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Investigating key performance indicators for facility management practices in university buildings in Minna, Nigeria

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Abstract

The aim of this paper is to identify the key performance indicators for facility management practices in university buildings in Minna in order to evaluate and improve on its management to enhance better performance. The research employed a quantitative approach with the occupants of the lecture rooms and office buildings as a unit of analysis. A total of 373 questionnaires were distributed to the end-users of the buildings. The paper revealed that existing performance evaluation of the university is weak and thus, the performances of the buildings were found to be average due to their age. The paper identified the key performance indicators for the management of university buildings, which is expected to enhance Building Performance Evaluation (BPE) for facility managers by taken into cognizance the key factors. The results of the research are important to the end-users as well as facility and maintenance managers in organisations. In addition, the output is also significant to those in academics as this may foster further research.

Keywords

Building performance evaluation, educational buildings, facility management and key performance indicator

1. Introduction

Facilities management is not entirely a novel area of management in some developing world which although had existed in various units and under

various professions, it is only just being aggregated into a singular functional field of management. In Nigeria, facilities management is not an all comer's affair and it cannot be made so if appreciable results are to be expected with the sale of many Federal Government of Nigeria houses to the public; a challenge of facilities management has been thrown to the practitioners. A new line of business has also been opened to entrepreneurs, though many organizations and institutions as asserted by Lavy (2008) often fail to recognize the importance of facility management (FM) to their business performance and success. The goal however, must be to manage Nigeria's huge infrastructure portfolio successfully.

Okupe (2002) identifies professionals as the key participant in the construction industry as well as in the management department. Maintenance delayed is costlier. Every element in a facility should be covered by appropriate maintenance, determined by the management. The only way to prolong the life span of a house is to maintain it regularly which in turn enables the facility to fulfil its function. However, the cost of replacement of a home is several times the annual cost of maintenance required to keep the facility in use. Every facility is designed and built to meet a specific need or a group of needs, which must have been determined to a large extent before the implementation of the project. The ability of a facility to successfully accomplish the purpose for which it is designed is a measure of its success (Opaluwah, 2005). In Nigeria, according to Adenuga and Iyagba (2005) public buildings are in poor and deplorable conditions of structural and decorative disrepairs.

The smooth operation of the management of facilities (multiple or single) depends largely on the ability to determine an organic process as a driving vehicle for delivery. No matter how simple or complex a facility may be without a defined order of maintenance management, the facility shall sooner or later not only become non-functional but may in addition constitute a hazard for its users. Barrett (2000) supports the evaluation of user needs in order to action better conditions for them using a Post-Occupancy Evaluation (POE) process.

2. Literature Review

2.1 The Nigerian university and the state of infrastructure facilities

According to Akpanuko (2012), Nigerian university system has undergone a series of developmental phases which can satisfactorily measure up with what is obtainable in the other countries of the world. This growth has witnessed an increase in the number of Federal Government owned universities from 4 in 1960s to 38 Universities; 37 State Universities and 50 private universities (125 in total) (National University Commission [NUC], 2010). Over the last three decades, the number of students admitted to Nigerian universities has increased tremendously from fifty-five thousand students (55,000) in 1980 to over four hundred thousand students (400,000) in 2002 (Bollag, 2002). As the upsurge in the number of students admitted or seeking admission increase over the years, the existing facilities can hardly take 20% of the student Soludo (cited in Akpanuko, 2012), and this has resulted in complete decline and collapse of the system of education (Bollag, 2002). The situation is not anything better thirteen years later.

Olukoya (2006) asserted that a typical Nigerian university is characterised with overcrowded classrooms with students sitting on the windows of lectures halls during classes, as well as ill-equipped laboratories and libraries. Nwaopara et al. (2008) alluded to the fact that universities in Nigeria have been reduced to glorified secondary schools as a result of institutional decay and poor state of infrastructure facilities. The continuous decay and neglect of the university infrastructure and many other reasons advanced by the academic staff union of universities (ASUU) has led to incessant strike actions like six months' strike experienced in 2002 (Bollag, 2002) and other subsequent industrial action embarked by the unions over the years. Although Nigeria's budgeting for the education department is low, but governmental politicisation of university administration has increased level of corruptions and misappropriation of funds which invariably impact negatively on the state of infrastructure facilities. The paper argued that although number of students grows in geometrical progression without commensurate facilities, an organised facility management practices is capable of improving the deplorable state of the facilities and enhance its physical performance as well as improve the effectiveness with which the facilities are maintained and managed.

2.2 Probable causes of facilities management failure in operational life

Lack of a policy

Facility management is not an ad-hoc exercise. There must be a concerned and systematic approach to the management of facilities in order for desired objectives to be realized. This therefore necessitates a policy, which either be documented or imbibed by all concerned and supported by management.

Lack of funding

In most organizations, top management needs to be fully briefed in order to understand and appreciate the demands of Facility Management such organizations. While it might be obvious that broken down equipment need repairs, funds requested for preventive maintenance may need some explanation before release is made. Most administrators believe that a functioning facility/equipment needs no more funding than running input cost only. This attitude has resulted in many organizations embarking on breakdown maintenance as a maintenance policy. The shortcomings of this approach are obvious as such facilities no sooner begin to deteriorate appreciably.

Use of unqualified personnel

Appropriate personnel are very crucial in the procurement of facilities management. While everyone appreciates a well-managed facility, only a few are professionally qualified to bring it about. The use of unqualified personnel is a ready source of disaster.

Abuse of facilities

Many users take liberties when occupying especially houses. They fail to realize that specific constants and values of loading/weights were employed in the design of these structures. Sometimes, this may be as a result of ignorance but suffice it to say that abuse of facilities is a potent cause of failures. Abuse occurs when a facility is subject to forces for which it was not designed or intended to resist.

2.2 Key Performance Indicators of Constructed facilities

Several research works have been carried out on success factors and success criteria for construction projects but those that dwell on constructed facilities are few in Nigeria. Though, for construction projects Cookie-Davies (2002)

distinguished between project success and project management success, the former is measured against the overall objectives of the project while the latter is measured against the widespread and traditional measures of performance against cost, time, and quality. Cookie-Davies (2002) argued that success factors are those which contribute to achieving success on a project while success criteria are the measures by which the success or failure of a project will be judged.

Few among those that examine the critical success factors of constructed facilities considered it from the angle of customer satisfaction as an addition to the traditional performance measurement of cost, time and quality (Torbica and Stroh, 2001; Karna *et al.*, 2009). In a research carried out by Torbica and Stroh (2001) it was submitted that quality improvement effort will improve customer satisfaction when the efforts are geared towards a higher product and service quality. Toor and Ogunlana (2010) concluded that factors constituting the success criteria are commonly referred to as the key performance indicators or KPIs and it was observed that the KPIs are helpful to compare the actual and estimated performance in terms of effectiveness, efficiency and quality of both workmanship and product (Cox *et al.*, 2003). Toor and Ogunlana (2010) differentiate between success factors and key performance indicator to give better understanding of the terminologies. Success factors are referred to as the efforts made or strategy adopted in achieving the desired success on project. Whereas, Key Performance Indicators are the compilations of data measures (either by quantitative or qualitative data) used to assess and evaluate the performance of the construction operation or constructed facilities (Toor and Ogunlana, 2010; Yuan *et al.*, 2009).

Solomon and Young (2007) reported that performance objectives are the baseline in carrying out performance measurement in the process of determining how successful organizations or individuals have been in attaining these objectives. No two facilities are entirely the same in terms of condition and maintainability, thus, it seems difficult as every facility has certain unique features and limitations and therefore generalizing the taxonomy of KPIs for all kinds of facilities looks fairly impractical (Toor and Ogunlana, 2010). Therefore, there is need to identify and evaluate a set of common indicators to be used by facility manager and maintenance officers in measuring performance of facilities (Cox *et al.*, 2003).

3. Research Method

The study source data through questionnaire administered to the users of the facilities which include Staff (both academics and non- academic) and students drawn from various departments within the University environment. Data relating to the population of the study area were retrieved from the archive. Prior to collection of data, pilot test was conducted using the first drafted questionnaire to ensure that the research instrument would be well understood by the respondents to establish the most productive form of data analysis. The input and the results generated from the pilot study were used to refine the questionnaire before the wide survey was carried out. Reliability test was also conducted on the research instruments using Cronbach's alpha (α). The reliability coefficients for the instrument with respect to key performance indicator and the perception of end users on Building performance evaluation were found to be 0.93 and 0.77 respectively.

This attests to the reliability of the instruments used for the study. In order to have a defined sample size, the total population for this study include all registered students, academic and non-academic staff within the study area. The lists of the total academic staff, non-academic staff and students are as obtained from the Academic Planning Unit of the university. The total sampling frame for the study was of 612 for academic staff, 171 for non-academic staff and 12947 for all the students. The total number of students as at the 2010/2011 session being the period within which this research is being carried out was 12947 out of which 2106 were 100 level students, a difference which resulted to 10841, therefore the total sampling frame were 11624 for the study, 100 level students were left out because it was believed they do not have required familiarities/knowledge of the facilities on campus. Based on the sample frame, sample size in respect of the various categories of respondents was determined from the following formulae as used by Hogg and Tannis (1997):

$$M = \frac{Z^2 \times P^* \times (1 - P^*)}{E^2} \quad (1)$$

$$n = \frac{m}{1 + \frac{m - 1}{N}} \quad (2)$$

Where m= sample size of unlimited population, n= sample size of limited population, Z= value (1.96 for 95% confidence level, P= degree of variance between elements of population (0.5), E= minimum error on the point estimate.

Substituting the pre-determined variables, the sample size for each of the study population the respondents from academic staffs, non-academic staffs and students was determined to be 19, 7 and 347 respectively. The sample size for the various categories of respondents was therefore found to be 373. Based on the result of pilot test carried out, 84 questionnaires were administered to academic staff, 30 to non-academic staff and 259 to students summing up to 373 determined using the formulae above. This was done on the premises that both academic and non-academic staffs surveyed have stayed more than five years required by the students in pursuance of their degree certificate. The research adopted random sampling technique; in which case every respondent in the defined population was given equal chance during the administration of the questionnaire. The valid retrieved questionnaire with respect to the overall response to the survey comprised a total of 284 well completed questionnaires, representing approximately 76 % response rate and according to Idrus and Newman (2002), a response rate of 30% is good enough in construction studies, which is also in line with the submission of (Fellow & Liu, 1997; Akintoye & Fitzgerald, 2000) that figure in the range of 20-30% response rate in questionnaire survey of the construction industry is good for analysis. The profiles of the respondents were analysed using percentiles. The key performance indicators were analysed using factor analysis, Mean score value was used in determining the strength and weakness of the indicator, Chi square was used to analyse the level of awareness among the respondents and finally, the building performance evaluation relativity was carried out using relative importance indices.

Table 1 - Sampling Frame of Respondents

S/No	Respondents	SAAT	SEET	SEMT	SET	SICT	SSSE	TOTAL
1	Academic	93	150	12	109	43	205	612
2	Non-Academic	26	41	15	31	28	30	171
3	Student	1207	3160	524	1690	519	3741	10841
	TOTAL	1326	3351	551	1830	590	3976	11624

Table 2: Sample size for the category of respondent

S/No	Respondents	SAAT	SEET	SEMT	SET	SICT	SSSE	TOTAL
1	Academic	3	4	1	3	2	6	19
2	Non-Academic	1	1	1	1	1	1	7
3	Student	39	99	18	55	18	118	347
	TOTAL	43	104	20	59	21	126	373

4. Data Analysis and Discussion

This section shows data analysis of the key performance indicators

4.1 Critical Performance Indicators (CPI) of university buildings

The factor analysis results show that the KMO of sampling accuracy and Bartlett's test of sphericity. The KMO was found to be 0.810 and 0.780 for student and staff respectively which is greater than 0.50 as a value less than this would be unacceptable for analysis. This means that the data is accurate for factor analysis. Similarly, the Bartlett's test was found to be significant which show that the data does not suffer from multi-collinearity.

4.2 Factor extractions for the CPI of university buildings (Student)

Table 3 shows all the possible number of factors which were extractible from the analysis of the elements for critical performance indicators of building performance for student respondents. The Eigen value, percentage of variance and cumulative percentage of variance of factors are also shown. Nevertheless, the important factors are those whose Eigen value are greater than or equal to 1 because a component with an Eigen value less than 1 is taken to be less important or of no use to the result. From table 4 six factors were generated with the Eigen value in a descending order i.e. 8.207 for factor 1 to 1.041 for factor 6. Which were selected based on the criteria of an Eigen value greater than 1. The chosen factor generates a percentage cumulative of 64%.

Table 3 - Factor Extractions for the CPI of University Buildings (Student)

Variable	Extraction % Communality	Factor	Eigen Value	% of Variance	Cumulative %
Favourable learning environment	52.9	1	8.207	32.828	32.828
Accessible classroom	70.7	2	2.377	9.509	42.337
Well ventilated classroom	70.1	3	1.853	7.414	49.750
Adequate illumination during day	63.6	4	1.413	5.652	55.402
Adequate illumination at night	68.4	5	1.1.56	4.626	60.028
Conducive classroom for study	63	6	1.041	4.164	64.192
Relatively close CR to other amenities	75.1	7	0.980	3.918	68.110
CR equipped with building facilities	55.4	8	0.899	3.596	71.706
School library suitable for study	59.1	9	0.796	3.184	74.890
Standard library building facilities	60.1	10	0.789	3.155	78.044
Standard clinic building facility	56.1	11	0.706	2.826	80.870
Standard laboratory building facility	65	12	0.623	2.492	83.362
Standard sport facility	67.2	13	0.550	2.201	85.563
Standard lecture halls and theatres	67.3	14	0.510	2.040	87.603
CR protection against harsh weather	58.2	15	0.469	1.874	89.478
Adequate fire-fighting facilities	74.3	16	0.410	1.641	91.119
Building designed with escape route	51.9	17	0.378	1.511	91.630
Rapid approach to facility repair	71.5	18	0.338	1.351	93.981
Replacement of damaged facility	74.2	19	0.307	1.228	95.209

Replacement with better facility	70.1	20	0.269	1.074	96.283
Checks carried out only if reported	52.7	21	0.254	1.106	97.229
Adequate building amenities	61.7	22	0.219	0.877	98.176
Building amenities purpose satisfaction	63.8	23	0.183	0.732	98.908
Facility compared to other institution	68.8	24	0.164	0.658	99.566
Innovative in facilities upgrade	63.5	25	0.109	0.434	100.000

4.3 Factor extractions for the CPI of university buildings (Staff)

All the possible number of factors extractible from the analysis of the elements of building performance evaluation as responded to by the staff is as shown in Table 4. The Eigen value, percentage of variance and cumulative percentage of variance of factors are also shown. Nevertheless, the important factors are those whose Eigen value is greater than or equal to 1 because a component with an Eigen value less than 1 is taken to be less important or of no use to the result discussion. Seven factors were generated with the Eigen value in a descending order i.e. 7.561 for factor 1 to 1.033 for factor 7, (for the purpose of balancing both response from staff and student in this research factor seven was ignored). Which were selected based on the criteria of an Eigen value greater than 1.

Table 4 Factor Extractions of CPI for evaluation of building performance (Staff)

Variable	Extraction % Communality	Factor	Eigen Value	% of Variance	Cumulative %
Favourable learning environment	76.1	1	7.561	30.246	30.246
Accessible classroom	89.4	2	4.096	16.384	46.630
Well ventilated classroom	87.1	3	2.480	9.920	56.549
Adequate illumination during day	94	4	2.293	9.170	65.720
Adequate illumination at night	88.5	5	1.731	6.923	72.642
Conducive classroom for study	81.3	6	1.449	5.796	78.438
Relatively close CR to other amenities	88.2	7	1.033	4.133	82.571

CR equipped with building facilities	75.6	8	0.960	3.841	86.413
School library suitable for study	85.7	9	0.795	3.182	89.594
Standard library building facilities	91.6	10	0.552	2.208	91.802
Standard clinic building facility	87.9	11	0.428	1.710	93.513
Standard laboratory building facility	85.2	12	0.403	1.613	95.125
Standard sport facility	86.9	13	0.357	1.426	96.552
Standard lecture halls and theatres	83.2	14	0.276	1.103	97.655
CR protection against harsh weather	82.5	15	0.197	0.787	98.441
Adequate firefighting facilities	93.8	16	0.133	0.533	98.975
Building designed with escape route	77.1	17	0.101	0.405	99.380
Rapid approach to facility repair	62.2	18	0.069	0.275	99.655
Replacement of damaged facility	86.1	19	0.056	0.223	99.878
Replacement with better facility	79.7	20	0.024	0.095	99.973
Checks carried out only if reported	74.9	21	0.007	0.027	100.000
Adequate building amenities	78	22	2.40E-016	9.58E-016	100.000
Building amenities purpose satisfaction	91	23	3.20E-019	1.28E-018	100.000
Facility compared to other institution	66.8	24	-5.39E-017	-2.16E016	100.000
Innovative in facilities upgrade	71.5	25	-3.09E-016	-1.24E015	100.000

4.4 Factor rotation for KPI of building performance (Student)

Table 5 shows factor rotations for the student's population, various variables of critical performance indicators for the building performance evaluation (except for those less than 0.50) and communalities (h^2) of factors attributing to the evaluation of building performance which was extracted from the rotated component matrix. These factor loadings are significant because the greater the value of the factor loadings, the more the variable contributes to that factor. Communalities (h^2) describe the variance in the variables that have been accounted for by the factors extracted, 53%, 71%, 70%, 64, 68%,

63% of average communality in factor 1, factor 2, factor 3, factor 4, factor 5, and factor 6 respectively was accounted for by the factors extracted.

Table 5: Factor Rotation for CPI of Building Performance (student)

Critical Performance Indicators	Variables	Factor loading	Extractions %	Mean Value	Cumulative %
Building performance Percentage variance =32.828 Eigen value = 8.207	Favourable learning environment	0.687	59.2	3.508	
	Standard clinic building facility	0.698	56.1	2.780	
	Standard laboratory facilities	0.658	65	2.601	
	Standard sport facilities	0.776	67.2	3.031	
	Standard lecture halls & theatres	0.654	67.3	2.977	
	Protection against harsh weather	0.685	58.2	3.109	
	Adequate building amenities	0.676	61.7	2.659	
	Building amenities purpose satisfaction	0.656	63.8	2.752	
	Facility ... compared to other institution	0.702	68.8	2.954	
	Innovative in facilities upgrade	0.591	63.5	3.209	32.828
Facility impact & user safety Percentage variance = 9.509 Eigen value = 2.377	Conducive classrooms for study	0.631	63	2.837	
	Classroom equipped with facilities	0.545	55.4	2.651	
	Library suitable for study	0.651	60.1	3.019	
	Standard library building facilities	0.536	60.1	2.841	

	Adequate fire-fighting facilities	0.637	74.3	2.516	
	Building ... designed with escape route	0.637	51.9	2.260	42.337
Approach to BPE Percentage variance = 7.414 Eigen value = 1.853	Rapid approach to facilities repair	0.659	71.5	2.558	
	Replacement of damaged facilities	0.713	74.2	2.725	
	Replacement with better facilities	0.763	70.1	2.624	49.75
Building facility users value Percentage variance = 5.652 Eigen value = 1.413	Well ventilated classrooms	0.736	70.1	3.740	
	Illuminated classroom during day	0.786	63.6	3.841	
	Illuminated classroom at night	0.668	68.4	3.147	55.402
Buildings accessibility Percentage variance = 4.628 Eigen value = 1.156	Accessible classroom locations	0.708	70.7	3.774	
	Relative close CR to other amenities	0.728	75.1	3.240	60.028
Facility maintenance Percentage variance = 4.164 Eigen value = 1.041	Checks carried out only if reported ...	0.635	52.7	3.442	64.192

4.5 Factor rotation for KPI of building performance (Staff)

Table 6 shows factor rotations for staff population, the various variables for the BPE (except for those less than 0.50) and communalities (h^2) of factors attributing to the evaluation of building performance which was extracted from the rotated component matrix. Communalities (h^2) describe the variance in the variables that have been accounted for by the factors extracted, 76%, 89%, 87%, 94%, 89%, and 81% of average communality in factor 1, factor 2,

factor 3, factor 4, factor 5, and factor 6 respectively was accounted for by the factors extracted.

Table 6 Factor Rotations for Critical Performance Indicators of BPE (staff)

Critical Performance indicators	Variables	Factor loading	Extractions %	Mean Value	Cumulative %
Building performance Percentage of explained variance = 30.246 Eigen Value = 7.561	Favourable learning environment	0.577	76.1	4.000	
	Standard clinic building facility	0.518	89.9	3.000	
	Standard laboratory facilities	0.835	85.2	3.000	
	Standard sport facilities	0.666	86.9	3.000	
	Standard lecture halls & theatres	0.578	83.2	3.000	
	Protection against harsh weather	0.726	82.5	3.000	
	Adequate building amenities	0.620	78	3.000	
	Building amenities purpose satisfaction	0.540	91	3.000	
	Facility compared to other institution	0.728	68.8	3.000	
	Innovative in facilities upgrade	0.735	71.5	3.000	30.246
User value and its impact Percentage of explained variance = 16.384 Eigen Value = 2.377	Conducive classrooms for study	0.837	81.3	3.000	
	Classroom equipped with facilities	0.540	75.6	2.100	
	Library suitable for study	0.616	85.7	2.500	
	Standard library building facilities	0.868	91.6	3.000	
	Adequate firefighting facilities	0.816	93.8	3.000	
	Building designed with escape route	0.783	77.1	2.000	42.337
Approach to BPE	Rapid approach to facilities repair	0.520	62.2	2.000	

Percentage variance = 9.920 Eigen Value = 2.480	Replacement of damaged facilities	0.698	86.1	3.000	
	Replacement with better facilities	0.565	79.7	3.000	56.549
Building facility users safety Percentage variance = 9.170 Eigen value = 2.293	Well ventilated classrooms	0.655	87.1	4.000	
	Illuminated classroom during the day	0.919	94	4.000	
	Illuminated classroom at night	0.687	88.5	3.000	65.720
Building facility upgrade Percentage variance = 6.923 Eigen value = 1.731	Accessible classroom locations	0.941	89.4	4.000	
	Relative close CR to other amenities	0.603	88.2	3.000	72.242
Users changing needs Percentage variance = 5.796 Eigen value = 1.449	Checks carried out only if reported	0.818	74.9	3.500	78.438

4.6 End users building performance perception

The variables were grouped into factors in descending rank order in Table 7, which were given headings under the critical performance indicators for educational buildings, from which conclusion were drawn for the six various factors, based on further analysis of each variables using the Mean to obtain the end users overall perceptions on the twenty-five (25) variables. Therefore, to obtain the populations perception on the various factors, the mean of each factor in Tables 5 and 6 for both staff and students were also obtained and are as follows:

CPI 1 was referred to as; Emphasis on building performance
CPI 2 was referred to as; User value and its impact on Users
CPI 3 was referred to as; Approach to building performance evaluation
CPI 4 was referred to as; Building facility Users safety

CPI 5 was referred to as; Building facilities upgrade
CPI 6 was referred to as; Facility maintenance

Table 7: End Users CPI of building performance perception

Critical Performance Indicators	Average mean	Rating
Emphasis on building performance	3.029	Average
User value and its impact on users	2.644	Low
Approach to building performance evaluation	2.483	Low
Building facility users safety	3.455	Average
Building facilities upgrade	3.504	Average
Facility maintenance	3.471	Average
Overall	3.097	Average

Table 8: Relative important index of FM and BPE (Staff)

Variables	RII	Rank	Mean	Standard Deviation	Standard Error	Skewness	Kurtosis
Need for Building Performance Evaluation	86.92	2	4.3462	0.8458	0.16588	-1.622	2.878
Need for facility management department	89.23	1	4.4615	0.70602	0.13846	-1.701	4.463
better infrastructural provision	82.31	3	4.1154	0.71144	0.13953	-0.893	2.046
Infrastructure purpose fulfilment	50.77	6	2.5385	1.02882	0.20177	-0.127	-1.086
Incorporation of facility user`s opinion	45.39	7	2.2692	1.00231	0.19657	-0.181	-1.007
School facilities maintenance	55.39	5	2.7692	1.21021	0.23734	-0.481	-0.637
Inquiry of end user`s opinion	71.54	4	3.5769	1.06482	0.20883	-0.540	-0.063

4.7 Building performance evaluation and its relativity to facility management

The need for BPE, need for facility management department, better infrastructural provision, Infrastructure purpose fulfilment, Incorporation of facility users opinion, School facilities maintenance and Inquiry of end users opinion, had mean value of 4.4362, 4.4615, 4.1154, 2.5385, 2.2692, 2.7692, and 3.5769 respectively in Table 8 while in Table 9 the need for BPE, need for facility management department, better infrastructural provision, Infrastructure purpose fulfilment, Incorporation of facility users opinion, School facilities maintenance and Inquiry of end users opinion had mean values of 4.22, 4.35, 4.24, 2.65, 2.57, 2.87 and 3.25 respectively.

Table 9: Relative important index (RII) of FM and BPE (Student)

Variables	RII	Rank	Mean	Standard Deviation	Standard Error	Skewness	Kurtosis
Need for Building Performance Evaluation	84.42	3	4.22	0.86075	0.05359	-1.217	1.823
Need for facility management department	86.90	1	4.35	0.80441	0.05008	-1.700	4.061
Better infrastructural provision	84.88	2	4.24	0.77313	0.04813	-1.369	3.460
Infrastructure purpose fulfilment	53.02	6	2.65	1.18125	0.07354	-0.362	-0.677
Incorporation of facility user`s opinion	51.40	7	2.57	1.17570	0.07320	-0.512	-0.624
School facilities maintenance	57.44	5	2.87	1.30962	0.08153	-0.270	-1.133
Inquiry of end user`s opinion	65.00	4	3.25	1.21377	0.07557	-0.465	-0.641

4.8 Extractions for Relative Importance Index for BPE and FM

It will be observed from Table 10 that highest level of importance was attached to building performance evaluation for the institution, next in ranking is better infrastructure provision, need for facility management, infrastructure purpose fulfilment, school facility management, inquiry of end

users' opinion, incorporation of Facility Users ideas in succeeding ranks. Likewise, from Table 10; the needs for facility management: such as better

Table 10: Extraction for Relative importance index

	Staffs		Rank	
BPE relativity to FM	RII	Rank	RII	Rank
Need for BPE in this institution	89	1	87	1
Better infrastructural provision	87	2	85	2
Need for FM in this institution	82	3	84	3
Infrastructure purpose fulfilment	72	4	65	4
School facilities maintenance	55	5	57	5
Inquiry of end user's opinion	51	6	53	6
Incorporation of facility user's opinion	45	7		7

infrastructural provision, need for building performance evaluation, and other functions of facility management in succeeding ranks. Hence, it can be inferred that there is a great relativity between building performance evaluation and facility management, as well as the need for facility management department for the institution whose functions are to carry out variable 1, 3,4,5,6 and 7 in the institution. Finally, the benefit of involving facility manager in the design and construction process as observed in variable 3 which were ranked 2.

The output of the paired sample t-test presented in Table 11 indicates that an insignificant difference exists between staff and students with respect to their perception on the performance of the buildings. The view of the respondent from staff and students confirms the insignificance regarding the performance evaluation of the buildings since value of $t(24) = 1.068$ and $p > .05$ in the frequency scale. Similarly, the paired sample correlation showed significant association in the opinion of the respondent since value of $r = 0.587$ and $p < .05$.

Table 11: Paired Samples Test

		Paired Differences					t	df	Sig. (2-tailed)
		Mean	Std. Deviation	Std. Error Mean	95% Confidence Interval of the Difference				
					Lower	Upper			
Pair 1	Staff - Student	-0.084	0.39336	0.07867	-0.24637	0.07837	-1.068	24	0.296

5. Discussion of findings

Using the percentile for analysing the responses from end users it was deduced that majority of the staff i.e. 80.8% have idea on Building Performance Evaluation while 62.7% as of students have no idea on BPE , while the staff are highly aware of BPE the students have poorly oriented on building performance evaluation, but for a general conclusion it can be inferred that the users of building facilities are defectively oriented on BPE since the larger percent i.e. 90.8% of students as against 9.2% of staff have no BPE idea. This is in line with the findings by Cotts and Lee (1992) that organizations seem to have more information on items such as computers, photocopiers, refrigerators, etc, than their buildings and those that have a relatively good management of their assets, have little information concerning their building performance.

It will be observed that the highest of respondents of 66.7% and 76.9% who responded 'Yes' to idea on BPE were considered respectively, hence, deducing from their response the previous approach to BPE in the institution is weak. Affirming the findings of Mutlaq (2002); Amaratunga and Baldry (2000); Zimring and Rashidi (2008) that to date, little data is available in Africa to assess how extensively the use of the technique has diffused educational institutions, how it affects teaching spaces and overall organizational performance, also Leaman (2004) reports that the reason for this is because academic disciplines do not regard building performance as an area of legitimate interest.

In other to effectively investigate building performance it was imperative that the critical performance indicators were listed out and grouped under headings from which users view were analysed, the use of factor analysis and mean were applied, factor analysis was used to categorize the variables into

six sections out of which conclusions were drawn for the critical performance indicators for evaluation of educational buildings based on guidelines by the National University Commission (NUC), to draw conclusions for end users perception on the building facilities in the study area the Mean value of their response to each variable under each critical performance indicators was obtained , while the schools users value and approach to BPE were professed low, emphasis on building performance, building facilities users safety, building facility upgrade and facility maintenance were opined average, in all the critical performance indicators of building performance was found to be average, this fact is contrary with the findings of Okolie (2009) that Critical performance indicators are often absent in the design, construction and management of educational building facilities.

Building performance evaluation relativity to facility management was established with the use of the relative importance index were extracted, based on the level of importance attached to the dependent variables used for the analysis, it was deduced that building performance evaluation is related to facility management, there is a great need for facility management department in this institution for efficient building performance evaluation, and the benefits of the employing the Facility Manager for the maintenance of building facilities in this institution. This is similar to the findings of Preiser (2005) who postulated that Building performance evaluation is a diagnostic tool which allows facility managers to identify and evaluate critical aspects of a facility in order to develop design guidance and criteria for future facilities and that performance evaluation of buildings is a toolkit for facility managers, Barret and Baldry (2006). Building performance evaluation is a facilities management function and so the evaluation of buildings in terms of user-needs provides a platform for facility managers to make their contributions to the achievement of organizational goals

6. Conclusions

The study presented here investigated the key performance indicators for facility management practices in tertiary education buildings with a view to establishing critical performance indicators that will enhance Building Performance Evaluation (BPE) for facility managers by taken into cognizance the key factors. The study therefore concluded that most students have no idea on Building performance evaluation while most staff are highly

oriented on BPE idea. It was concluded that the institutions existing approach to building performance evaluation is weak. Hence, the buildings are found to be at average performance level. In view of these, the buildings being used as the case study for this research is an educational institution which still at its infrastructural development stage, hence, the best time to establish a facility management department for the institution which will raise the level of awareness of building performance evaluation among end users, by its periodical application to building facility evaluation, a task which will be carried out with response from end users, hence orienting them on BPE. This will ensure that facilities managers will procure and manage buildings using the critical performance indicators for educational buildings as recommended by the National University Commission. However, the establishment of a facility management department for the institution is paramount, so as to always be conversant with the building facilities end users ever dynamic needs in buildings. Hence, the need for a department which will be involved in the early design and construction of suitable building facilities for the institutions, effectively manage such in line with the user's vibrant needs, finally carryout the two functions above.

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