International Journal of Innovative Engineering Research and Development
IJIERD

PERFORMANCE ASSESSMENT OF ACADEMIC LIBRARY BUILDINGS IN SELECTED PUBLIC TERTIARY INSTITUTIONS IN ABEOKUTA METROPOLIS

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ABSTRACT

Academic library buildings are key component of tertiary education. They are provided for the purposes of supporting the academic curriculum of their parent institutions. Many studies on academic libraries have focused on the resources and services provided however, there is a dearth of research on users preferences regarding the physical design features and architectural elements of academic library buildings. The aim of the study is to examine the effectiveness of the performance of academic library buildings in Abeokuta metropolis with a view to improve their level of user satisfaction. This study, being a descriptive survey relied on a questionnaire survey to obtain data on users preferences regarding the specific design features and architectural elements of the academic library buildings. Purposive sampling was used to select the tertiary institutions that were accredited by government with purpose-built library buildings. Accidental sampling was used to select respondents at each centre. Relative effectiveness index (REI) was used to rank the effectiveness levels of the elements of performance. A response rate of 92.89% was obtained from 239 respondents. Findings revealed factors of technical, functional and behavioural performances that have statistically significant contribution to effectiveness of library buildings. The study recommended that adequate considerations be given to these factors in the planning, designing and management of academic library buildings.

Keywords: Academic Library Buildings, Physical Environment, Effectiveness, Performance Elements and User Satisfaction

INTRODUCTION

Academic library buildings have become so important to the operation of tertiary educational institutions on a daily basis (Amaratunga & Baldry, 2016; Hassanain & Ibrahim, 2020). Globally, library building is changing in its form, function and appearance. This is in response to the changing needs of its users and the modern trend. Academic libraries need to ensure their relevance in terms physical spaces to avoid obsolescence and redundancy because of the digital revolution. Academic library buildings are valuable assets and the evaluation of their physical aspects is important. From the perspectives of their users, library buildings must be constructed with respect to design mandate or objectives to establish the extent to which they satisfy intended usage and the degree to which they support the goal of the educational process of the institutions. Academic library buildings are key component of tertiary education. They are provided for the purposes of supporting the academic curriculum of their parent institutions. Many studies on academic libraries have focused on the resources and services provided. However, there is a dearth of research on users' preferences regarding the physical design features and architectural elements of academic library buildings. Scholarly literature is expanding regarding the connection that existed between the physical environment and humans. It is important to understand users preferences in the physical environmental design of academic library buildings in order to positively influence perception and behavior within the library space. A critical success factor area which cannot be overlooked and must be made satisfactory in order to ensure competitive performance for the tertiary educational institutions is the effectiveness of their academic library buildings. The academic library building is the heart of a university both as a pivot of learning and research (Ugwuanyi *et al.*, 2011) occupying a central location on campus signifying it's centrality to the institution's mission of teaching and learning and facilitating students movement to other activity spaces such as classrooms, laboratories and other extracurricular and social activity areas (Cunningham and Tabur, 2012). The primary focus of an academic library building should be the satisfaction of the community of users (Vischer, 2008; Ibem *et al*, 2013; Seshadhri and Paul, 2018). Scholars have argued that if the academic library environment is made welcoming and desirable and user satisfaction and comfort is highly prioritized, users will still visit the library.

STATEMENT OF THE RESEARCH PROBLEM

The effectiveness of performance of the academic library buildings is crucial and cannot be compromised in order to achieve educational productivity. Educational buildings and facilities that are poorly planned and designed may impact negatively on educational outcomes (Isa & Yosuff, 2015). Many library buildings in tertiary institutions are poorly factored into physical planning decisions and are confronted with problems of overcrowding and indoor environmental quality (Akanmu *et al.*, 2021). Many library buildings are yet to respond to dictates of digital revolution and new planning principles required to meet the changing needs of future users (Head, 2016).

Designers and other professionals are expected to have adequate knowledge of both users' needs and expectations and standards and specifications established by governments. However, studies on library buildings have shown that knowledge is lacking on the design standards and specifications employed sometimes do not align with the changing needs and expectations of users. Presently, no existing study has examined the effectiveness of academic library buildings from the perspective of the users by associating satisfaction with the technical, functional and behavioural performance elements of the library buildings in tertiary educational institutions in the study area.

AIM AND OBJECTIVES

The aim of the research is to examine the effectiveness of academic library buildings in tertiary institutions in Abeokuta, Ogun state with a view to provide feedback for stakeholders for future improvements.

The specific objectives are to:

i. evaluate the effectiveness of the technical element of performance of the academic library buildings in the study area;
ii. assess the effectiveness of the functional element of performance of the academic library buildings in the study area;
iii. appraise the effectiveness of the behavioural element of performance of the academic library buildings in the study area.

LITERATURE REVIEW

Performance Evaluation of Buildings

In building performance evaluation, the elements of building performance are measured, evaluated and used to improve the building (Mahgoub, 2011). In the evaluation process, the user factor is important in identifying the successes and failures in performances. Decisions taken by designers during designing are assessed to determine whether they provide the performances needed by the users of the building (Sharpe, 2013). Designers are supposed to have adequate knowledge of both users' needs and expectations and standards and specifications established by governments. Previous studies have shown that design standards and specifications sometimes do not align with the changing needs and expectations of users, and they are not satisfied with the overall performance of their buildings (Ibem *et al*, 2014). Evaluation by the actual users of a building is so important for improving design quality, construction and management (Ilesanmi, 2010).

Post occupancy evaluation and building performance

User evaluation has become a very valuable tool in assessing building performance and understanding users' views and attitudes towards the effectiveness of their buildings in use or other occupied designed spaces. These views and attitudes are important in investigating building performance and the extent to which needs and expectations are met (Mustafa, 2017).

From thorough literature review, (Amaratunga & Baldry, 2016; Ejoor *et al*., 2021), three major categories of performance elements relevant to the academic library buildings have been identified. These are technical, functional and behavioural elements. An academic library may experience problems of deficiencies and ineffectiveness during occupation which are related to these key performance elements. Technical performance elements address survival attributes such as security, structural adequacy, cleanliness and hygiene and fire safety. Others include indoor air quality, visual comfort, acoustic comfort etc. (Mustafa, 2017; Hassanain & Ibrahim, 2020).

Technical performance deals with the functionality and efficiency of the architectural elements and design features. This relates to spatial interaction and adequacy of facilities, utilities, telecommunications and other things having to do with activities within the building (Hassanain & Ibrahim, 2020). Behavioural performance aspects creates a connection between occupants activities and the physical environment (Abisuga *et al*., 2019). Humans and physical environment are inseparable and the physical setting can exhibit either satisfaction or dissatisfaction behaviour on the part of building users (Azila-Gbettor, 2013).

POE literature has established that the performance of a building can be evaluated based on performance attributes related to the user requirements in meeting the needs and expectations of the users (Nawawi & Khalil, 2008; Ilesanmi, 2012; Ibem *et al.*, 2013; Gopikrishnan and Topkar, 2014; Seshadhri & Paul, 2018; Abisogun *et al*., 2019). Some earlier studies of academic library buildings have only considered and presented findings of an indicative assessment on building performance based both technical and functional performance elements and left out the behavioural factor (Shika *et al*.,2013). This approach has been criticized as not being comprehensive and systematic enough to enrich the literature on the applicability of post occupancy evaluation for tertiary educational buildings in general and an academic library building in particular (Abisuga *et al*., 2019).

METHODOLOGY

Research design

Using the quantitative approach, the study involved the collection of primary data from the population of users through structured and close ended questionnaires. Purposive sampling was used to select the sample of tertiary educational institutions for questionnaire survey while the

convenience sampling was adopted in selecting the required library users from the population due to the unconvinced and irregular movement of users.

The study population

The target population for the study comprises of publicly owned tertiary institutions in the Abeokuta metropolis. These included tertiary institutions that were accredited by the government under the Federal ministry of education in Nigeria. Also, the availability of purpose-built academic library buildings is a criteria for the selection. Table 1 presents the list of selected tertiary institutions for the study.

Table 1: Selected Academic library buildings in tertiary institutions in Abeokuta

S/N	Institutions	Category	No.	Effective capacity of Reading Room	Sample Size
1.	**University**	Federal	1	552	85
2.	**Polytechnic**	State	1	378	79
3.	**College of Education**	Federal	1	300	75
Total				**1230**	**239**

Source: Researcher's computation, 2023

Sampling size

Altogether, a sum of 1230 reading room capacity were recorded for the institutions. a sample size from the sum total of (1230) was determined using the Slovin's formula (Mustafa, 2017) as seen in equation the equation.

Sample Size (n) $= \frac{n=N/}{(1+N(e)2)}$ ---------- Eq. (i)

Where n= desired sample size

N= Effective seating capacity

e = allowable sample error, considered to be 1.0, indicating a 90% confidence level.

By implication, for each library building, the effective seating capacity is (N). The sample error (e) was considered at 1.0 indicating a 90% confidence level that the sample size accurately represents the population. Therefore, a total of 239 users are were administered with questionnaires out of the **1230** total seating capacity. This represents 19.43% as indicated by Slovin's sample size formula (Mustafa, 2017).

Data analysis

The descriptive statistical tools were deployed to measure the effectiveness of the building performance elements of the sampled library buildings. The questionnaire consisted of 5 sections with close ended questions related to the technical, functional and behavioural performance elements. The five points ordinal scale was used to measure the level of effectiveness of the buildings. Measurement scale ranges from the least weighted option (1- very ineffective) to the highest assigned weighted option (5-very effective). In the evaluation, relative effectiveness index (REI) was computed to rate the factor of performance against a scale used to assess the effectiveness and ranking of each library building. The relative effective index (REI) is evaluated using the following expression:

$$\text{Relative Effectiveness Index (REI)} = \frac{\sum w}{A \times N} \quad \text{----------Eq. (3)}$$

Where w = weighting given to each factor by the respondents and ranges from 0 to 5 where '0' is not significant and '5' is extremely significant, A = highest weight (i.e. 5 in this case), N = total number of respondents and the index range from 0 to 1 ($0 \leq$ index ≤ 1).

FINDINGS AND DISCUSSIONS

Table 2 presents the socio-economic characteristics of the users in selected tertiary institutions of the study. Female respondents were 141(63.52%) as against the male population of 81(36.48%). Age analysis revealed that the library users below the age of 21years were more than other age category of users. Analysis of marital status revealed that 220 (99.22%) users were singles as against 2 (0.78%) married users. Regarding educational qualifications, secondary school certificate holders constituted 136(61.36%) the largest category of users of academic library buildings. Employment category showed undergraduate students representing 208 (93.79%) were the majority. Analysis of health conditions showed that 221users (99.09%) had no disabilities as against 1 user (0.45%) with eyesight challenge.

Table 2: Socio-Economic Characteristics of Academic Library Users

Profile		Parameters	Frequency	Percentage (%)
i.	Gender	Male	81	36.48
		Female	141	63.52
		Total	**222**	**100.00**
ii.	Age	< 21yrs	122	54.95
		21-30yrs	59	26.60
		31-40yrs	32	14.37
		> 40yrs	09	4.08
		Total	**222**	**100.00**
iii.	Marital Status	Single	220	99.22
		Separated	Nil	Nil
		Widow	Nil	Nil
		Married	2	0.78
		Divorced	Nil	Nil
		Total	**222**	**100.00**
iv.	Highest Educational Qualification	Primary	Nil	Nil
		Secondary	136	61.36
		OND/NCE	66	29.71
		B.Sc./HND	15	6.60
		MSc	5	2.33
		Ph.D	Nil	Nil
		Total	**222**	**100.00**
		Academic Staff	4	1.94
		Non-Academic Staff	Nil	Nil
		Undergraduate Student	208	93.79

v.	Employment	Post-Graduate Student	8	3.50
		Visitor	2	0.77
		Total	**222**	**100.00**
		Hearing challenge	Nil	Nil
		Eye sight challenge	1	0.45
		Mobility challenge	Nil	Nil
vi.	Health Condition	Others	Nil	Nil
		None	221	99.09
		Total	**222**	**100.00**

Source: Researcher's Computation, 2023

Findings from the analysis as shown in Table 3 revealed that for functional performance, FCE, Osiele obtained the highest percentage score of the avg. REI of 75.31% followed by FUNAAB and MAPOLY respectively with 73.95% and 71.45%. Functional elements in academic library buildings are expected to support the activities that are carried out within the building. They are expected to be responsive to specific requirements and needs of the users in line with their organizational goals and objectives (Shika *et al.*, 2013).

Table 3: Effectiveness of Functional Performance of Academic library buildings

Functional Performance Element	FUNAAB		MAPOLY		FCE, OSIELE	
	REI	Rank	REI	Rank	REI	Rank
Location of the library on campus	0.8499		0.7524		0.8023	
Entrance area of the library building	0.7603		0.7989		0.8210	
Provision of furniture such as bookshelves, chairs and tables	0.8172		0.8079		0.7968	
Entrance door of the library building	0.8028		0.7989		0.8462	
Landscaping such as lawns and shrubs etc. around the library building	0.7837		0.7845		0.7801	
Vertical and horizontal circulations (stairs, lifts and corridors) within the library building	0.8041		0.7770		0.7830	
General layout and physical condition of the library building	0.8027		0.7940		0.7544	
Functioning of openings such as doors and windows for natural lighting and ventilation	0.7900		0.8007		0.7376	
Functioning of the interior finishes of the library building	0.7974		0.7850		0.7256	
Functional spaces for different activities within the library building	0.7504		0.7651		0.7372	
Accessibility of the library to the physically challenged	0.7819		0.7934		0.7333	

Functioning of water saving devices in the library building i.e. self-closing taps, water closets etc.	0.7853		0.7584		0.6931	
Car parking lot	0.7206		0.7683		0.6667	
Functioning of energy saving devices in the library building i.e. light regulators, occupation sensors etc.	0.7219		0.8001		0.7246	
Functioning of renewable energy resources such as solar panels etc.	0.7249		0.7826		0.6951	
Average REI (%)	**73.95**		**71.45**		**75.31**	

Source: Researcher's computation, 2023

Findings from the analysis as shown in Table 3 revealed that for technical performance, FCE, Osiele obtained the highest percentage score of the avg. REI of 79.85% followed by MAPOLY and FUNAAB respectively with 77.36% and 76.68%. The indicators of technical performance of academic library buildings are very important for efficiency and productivity.

Table 4: Effectiveness of Technical Performance of Academic library buildings

Technical Performance Element	**FUNAAB**		**MAPOLY**		**FCE, OSIELE**	
	REI	**Rank**	**REI**	**Rank**	**REI**	**Rank**
Maintenance practice in the library building	0.8808		0.8795		0.7659	
Safety and security level in terms of fire prevention, theft, vandalism and violence in the library	0.8072		0.7838		0.8486	
Thermal comfort level within the library building	0.7928		0.7934		0.8882	
Visual comfort level within the library building?	0.8109		0.7614		0.7880	
Acoustic provision against sources of noise within the library building	0.8035		0.7658		0.8166	
Provision for garbage collection and disposal in the library building	0.7784		0.7772		0.7739	
Provision for mechanical ventilation such as fans, air conditioning	0.7585		0.7414		0.8010	
Emergency doors for escape from fire and other dangers	0.7590		0.8429		0.8386	
General ambience of the library interior in terms of painting, artworks, flowers etc.	0.7497		0.7343		0.7576	
Telecommunications within the library building?	0.6944		0.8405		0.7457	
Provision for water supply for sanitary uses and drinking	0.7067		0.7346		0.7734	

Power supply for appliances and internet services within the library building	0.7125		0.7065		0.8003	
Provision for recreation and relaxation in the library building	0.7138		0.6946		0.7824	
Average REI (%)	**76.68**		**77.36**		**79.85**	

Source: Researcher's computation, 2023

Findings from the analysis as shown in Table 4 revealed that for behavioural performance, FCE, Osiele obtained the highest percentage score of the avg. REI of 87.63% followed by MAPOLY and FUNAAB respectively with 82.98% and 80.56%. Adequate consideration is expected to be given to the effectiveness of the behavioural performance in a library building as it is concerned with social and psychological needs of the library users. This approach is expected to influence the planning and design of the library building as a social space. Many academic library buildings have employed the open plan or courtyard layout that encourages circulation and interaction between users.

Table 5: Effectiveness of Behavioural Performance of Academic library buildings

Behavioural Performance Element	**FUNAAB**		**MAPOLY**		**FCE, OSIELE**	
	REI	**Rank**	**REI**	**Rank**	**REI**	**Rank**
Functional distance between spaces	0.8329		0.8346		.99262	
Image/outlook of the library in attracting/welcoming users	0.8044		0.8324		.68599	
Density of functional spaces in the library building	0.8201		0.8459		.70189	
The circulation routes in enhancing social interaction	0.7851		0.8433		.68599	
Library spaces in supporting different activities of categories of users	0.7955		0.8155		.51450	
Social interaction among users and staff in the library building	0.7952		0.8072		.43724	
Average REI (%)	**80.56**		**82.98**		**87.63**	

Source: Researcher's computation, 2023

IMPLICATION OF FINDINGS

The implication of the findings is that there is a direct influence of the respective performance elements (functional, technical and behavioural) on the effectiveness of the performance of academic library buildings in the study area. The implications of this is that in order to capture the feelings expectations and aspirations of academic library users in the tertiary institutions, in a performance evaluation, the focus of the POE exercise must be considered in terms of these three broad categories of technical performance element, functional performance element and behavioural performance element (Mustafa, 2017). Furthermore, the study established an indirect influence of the moderating of the moderating factor (socioeconomic characteristics of users i.e. age, gender, marital status, educational qualifications etc.) on the effectiveness of the performance of academic library building. 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 academic library building.

CONCLUSION

The study concluded that there should be a significant improvement in the planning, designing and management of academic library buildings at the federal, state and privately tertiary institutions in Nigeria. This is achievable by considering variables, attributes and parameters that are capable to ensure effective performance consistent with satisfaction and comfort of users and organizational goals and objectives. Also, adequate consideration and priority should be given to accommodating the disabled through universal design and inclusiveness in the design, planning and construction of academic library buildings in tertiary educational institutions by the federal, state and privately owned tertiary educational institutions in Nigeria.

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