



## APPRAISAL OF THE STATE OF HEALTH OF RESIDENTIAL BUILDING FACILITIES IN A PRIVATE UNIVERSITY IN NIGERIA

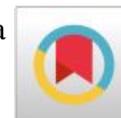
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### Abstract:

*The study assessed the state of health of residential building facilities for students and faculty in a private university in Nigeria. The study utilized 490 maintenance job request forms (MJRFs) in addition to 120 questionnaire on user's satisfaction about their home buildings to generate data from respondents drawn from students and faculty. The results obtained revealed that electrical works, carpentry & joinery and ceiling tiles defects recorded 1st, 2nd & 3rd highest respectively on frequencies of occurrence. Whereas, roof works and external works on 11th & 12th positions respectively trailed last on frequency of occurrences. In the same light, results obtained on user's satisfaction about their buildings indicated that out of the selected key performance indicators (KPIs) utilized on a 7-point Likert scale, users expressed satisfaction on supply of electricity & water, quality of floor & wall tiles, among others with mean scores of 6.94, 6.91 & 6.12 respectively. However users expressed dissatisfaction on, response rate to job requests and quality of wardrobe units, among others. It concludes that the provisioning of maintainable building facilities, design and application of standard maintenance management policy, plan and practices by private universities will stand them out to succeed over their rivals. It recommends that, better attention be accorded to those areas that failed on user's satisfaction in order to, not only prolong the life of these buildings but to increase its economic value and satisfy purpose.*

**Keywords:** Hostel Buildings; Maintenance; Staff Quarters; Private University; State of Health.

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## 1. Introduction

An appraisal of the state of health of a building structure imply a detailed diagnosis of the totality of the building elements, parts and components to discover areas of distress that may require expertise intervention in order to continue to retain its optimal performance. The need for maintenance arises where a number of ailments that could endanger its existence and that of users are discovered after the assessment. State of health assessment of a facility is a good strategic management system, the result of which enhances practical maintenance management action plans and policies. Maintenance itself has been defined by different authors, (Adeniji, 2003; Wahab, 2003) defined maintenance as work undertaken in order to keep, restore or improve every facilities, i.e. every part of the structure, its services, and surroundings to community accepted standard to sustain the utility and value of the facility. Similarly, Harug (2001) defined maintenance as the required processes and services undertaken to preserve, protect, enhance and care for the building fabrics and service after completion.

In this regard (Chanter and Swallow, 2007) observes that maintenance work is inevitable, as it is in its nature, for materials to deteriorate over time with usage and exposure to the elements of climate. Ironically, (Too, 2012; Sherwin 2000) submits that built asset maintenance is often viewed as a cost burden, and owners are typically reluctant to spend in order to preserve the condition of their assets (Chew, Tan & Kang, 2004). Paradoxically, (Taillander, Sauce & Bonetto, 2011) posits that just recently maintenance has been recognized as a potential profit generator propounding that maintenance should be viewed not as a source of cost, but rather as a way for potential gain. Literature in strategic management (Prahalad and Hamel, 1990; Wenerfelt, 1984) has argued that an organization must create value better than rivals if it wants to sustain its competitive advantage. This can only be realized either when an organization gains an advantageous position in an industry or when it mobilizes and deploys core competencies that enable it to offer superior products to customers relative to its competitors (Lado et al, 1997). This implies that investigating the state of health of buildings and other facilities for purposes of formulating maintenance policies and plans is good management strategy (if outcome is implemented) that situates in vantage position over other competitors. Moreover Okolie, (2011) reveals that buildings are essential physical facilities which represent a sustainable percentage of most tertiary institutions assets. Both public institutions but private institutions in particular must therefore take advantage of this knowing fully well that there is stiff competition amongst them to attract more students to sustain.

Housing constitutes not only a basic human need but also a vital component of man's welfare, life sustenance and survival as well as investment of value. In the hierarchy of man's needs, housing has been ranked second to food. It is believed to have a profound influence on health, efficiency, social behavior satisfaction and general welfare of the community (Onibokun 1982), and for housing to produce these impacts, it must be adequately provided with functional infrastructure and facilities. In the educational sector, the demand for school infrastructure at all levels from the primary to the university has far outweighed the growth in the construction of new schools and the expansion of the existing ones.

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, including private universities. Oluwunmi, Akinjare, Ayedun, and Akinyemi, (2012) observes 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 intake without a commensurate expansion of facility, including buildings. The provision of housing for students and members of faculty is no exception in the university. In particular, the adequate provision of staff quarters accommodation in a university has various advantages and disadvantages to its inhabitants. By far, the advantages usually out-weigh the disadvantages. Some of these advantages include (Oluwunmi et al, 2012) punctuality to classes as against having to come from outside the university, peace and tranquility derivable from a campus environment, security, attraction of high quality faculty from far and wide because of infrastructural provisions such as, internet connectivity, functional public utility such as constant power supply, portable water, etc.

These factors ultimately stimulate increased human productivity in terms of output. In some tertiary institutions, there is no provision for accommodation for their staff, but in most private universities, all students are resident while conscious effort is being made to accommodate their staff as well. The onus of managing accommodation facilities therefore fall on the management of the university which is expected to manage same effectively with little or no challenges (Oluwunmi et al 2012), although Harug (2001) observes that the efficient maintenance management of these buildings constitute a challenge to the management of the institutions. Thus, this paper aims to assess the state of health of building facilities provided for shelter for students and staff in a private university in Nigeria. The objectives being to determine the level of deterioration of the building fabrics, rate of deterioration including level of satisfaction derived by the occupants and to suggest possible remedies. Knowledge of these issues will enhance development of good maintenance management policies, systems and practice.

## 2. Literature Review

Douglas (1996) upholds that buildings contribute to the functionality, ultimate performance and realization of the goal and objectives of education. However, for these buildings to function effectively and fulfil its intended purpose there is the need for constant maintenance planning and management considerations. A tertiary institutional building requires a properly planned regular maintenance practice in order to create a conducive environment that supports and stimulates the much desired teaching, learning, innovation and research because, according to Wahab (2003) the primary objective of maintenance is to ensure as far as practicable, the continued peak performance of the building throughout the design life thereby optimize productivity and user's satisfaction with minimum resources. This corroborates the position of Kunya and Achuen, (2005) that the role of building maintenance is to retain the usefulness of the property in the public and private sectors, respectively.

Similarly, Harug (2001) defined maintenance as the required processes and services undertaken to preserve, protect, enhance and care for the building fabrics and services after completion. Chanter and Swallow (2007) observes that maintenance work is inevitable, as it is in its nature, for materials to deteriorate over time with usage and exposure to the element of climate. Then (1998) thus posits that buildings are dynamic entities which should be maintained proactively. However, (Son and Yuen, 1993) observes that building maintenance remains one of the most intractable problems for

most countries especially in tertiary institutions, maintaining that building maintenance remains to be accorded adequate attention. This is in line with Adewole (2003) who states that school buildings are in a state of disrepair and through continuing neglect, they are getting worst. In this light, Okolie, (2011) observes that lack of maintenance culture of buildings in our universities has led to unproductive learning environments in the Nigerian University System, asserting that the learning environment in our universities is inhibited with decayed and dilapidated buildings, and this seriously undermines the goals and objectives of national policy on education.

According to Uma et al (2014) in Nigeria the organization and implementation of maintenance strategy have not been given adequate attention and so very low results are realized in the use of assets, which led to the country being categorized as part of 'poor maintenance culture' for engineering infrastructure, among others. According to them it is disheartening that huge and very expensive projects are allowed to go into disuse in a short while due to lack of maintenance culture. Succinctly, the establishment of buildings and other infrastructures in Nigeria is not easily attained, but the extent to which the existing ones are allowed to deteriorate owing to lack of maintenance culture is a thing of worry. The neglect cuts across all levels of education in Nigeria. For example, findings of Asiyai, (2012) who assessed school facilities in public secondary institutions in Delta State revealed among others that school facilities in the schools are generally in a state of disrepair, maintenance carried out were inadequate for majority of the facilities and that the factors encouraging school facilities depreciation included excess pressure on available facilities and delayed maintenance.

Oyedele (2012) cited in (Uma et al 2014) posits that the numerous economic benefits of a well maintained building to the owners and the occupants are overwhelming, that it raises the greatest benefit as it attracts consumers if it is for commercial purpose; it brings about utmost performance at a very minimal cost and provides comfort and decency to the occupants. The quality of education delivered by teachers and the academic environment of pupils of any school is dependent on many factors of which school facilities is paramount. School facilities are materials resources that enhance teaching and learning thereby making the process meaningful and purposeful. School facilities can be referred to the entire school plant. School facilities can be defined as the entire school plant which school administrators, teachers and students harness, allocate and utilize for the smooth and efficient management of any educational institution, for the main objective of bringing about effective and purposeful teaching and learning experience.

According to (Adeboyeje, 2000; Emetarom, 2004) school facilities are the physical and spatial enablers of teaching and learning which will increase the production of results. School facilities serve as pillars of support for effective teaching and learning. Asiyai (2012) maintains that good quality and standard of school depend largely on the provision, adequacy, unitization and management of educational facilities. In Nigeria public school enrolment has continued to increase without a corresponding increase in facilities for effective teaching and learning as a result of underfunding of education in Nigeria. School facilities maintenance entails ensuring that the facilities are kept near their original state as possible. According to (Hinun 1999) the quality and durability of a building largely depend on the type and level of servicing, repairs and the rate at which the needs and requirements change. School facilities management involves keeping records of the facilities, supervising the facilities, planning for the facilities, motivating students and teachers to participate in facilities maintenance and evaluating the available facilities. Researchers

like (Wilcockson 1994; Owuamanam 2005; Ajayi 1999 and Owoeye, 2000) have long identified the importance of school facilities in teaching and learning while the inadequacy, deterioration and lack of maintenance of these facilities will spell doom for the teachers and students in the teaching and learning activities. Negligence in the maintenance of school facilities has many negative consequences. When school facilities are not well managed and maintained, they constitute health hazards to pupils and teachers who use the facilities. For instance (Ogonor 2001) reported the killing of a pupils and teachers of a primary school in Nigeria when the school walls and roof collapsed.

Plethora research reports have revealed that a significant relationship existed between school environment and students' attitude to schooling. For example (Ikoya and Onoyase 2008) studies have shown also that the condition of school facilities have a long effect on academic performance of pupils. Chan (1979) found that students who were taught in modernized buildings scored consistently higher across a range of standardized tests. Adeboyeje (2000) reported that schools with well co-ordinated plant planning and maintenance practices recorded better student's performance. Findings of Burkett and Bowers, (1987) reveal that students in newer and well-equipped schools outperformed students in older schools with inadequate school facilities. Conducive school physical environment could enhance students' school attendance, involvement in academic activities and academic performance positively. In addition, (Adesina, 1999) cited in Asiyai (2012) stressed that the quality and quantity of educational facilities available within the educational system positively correlates with the quality and standard of the educational system. Durosaro, (1998) examined school plant planning in relation to administrative effectiveness of secondary schools in Oyo state, Nigeria. He found that schools that planned and maintained their facilities had higher students' retention and is more effective than the others.

### **Agents of Deterioration and Way Forward**

Maintenance-free or self-sustaining building is highly desirable but not feasible. Infrastructures deteriorate with time due to wear and tear, users and occupiers' activities, inherent defects in design and construction as well as effects of environmental variations; hence left to themselves, facilities will eventually become inefficient, unreliable and fail. It could be rightly estimated that infrastructural facilities depreciate at a rate varying between 6% and 10% depending on their physical conditions in a period of 10 years. When maintenance is ignored the effect is to aggravate the rate of infrastructures deterioration from year to year. Some of the identified agents of building deterioration are highlighted:

- 1) Wear and tear process: These are natural phenomena which defies solution. However, the rate of wear and tear can only be controlled by the application of standard maintenance manual and management procedures.
- 2) Lack of technical ability: Good technical training in subject matter will equip practitioners a great deal in dealing with complex designs, calculations, specifications, maintenance techniques with the use of (IT) management systems. Maintenance and its management processes requires inputs of well trained and experienced professionals and should not be left in the hands of workmen as is currently the case.
- 3) Unavailability of materials and or equipment: sustainable materials and maintenance equipment must be strongly considered at the design phase to simplify maintenance work otherwise their unavailability at time of need will aggravate rate of deterioration.

- 4) Vandalism: Users action or people's behavior (Tezangi, 2014) often constitute a great source for maintenance need in infrastructure maintenance. This could be described as vandalism, it has its roots in the social fabric of the society and it's often out of psychological disposition to cause damage, it is as well often calculated intention to express dissatisfaction to authority or society at large. Vandalism impairs the aesthetic value of building, and reduces its life span, insecure for users and cost intensive. Others in this category are overuse due to overcrowding, animals such as destructive rodents and insects that maliciously attack most building fabrics and services components.
- 5) Environmental stress effects (Sick building Syndrome): Environmental agencies such as climatic conditions (rainfall, humidity, temperature, wind, groundwater conditions), chemical agents like acids, chlorides and sulphates (Iyagba, 2005) all impact stress to building which results in its deterioration. These stressors act based on orientation of the structure and on external elements of the structure. The resultant effect of these stressors on the building is referred to as sick building syndrome. This phenomenon could be remedied by reinforcing the structure at both substructure and superstructure levels with measures that would mitigate their effects.
- 6) Deficiency in design construction and interdependency of building components: The nature in which some elements in building were designed often hinders their maintainability. This may result from non-availability of replacement parts and components as in the case of many imported household items like lifts and air-conditioners, in this kind of situation therefore, the most effective maintenance strategy should be one that minimizes the incidence of maintenance works through informed choices at design stage. To be able to sustain a design or concept, it should be maintainable (Gray, 1990).
- 7) Quality of materials and material selection: Different qualities of materials are abound. The onus lies on the designers, owners, constructors, merchants and suppliers to select standard materials with assured warranties and maintenance manuals documents for application. The strict adherence to the instructions on these manuals will prolong the life of the building with minimal rate of maintenance and make it function optimally. The choice of recyclable eco-friendly (Tezangi, 2014) materials is also recommended at the design phase for enhanced sustainable maintenance practice.
- 8) Introduction of new construction and maintenance concepts: The penetration of new technology, design concepts, construction and maintenance of infrastructure, will produce an economic and environmental valid construction products. Therefore, synergic approach in this respect, among built environment stakeholders is needed to produce advanced products. The development and incorporation of subsystems however should not be cost intensive (Elmualim et al 2012) the application should be environmentally compatible flexible and sustainable. New concepts in maintenance should be availed.
- 9) Other causes are bad workmanship; poor supervision; delayed maintenance intervention; and misuse.

### 3. Research Methodology

Two sources of primary data were deployed to carry out the investigations in a bid to elicit data on the maintenance challenges confronting the residents. The first was by the use of a typical

maintenance job request form (MJRF) and the second was by the use of questionnaire. The MJRF was used to harvest the state of health of the buildings whereas the questionnaire was used to quantify and rate the level of user's satisfaction about the staff buildings. The MJRF was structured according to the various construction trades -blockwork, concretework, carpentry & joinery, among others. The total of four hundred and ninety (490) MJRFs were administered on students' and resident faculty staff respectively using random sampling method. On the basis of the number of years already spent residing in the University hostels as well as the knowledge and experience garnered over these years while using these facilities only students who were in the 300, 400 and 500 levels of years of study respectively were adjudged qualified and randomly administered the MJRF as population of interest. To ensure reliability of information supplied and stimulate the respondents willingness to fill the job forms promptly, the students were reassured that the maintenance unit of the institution was involved in this exercise as such, all reported cases would be given prompt attention.

The LIKERT's 7-point scale questionnaire was used to assess the level of user's satisfaction about their building fabrics and services. A scale of 7-1 was assigned to identified satisfaction parameters as obtained in 'Key Performance Indicators' (KPIs) for home buildings (Torbica and Stroh 2001; Xu et al 2012). The reason being to aid quantitative analysis of results obtained about user's level of satisfaction (Okoye 2014; Torbica and Stroh 2001; Xu et al 2012). KPIs function as a succinct way to provide a snapshot of the most important priorities of the division at any given point in time. Vilcekova (2013) defines KPI as indicators showing the relevant information about the performance of service facility management supply.

The scale construct are, 7- Very Satisfied (VS), 6-Satisfied (S), 5-Somewhat Satisfied (SS), 4- Neither Satisfied nor Dissatisfied (NSND), 3-Somewhat Dissatisfied (SD), 2- Dissatisfied (D), 1- Very Dissatisfied (VD). Eleven (12) KPIs for assessing user's satisfaction in home buildings were adopted in determining the satisfaction levels as against 16 used by Torbica & Stroh (2001), they are (i). regular supply of electricity (ii). regular water (iii). response rate to maintenance requests (iv). quality of materials of construction (v). quality of wardrobe fittings and fixtures (vi). quality of workmanship, (vii). quality of floor and wall tiles (viii). functional Air-conditioners (ix) quality of kitchen units (x) performance of doors & windows and (xi) functional bathroom facilities.

The sample size was determined using the formula for large population as was used by Bulus and Adefila (2014);

$$n = \frac{N}{1+N (\theta^2)} \quad \text{where, } n = \text{desired sample size; } N = \text{known}$$

population. It assumed 95% confidence level and 5% margin of error. Therefore, with a population of 4,860 it obtained three hundred and seventy (370) respondents. The total of 370 MJRFs were therefore administered on respondents according to their rooms in their halls of residence. Only one job form was administered per room which accommodated more than one student, as the case may be, and it was expected that roommates would collaborate to fill the forms accurately. Similarly, adopting the same sampling method 120 respondents were obtained and used for Faculty Staff MJRF and user's level of satisfaction about their buildings. Bringing it to a total of 490 MJRFs and 120 User's Satisfaction questionnaire (Table 2).

### 3.1. Description of Case Study

The assessed case study is a Private University located in the South-West of Nigeria owned by a Christian Ministry, established about ten years ago, currently estimated to have student population of about five thousand, endowed with a good number of academic buildings including male and female hostels as well as staff quarters. Presently, all Private Universities in Nigeria are residency for all students. The hostel buildings under study have similar design concept, which is a large multi-storey facility built of concrete frames and sandcrete blockwall infills. The roof is of steel truss members covered with corrugated longspan aluminium roofing sheets with roof gutters, walls were plastered and painted with texcote paint externally and emulsion paint internally. The toilet and bathroom floors and walls were tiled and fitted with water closets (WC), wash hand basins (WHB) and shower facilities on each floor. The floors and stairs are finished with terrazzo and ceramic tiles respectively. The windows are aluminium glazed complete with insect flyscreen whereas, the timber doors were of hardwood timber door-leave panels and frames, steel doors are fitted to the emergency exit routes. The buildings have a large septic tank with inspection chambers dotted along the line. A typical room contains two double bunk beds, two 13A double pole sockets, two wall bracket lighting points, four wardrobes and reading tables respectively to serve four occupants comfortably. The staff quarters are in different variants of one-bedroom, two-bedrooms, three-bedrooms, duplex (2- & 4-bedrooms types) buildings.

### Presentation of Results

Table 1: Number of Buildings Surveyed

S/N	Type	No. Of Units	Percentage (%)	Position
1.	Professors Quarters (Type A)	20	13.61	4 <sup>TH</sup>
2.	Professors Quarters (Type B)	10	6.80	5 <sup>th</sup>
3.	3-Bedroom	41	27.89	1 <sup>ST</sup>
4.	2-Bedroom	10	6.80	5 <sup>TH</sup>
5.	1-Bedroom	24	16.33	3 <sup>RD</sup>
6.	Male Hostels (185 Rooms)	5	3.40	7 <sup>TH</sup>
7.	Female Hostels (185 Rooms)	5	3.40	7 <sup>TH</sup>
8.	2-B/R Duplex	32	21.77	2 <sup>ND</sup>
	<b>TOTAL</b>	<b>147</b>	<b>100%</b>	

Results presented in Table 1 indicates that one hundred and forty seven residential buildings were assessed out of which the number of staff residential buildings were one hundred and thirty seven 137 representing 93% of the total residential buildings surveyed. Students' hostels were ten buildings representing 7% of the entire number of buildings surveyed. However, in terms of population of interest count, the Students' were 370 as against 120 faculty staff.

Table 2: Number of Mjrf's Administered And Retrieved

S/No	Number Administered	No. Filled & Recvd.	% Number Recvd.
Female Students	185	161	87%
Male Students	185	145	78%
Faculty Staff (MJRF)	120	108	90%
Faculty Staff (Quest.)	120	108	90%

<b>TOTAL</b>	<b>610</b>	<b>522</b>	<b>86%</b>
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Results in Table 2 indicates that the total of 490 questionnaire was administered in the proportion indicated out of which 426 representing 87% were retrieved and properly filled. A commendable observation was that all questionnaire administered to faculty staff were properly filled and retrieved (100%).

Table 3: Summary Results of Defects Harvested From Mjrfs

S/N	Type Of Res.	ADW	TW	A/C	FW	PLW	RW	PTW	CJW	CW	CL	BW	PW	EX	EW	MR	DT
1.	Pf Qt 1	5	0	1	7	5	4	1	1	0	2	0	1	2	2	0	1
2.	Pf Qt 2	12	6	4	20	16	5	11	23	5	20	1	4	2	13	8	5
3.	3-Brm	13	9	2	15	30	12	11	34	7	12	1	7	3	20	1	1
4.	2-Brm1	1	4	2	1	9	3	2	9	1	1	0	1	1	5	0	1
5.	1-Brm	0	1	0	0	2	0	0	3	0	1	0	0	0	1	0	0
6.	Mh (185)	4	0	8	4	6	0	2	104	4	34	0	0	2	190	3	1
7.	FH (185)	8	0	0	10	2	2	4	103	0	20	0	0	0	134	2	0
8.	2-Brm2	12	11	24	32	20	4	17	37	8	12	0	21	4	29	19	7
	<b>Total</b>	<b>53</b>	<b>31</b>	<b>41</b>	<b>89</b>	<b>90</b>	<b>30</b>	<b>48</b>	<b>314</b>	<b>25</b>	<b>102</b>	<b>2</b>	<b>34</b>	<b>14</b>	<b>394</b>	<b>33</b>	<b>16</b>

**LEGEND:** Aluminium Doors & Windows – ADW; Tiling Work – TW; Air-conditioner – AC; Fumigation- FW; Plumbing Work- PLW; Roof Work- RW; Painting Work- PTW; Carpentry & Joinery Work- CJW; Concrete Work- CW; Ceiling Work- CL; Block Work- BW; Plastering Work- PW; External Works- EXW; Electrical Work- EW; Metal Work- MW; Ducts- DT; Others (Pls Specify) – OW; PRQT1 & 2 – Professor's Quarters (Types 1 & 2); 3-BRM- 3-Bedroom; 2-BRM (1& 2); 2-Bedrooms (Types 1 & 2); 1-BRM = 1-Bedroom; MH- Male Hostel; FH – Female Hostel.

### Nature of Some Defects/Complaints Harvested

(A). Professor's Residential Buildings: Sections of the house have no light; broken window or door glazing; water leakage from suspended concrete slab; burnt electrical fittings; reptiles (snakes), cockroaches and rodents infestation; badly installed doors and have no keys; leaking kitchen sinks; leaking roof; doors & wardrobe hinges bad; water seeping through wall; cracks on the external wall; decaying kitchen cabinets; missing PVC ceiling tiles; severe water leakages in the bathroom; flooded courtyard; some uncovered plumbing ducts providing access to reptiles; water leakage to rooms & bathroom walls during rainfall; windows not closing properly.

(B). Three-Bedroom: decaying kitchen cabinets; wardrobe hinges bad; missing shower taps; leaking kitchen and bathroom plumbing; missing balcony ceilings; bad mosquito nets; wood rot in bedrooms wardrobe; WC flushing system bad; mosquito nets destroyed by rats; water leakage in ceiling; shaky toilet WC and Kitchen Sinks; broken toilet plumbing pipes leading to leakages inside the wall; damaged ceiling fans, frontage door not opening even with key; unfinished inspection chambers, water seeps to kitchen and electric Distribution Board from upper flat

kitchen; broken balcony gate; main entrance door about to fall off; faulty electrical fittings in living room, paint in bedrooms walls peeling off; kitchen floor tiles broken; metal iron railings require welding; loose door handle; stained walls caused by leakages in walls; aluminium doors are bad; leaking decking; rainwater entering through window during rainfall; toilets wiring bad; leaking bath tubs due to rusting pan, leaking inspection chamber.

(C). Two- Bedroom (Type 1): Leaking concrete roof in multiple locations leading to loosened tiles and stained walls; damaged or badly installed doors; faulty bathroom plumbing; leaking bedroom roof; floor tiles removed or broken; faulty kitchen taps; decaying kitchen cabinets; wet walls; faulty lamp holders; burnt electrical fittings, invasion by rodents and reptiles; wood rot in rooms wardrobes.

(D). One-Bedroom Flat: Ceiling fan fell off; faulty kitchen and bathroom water pipes; house is cockroach and rat infested; door drags on the floor.

(G). Two-Bedroom (Type 2): Intercom not working, water leakage from roof through soffit of suspended concrete slab, snakes and rodents in the room, timber hardwood handrails badly fixed, poor quality materials for main-entrance door and other internal doors, frequent change or repair of ironmongery; entrance veranda and balcony metal rails of poor quality materials, badly fixed and rusting; electrical faults common; electric shock on water taps in bathroom and kitchen; kitchen cabinet poorly fixed with poor quality materials; ground floor wall dampness, scaling of plaster and paint; frequent repairs or replacement of taps due to poor quality taps; rusting shower trays; mal-functioning external taps and PVC pipes; ceiling tiles poorly fixed; majority of A/C are mal-functioning.

(E). Hostel Buildings: The fans and sockets are dysfunctional; toilet and laundry have no light; some sockets in the rooms are bad; bad double bunks bed; bad windows and net; burnt bulbs; door nails coming off frequently; bad lockers and wardrobes; no window panes; no curtain railings; no board in lockers; key stuck to the door; door & window nets can't close well; bad door; hole in ceiling; bad lockers and no reading tables; no light; door lock is damaged; door can't be locked; all needs painting bad sockets; lots insects and flies; torn nets; broken ceiling; toilets washed once a week; no water supply and light to toilets; doors & door locks bad; noisy fan; no table locker key, wall stains; bad fan control; no wardrobe hanger; fan shocking; malfunctioning fan; wall needs painting; no water on this floor; window not closing; no window; no wardrobe door; sparking fan; catcher door handle.

**Remarkable complaints:** requires external water connection in front of the house; dead tree in front of the house need to be cut down; intercom not working; window retaining water, occupant is in distress and pleads for intervention; sparking appliances; residents has filled 5 complaint forms without response; electrical shock experienced on the walls in the house, incursion of reptiles (snake), rodents and insects into rooms, water leakage through soffit of suspended concrete floor slab, water leakage into the Distribution Board from adjoining upper floor flat

#### 4. Discussion of Results

##### The State of Health of the Buildings

Results in Table 4 reveals that defects on electrical works and air-conditioning services recorded the highest frequency of 435 complaints representing 33% of the total defects obtained. Whereas, defects on carpentry & joinery was the second highest with 314 complaints representing 24%. . The third highest was in ceiling works with 102 complaints representing 8% of the total defects obtained. Plumbing works was the fourth highest with 90 defects representing 7% and ironically, immediately following was environmental sanitation and fumigation which recorded 89 complaints or 7% of total complaints. Similarly, but trailing from behind in the last position was external works with 14 defects representing 1% of total complaints obtained.

Table 4: Results Obtained Upon Grouping the Defects

S/NO.	Work Category	Freq. Of Defects	Cum. Freq.	Percentage	Position
1.	Masonry Works– concrete & block works	27	27	2.08	
2.	Plumbing works	90	117	6.92	4 <sup>th</sup>
3.	Electrical works + Air-condition services	435	552	33.46	1 <sup>st</sup>
4.	Aluminium Doors and Windows	53	605	4.08	6 <sup>th</sup>
5.	Plastering	34	639	2.62	8 <sup>th</sup>
6.	Painting work	48	687	3.69	7 <sup>th</sup>
7.	Roofing works including Chemical (stalactites & stalagmites) & Biological vegetation (fungi, algae, ferns) on floors, walls & roof	30	717	2.31	11 <sup>th</sup>
8.	Metal and steel works	33	750	2.54	9 <sup>th</sup>
9.	Carpentry & Joinery, and ceiling works	314	1064	24.14	2 <sup>nd</sup>
10.	External works	14	1078	1.08	12 <sup>th</sup>
11.	Tile Works -wall & floor	31	1109	2.38	10 <sup>th</sup>
12.	Ceiling works	102	1211	7.85	3 <sup>rd</sup>
13.	Environmental sanitation including fumigation	89	1300	6.85	5 <sup>th</sup>
	<b>TOTAL</b>	<b>1,300</b>	<b>1,300</b>	<b>100%</b>	

### Level of User's Satisfaction

Table 5: User's Satisfaction Ranking

S/n	KPIs	Percentage	7	6	5	4	3	2	1	Mean	Rank
1.	Electricity	VS – 93.5; S- 6.5	101	7	0	0	0	0	0	6.94	1 <sup>st</sup>
2.	Water	VS -90.7; S- 9.3	98	10	0	0	0	0	0	6.91	2 <sup>nd</sup>
3.	Response rate to job requests	S-4.6; SS-6.5; NSND-13.9; SD-11.1; D-26.9; VD-37.0	0	5	7	15	12	29	40	2.40	9 <sup>th</sup>

4.	Quality of materials	SS-1.9; NSND-10.2; SD-14.8; D-27.7; VD- 45.4	0	0	2	11	16	30	49	1.95	12 <sup>th</sup>
5.	Quality of wardrobe unit	S -1.9; SS- 5.6; NSND- 9.3; SD-13; D- 25; VD- 45.4	0	2	6	10	14	27	49	2.10	11 <sup>th</sup>
6.	Quality of workmanship	S- 6.5; SS- 9.3; NSND- 5.6; SD-15.7; D- 28.7; VD-34.3	0	7	10	6	17	31	37	2.46	8 <sup>th</sup>
7.	Quality of floor & wall tiles	VS- 4.6; S- 38.9; SS- 33.3; NSND-10.2; SD-10.2; D-2.8	5	42	36	11	11	3	0	5.09	5 <sup>th</sup>
8.	Functional Air-conditioner	VS -46.3; S- 32.4; SS- 13.0; NSND-2.8;D- 7.4; VD- 9.3	50	35	14	3	0	8	10	6.12	3 <sup>rd</sup>
9.	Quality of kitchen units	VS – 29.6; S – 18.5; D- 23.1; VD- 28.7	32	20	0	0	0	25	31	3.93	7 <sup>th</sup>
10.	Doors & Windows perf.	VS -51.9; S – 24.1; SS- 7.4; D- 5.6; VD- 12.0	56	26	8	0	0	6	13	5.68	4 <sup>th</sup>
11.	Bathroom facilities	VS- 50.0; S- 13.0; NSND- 1.9; D-11.1; VD- 24.1	54	14	0	2	0	12	26	4.81	6 <sup>th</sup>
12.	General sanitation	NSND- 9.3; SD-28.7; D- 22.2; VD-45.4	0	0	0	10	31	24	49	2.13	10 <sup>th</sup>

Results presented in Table 5 indicates that out of the twelve KPIs examined on user's satisfaction about their home buildings, seven namely, supply of electricity, water, quality of floor & wall tiles, functional air-conditioners, quality of kitchen units, performance of doors & windows and functional bathroom facilities with mean scores of 6.94, 6.91, 6.12, 5.68, 5.09, 4.81 and 3.93 respectively, received acclamation of satisfaction. Remarkable results were obtained from the respondents on user's satisfaction on electricity and water supply with (93.5% Very Satisfactory & 6.5% Satisfactory) and (90.7 Very Satisfactory & 9.3% Satisfactory), thereby garnering the maximum mean score (6.94 and 6.91) in the first and second positions respectively. This may infer that the user's level of productivity would be high with the provision of constant electricity and water supplies. Similarly, on functional Air-conditioners (6.12 mean score), garnered 46% very satisfied, 32% satisfied, 13% somewhat satisfied, 2.8% neither satisfied nor dissatisfied, 7.4% expressed dissatisfaction and 9.3% very dissatisfied and ranked 3<sup>rd</sup> position. However, performance of doors & windows (5.68 mean score) ranked 4<sup>th</sup> position and garnered 52% very satisfied, 24% satisfied, 7% somewhat satisfied, 5.6% dissatisfied and 12% expressed very dissatisfied.

Regrettably, users expressed dissatisfaction on response rate to job requests, quality of materials, quality of wardrobe units, quality of workmanship and quality of kitchen units and general sanitation with mean scores below the threshold at 2.4%, 1.95%, 2.1%, 2.46% & 2.13% ranked 9<sup>th</sup>, 12<sup>th</sup>, 11<sup>th</sup>, 8<sup>th</sup> and 10<sup>th</sup> positions respectively. This result is not a surprise due to the fact that most of these buildings may be termed 'items of necessity'. It is insinuated that proprietors of most private universities do not usually adopt conventional methods to procure their facilities as they are always in a rush to construct them, the implications of which are these manifestations at point of use. More so, since they are the sole financiers of these projects they may tend to compromise on professionalism by engaging the services of workmen to perform most engineering duties with the desire to eliminate or reduce cost of professional services. Other reasons for poor quality of inputs and outputs recorded and being suffered by the residents could be traced to lack of or poor supervision of workers in addition to the use of low quality materials as highlighted in the results and espoused in plethora literature.

## 5. Conclusions

The study assessed the state of health of residential building facilities for students and faculty in a private university in Nigeria. Some of the causes of building deterioration and their remedies were identified in literature and discussed. Field survey of case study was undertaken. The results obtained indicated that electricity, carpentry & joinery and ceiling tiles defects recorded 1<sup>st</sup>, 2<sup>nd</sup> and 3<sup>rd</sup> positions respectively about frequencies of occurrence in the buildings examined. Whereas, roof works and external works in 11<sup>th</sup> and 12<sup>th</sup> positions respectively trailed last in frequency of occurrences.

In the same light, results obtained on user's satisfaction about their buildings indicated that out of the selected key performance indicators used, the users were satisfied on supply of electricity, supply of water, quality of floor & wall tiles, functional air-conditioners, quality of kitchen units, performance of doors & windows and functional bathroom facilities, respectively. However, user's expressed dissatisfaction on response rate to job requests, quality of materials, quality of wardrobe units, quality of workmanship and quality of kitchen units and general sanitation, respectively. This implies that better attention be accorded to maintenance challenges generally but on the areas of user's dissatisfaction in particular in order to, not only prolong the life of these buildings but to increase its economic value as well as satisfy purpose.

Literature indicates that Nigeria is averse to maintenance culture, resulting in huge economic loses on investments, that there are tertiary educational institutions including private universities spread across the 36 states of Nigeria including the FCT who are competing for fame and students. Also, building facilities was revealed as among key facilities being considered by parents and students before seeking admission into most tertiary educational institutions of which private universities are no exception. In this light, the provisioning of maintainable building facilities, design and application of standard maintenance management policy, plan and practices by private universities will stand them at vantage position to succeed over their competitors, and it's therefore recommended.

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