educational institutions in Nigeria should commence regular performance evaluation of their educational buildings using POE in particular, by integrating users' perspectives, insights and opinions in order to achieve best quality in building performance management. Moreover, by evaluating the feedback from users, it will ensure that the resources in terms of time and money spent in their management will not be a waste and planning departments are able to make inputs for programming for the future.

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