



## **Appraisal of Maintenance Management Practices of Benue State Universities Buildings**

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### ***Abstract***

*The study assessed the building maintenance practises employed in universities in Benue State with the view of suggesting measures for effective maintenance management practises in these institutions. Data was collected from 185 members of the sampled institution's staff and students, with an 89% response rate. A purposive sampling technique was adopted for the study. The analysis of the data was carried out with the use of percentage, mean item score, and Spearman rank correlation. The study identified the current maintenance practises in Benue state's public universities and renovations were agreed to be the most adopted form of maintenance practise with a (MS = 3.82). The study identified the most significant factor influencing the decision to carry out maintenance work on buildings in Benue State Universities as faulty design (MS = 3.29). The result of the Spearman rank correlation analysis is presented as positive and slightly strong (0.485). The correlation was therefore found to be significant at a 1% (0.01) level of significance ( $p = 0.00$ ). It can therefore be concluded that a lack of maintenance culture on the part of both governments, maintenance managers, and building users' maintenance in the study area results in the deferred maintenance of academic buildings in public universities in Benue State. The major recommendations from the study were that the school's management should employ qualified maintenance personnel to be in charge of maintenance-related issues and that both the management and users should be sensitised to the proper use of public facilities.*

**Keywords:** Maintenance, Management, Practices, Universities Buildings, Benue State.

## Introduction

The importance of buildings and their auxiliary facilities to human existence and their activities cannot be overemphasized. Though a building structure should be built to last, its longevity still depends on the level of care channelled into it. Effective maintenance is required to sustain the original purpose and intent of the building in terms of functions, aesthetics, health and safety, and so on. As the economy of a nation grows, the need for maintenance functions increases (Tan, Shen, and Langston, 2012).

Infrastructure constitutes a huge percentage of a country's investment. It is important that these facilities, which include public buildings, are well maintained for them to serve the aesthetic and for the architectural purposes for which they are constructed (Odeyemi *et al.*, 2019). A major peculiarity of a developed country is their infrastructural development, which includes well-planned maintenance since this plays a major part in the socio-economic growth of any country. Consequently, a lot of developed nations have well-maintained infrastructures on which they rely as a source of income for their economies. Hence, such nations take maintenance of their infrastructures seriously and use them to attract tourists to their country,

yielding revenue for them (Ugwu *et al.*, 2018).

According to Oyigbo and Ugwu (2017), many institutions carry out infrastructure development through PPP but measurable indicators of success or otherwise do not exist. Maintenance is defined as "a combination of any actions carried out to retain an item in, or restore it to an acceptable condition" (BSI 1984, 3811). However, maintenance, according to Olanrewaju (2010), is "the processes and services to preserve, repair, protect, and care for a building fabric and engineering services after completion, repair, refurbishment, or replacement to current standards to enable it to serve its intended function throughout its entire lifespan without drastically upsetting its basic features and use". From the definitions, it can be seen that maintenance is a vital component of an organisation's existence in relation to asset management. It is of great importance that construction management practises are given great attention (Iyamu *et al.*, 2018). Higher education institution buildings constitute a significant part of the nation's assets. As it is understood that tertiary education is an important wheel for the development and progress of a nation, the

importance of educational facilities which play host to a large number of users with various needs as typified by tertiary education facilities cannot be overemphasised (Anifowose and Lawal, 2013). It is through the university buildings that future leaders, captains of industry, entrepreneurs, professionals, and scientists are produced (Eke *et al.*, 2017).

These types of buildings require maintenance in order to provide a quality and favourable environment for learning, research, and administrative activities within the institution (Pute and Geipele, 2017). At the tertiary level, the phenomenal growth in the number of applicants for admission every year has led to the rapid development of new institutions. Oluwunmi, Akinjare, Ayedun, and Akinyemi (2012) observe that today, almost all the 36 states and Abuja (FCT) have a federal and/or state college of education, polytechnic, and university. In spite of these positive developments, the demand for admission still far outstrips the supply at the tertiary level. The result is that over the years, the existing institutions have had to double or even triple their intake without a commensurate expansion of facilities, including buildings.

Many public structures are not well maintained. The components of such buildings, such as floors, ceilings, doors, and windows, frequently express evidence of the nonexistence of maintenance and repair. Some office and residential buildings of public institutions have not experienced any major maintenance since they were constructed. This has resulted in such structures being in a dilapidated state, and some of them having been totally abandoned. Thus, lack of maintenance of these facilities by occupants and authorities regularly results in the reduction of the lifespan of such buildings (Talib *et al.*, 2014). In view of the above, this research assessed the maintenance management practices of the Benue State Universities buildings. The buildings include the administrative buildings, the students' lecture theaters, the students' hostels, and the university staff quarters.

The following objectives were formulated:

- i. To evaluate current maintenance practices in Benue state's public universities.
- ii. To assess the effectiveness of maintenance management practices in Benue State Universities.

## **LITERATURE REVIEW**

### **Forms of maintenance practices**

#### **1. Servicing**

Servicing as a form of building maintenance according to the author is essentially a clearing operation undertaken at regular intervals of varying frequency and is sometimes termed day-to-day maintenance. Daily sweeping of floors, monthly washing and cleaning of windows and regular painting for decoration and protection every four years are some examples of servicing. However, as more equipment that is

sophisticated is introduced so more complicated service schedules become necessary. Servicing becomes necessary because of constant use of facilities, and the effect of the weather and atmospheric conditions on the components of the building (Cobbinah, 2010). Odediran *et al.*, (2012) found out that a large percentage of building occupants carry out “servicing” form of maintenance daily, weekly, monthly, quarterly, and yearly. Albeit, most do this without knowing they are carrying out maintenance. However, it is uncertain of a similar experience in Universities since University Buildings Users have a peculiar case quite different from residential building occupants.

## **2. Rectification**

Cobbinah (2010) submitted that Rectification work usually occurs fairly early in the life of a building; but it can also occur sometime within the life span of the building. It arises from shortcoming in design, inherent fault in or unsuitability of component, damage of goods in transit or installation and incorrect assembly. Rectification represents a fruitful point at which to reduce the costs of maintenance, because it is available. All that is necessary at any rate in theory is to ensure that components and materials are suitable for their purpose and are correctly installed. Rectification work could be reduced by the development and use of performance specifications and codes of installation (Bolaji & Adejuyigbe, 2012). Rectification is the response to inherent defects in design, construction or installation stages of the building process, to this effect Odediran *et al.* (2012) says “one third of the maintenance cost of building can be saved if proper care has been taken at design and construction stage”. To avert this therefore the various building professionals must be alert and design buildings devoid of faults and specify materials that are appropriate and readily available to avoid or ensure ease of maintenance at post occupational stage (Che-Ani *et al.*, 2009). This will provide an opportunity to “trade off” current capital expenditure against future maintenance costs.

## **3. Replacement**

Replacements occur at all costs in buildings. It is inevitable because service conditions cause materials to decay at different rates. Much replacement work stems not so much from physical breakdown of the materials or element as from deterioration of the appearance (Olagunju, 2012). This is because the extent of exposure of materials to the vagaries of the weather varies, and the weather in specific locations also varies whilst the capacity of elements of buildings in withstanding changes and different intensities of the weather vary. This therefore becomes necessary as a result of material decay due to these differential rates of weather conditions. Physical breakdown of materials or elements as well as deterioration appearance may necessitate replacements.

However, this brings the problem of distinguishing between maintenance and improvement, which has not been resolved satisfactorily by many definitions. It is however, generally conceded that maintenance should include reasonable elements of improvement, for example, the replacement of worn out component with up-to-date version. Where the intention of work done is to increase efficiency in the use of the building by adding facilities, which were not previous present, the work should be classify as improvement. However, it is logical therefore to extend the meaning of maintenance to cover some localized improvement (Oyeleye, 2010). Maintenance can also embrace renovations, which consist of work done to restore a structure, service and equipment by a major overhaul to the original design and specification, or to improve on the original design. This may include limited additions and extensions to the original building.

#### **4. Renovations**

It consists of work done to restore a structure, service and equipment by a major overhaul to the original design and specification, or to improve on the original design. Some common maintenance work includes: Repainting of building components such as doors, walls, and ceilings, Repairs of leaving roofs, Repairs of damaged or spoilt electrical and mechanical components (Cobbinah, 2010). This seem to be the major maintenance form of maintenance engaged in, in the construction industry today. Olanrewaju (2010) further affirmed that renovations reduce maintenance cost while Lateef *et al.*, (2010) asserted that renovation works in universities are mainly carried out by major contractors.

#### **5. Conversion**

Conversion simply refers to converting or changing the use of a building from one form to another. For example, converting a residential building to a church, or converting a lecture theatre to an office complex (Cobbinah, 2010). Seeley (1987) stated that prior to conversion the building must be thoroughly examined to determine its stability.

#### **6. Extension**

These forms of maintenance arise as a result of sudden/Necessary development. For example, a lecture theatre can be extended as a result of growth in population. It involves addition of parts to make housing wider or larger in response to what is required of it (Cobbinah, 2010).

#### **7. Alteration**

It simply refers to adjustment of initial design of a building to upgrade the building to a particular standard or aesthetics. These usually arise as a result of increase in taste of the occupant or tenant. And also factors such as environmental factor, geographical location of building among other reasons. This can be found mainly in first generation Universities as they try to modify ancient architecture to modern standard a typical

example is changing of Louvre windows to casement windows (Cobbinah, 2010). Lateef *et al.* (2010) found out that alteration works in universities are carried out mostly by small contractors.

## RESEARCH METHODOLOGY

This research is designed to provide an appraisal of the maintenance management practises of Benue State Universities Buildings. For the purpose of this research, quantitative analysis methods and cross-sectional survey design involving management surveys were adopted to ensure that meaningful data is collected from primary and secondary sources of data. The research population for this study was made up of the staff and resident students who are users of the hostel accommodations, quarters, and facilities, and the representatives of the maintenance executives of the Works and Physical Planning Department of the University. Therefore, 30 staff, 150 students, and 5 maintenance staff were purposefully selected at a ratio of 10 staff, 50 students, and 2 maintenance staff in the University of Agriculture, University of Health Technology, and Benue State University, respectively. The use of structured questionnaires was employed for data collection in order to achieve the study's objectives. The questionnaire (designed in a five-point Likert scale format) addressed issues relating to the research objectives respectively. The collected data was analysed using the Mean Item Score (MIS).

## RESULTS PRESENTATION AND DISCUSSIONS

### Current Maintenance Practices in Benue State's Public Universities

#### Maintenance policy

Table 1 show if there is a maintenance policy in place in the sampled universities. The findings revealed that a majority of 92.7% of the respondents opined there is a maintenance policy in place while 7.3% of the respondents stated otherwise. This finding implies that there is a maintenance policy in place in the sampled universities.

Table 1: Maintenance Policy

<i>Maintenance Policy</i>	<i>Frequency</i>	<i>Percent</i>
<i>Yes</i>	153	92.7
<i>No</i>	12	7.3
<i>Total</i>	165	100.0

#### Frequency of building maintenance

The findings on the frequency of carrying out maintenance on buildings in the sampled higher institutions, as shown in Table 2, revealed that 58.3% of the sampled respondents were of the opinion that institutions carried out maintenance when the

need arose, while 18.2, 13.9, 7.3, and 2.4 opined once a year, monthly, quarterly, and other specified, respectively. This implies that over half of the respondents opined that maintenance is being carried out when the need arises in their various institutions.

**Table 2: Frequency of Building Maintenance**

<i>Frequency</i>	<i>Frequency</i>	<i>Percent</i>
<i>When the need arises</i>	96	58.2
<i>Monthly</i>	23	13.9
<i>Quarterly</i>	12	7.3
<i>Once in a year</i>	30	18.2
<i>Others specify</i>	4	2.4
<i>Total</i>	165	100.0

### **Form of maintenance practices**

The results of the analysis as shown in Table 3 revealed the current form of maintenance practise in Benue state public universities, which were ranked from 1st–7th were computed with mean scores ranging from 3.82 to 3.47. Renovations were agreed to be the most adopted form of maintenance practise with a MS = 3.82 and ranked 1st. The second most adopted form of maintenance was replacement (ranked 2nd, MS = 3.80). followed by rectification and servicing (ranked 3rd and 4th, MS = 3.20), respectively. Alteration was agreed to be the least adopted form of maintenance practised in Benue state public universities (ranked 7th, MS = 3.47). The general level of agreement for the adoption of forms of maintenance practises in the Benue states was average, as indicated by the computed MS value of 3.70 that was obtained.

**Table 3: Form of maintenance practices**

<i>Form of maintenance practices</i>	<i>Mean</i>	<i>Rank</i>	<i>Decision</i>
<i>Renovations</i>	3.82	1 <sup>st</sup>	Somewhat agree
<i>Replacement</i>	3.80	2 <sup>nd</sup>	Somewhat agree
<i>Rectification</i>	3.75	3 <sup>rd</sup>	Somewhat agree
<i>Servicing</i>	3.75	3 <sup>rd</sup>	Somewhat agree
<i>Extension</i>	3.69	5 <sup>th</sup>	Somewhat agree
<i>Conversion</i>	3.65	6 <sup>th</sup>	Somewhat agree
<i>Alteration</i>	3.47	7 <sup>th</sup>	Somewhat agree
<b>Average</b>	<b>3.70</b>		<b>Somewhat agree</b>

### **Effectiveness of Maintenance Management Practices in Benue State Universities. Effectiveness of Form Maintenances Practice**

Table 4 shows the effectiveness of form maintenance practises adopted by the sampled institutions. The findings revealed that 51.5% and 44.2% of the respondents were of

the view that the form maintenance practises adopted were effective and moderate, respectively. The remaining 4.2% of the respondents opined that the form maintenance practises were very effective. This implies that the form of maintenance practise was effective.

Table 4: Effectiveness of form maintenances practice

<i>Effectiveness</i>	<i>Frequency</i>	<i>Percent</i>
<i>very effective</i>	7	4.2
<i>Effective</i>	85	51.5
<i>Moderate</i>	73	44.2
<i>Total</i>	165	100.0

### **Period spent in the institution**

Table 5 shows the number of years' respondents were staff or students in the sampled schools, and the findings revealed that the majority, 79.4%, spent 1–4 years, while 15.2% spent 5–8 years. The remaining 5.5% of the respondents sampled have spent a period of 9–12 years. This implies that respondents have the requisite knowledge of what is happening within the school premises.

Table 5: Period spent in the institution

<i>Period</i>	<i>Frequency</i>	<i>Percent</i>
<i>1-4yrs</i>	131	79.4
<i>5-8yrs</i>	25	15.2
<i>9-12yrs</i>	9	5.5
<i>Total</i>	165	100.0

### **Respondents opinion on maintenance of building in the school premises**

The opinion of the respondents on whether the buildings in their various institutions were properly maintained, as shown in Table 6, revealed that 50.3% of the respondents opined yes that the buildings were properly maintained and 49.7% of the respondents stated otherwise. The findings went to ask about the present condition of the components of buildings, and the findings, as shown in Table 7, reveal that a majority of 60.6% of the building components are in fair condition, 37.0% are in bad condition, and only 2.4% of the building components are in good condition. This implies that half of the respondents 50.3% are of the opinion buildings in their various institutions were properly maintained and majority 60% opined that the building components were in good condition.



**Table 6: Opinion on maintenance of building**

<i>Opinion on maintenance of building</i>	<i>Frequency</i>	<i>Percent</i>
<i>Yes</i>	83	50.3
<i>No</i>	82	49.7
<i>Total</i>	165	100.0

**Table 7: Present condition of buildings**

<i>Present condition</i>	<i>Frequency</i>	<i>Percent</i>
<i>Good</i>	4	2.4
<i>Fair</i>	100	60.6
<i>Bad</i>	61	37.0
<i>Total</i>	165	100.0

## CONCLUSION AND RECOMMENDATIONS

The maintenance management practises of Benue State's Universities buildings were critically evaluated in this research. The results of the analysis carried out led to the conclusions made in this chapter. Based on the results of this study, it can be stated that a maintenance policy is in place in the sampled universities, and the findings reveal that maintenance is being carried out when the need arises. Renovations were agreed to be the most adopted form of maintenance practice. The respondents were of the view that the form maintenance practises adopted were effective. The findings revealed that the building infrastructure in the school grounds is in fair condition. It can therefore be concluded that a lack of maintenance culture on the part of both governments, maintenance managers, and building users' maintenance in the study area results in the deferred maintenance of academic buildings in public Universities' in Benue state. As a result of the conclusions made in this study, the following were recommended: The Universities' management should employ qualified maintenance personnel to be in charge of maintenance-related issues. Both the management and users should be sensitised to the proper use of public facilities.

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