

# Impact of Maintaining Public University Buildings on Occupants, the Legal Consequences on Owners of the Universities in Cross River State, Nigeria

## ABSTRACT

Building maintenance is a very important aspect of every nation infrastructural development and when properly maintained will preserve the condition of building and other facility and will reduce the rate of interruption in occupants services and productivity. This study centered on impact of maintaining public university buildings; the legal consequences on the management of the university with a population 56.251 occupants. The author used qualitative and quantitative method and stratified random sampling technique for the study. Structured questionnaire were used as instrument for data collection. 382 questionnaires were sent out, and out of the 382 questionnaire administered, only 268 copies were returned representing 70% respondent rate for determination of sample size. And from the qualitative study, physical inspection reveal 14 building element that were in a state of dis-repair. Hence, finding from the study reveal that regular and periodic maintenance of building element and other facilities will enhance continuing viable improvement of occupants activities and further help them achieve their goal that will usher sustainable growth in the university, the implication of this finding is that, while keeping the public universities on the part of development remain primary in the policy objectives of successive government, one can state that these conditions appear to be a leaning that has been deeply rooted into the system by demonstrating the pervasiveness and systematic nature that lack of regular maintenance has remained a major set-back to the productive development of the Nigerian public university.

Keywords: poor maintenance, Building maintenance, defect, Tertiary institution, Obsolescence, Sick Building, Negligence, Legal consequence, Consequence, occupant. Liability,

## INTRODUCTION

The prevailing trend of dilapidation of building element in public universities in recent times reveals the level of inadequate attention by management of the university to maintenance policy

of the institution of higher learning. When building are properly maintained it preserve the condition and failure of building element and other facilities that could interrupt occupants activities and the delivery of services and When not properly maintained, there is tendency that deterioration of the element will set-in which will in great measure exert positive or negative influence on the occupants wellbeing, safety, performance and management of the university.

Lateef O. (2010) alleges that, other than the human resources, buildings are the second most significant asset of a university institution and they constitute a significant part of the nation assets while (Mat et al, 2009) as sited by Ofide, Jimoh and Achuen (2015) who further posit that Higher education building are where captains of industries, entrepreneurs, professionals and scientist are produced.

Main while the deplorable condition of most public university buildings within Nigeria and the world in general appears to be a trend that has eaten deep into the system to the extent which some public universities that pride themselves of certain facilities now have them in a standing shadow evidenced by lack of functionality with noticeable trace of abandonment.

Miller (2007). Stated that the business of a tertiary institution is to transmit and disseminate knowledge and culture, teach and conduct scientific research. University assets comprise finance, technology, humans, equipment and plant as well as the constructed facilities (i.e. buildings). The human resource is considered the most significant resource of the university organization because university education is labour intensive. But “The states of abandonment of infrastructural facilities from the basic schools to the tertiary institutions in Nigeria are worrisome and several studies have revealed that dilapidation and unhealthy buildings in a decaying environment depress the quality of life, education, health problems experienced by occupants, and contribute in some measure to antisocial behaviors.” Claudio, Rivera and Ramirez (2016), Gua and Lau (2012) Tanner (2011) Wong and Jan (2003).



## LITERATURE REVIEW

### 2.1 Concept of Building

The concept behind every building is to serve a purpose and when the purpose for which it was built start failing then such building requires attention of the owners or management of the public buildings and experience has shown that, every building start experiencing wear and tear the moment it is completed while others before completion. Hence any building built without a maintenance policy/program from the onset has already program the building for rapid dilapidation that will result to break down of occupant functionality and high cost of maintenance expenses.

Studies by Rangwala, and Dalal (2017), Ming and Mydin (2012), stated that the society requires building for its various activities which could be group into; Residential, Educational, Recreational Buildings, Institutional Buildings, Religious/Assembly Buildings, Business/commercial Buildings, Industrial Buildings, Transportation buildings amongst others but the author shall limited this studies to Educational buildings.

#### **Educational Building:**

Educational buildings covers establishment which include any building used for academic activities or technical instruction which may include; book stores, amusement activities, kindergarten to large universities and community assembly covering both public and private schools. However, elementary and high schools are the most difficult to manage and maintain due to their large number and scattered locations. Schools should provide a physical setting that is appropriate and adequate for learning (NCES 2003 a). Essienyi, (2011) as sited in Agyekum, Ayarkwa and Amoah (2016) which state that the provision of buildings has always been a major concern for both government and private individuals because it provides one of the basic needs of humans, that is shelter while Olanrewaju (2010) repoerted that building are critical factors of production needed to achieve desirable outcomes for university institutions and inadequacy in building facilities would represents a loss in value to the university Institution, its users and other stakeholders.

Adenuga and Iyagba (2005) also in their study, posit that, public buildings are in very poor and deplorable conditions of structural and decorative disrepairs due to abandonment. In spite of millions of Naira spent to erect all these buildings, they are left as soon as commissioned to face premature but steady and rapid deterioration, decay and dilapidation

#### **Building Maintenance**

The word Maintenance has been variously defined by many authors of whom each definition depend on the perception of the problem and the implication of maintenance, efficiency and economy one of such definition is by Ajibola (2009). Who defined maintenance as the work that is done regularly to keep a machine, building or a piece of equipment in good conditions while Adeleye (2009) saw maintenance as involving keeping equipment and mechanized infrastructure in operational conditions for continual use. Oladimeji (1996) described maintenance as the combination of any actions carried out to retain an item in or restore it to an acceptable condition.

Maintenance according to British Standard Glossary of terms (3811:1993) is the construction of all technical and associated administrative actions intended to retain an item in or restore it to a state in which it can perform its required function. Maintenance, be it periodic, preventive or routine serves the primary purpose of preventing the premature failure of the facility and restoring it to its initial status or at least to a level comparable to its initial condition. (Bokinni, 2006) as cited by Anifowose and Lawal (2013).

Seely, (1993) as cited by Cobbinah (2010) defines maintenance as the combination of all technical and associated administrative actions intended to retain an item in or restore it to a state in which it can perform its required functions to an acceptable standard. Maintenance Committee in British recommended building Maintenance to be define as “Work undertaken in order to keep, restore or improve every facility, i.e every part of a building, its services and surrounds, to a currently accepted standard and to sustain the utility and value of the facility’.

- To keep here means that defects are prevented from developing
- To restore means that minor defects, if they are allowed to occur, are then corrected;
- Acceptable standard and acceptable cost indicate that maintenance work is tailored to suit individual needs and conditions.

Building maintenance in its totality includes a wide variety of tasks depending on the particular business or organization. It encompasses a great deal of “behind the scenes” work to ensure that a facility or building remains functional and comfortable for its users, organisation and or management. It could be refer to work undertaken in order to keep, restore or improve a facility or a part of the building, its services and surroundings to a currently acceptable standard and to sustain the utility and value of the facility and includes; inspection, testing, servicing, classification to serviceability, repair, refurbishment, rebuilding, rehabilitation, reclamation, preparation of coasted maintenance schedules, planning, budgeting and management of maintenance works;

When public building are not maintain dilapidation is shore to set in, and dilapidation According to Seeley (1987),denotes a condition of disrepair which has been caused or allowed to develop in the building and which will involve the person responsible in legal liability. Dilapidation of a building may occur as a result of occupant’s failure to keep a particular building in good condition of repairs. Dilapidation is best dealt with by not allowing them to accumulation over time to avoid any consequences it will Cause the occupant and management of the university.

### **General Perspective of Impact of Poor Maintenance of Public Building on Occupants Performance.**

Maintaining public university is an exercise that must be inculcated into the design stage of every building development project as poorly maintained buildings are prone to severe positive and negative impact on the occupants which will cause consequence to the management of the university ranging from dispute and subsequent litigation. Investigation into some studies on the impact of maintenance on occupants of building reveals that, poorly maintain building element and other infrastructure have tremendous impact ranging

from; Health, Economic, Psychological, physiological and sociological impact. Previous Empirical studies on various impact of poor maintenance on the occupants of buildings reveals thus;

Mcintyre (2016) in his study of decaying school buildings in USA posit that, Poor school conditions have an impact on student performance and learning. Research links children’s ability to learn to the condition of their school environment that In the United States, the average school building is more than 40 years old. And in some states, like Michigan, decaying school conditions like those in Detroit Public Schools have now resulted in litigation. Both the district and former state-who were appointed emergency manager Darnell Earley are named in a lawsuit filed by the Detroit Federation of Teachers and the American Federation of Teachers, blaming them for unsafe learning conditions. Some schools had broken classroom windows, mold, and other safety hazards — conditions that Duggan told the Detroit Free Press "break your heart.

Research has links children’s ability to learn to the condition of their school environment. That means, the deteriorating condition of school buildings should be more relevant in ongoing discussions about closing achievement gaps.

Therefore, the condition of a school has a direct impact on students’ achievement (McCall 1997). The literature cites numerous instances indicating that students learn better in an environment that is pleasant, safe, and free of health hazards (Earthman, Cash, & Van Berkun, 1995, NCES 2003 a). In an international seminar in Austria (1998) on “Improving the Quality of Educational Buildings,” ample research was presented indicating that the quality of facilities has an impact not only on educational outcomes but on the well-being of students and teachers (Hinnum 1999). Seon, Guerin, Km, Brighton, and Baurer (2013) investigate the relationship between indoor environmental quality (IEQ) in a set of university classrooms and students’ outcomes and explain that many researchers have found that IEQ affects people’s performance whether they are in work, home, or learning environments. This can be true for schools where it has been found that poor indoor environments may reduce students’ performance (Fisk, 2000; Mendell et al.,2002). In 2014 the Civil Rights at the U.S.

Department of Education affirm that; “Structurally sound and well-maintained schools can help students feel supported and valued. Students are generally better able to learn and remain engaged in instruction, and teachers are better able to do their jobs, in well-maintained classrooms that are well-lit, clean, spacious, and heated and air-conditioned as needed. In contrast, when classrooms are too hot, too cold, overcrowded, dust-filled, or poorly ventilated, students and teachers suffer. Data collected from students (N = 631) of University of Minnesota were analyzed to test a hypothesized conceptual model by conducting a path analysis. Findings suggested that IEQ of the classrooms, such as thermal conditions, indoor air quality, acoustic conditions, lighting conditions, furnishings, aesthetics, technology, and view conditions, was associated with positive student outcomes. The general positive contribution that classrooms make to students’ satisfaction and learning concurs with many other researchers (Earthman, 2004; Hescong Mahone Group, 1999; Mendell & Heath, 2005) who have investigated these issues. This study provided empirical evidence that designing a classroom with attention to sustainable IEQ criteria. is associated with positive student outcomes including their overall satisfaction with classroom IEQ and its perceived effect on their learning, that lead to students’ satisfaction with courses.

Dawson and Parker as cited by Glen Earthman (2002): posit that, school facilities condition and student Academic Achievement provide a descriptive analysis of the feelings of teachers about the building before, during, and after a renovation project is done on their schools. Teachers reported that, there were many aspects of the renovation project they did not like and they had negative feelings about their work before and during that period of time. After the renovation, however, teachers reported that morale among the faculty was high and their frustration level was much lower than during the renovation. The faculty reported that the changes and improvements to the physical environment greatly enhanced the teaching and learning environment and in a way compensated for the inconveniences the renovation work caused.

Decades of research further confirms that the conditions and qualities of school facilities affect students, teachers, and overall academic achievement. In their review of the peer-reviewed

literature, researchers at the Harvard School of Public Health conclude that “the evidence is unambiguous — the school building influences student health, thinking, and performance” (Eitland et al. 2017) as cited in Filardo, Vincent, & Sullivan (2019). This study was conducted among university students from the Faculty of Business and Management in Universiti Teknologi MARA (UiTM) Perlis Branch and it has been involved with 217 students as respondents. The researcher used various techniques to analyse the data such as reliability test (Cronbach's Alpha Value), descriptive statistics for each item in independent variables, Pearson correlation analysis, and multiple regression analysis to test the relationship between each variable in this study. The results obtained from the regression analysis was useful to determine the overall fit of the model in this study. Based on the research conducted, out of all the variables involved which are e-learning, library, and the hostel is positively significantly correlated and only one independent variable that shows insignificant correlated with the academic achievement which is the classroom.

Clark (2002). Contend that “The quality of school buildings can help or hinder learning and teaching; a new study claims, Well-designed buildings and pleasant surroundings can lead to better attendance and concentration as well as motivation and self-esteem - factors which can improve performance. More so, studies from previous researchers have proved that, there is a link that establish a direct impact between the quality of building facilities on staff and students’ comfort, satisfaction and the school image, ‘Leung and Fung, 2005; (2011); Kok and Mobach (2011) and Tschannen-Moran, (2008). If the facilities are inadequate or dysfunctional then the learning process will be hindered and academic productivity will decrease,” Nutt and McLennan (2000). In similar studies by Wordsworth (2001); it was reveal that, the condition and quality of buildings in which people live, work and learn reflects a nation’s well-being while Khalil and Husin (2011) as cited by Ofide & Jimoh (2016) posit that the educational process and learning activities can be disrupted if the building performance is poor, as a result will tend to affect the student’s academic success. This attest to the assertion that there is a relationship between the

condition of building the occupant of building studies by (Abisuga, Famakin, & Oshodi, 2016 Claudio, Rivera and Ramirez 2016 Gua and Lau 2012 Tanner 2011 Wong and Jan 2003). Reveal that there is a relationship between educational facility and the performance of students and staffs in a tertiary institution.

Other empirical studies includes; (Agyekum, Salgin, & Danso, 2017, , Earthman G. 2002, Olarewaju, A. 2012, MaCall, H. 1997, Maxwell, L. 2015, Erin McIntyre 2016, Lair, 2003) all investigated the condition of building or facility on occupants and all submitted their findings that there is a relationship between maintaining university building and the occupants of the building.

### **Health Implication of Maintenance of Public Building on Occupants**

The implication of maintenance on the wellbeing of the occupant of building the is better define by World Health Organization (1948) as a complete state of physical, mental and social well-being, and not merely the absence of disease or infirmity and from these definition of health it implies that the wellbeing of every individuals is influenced by the living environment and several studies within Nigeria and outside seem to unveil an existing relationship between building and its occupants. Studies by Uline & Tschannen-Moran, (2008) on the inter-play of quality of facilities, school climate and student achievement reveals that, substandard school buildings and grounds can negatively affect the health of children and adults in schools. Alexander Robertson IV (2001) conducted a study on mold and it impact on occupants the purpose of the study was to unveil legal consequence of the health impact of Mold. He cited various empirical cases and court rulings on health consequences of mold on occupant of building defect at various instances in California and other state of property damages and personal injuries, claims arising from micro biological agent found in structure. Uline and Tschannen-Moran, (2008). investigated the relationship between defects in educational buildings and building related illnesses (physical, psychological and physiological) experienced by users, Abisuga-et.al (2016) in their study reveal the diverse building related sickness such as headache, tiredness, fatigue, cough, itching and burning eyes,

runny nose and their related causes have been identified in the literature. Similarly, in a survey conducted in educational laboratories most of the students experienced all the SBS symptoms such as dry skin, runny noses, dry eyes, blocked/stuffy nose, tiredness and flu-like symptoms (Amina *et al.*, 2015). While, Gupta, Khare and Goyal (2007) found headaches, lethargy and dryness in body mucous in air conditioned buildings.

### **Consequences of maintaining public university building On Occupants And Management of University Buildings.**

#### **i. Health of Occupants:**

Several studies have investigated impact of maintenance on health occupants with result showing positive impact due to the state of class rooms, offices and poor sanitary condition in school toilet facilities which further cause their absentee in class.

#### **ii. Economic Waste /Rebuilding Cost:**

When maintenance in buildings are deferred, or un attended to, It will set the building for more wear and tear and collapse of some element of the building which will attract increase cost for remedial work to put the building back to its original condition,

#### **iii. Injury, Impairment and Death**

Occupant of poorly maintained university building are prone to injuries as a result of broken tiles, such as slip and fall which could cause injury and impairment that may result to death

#### **iv. Poor Corporate Image And Performance**

Well-designed buildings and pleasant surroundings can lead to better attendance and concentration as well as motivation and self-esteem - factors which can improve performance. Clark (2002)

### **Legal Frame Work And Building Regulations**

When issues regarding poor maintenance in building are reported with negative consequences resulting to disputes,

legislature provide an adequate, reasonable, effective and complete way to solve these disputes. Most studies have attributed the condition public university buildings to poor maintenance due to several reason ranging from inability of owner to identify early wear and tear, lack of policy to lack of knowledge of the consequences on the management of the universities but how far various recommendation from previous studies on this subject has been address by stake holders in the built environment in Nigeria and in particular reference to the study area call for concern to the author.

In Cross River State, the Building regulations address the ways in which new structures are to be built and materials to be used. They may also be applied to maintenance and improvement of existing buildings. The main objective of building regulations is that of securing social acceptable minimum standards. In these study area the Cross River State building regulation law of (1987) published as Cross River State legal notice No.15 of 1984 hereafter refer to as the principal regulation strictly address the various process and approval of development and control of buildings projects in Calabar and its environ

### Legal Consequence

Legal denote that which is allowable or enforceable by being in conformity with the law of the land and the public policy not condemned. Hence legal consequence implies an unpleasant outcome or effect on the occupant that one could reasonable expects to result from an act done consciously or unconsciously which is determinable at law.

### Acts of Negligence

Negligence is the omission to do something which a reasonable man is guided upon considerations that regulate the conduct of human affairs or doing something which a prudent and reasonable man could not do. The most usual definition of negligence is that it is a conduct, or a failure to act, that breaches a duty to take care. Negligence can be something that occurs in everyday life, such as a Council that fails to repair the pavement properly, resulting in an injury to a pedestrian.

### Owners-Liability

Owners typically consider themselves immune from liability for construction defects or failures. The owner's view is that the designer is obliged to produce plans and specifications that are sufficient for their intended purpose and the contractor is responsible to build the project in accordance with those plans and specifications. However, the owner may be responsible for construction defects in certain circumstances. For example, an owner who provides project information represents (either explicitly in the construction contract or implicitly as imposed by law) that the information will be accurate. Thus, an owner who inaccurately reports the condition of the building site is responsible for that information in the event that a building failure results. This means that proper skill, knowledge and care are applied to the construction of the building by these professionals. Anyone that could be injured through foreseeable means is encompassed in this duty of care that is provided by the hired persons for the construction defects with regards to everyday situations it can sometimes be difficult to know whether a duty of care was owed.

### Liability for Slip and Fall Accident

If you've been injured in a slip and fall accident on someone else's property because of a dangerous condition, you'll likely need to be able to show one of the following in order to win a case for your injuries;

- i. Either the property owner or his employee should have known of the dangerous condition because another, "reasonable" person in his or her position would have known about the dangerous condition and fixed it.
- ii. Either the property owner or his employee actually did know about the dangerous condition but did not repair or fix it
- iii. Either the property owner or his employee caused the dangerous condition (spill, broken flooring, etc.).

In the House of Lords decision *D & F Estates Ltd and Others v Church Commissioners for England and Others* (see *Facilities* Vol. 6/No 9 /September

1988) given on 14 July 1988, the House of Lords considered the extent to which the cost of repairing a defect in a building which was discovered before the causing of any injury or personal damage to other property, was recoverable by a negligence claim by the occupier against the builder. The case concerned the scope of the duty of care which a builder owes to a party such as an occupier in the absence of a contractual link or a uniquely proximate relationship (that is, a relationship so close that it is akin to contract). This article explains the facts of *D & F Estates* and its implications for the occupiers of buildings.

In May 1999, a Simi Valley woman recovered \$350,000 against her homeowners association for failure to repair and remediate chronic water damage to her condo and for her personal injuries suffered from exposure to toxic molds, including *Stachybotrys*. The plaintiff also contracted Meniere's disease as a result of microbiological contamination of her unit. (Tri-Service Reference No. S99-09-19; *Jan Hickenbottom v. Raquet Club Villa HOA*, VCSC case no. SC 020 526.). In May 1998, the owners of a 7,000-square-foot custom home in Playa Del Rey sued the builder after the ceiling caved in as a result of roof leaks that occurred before they moved in. *Stachybotrys* was found in many locations in the house. The case settled for \$900,000. (Confidential Report for Attorneys, CRA No. 10272, 1998 Issue, at pg. 12-54; *Doe Homeowners vs. Roe Builder*.)

## METHODOLOGY

This research paper based on its magnitude adopt qualitative and quantitative research design with a case study research approach due to the large group of respondents and the ease of collecting qualitative data from respondents. And in determining the proportion of respondent in the two public universities, stratified random sampling technique was adopted. Data were gathered from primary source through, Physical observation of the buildings, sampled photographs of some of the buildings were taken and administration of Questionnaires to occupants of the 2 public universities within the study area while Data from secondary source were obtained from the internet which comprises; Published research materials,

seminar papers and Journals from previous researchers.

The population of the 2 public university covered is 56,251 comprising of; University of Calabar 39,612 and Cross River State university of science and technology 16, 639. and the author applied Krejcei and Morgan (1970) table for determining sample size of a study. The research instrument were administered to 382 respondent out of which 268 were return which is 70% and is well thought-out as high and excellent making an allowance for a minimum return rate of 70% as suggested by Kothari (2011). The remaining 114(30%) copies produced and distributed were not returned and were unaccounted for. See table below for respondent status. Moreover, out of the 268 copies of the questionnaire returned, the usable copies numbered 202 due to wrong filling by respondent. This research adopted both descriptive statistics in the form of mean, standard deviation, frequencies regression analysis to measure the strength and association that exist between the impacts of maintaining public universities on occupants of public universities buildings, legal consequences on the management in Cross Rivers State. Data generated from primary sources were used to carry out several statistical analyses descriptive statistics was used for analysis of the collected data.

Reliability Coefficient was computed for the composite scale and each of the subscales, and the results are reported in Table 1. As we can see, the value of the Alpha coefficient for the composite scale and the subscales are all above the threshold ( $\alpha \geq 0.70$ ); hence, they are all reliable. Table.1. shows the reliability assessment of our predictor variables using Cronbach's alpha. It indicates how the items for each factor were internally related in the manner expected.

**Table 1. Test of Reliability (n=202)**

Scale	Dimension	Items	Reliability
COB	Condition of Building	5	0.761

RM	Regular Maintenance	5	0.732
PM	Poor Maintenance	5	0.712
OOB	Occupants of Building	5	0.774
Overall Reliability Scale		15	0.912

*Source: SPSS 22.0 Window output (based on 2021 field survey data)*

**Result and Discussion of Findings**  
**Determination of condition of building and other physical Facilities.**

**Table 2.** Frequencies showing condition of building and other facilities in University of Calabar(n=165)

S/N	Building Conditions	Very Conductive	Conductive	Fair	Not Conductive	Very Unconductive
1	Roof	15(10%)	35(21%)	20(12%)	35(21%)	45(27%)
2	Ceiling	20(12%)	25(15%)	15(9.1%)	50(30%)	55(33%)
3	Walls	-	11(5%)	15(19%)	70(42%)	60(36%)
4	Doors	-	-	-	35(21%)	130(79%)
5	Floor	15(10%)	55(33%)	20(12%)	25(15%)	50(39%)
6	Paintings	25(15%)	10(7%)	50(30%)	55(33%)	25(15%)

*Source: SPSS 22.0 Window output (based on 2021 field survey data).*

Table 2. indicates that responses on roof in the University of Calabar was 45(27%) for not very conductive. This indicates that roof as an aspect of the building in the University of Calabar was not encouraging due to its poor state of affairs. Ceiling recorded 55(33%) as not very conductive. This implies that the building in the University of Calabar has dilapidated ceilings.

Responses on the walls of the building yielded no response for very conductive, 60(36%) for very unconductive.

Responses on the doors of the buildings presented no responses for 130(79%) as not very conductive. Responses on the floors of the building yielded 55(33%) for conductive,. This indicates that the floors of the buildings of the University of Calabar have utterly gone bad beyond the acceptable standard befitting a university.



**Plate 2: Showing condition of external/internal walls of university of Calabar library building.**

The item on paintings presented respectively. 55(33%). These results implies that state of the building element in University of Calabar as seen in Table 3, clarifies the implication of poorly maintained public universities buildings considering this outcome for decision making on occupants of buildings.

**Table 3:** Frequencies showing condition of building and other facilities in

**Cross Rivers State University of Science and Technology (n=103)**

S/N	Building Conditions	Very Conductive	Conductive	Fair	Not Conductive	Very Unconductive
1	Roof	5(5%)	3(3%)	19(20%)	35(34%)	40(39%)
2	Ceiling	-	8(8%)	30(29%)	25(24%)	40(39%)
3	Walls	-	13(5%)	25(24%)	30(29%)	35(33%)
4	Doors	25(24%)	30(29%)	-	15(15%)	33(32%)
5	Floor	6(3%)	13(6%)	15(14%)	26(13%)	42(41%)
6	Paintings	-	-	-	48(47%)	55(53%)

Table 3. indicates that responses on roof in Cross Rivers State University of Science and Technology was not 40(39%) for not very conductive. This indicates that roof as an aspect of the building in Cross Rivers State University was not encouraging, due to its poor state of affairs. Ceiling recorded no response for very conductive, 40(39%) as not very conductive. This implies that the buildings in Cross Rivers State University of Science and Technology have dilapidated ceilings. Responses on walls of building in Cross Rivers State University recorded no response for 35(33%) as not very conductive. This implies that the walls of buildings in Cross Rivers State University of Science and Technology have unfavourable condition.



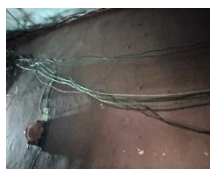
**Plate 3. Showing condition of building in Crutech**

**Table 4. Frequencies showing condition of other elements of building in University of Calabar (n=165)**

1.	Broken Sockets 80(48%)	Pull Off Sockets 20(12%)	Not Functioning Sockets 50(30%)	No Idea 15(10%)
2.	Broken Switches 20(12%)	Pull Off Sockets 35(21%)	Not Functioning Switches 50(30%)	No Idea 60(36%)
3.	Broken Wall Brackets 70(42%)	Pull Off Wall Brackets 15(10%)	Not Functioning Wall Brackets 20(12%)	No Idea 60(36%)
4.	Unguided Cables -	Pull Off Cables 35(21%)	Not functioning Cables 130(79%)	No Idea -

**Source: SPSS 22.0 Window output (based on 2021 field survey data).**

Table 4 shows defects on each of the elements of the facilities in University of Calabar. It shows that, for broken sockets, the responses are: 80(48%) for pull off sockets, 20(12%) for not functioning sockets, 50(30%) and for no idea 15(10%). The item on broken switches witnessed 20(12%), pull off sockets had 35(21%), not functioning switches 50(30%), and No Idea had 60(36%). The item on broken walls witnessed 70(42%), pull off wall brackets 15(10%), not functioning wall brackets 20(12%), and No Idea 60(36%). Finally, on unguided cables witnessed no response, pull off cables had 35(21%), not functioning cables 130(79%) while No Idea had no response. This result shows the poor state of affair other element in university of calabar.



**Plat 4. Showing conditions of other facility in the university**

**Table 5. Frequencies showing defects on each of the elements of the facilities in Cross Rivers State University of Science and Technology (n=103)**

1.	Broken Sockets 25(24%)	Pull Off Sockets 30(29%)	Not Functioning Sockets 15(15%)	No Idea 33(32%)
2.	Broken Switches 48(47%)	Pull Off Sockets -	Not Functioning Switches 55(53%)	No Idea -
3.	Broken Wall Brackets 30(29%)	Pull Off Wall Brackets 25(24%)	Not Functioning Wall Brackets 40(39%)	No Idea 8(8%)
4.	Unguided Cables 25(24%)	Pull Off Cables 13(12%)	Not functioning Cables 30(29%)	No Idea 35(34%)

**Source: SPSS 22.0 Window output (based on 2021 field survey data).**

Table 5. shows defects on each of the elements of the facilities in Cross Rivers State University of Science and Technology. It shows that, for broken sockets, the responses are: 25(24%) for pull off sockets 30(29%), for not functioning sockets, 15(15%), and for no idea 33(32%). The item on broken switches witnessed 48(47%), pull off sockets had no response, not functioning switches 55(53%), and No Idea had had no

response. The item on broken walls witnessed 30(29%), pull off wall brackets 25(24%), not functioning wall brackets 40(39%), and No Idea 8(8%). Finally, on unguided cables witnessed 25(24%), pull off cables had 13(12%), not functioning cables 30(29%), and No Idea had 35(34%). This statistical result shows that building element in the public university studied have not received adequate attention which has remain a major setback in the productive of the Nigerian public universities.

**Table 6. Frequencies showing defects on each of the elements of the facilities in University of Calabar(n=165)**

S/N	ITEMS	SD	D	A	SA	(x)	ST D	Remark
1.	Broken Floor.	(4.50)	(3.50)	(28)	(32)	3.14	.85	Agree
2.	Leaking Roofs.	(4.00)	(3.50)	(17.3)	(75.2)	2.14	0.99	Agree
3.	Plumbing Wares.	(3.0)	(3.50)	(7.9)	(57.4)	3.41	0.85	Agree
4.	Wetness/Crack on Walls.	-	47 (23.3)	-	155 (76.7)	3.54	0.65	Agreed
5.	Electrical Installations.	-	-	75 (37.1)	127 (62.9)	3.43	0.63	Agreed
6.	Other Facilities.	-	11 (5.40)	74 (36.6)	117 (57)	1.47	0.65	Agreed

*Source: SPSS 22.0 Window output (based n 2021 field survey data).*

Table 6. shows defects on each of the elements of the facilities in University of Calabar. It shows that, for plumbing/sanitary wares/fittings, the responses are: 70(42%) for broken toilet seat, 15(10%) for cistern not functioning, 20(12%) for dismantle and 60(36%) for broken flushing handles. The item on water taps witnessed 50(28%) for leaking pipes, 25(15%) for faulty taps, 55(33%) for pull off taps/showers, and 35(21%) for disconnected water supply. Finally, the item on sewage system recorded 45(3%) for leaking pipes, 20(12%) for broken toilet seat/cistern, 35(21%) for un-dislodged soak away pit, and 65(39%) for uncovered inspection chamber/pits.



**Plate 5. showing condition of Hostel Building, Cross River State University of Technology**

**Table 7. Frequency showing whether poor maintenance has any health impact on occupant of public universities buildings (n=268). (UNICAL and CRUTECH)**

Source: (Statistical Data, 2021). (Percentage in parenthesis).

*SD=strongly disagree, D=Disagree, A=Agree and SA=Strongly agree*

1.	Sanitary Wares	Broken Toilets	Cistern not functioning	Dismantle	Broken Flushing Handle
		70(42%)	15(10%)	20(12%)	60(36%)
2.	Water Taps	Leaking Pipes	Faulty taps	Pull Off Taps/showers	Disconnected water supply
		50(28%)	25(15%)	55(33%)	35(21%)
3.	Sewage System	Leaking Pipes	Broken toilet sheets/cistern	Un dislodged soak away pit	Uncovered inspection chambers/pits
		45(27%)	20(12%)	35(21%)	65(39%)

Table 7. indicates that responses on broken floor tiles presents 9(4.50%) as strongly disagree, 7 (3.50%) as disagree and 74 (36.6%) as agree, the response on leaking roofs was given as 112 (55.4). Plumbing wares presented 8(4.00%), Strongly Disagree, 7(3.50%) as Disagree then 35(17.3%) as Agree and Strongly Agree presented 152(75.20%) respectively. Responses on plumbing wares yielded 6 (3.00%) for strongly disagree, 7 (3.50%) for disagree, 16(7.90%) for Agree; 116(57.4%) for Strongly Agree. Wetness/crack on walls and

electrical installations, portray that responses on disagree and strongly disagree yielded 47 (23.3%) and 155 (76.7%) respectively. The item on other facilities presented 75 (37.1%) and 127 (62.9%) for agree and strongly agree respectively. This implies that poorly maintained building elements and other physical facilities have direct consequence on users which clarifies the implication of public universities management considering this outcome for decision making taking the occupants of buildings into consideration.

**Evaluation of the Socio-economic impact of poor maintenance on the occupants of public university buildings**

Table 8. Frequencies showing socio-economic impact poor maintenance

on occupants of buildings (n=268)					
1.	Health wise	Cold/cough/ headaches 70(30.2%)	Expiratory infections 67(26%)	Skin itching/burning and watery eyes 81(30%)	Blood pressure 50(19%)
2.	Academically	Poor Concentration 79(29%)	Poor Performance 81(30%)	Loss of Interest 58(22%)	Poor Reputation 50(19%)
3.	Socially	Low Self Esteem 75(28%)	Fatigue 85(32%)	Poor Grading 69(25%)	Reduce Interest 39(15%)
4.	Economically	High cost of Maintenance 50(19%)	Litigation Cost 79(29%)	Increased Stress Level 81(30%)	P 5

Table 8. shows that, health wise recorded 70(30.2%)for Cold/cough/headaches, 67(26%) for expiratory infections, 81(30%) for, Skin itching/burning and watery eyes and 50(19%for Blood pressure 15(7.4%). For academically, Poor Concentration has 58(22%),Poor Performance has 81(30%), Loss of Interest58(22%) and Poor Reputation 50(19%). For Socially, Low Self Esteem recorded 75(28%)

Fatigue has 85(32%) Poor Grading 69(25%) and Reduce Interest 39(15%). Economically, responses were: High cost of Maintenance 50(19%), Litigation Cost 79(29%) Increased Stress Level 81(30%) and Poor Output 58(22%). Physical Environment presents Exposure to Hazard 79(29%),

Poor Aesthetics 58(22%)Negative Image 79(29%)and Wear and Tear of Physical Structures 50(19%).*the statistic outcome of this result reveals how severe the negative impact of poor maintenance is to the occupants.*

**Table 9: showing whether Owners of Public Universities are held accountable for consequences of negative impact of poorly maintained universities buildings (n=268) (UNICAL AND CRUTECH)**

SN	Variable	Freq.	%
1	Yes	100	37
2	No	128	48.
5	No Idea	40	15
<b>Total</b>		<b>268</b>	<b>100.00</b>

Source: field survey 2021

As Table 9 shows, the responses on NO. are the highest, representing approximately 48 percent, closely followed by responses on Yes, representing approximately 37 percent. Responses on Not All represent approximately 15 percent. The outcome of this result signifies that owners of universities have not been fully made to be accountable for the potential negative impact of poor maintenance on the occupants of their universities.

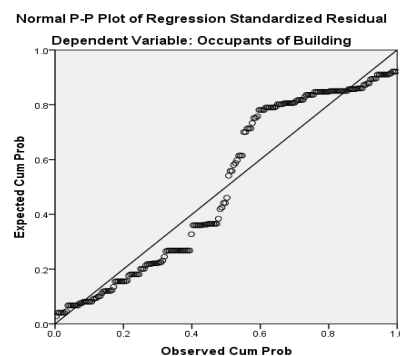


Figure 5. f-ratio table

**CHAPTER 5**

**INTERPRETATION AN DISCUSSION OF FINDINGS**

The results of the model condition of building on occupant of building provide insights into the dynamic relationship between poorly maintained public university building and occupants of building

### **Influence of Condition of Building on Occupants of Building**

As observed from the statistical result, condition of building has significant influence on occupants of building. This implies that the predictor variable (condition of building) explains 55.2% of the variables in occupants of buildings in public universities in Cross Rivers State.

The findings indicate that a relationship exists between condition of building and the occupants of building. These problems persist as a result of poor maintenance policy, poor funding of the universities and corruption in government. The result of this finding agrees with the result of Cobbinah J. s(2010) Yahaya Ibrahim (2017) who reveals that the deplorable condition of public university buildings potential impacts negatively on the lives of the occupants of such buildings.

### **Influence of Regular Maintenance on Occupants of Building**

The estimated regular maintenance model reveals that regular maintenance have significant positive impact on occupants of building. This finding is indicative that regular maintenance in public universities in Nigeria is an important source of improving prolonged existence amongst the university population. This positive impact of regular maintenance corroborates with the findings of Lateef (2010) that, other than the human resources, buildings are the second most significant asset of a university institution.

**Influence of Poor Maintenance on Occupants of Building:** The dynamic relationship between poor maintenance and occupants of building reveals that poor maintenance has significant effect on occupants of building. In this present study for instance, impact of poor maintenance, health wise recorded 108(54%) for Cold/cough/headaches, and Expiratory infections in University of Calabar, and 94(46) for Cross Rivers State University of Science and Technology. Thus, poor maintained buildings

diminish the competence and performance of enclosed spaces in university buildings. (Claudio et al., 2016; Gou & Lau, 2012; Tanner, 2000; Vafaeenasah et al., 2015; Wong & Jan, 2003). Putus (2012) and have linked health problems experienced in buildings with low functionality of building facilities. The implication of this finding is that the available government involvement in maintenance activities in public universities is inadequate to reduce to income gap amongst the occupants of the buildings. Given the outcomes of the statistical tests, one can state that these conditions appear to be a leaning that has been deeply rooted into the system in this manner originating incalculable adversity on the occupants, the university management and the built environment in general.

### **CONCLUSION**

This study deepened the understanding of the influence of maintenance of building on the occupants of public universities buildings in Nigeria. The indicators of the independent variable include condition of building, regular maintenance and poor maintenance. These indicators offered insights into the various components of maintenance that affects the occupants of building. As observed from the results, maintenance index contracts the occupants of the building. This attests to the pervasiveness of poor maintenance culture in public universities in Nigeria which has remained a major threat to the development process. Based on the statistical tests, the following findings were made:

- i) Poor condition of building in public universities in Nigerian has remained a major constraint to the growth of the universities which has course several strike action by academic and nonacademic union of the universities.(ASSU, NASSU)
- ii) It becomes apparent that condition of building enhance negative or positive performance of building occupants and when adequately engaged upon, makes building occupants achieve their goals and consequently capable of delivering faithful result that will usher in sustainable growth in the university system.
- iii) The finding reveals that prevalent and pervasiveness of poor maintenance culture in

public universities affects its occupants based on the statistical result showing the relationship that exist between occupant of building and condition of building.

### **Conclusion**

This study from the statistical findings, the condition of the element of building and other Facility in the two public university cover were at aqt different level of dilapidation. The finding on items of roof, ceiling, walls, doors, floors, painting from the federal owned university compared to those in the state owned university record a higher percentage of not condusive and very unconductive though the records were not encouraging from both university due to the poor state of affairs in the condition of element of building and other facilities the lecture halls, office and hostels in both universities. Poorly maintained building engenders rapid and sustained injuries to occupants of building, In view of the findings, the research reveal that, condition of building has direct influence on occupants of building, this mean improved condition of building element and other facility will cause an improve in comfort of the occupants. It is concluded that existing governments have not played an appreciable role in fostering the maintenance culture in public universities in Nigeria. **Recommendations**

In accordance with the findings, the following recommendations are proffered:

1. Policy makers should initiate proactive measures capable of addressing the pervasive and systemic nature of poor maintenance culture in order to keep the Nigerian public universities on the path of rapid and sustained development with improve educational expectancy for the Nigerian population.
2. The physical planning units of all public universities should be strengthened with more innovative policies while allowed to operate independently in order to proactively curb negligence and keep the Nigerian public universities on the path of productive growth.
3. Policy makers should promote strong and quality public universities with high potentials of promoting longevity and improved educational attainments amongst the population.

### **6.4 Suggestion for Further Studies**

Further studies should organize input-output assessment studies in order to gain more insights into it specific roles in driving the process of quality management in public universities.

**Contribution to Knowledge:** This study has demonstrated the pervasiveness and systemic nature of maintaining public university buildings as it remained a major key to productive development of the Nigerian public universities. Again, this study has revealed that public universities have remained important hallmark in driving the process of educational attainment in Nigeria.

## REFERENCES

- Abisuga A. O., Famakin I. O. & Oshodi S. O. (2016). Educational building conditions and the health of users. *Construction Economics and Building*, 16(4), 19-34. DOI: 10.5130/AJCEB.v16i4.4979
- Adenuga, O.A and Iyagba, R.O.A (2005) Strategic Approach to Maintenance Practices for Public Buildings in Lagos State, *Journal of Environmental Studies*, Faculty of Environmental Sciences, University of Lagos 5(1).
- Agyekum K., Ayarkwa J. & Amoah P. (2016) Built and forgotten: unveiling the defects associated with the Ghana cocoa board (cocobod) jubilee house in kumasi. *Journal of Building Performance* ISSN: 2180-2106
- Anifowose, M.O. and Lawal, P.O. (2013), "State of physical facilities in Nigerian tertiary educational institutions: case study of the Federal University of technology, Minna, Niger state Nigeria", *Nigerian Journal of Technological Research*, Vol. 8 No. 1, pp. 56-60
- institutions: case study of the Federal University of technology, Minna, Niger state Nigeria", *Nigerian Journal of Technological Research*, Vol. 8 No. 1, pp. 56-60
- case study of the Federal University of technology, Minna, Niger state Nigeria", *Nigerian Journal of Technological Research*, Vol. 8 No. 1, pp. 56-6
- Ajibola, J.K. (2009). Maintenance culture in Nigeria: problems and challenges. A paper presented at sensitization campaign on Maintenance Culture Organized by National Orientation Agency, Oyo State Directorate, Ibadan.
- Oladimeji, A.B. 1996. 'Budgeting, Costing and Cost Control in Maintenance Engineering and Management', being a paper delivered at a 3-Day Course organized by the Nigerian Society of Engineers, Osogbo Branch at the Federal Polytechnic Ede, Osun State, 3rd – 5th July.
- Clark, C. (2002). Texas state support for school facilities, 1971 to 2001. *Journal of Education Finance*, 27(2), 683-700.
- Cobbinah, J. (2010): Maintenance of buildings of public institutions in ghana. case study of selected institutions in the ashanti region of ghana. A Thesis Submitted to the Department of Planning, Kwame Nkrumah University of Science and Technology, Kumasi.
- Claudio, L. Rivera, G.A., & Ramirez, O.F. (2016) Association between markers of classroom environmental conditions and teachers' respiratory health. *Journal of School Health*, 86(6), 444-451.
- Darwson, C. & Parker D. (1998): A descriptive Analysis of the perspective of Neville High schools Teachers regarding the school renovation.
- Drukis, P., Gaile, L., & Pakrastiņš, L. (2017). Inspection of public buildings based on risk assessment. *Procedia Engineering*, 172, 247–255.
- Essienyi, E.K. (2011). Prefabricated Housing, a Solution for Ghana's housing Shortage. An MSc. Thesis submitted to the Department of Real Estate, Massachusetts Institute of Technology.
- Earthman Glen I. (2002): School facility condition and student academic achievement. Los Angeles, CA: UCLA's Institute for Democracy, Education, & Access.
- Erin McIntyre (2016): Decaying school buildings have physical, psychological consequences.
- Filardo, M., Vincent, J.M., & Sullivan, K. (2019): How crumbling school facilities perpetuate inequality. *100* (8), 27-31
- Gupta, S., Khare, M., Goyal, R., (2007) Sick building syndrome: A case study in a

- multistorycentrallyair-conditioned building in the Delhi City. *Building and Environment* 42, p.2797–2809. doi: <https://doi.org/10.1016/j.buildenv.2006.10.013>
- Gou, Z. & Lau S. S. Y. (2012): Sick building syndrome in open-plan offices. *Journal of Facilities Management*, 10(4), 256-265.
- Khali, N., & Husin, H.N (2011): Sustainable building rating tool towards learning improvement in malasia's higher institution; a proposal. *International Conference on Social Science and Humanity*, iacsit press, singapore.
- Kok, H. B., Mobach, M. P. & Omta, S. W. F. (2011) The added value of facility management in the educational environment. *Journal of Facilities Management*, 9(4), 249-265.
- Leung M. Y. & Fung, I. (2005) Enhancement of classroom facilities of primary schools and its impact on learning behaviors of students. *Facilities* 23(13/14), 585-594. doi: <https://doi.org/10.1108/02632770510627561>
- Lateef, O A, Khamidi, M. F. and Idrus, A. (2010). Building Maintenance Management in a Malaysian University Campuses: A Case Study, *Australasian Journal of Construction Economics and Building*, 10 (1/2), 76-89.
- Lair, Susan Brooks (2003): A study of the effect school facility condition have on student achievement
- Mat, S., Sopian, K., Moktar, M., Hashim, S.H., Abdul R.A., Zain, M.F.M. and Abdullah, G.N. (2009). Managing Sustainable Campus in Malaysia – Organizational Approach and Measures, *European Journal of Social Science*, 8 (2), 201- 214
- McCall, H. C. (1997). *School Facilities Condition, Problems and Solutions*, New York State Office of the Comptroller, U.S.A.
- National Center for Education Statistics. U.S. Department of Education The Condition of Education 2003, NCES 2003–067. Washington, DC: 2003. HHP/nes/ed.gov/pub2014/2014022
- Ofide Blessing, & Jimoh Richard (2016): Building Condition: Rating of Higher Institutions in Niger State, *Covenant Journal of Research in the Built environment*. 4(1).
- Olanrewaju Abdul Lateef (2010): Case for alternative approach to building maintenance management of public universities; *Journal of building appraisal* 5(3):201-212.
- Putus T., Haverien, U., Jari M-shaughessy, Mari T., Jari P., Jerek K., Richard S. (2012): Sixth Grade Pupils' Health and Performance and Indoor Environmental Quality in Finnish School Buildings, *Journal of Education, Society and Behavioural Science*, 20-41.
- Uline, C. & Tschannen-Moran, M. (2008). The walls speak: The interplay of quality facilities, school climate, and student achievement. *Journal of Educational Administration*, 6 (1), 55-73.
- Wong, N. H. & Jan, W. L. S. (2003) Total building performance evaluation of academic institution in Singapore. *Building and Environment*, 38, 161-176. doi:
- Maxwell, L. E. (2015): The condition of school building and the effect on Children. (children in Deficit School Buildings Cornell [ttps://research.cornell.edu/news-features/children-deficient-school-buildings](https://research.cornell.edu/news-features/children-deficient-school-buildings))
- Miller, B. A. (2007). *Assessing organizational performance in higher education*. Jossey-Bass

- Olanrewaju, A. A. (2012) Quantitative analysis of defects in university buildings: user perspective. *Built Environment Project and Asset Management*, 2(2) 167-181. doi: <https://doi.org/10.1108/20441241211280909>
- Seth Emmanuel Allotey (2014 ) An Evaluation of the Impact of Defects in Public Residential Buildings in Ghana. Civil and Environmental Research [www.iiste.org](http://www.iiste.org). ISSN 2224-5790 (Paper) ISSN 2225-0514 (Online +) Vol.6, No.11
- Uline, C. & Tschannen-Moran, M. (2008). The walls speak: The interplay of quality facilities, school climate, and student achievement. *Journal of Educational Administration*, 6 (1), 55-73.
- Yusof H., Keith A., & David B.(2010):The cause and effects of deferred maintenance on higher education buildings. Research Institute for the Built and Human Environment Salford, M5 4WT, UK.
- National Center for Education Statistics (NCES 2014): Condition of America public school facilities. [HHP/nes/ed.gov/pub2014/2014022](http://HHP/nes/ed.gov/pub2014/2014022),
- Needs Assessment in the Nigeria Educational sector, international organization for migration Abuja, Nigeria, 2014.
- Poidevin, J. & Perry, P. (2004), *Complying with Health and Safety Law in Booty Frank*, P.(Ed.), *Facilities Management Handbook*, Lexis Nexis, UK.
- Tanner, C. K. (2000) The influence of school architecture on academic achievement. *Journal of Educational Administration*, 38(4), 309-330. doi: <https://doi.org/10.1108/09578230010373598>
- Vafaenasab, M. R, Morowatisharifabad, M. A, Ghaneian, M.T, Hajhosseini, M., & Ehrampoush, M.H. (2015) Assessment of sick building syndrome and its associating factors among nurses in the educational hospitals of Shahid Sadoughi University of Medical Sciences, Yazd, Iran. *Glob J Health Sci*. 7(2),247–253. doi: <https://doi.org/10.5539/gjhs.v7n2p247>
- Krejcie, R.V. & Morgan, D.W., (1970): Determining sample size for research activities. *Educational and psychological measurement*, 30(3), 607-610.
- William J. F. (2000): Health and productivity gains from better indoor environments and their relationship with building energy efficiency, *Annual Review of Energy and the Environment* 25(1):537-66 DOI:[10.1146/annurev.energy.25.1.537](https://doi.org/10.1146/annurev.energy.25.1.537)
- Authors:
- Confidential report for Attorney CRA 10272, 1998 page 12-54, DOE Homeowner Vs Roe Builders
- Cross River State Building Regulation 1984: cross river state ministry of lands town planning department.
- Facilities Vol. 6/No.9/Sept. 1988 D&F Estate limited Vs church commissioner for England and others. Tri- service reference No. S99-09-19 Jan. hackem bottom Vs Raquit club Villa HOA, VCSC Case SC 020 526.
- Webstroke Law: Anns v Merton London Borough Council (1978): A.C. 728 <https://webstroke.co.uk/law/cases/anns-v-merton-london-borough-council->
- World Bank (2019) World development report on the future of work