



**FEDERAL UNIVERSITY OF TECHNOLOGY  
MINNA**

**POST-OCCUPANCY EVALUATION:  
A NECESSARY TOOL FOR ARCHITECTS,  
FACILITIES MANAGERS AND OTHER  
PROFESSIONALS IN THE BUILDING INDUSTRY**

*By*

**PROF. STELLA NONYELUM ZUBAIRU**

*B.Arch, (UNN), MSc (Strathclyde), PhD (Unilag)*

*Professor of Architecture*

**INAUGURAL LECTURE SERIES 68**

**4<sup>TH</sup> OCTOBER , 2018**



**FEDERAL UNIVERSITY OF TECHNOLOGY  
MINNA**

**POST-OCCUPANCY EVALUATION:  
A NECESSARY TOOL FOR ARCHITECTS,  
FACILITIES MANAGERS AND OTHER  
PROFESSIONALS IN THE BUILDING INDUSTRY**

*By*

**PROF. STELLA NONYELUM ZUBAIRU**

*B.Arch, (UNN), MSc (Strathclyde), PhD (Unilag)*

*Professor of Architecture*

**INAUGURAL LECTURE SERIES 68**

**4<sup>TH</sup> OCTOBER, 2018**

---

**University Seminar and Colloquium Committee**

© Copyright: 2018

This 68<sup>th</sup> Inaugural Lecture was delivered under  
the Distinguished Chairmanship of:

**Professor Abdullahi Bala**, FSSSN,

*Vice-Chancellor*

Federal University of Technology, Minna

*All Rights Reserved*

ISSN 2550 - 7087

*Published by:*

**University Seminar and Colloquium Committee**

Federal University of Technology, Minna.

**4<sup>th</sup> October, 2018**

*Design + Print:*

**Global Links Communications, Nigeria**

©: 08056074844, 07036446818



**Professor Stella Nonyelum Zubairu**

*B.Arch (UNN), MSc (Strathclyde), PhD (Unilag)*

***Professor of Architecture***

# POST-OCCUPANCY EVALUATION: A NECESSARY TOOL FOR ARCHITECTS, FACILITIES MANAGERS AND OTHER PROFESSIONALS IN THE BUILDING INDUSTRY

## 1.0 Introduction

Buildings are an important necessity to provide for human needs for shelter. They also provide support for operations and equipment. Therefore by understanding how existing buildings affect occupants, designers can minimise problems and capitalise on successful design features. Often, once a building is physically completed, the designers and builders treat the building as a closed issue. There is a need to look back at the building to evaluate its performance, learn and apply the knowledge for improvement in the design, construction and maintenance of future buildings for a better built environment (Zubairu, 2012).

It has increasingly been demonstrated that this look back or post-occupancy evaluation (POE) is absolutely essential so that future buildings can perform better from lessons learnt from building performance (John, 2008). Thus POE is intended to compare systematically and vigorously the actual performance of completed and occupied buildings with explicitly stated performance objectives. Kampschroer and Heerwagen (2004) noted that the difference between the actual performance and the intended performance constitutes the evaluation.

Evaluation and feedback are known to be cornerstones for the continuous improvement in building procurement. Thus, for an effective feedback system there is a need for post-occupancy

evaluation. Post-Occupancy Evaluation (POE) involves systematic evaluation of opinions about buildings in use, through careful analysis of buildings from all relevant viewpoints. It is equally a tool to account for building quality, most especially when planning refurbishment of existing buildings. It helps clarify perceived strengths and weakness in order to focus resources where they are needed (Zubairu and Olagunju, 2012; Zubairu and Ayuba, 2012).

From past researches carried out ((Brill *et al.*, 1984; Ellis, 1988; Wolfgang *et al.*, 1988; Van Wagenberg, 1989; Adedayo and Zubairu, 2013; Anunobi and Zubairu, 2016), the participation by the users has been revealed to generate greater commitment to solutions and more willingness of users/owners to accept shortcomings. Consequently, POE of existing buildings involves various relevant groups, such as building research experts and users. There is growing global desire to assess and investigate performance of buildings after being occupied due to its enormous influence on the occupants' health and safety and stakeholders' needs.

Preiser and Schramm (2002) explained that as the term evaluation contains the word “value” POE explicitly requests users to assess the performance of the building within certain contextual objectives. Building users here refer to all people with an interest in the building under consideration. They include but are not limited to staff, managers, customers or clients, visitors, owners, design and maintenance teams and other interest groups such as the physically and or mentally challenged.

## **2.0 Post-Occupancy Evaluation**

### **2.1 Definition of Post-Occupancy Evaluation**

Different terms have been used for Post-Occupancy Evaluation

(POE), namely, Facility Performance Evaluation (FPE), Environmental Design Evaluation (EDE), Environmental Audits (EA), Building-in-use Assessments, Building Evaluation, Facility Assessment and Building Performance Evaluations (BPE). In a historical survey, Cutler and Kane (2009) argued that POEs started in the 1960s and 1970s, although these involved individual case studies such as public and student housing.

The term Post-Occupancy Evaluation (POE) was coined over 60 years ago. Though there are several definitions of POE, it may be defined as any and all activities that originate out of an interest in learning how a building performs once it is built and occupied, including if and how well it has met expectations and how satisfied building users are with the environment that has been created. Precisely, Post-Occupancy Evaluation involves systematic evaluation of opinions about buildings in use, from the perspective of the people who use them. Preiser *et al.* (1988) further defined POE as a process of evaluating buildings in a systematic and rigorous manner after they have been built and occupied for some time.

Many actors participate in the use of buildings, they include investors, owners, operators, maintenance staff, and perhaps most important of all, the end users. POE differs significantly from the conventional surveys and market research. It uses the direct, unmediated experiences of building users as the basis for evaluating how a building works for its intended purpose.

## **2.2 Levels of POE**

There are three levels of POE: Indicative, investigative and diagnostic. The indicative POE is the first level carried out in a short period of time to determine whether there are serious problems in the building. The next level is the investigative POE which is carried out after an indicative POE has identified issues

that need further investigation. The third level is the diagnostic POE which may take from several months to a year and the results are long-term oriented to improve not only a particular facility but also the state of the art in a given building type.

### **2.3 Process of POE**

The process of POE includes:

- i. Study and analysis of as-built drawings.
- ii. Preparation of questionnaires for management and workers/users in the building(s).
- iii. Walk-through evaluation – this involves a complete physical examination of the building by the POE team.
- iv. Interviews – the POE team finally interviews selected personnel at the end of the walkthrough (Zubairu, 2002).

Post occupancy evaluation involves measuring the suitability and convenience of facilities through the following:

- (i) Systematic consideration of opinions of users about buildings in use.
- (ii) Onsite inspection of existing infrastructure.
- (iii) Prescribing possible means of improvement of these facilities (Preiser *et al.*, 1988).

Equally, POEs are used for many purposes including;

- (a) Developing new facilities.
- (b) Managing and improving on new buildings.
- (c) Establishing better building and maintenance standards.

### **2.4 Buildings whose designs were influenced by POEs**

As the importance of POE was realised, designers utilised findings to change designs of buildings to meet the yearning of users. In Germany, Netherlands and Scandinavian countries, it is mandatory that users are consulted in the design of public buildings.



**2.4.1 Changes in floor plans of office buildings** - POEs indicated that workers in office buildings prefer to work near windows which they can open if they wish to. This changed the floor plans of many office buildings from deep open plan to group spaces or narrower open plan offices. These changes can be seen in the following office buildings:

**(a) NMB (now ING Bank) Headquarters, Amsterdam, Netherlands (1987)**

The building was designed by Ton Alberts of Alberts and Van Huut and the unique configuration was to ensure that workstations were as close to windows as possible (see Plate 2.1)



Plate 2.1 - NMB (now ING) Headquarters, Amsterdam, Netherlands  
Source: *Architecture Guide* (2018)

The workers appreciate the beautiful and comfortable working environment and this has enhanced productivity.

**(b) Commerzbank Tower, Frankfurt, Germany (1997)**

The building was designed by Sir Norman Foster and was the first eco-friendly skyscraper in Europe when completed in 1997. The design utilises natural ventilation and allows users to be able to open windows to a beautifully landscaped atrium (see Plates 2.2 and 2.3).



Plate 2.2 - Commerzbank Tower, Frankfurt, Germany

Source: [www.fosterandpartners.com/projects](http://www.fosterandpartners.com/projects)



Plate 2.3 - Commerzbank Tower, Frankfurt, Germany

Source: [www.fosterandpartners.com/projects](http://www.fosterandpartners.com/projects)

## 2.4.2 The Office Village Concept

POEs revealed that office workers preferred an office environment that provides all the facilities one might get in a community centre; these include restaurants, crèche, barber shop, small shops and pharmacy. This led to the office village concept where headquarter buildings of large organisations were designed as office villages. The increase in productivity of workers was quite substantial. An example of the office village is the Scandinavian Airlines (SAS) headquarters building in Sweden.

### (a) Scandinavian Airlines Headquarters, Frosundavic, Sweden (1987)

The building was designed by Norwegian architect Niels Torp and took two years to build from 1985 to 1987. It has seven separate building blocks with a 'street' covered by a glass roof connecting the corridors (see Plates 2.4, 2.5 and 2.6).



Plate 2.4 – SAS Building, Sweden

Source: [www.alamy.com](http://www.alamy.com)



Plate 2.5 - SAS Building, Sweden  
Source: [www.alamy.com](http://www.alamy.com)



Plate 2.6 - SAS Building, Sweden  
Source: [www.alamy.com](http://www.alamy.com)

## 2.5 Buildings Demolished after POE

### Red Road Flats, Glasgow (1971)

The Red Road Flats consisted of 8 blocks of high rise residential flats built in the districts of Balornock and Balmulloch in the north-east of Glasgow (see Plates 2.7 and 2.8). They were designed by Arc Sam Burton and associates. Two blocks had 28 floors (79m) while six blocks had 31 floors (89m). Construction was completed in 1968 while the opening was in 1971 (Smith, 2010).



Plate 2.7 - Red Road Flats, Glasgow

Source: [www.redroadflats.org.uk](http://www.redroadflats.org.uk)

POE revealed that asbestos was used to clad the steel frame as fire protection. Also residents were not happy due to having to live so high above ground, high crime rate and inadequate maintenance of the buildings. It was after a series of suicides, four in number, that the government decided that the flats should be demolished. The demolition took place from 2012 to 2015.



Plate 2.8: Red Road Flats, Glasgow

Source: [www.redroadflats.org.uk](http://www.redroadflats.org.uk)

### **3.0 MY CONTRIBUTION**

My research team has carried out series of post-occupancy evaluations of various building types.

#### **3.1 Hotels in Minna**

POE was carried out to determine the standard of hotels in

Minna. Twelve hotels were selected by stratified sampling method. The ages of the hotels ranged from one year to over eight years old as displayed in Table 3.1.

**Table 3.1: Range of ages of the hotels**

<b>Age of Hotel</b>	<b>Number of Hotels</b>
0 - 1 year	1
2 - 3 years	0
4 - 5 years	5
6 - 7 years	3
8 years and above	3
<b>Total</b>	<b>12</b>

Table 3.1 indicates that most of the hotels in Minna are relatively new. Only three hotels are eight years and above in age. This is attributable to the fact that prior to the creation of Niger State in 1976 and the elevation of Minna to a state capital, the town was a small railway town on the route from Lagos metropolis to the cities of Kaduna and Kano.

### **3.1.2 Number and Types of Rooms Available**

The number and types of rooms available in each of the hotels was ascertained. Table 3.2 displays the results.

Table 3.2 indicates that based on number of rooms only four of the hotels, namely Shiroro, Hydro, Aloe vera and Nasfah have more than the minimum number of lettable rooms of fifty that are required for consideration for 5-Star ranking consideration. The hotel with the fewest number of lettable rooms is Niteco which makes it a 1-Star hotel.

**Table 3.2: Number and Types of Rooms Available**

S/N	Name of Hotel	Single/Standard	Double	Executive	Presidential	Total
1.	Ajuba	6	2	8	0	16
2.	Aloevera	27	7	21	1	56
3.	Ben Jama'a	38	0	0	0	38
4.	Brighter	19	0	16	2	37
5.	De Peacock	8	8	4	0	20
6.	Farindoki	24	0	0	0	24
7.	Golden Palace	8	4	6	2	20
8.	Had Resources	5	10	5	0	20
9.	Hydro	35	7	35	1	78
10.	Nasfah	32	0	19	2	53
11.	Niteco	5	6	1	0	12
12.	Shiroro	0	195	0	0	195

### 3.1.3 Facilities Available in the Hotels

It is the number and quality of other facilities available in the hotels that determine their actual ranking. These facilities are indicated in Table 3.3.

**Table 3.3: Facilities available in the hotels**

S/N	Name of Hotel	Restaurant	Salon	Bar	Gym	Shop	Swimming Pool	Cyber Café	Banquet Hall
1.	Ajuba	1	0	1	1	0	0	0	1
2.	Aloevera	1	1	1	1	1	1	1	1
3.	Ben Jama'a	1	0	1	0	0	0	0	1
4.	Brighter	1	0	0	0	1	0	1	1
5.	De Peacock	1	0	1	0	1	0	0	1
6.	Farindoki	0	0	0	0	0	0	0	0
7.	Golden Palace	1	0	1	1	1	1	1	1
8.	Had Resources	1	0	1	0	0	0	0	0
9.	Hydro	1	1	0	1	0	1	1	1
10.	Nasfah	1	0	0	1	0	1	0	1
11.	Niteco	0	0	0	0	0	0	0	1
12.	Shiroro	1	1	1	0	1	1	1	1

Table 3.3 indicates that the only hotel that has all the listed facilities is Aloevera Hotel followed by Shiroro Hotel which has all the facilities except for a gymnasium.

### 3.1.4 Infrastructure in the Hotels - The nature of infrastructure



in the hotels was determined. All the hotels utilise standby generators to ensure twenty-four hour power supply, because supply from the National grid is epileptic and unreliable. Whenever there is a cut in supply from the National grid, the generators are immediately put on to ensure the comfort of the customers. Regarding water supply, the public water supply is very irregular. Nine of the hotels have sunk bore-holes to ensure twenty-four hour water supply, while three dug wells to provide water for their customers. All the hotels make use of private refuse collectors who dispose of their waste for them.

### 3.1.5 Location, External and Internal Images of the Hotels

The location of a hotel is a very important criterion as it determines whether it is easily accessible to clients. The nature of access roads, proximity to bus routes and train stations are key determinants. Ten of the hotels had good accessibility and only two namely Had Resources and Nasfah had poor access routes. Plates 1 to 12 illustrate the external and internal images of some of the hotels.



Plate 3.1 - Good access road



Plate 3.2 - Good access road

Plates 1 and 2 represent the hotels that enjoy locational advantage, proximity to bus route and good condition of adjacent street.



Plate 3.3 - Bad access road



Plate 3.4 - Bad access road

Plates 3.3 and 3.4 represent the hotels with bad location.

### 3.1.6 External image

Plates 3.5 and 3.6 represent hotels with attractive external image and good landscaping.



Plate 3.5 - attractive external image



Plate 3.6 - good landscaping image



Plate 3.7 - Poor external image

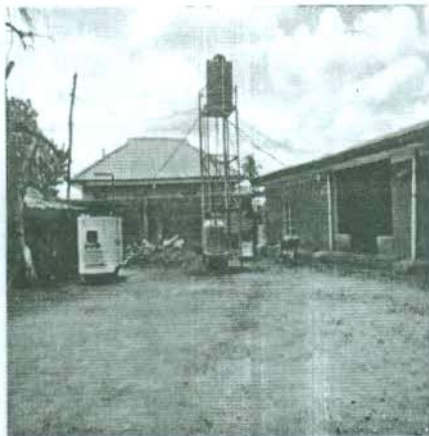


Plate 3.8 - Poor external image

Plates 3.7 and 3.8 show hotel with bad external image and landscape  
Plates 3.7 and 3.8 show hotel with bad external image and landscape

### 3.1.7 Internal image



Plate 3.9 - Good indoor image



Plate 3.10 – Good indoor image

Plates 3.9 and 3.10 show hotels with good indoor cleanliness and interior decoration.



Plate 3.11 - Poor interior



Plate 3.12 - Poor wall and floor maintenance

Plate 3.11 depicts bad interior finishes and decoration while plate 3.12 shows bad wall and floor maintenance.

### **3.1.8 Summary of Findings**

- Most of the hotels are not more than seven years old and this is because Minna was a small railway town before its establishment as a state capital in 1976.
- Only two of the hotels can be regarded as close to 5-Star ranking in terms of number of rooms and facilities available.
- All the hotels studied use the public power supply in addition to stand by generators as sources of power supply. All the respondents reported that the public power supply is epileptic and unreliable.
- All the hotels are connected to the public water supply, but require boreholes and wells to ensure adequate water supply.
- All the hotels employ the private refuse collection system for their refuse disposal.
- The location of most of the hotels is satisfactory. External and internal images of some of the hotels need improvement to attract customers.

### **3.1.9 Recommendations from POE of Hotels in Minna**

One of the objectives of this study was to suggest ways of improving hotel buildings' performance and users' satisfaction. The following recommendations were therefore made:

- The hotels should improve the number and room types in their hotels.

- Additional facilities should be provided by most of the hotels in order to attract more customers; recreational facilities like gymnasium and swimming pool, should be provided in the hotels for customer satisfaction and convenience.
- The hotel owners/operators should tap the enormous opportunities offered by Post-Occupancy Evaluation method of building appraisal. This helps in ensuring improved business performance.
- The government should improve on the quality of power and water supply in the State.
- Aesthetics should be given a high priority. Building users derive a lot of psychological satisfaction and aesthetic pleasure if the premises are well maintained and landscaped.

### **3.1.10 Conclusion of POE of hotels in Minna**

Hotel managers have an important obligation to ensure that hotel buildings and facilities are well managed to maintain building sustainability. Consideration has to be made of the additional and recreational facilities that make a hotel more attractive to customers. Evaluation after occupancy in buildings is vitally needed to ensure that hotel building performance is sustained. Hotels in Minna have to continue to improve in their services to meet international standards of high ranking hotels in the world.

## **3.2 Post-Occupancy Evaluation of Students' Hostels in FUT Minna**

### **3.2.1 Analysis of Over Crowding**

In Hostel A (Male) located in Gidan Kwano, which has a statutory

allocation of 4 students per room, the study revealed that 86% of rooms studied have between 4-6 students, while 7-9 students are resident in the remaining 14% of rooms, (see Figure 3.1). This shows that overcrowding exists in 14% of the rooms in this hostel. It is important to note that the rooms were neither below the statutory allocation nor were they grossly overstretched.

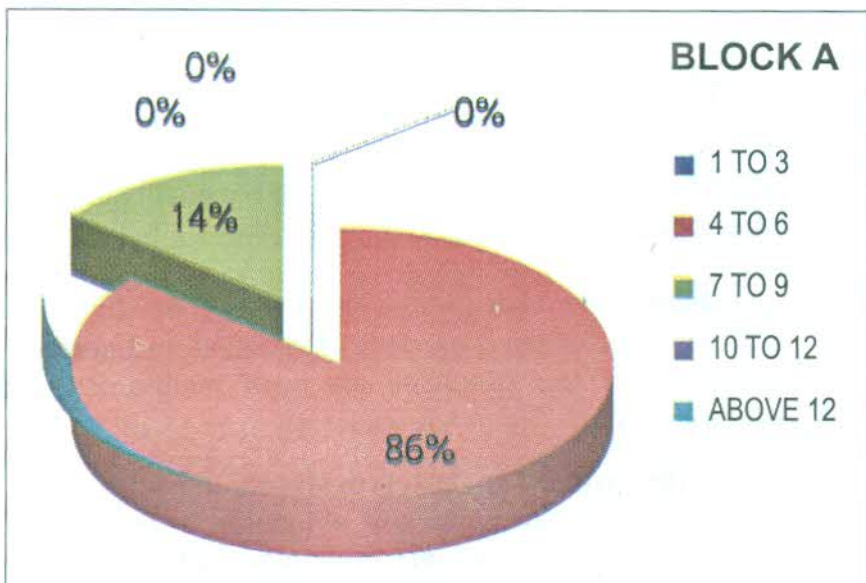


Figure 3.1: Occupancy of Block A

In Hostel B (male) – Gidan Kwano (see Plates 3.13 3.14) which similarly has a statutory allocation of 4 students per room, the study indicated that 7% of respondents rooms have 1-3 students in a room, 40% have 4-6 students, 46% have between 7-9 students and a further 7% have 10-12 occupants while none of the rooms studied have more than 12 occupants, (see figure 3.2). 53% of the can be said to be overcrowded and 7% are under occupied. Hostel B can therefore be said to be overstretched in terms of its occupancy.

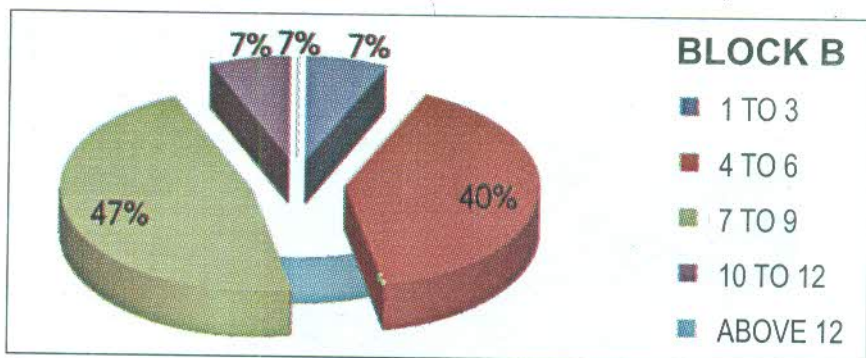


Figure 3.2: Occupancy of Block B

The Old female hostel in Gidan Kwano campus comprising blocks C, D, E, F, G has legal occupancy of 5 students per room. Studies showed that 73% of rooms have 4-6 occupants per room, 20% have 7-9 occupants and 7% have 10-12 occupants while none had 1-3 occupants or above 12 occupants, (see Figure 3.3). This Hostel can thus be said to have overcrowding in 27% of rooms.

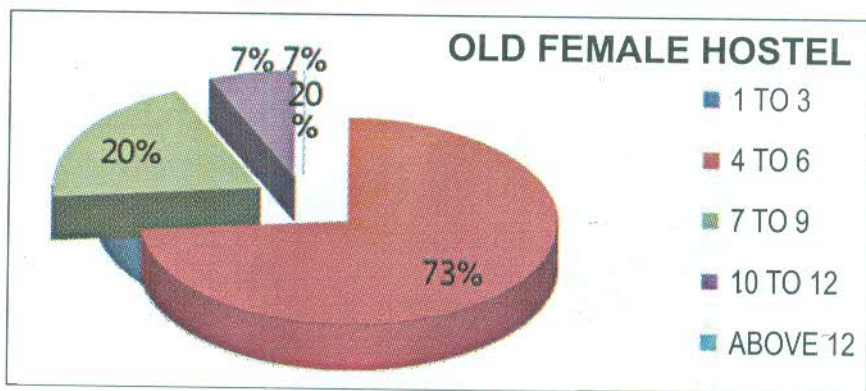


Figure 3.3: Occupancy of Block C, D, E, F and G.

In the new female hostel, Gidan Kwano whose legal occupants per room is 3, the study revealed that 64% of rooms are optimally occupied by 1-3 occupants while 29% of rooms are occupied by 4-6 students, 7% have 7-9 students, (see Figure 3.4). 36% of the rooms in this hostel are overcrowded.



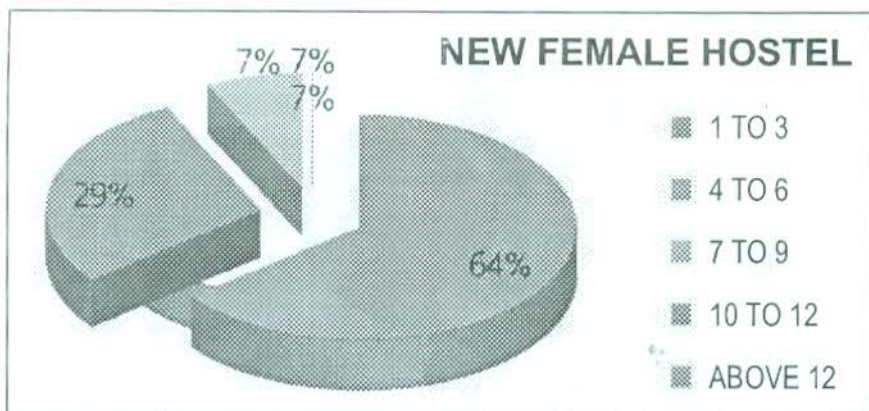


Figure 3.4: Occupancy of New Female Hostel

In Bosso Campus, Block P (male) and Block Q (male) posed identical results with 60% of the rooms studied having 7-9 occupants, 20% have 4-6 occupants, 7% have 1-3 occupants while 13% are occupied by 10-12 students, (see Figure 3.5). Since these hostels have a statutory allocation of 8 students per room, then 13% of them can be said to have overcrowding issues while 27% are under occupied!

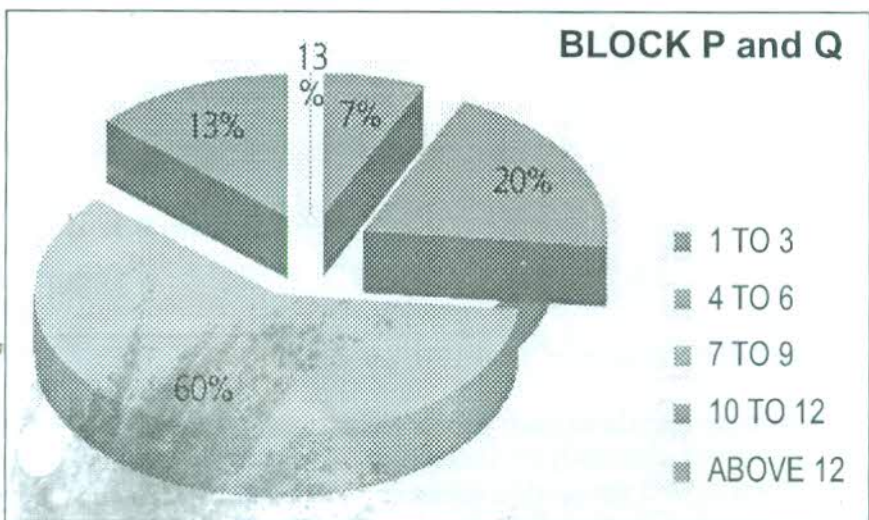


Figure 3.5: Occupancy of New Female Hostel.

In Block L and M and Block N (female) hostel located in Bosso campus, the result show that 80% of the hostel has 9-12 students per room while 20% have above 12 rooms, (see Figure 3.6). As its statutory allocation is 9 per room, 20% can be said to be overstretched.

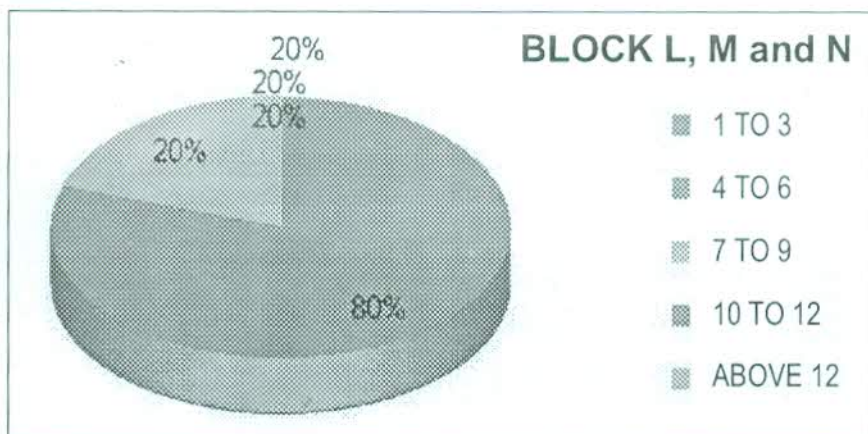


Figure 3.6: Occupancy of Block L, M and N

Summarily, about 34% of hostel rooms in Gidan Kwano campus are overstretched while only 17% of rooms in Bosso campus were congested. The male hostels had overcrowding issues in 27% of its rooms while their female counterparts similarly had 27% overcrowding in their rooms. In general, overcrowding in rooms can be put at 27%. Plates 3.15, 3.16, 3.17 and 3.18 illustrate overcrowded rooms in the hostel.

- Findings from the research have shown that the bed spaces are adequate for the number of persons in it, although the bed spaces are more than the required number in a room according to design. This is the situation in more than half of the rooms in the hostel, male and female inclusive. Many of the rooms had less wardrobes and lockers than the number of occupants in a room. The design of the hostels is not flexible to accommodate the

increasing number of students as well as accommodate the new level of modernization such as computer. All these and more should be looked into in new project designs in order to make the new hostels more functional and easily adaptable.

**3.2.2 Other facilities in the hostels** - The POE revealed that students made many illegal electrical connections in their rooms. Plate 3.19 illustrates such a connection through the ceiling fan in a room.



Plate 3.13 Hostel B (male) at Gidan Kwano



Plate 3.14 Courtyard of male hostel



Plate 3.15 Overcrowded room in male hostel



Plate 3.16 Overcrowded room in male hostel



Plate 3.17 Overcrowded room in female hostel Gidan Kwano



Plate 3.18 Overcrowded room in female hostel Gidan Kwano



Plate 3.19 - Illegal connection from fan in male hostel

A good number of rooms had a ceiling fan in their rooms with a slightly lesser number functioning. Every room has at least one socket, but more than 60% of the rooms either do not have one (1) that is functioning or have less than sufficient number.

Also, findings showed that lack of good water supply, poor management and maintenance are major issues highlighted by the students as reasons for discomfort in their hostels. About half of the respondents claim to be supplied water daily in rainy season, with over 35% hardly ever receiving water. A slightly greater percentage is not supplied water in the dry season. Due to the conditions of the hostel, and the overcrowded situation of the rooms, more than 80% of the respondents are at not comfortable in the hostel; more than half of the 80% were very uncomfortable.

It is observed that, if attention is paid to the maintenance and repairs of the basic services and facilities in the hostels, a greater student's satisfaction would have been received from the respondents. Hostels, as living spaces should offer adequate services as well as functional and aesthetic satisfaction to students. From the findings, the hostel evaluated performed just above average as good quality ratings of the aspects used in the evaluation outweighed the poor quality ratings.

### **3.2.3 Recommendations from POE of Hostels in FUT Minna**

For optimal performance of on-campus student hostels, the space, services and facilities provided require intervention. Therefore the following recommendations are made:

- Increase in the size of the rooms for subsequent hostel design to give convenience and accommodation for the students and their belongings. It should be noted that increase in the size of the rooms will give way for ease of movement, level of privacy and adequate flow of ventilation.

- Minimizing the level of room occupancy to avoid overcrowding which can contribute to unhealthy environment, and which could eventually cause the spread of air borne disease to the students. This can be achieved by proper monitoring on the part of the university management.
- The University management should outsource maintenance management aspect of the student housing in terms of adequate services and facilities provided to serve the students. The services and facilities such as adequate water supply, electricity, regular waste disposal management, maintenance of drainage system and repair of toilets/baths should be the major focus of the university management as these will help in improving student hostel satisfaction.

### **3.3 Post-Occupancy Evaluation of Factories in Minna**

The industries in Minna are mainly small and medium scale. The number of registered factories in Minna as at June 2008 was 26. They are:

1. Abu-Turab Feeds Limited
2. Abu-Turab Poultry Limited
3. Kad Engineering Limited
4. Tomi-Zayi Limited
5. Water Search Nigeria limited
6. Sawn Mill and Furniture Limited
7. Al-Habib Pottery Centre
8. Northern Enterprise Limited
9. Ashwin Nigeria Limited
10. Bakai Heveltica
11. Dana Pharmaceutical
12. Tagwai Bakery and Confectionery

13. Imurat International Limited
14. Golden Nut Oil Limited
15. Abu-Turab Rice Processing Mill Limited
16. Niger Flour Mill Limited
17. A and Shine Honey Limited
18. Ebanshin Nigeria Limited
19. Maizube Farms
20. Jochips Nigeria Limited
21. Owin Nigeria Limited
22. Takimo Kampala
23. Morris Nigeria Limited
24. White Heart Limited
25. El-amin Bakery and Confectionery
26. Ola sawn Mill and Furniture Company.

A post-occupancy evaluation exercise was carried out by post graduate research students of the Department of Architecture, Federal University of Technology, Minna, in 2008 to determine the working conditions of the registered factories in Minna. All the 26 factories listed above were visited by the research groups and only nine were found to be fully operational. They are:

1. Golden Nut Oil Limited
2. Imurat International Limited
3. Maizube Farms
4. White Heart Limited
5. Takimokampala
6. Al-Habib Pottery Centre
7. Ola sawn Mill and Furniture Company
8. Abu-Turab Feeds Limited
9. El-Amin Bakery and Confectionery.

The management of El-Amin Bakery and Confectionery did not permit the research team to carry out a POE of their factory so the

data presented below is based on data obtained from eight factories in Minna. It should be noted that there are other small scale industries operating in Minna but they were not registered with the Niger State Ministry of Commerce and Industries so they were not included in this study.

### 3.3.1 Space management

Space management is the planning and organising of space and equipment in a building in a cost-effective manner, to meet the changing requirements through time, of the organisation occupying the building. The POE team, during the walkthrough evaluation of the factories, assessed how effectively the spaces in the factories were arranged. Table 3.4 indicates that the space management was generally good in all the factories except for White Heart.

**Table 3.4: Space management**

S/No.	Factory	Good (%)	Poor (%)
1	Golden Nut Oil	53	47
2	Imurat International	67	33
3	Maizube Farms	80	20
4	White Heart	30	70
5	Takimo Kampala	100	0
6	Al-Habib Pottery	100	0
7	Olasawn Mill and Furniture	90	10
8	Abu-Turab Feeds	89	11



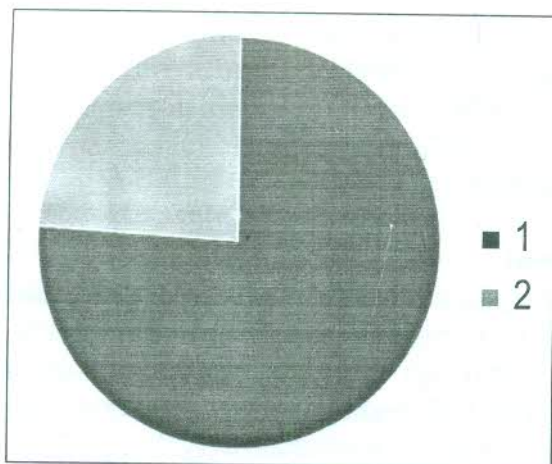


Figure 3.7: Showing the space management of factories in Minna

1 = good condition  
2 = poor condition

### 3.3.2 User Satisfaction

When workers are satisfied with their working conditions, they tend to be more productive. Table 3.5 indicates the level of satisfaction of the workers with their working environment. The results indicate that most of the workers were satisfied except for White Heart and Abu-Turab Feeds where 60% of the workers were dissatisfied with their working conditions.

Table 3.5: User Satisfaction

S/No.	Factory	Satisfied (%)	Dissatisfied (%)
1	Golden Nut Oil	56	44
2	Imurat International	70	30
3	Maizube Farms	80	30
4	White Heart	40	60
5	Takimo Kampala	80	20
6	Al-Habib Pottery	79	21
7	Olasawn Mill and Furniture	86	14
8	Abu-Turab Feeds	40	60

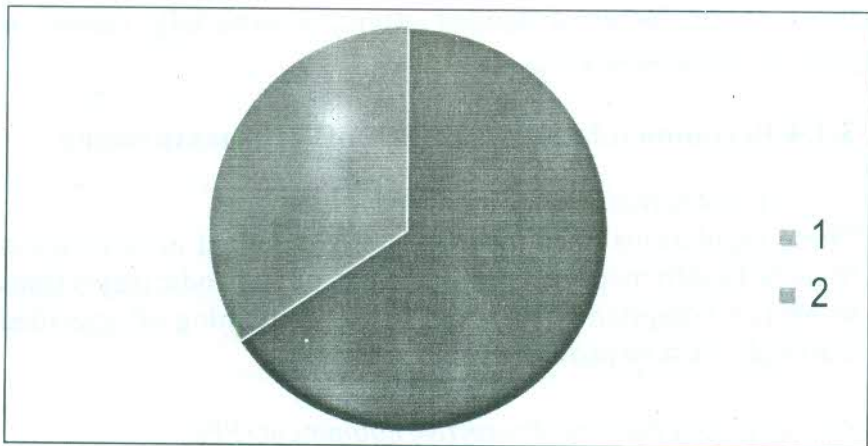


Figure 3.8: Showing the user satisfaction of factory staff in Minna

1 = satisfied

2 = dissatisfied

### 3.3.3 Findings of the Study

From the survey of the functional factories in Minna, it was observed that there are more male factory workers than females. This is not unexpected as factory work in Nigeria has generally been male dominated. Majority of the workers are in the 25-35 year age bracket. Most of the staff were secondary school certificate holders. In the space management, it is seen that most factories in Minna had an above average space management - Ventilation and lighting were fairly good except for a few of the factories. Most of the workers were satisfied with the working environment. Space for movement of workers between equipment was adequate though room for expansion was lacking in most of the factories. Only one of the factories had a clinic and only few had first-aid boxes. Personal protective clothing and equipment were lacking in most of the factories. Maintenance of the factories needed to be improved upon. The interiors of most of the factories were overdue for re-painting. The exterior of

most of the factories needed attention especially cutting of grasses and landscaping.

### **3.3.4 Recommendations from POE of Factories in Minna**

#### *3.3.4.1 Factory Health and Safety Regulations*

These regulations need to be properly enforced in factories in Nigeria. Health inspectors should carry out periodic inspections to ensure compliance. First-aid boxes containing all specified materials must be provided in all factories.

#### *3.3.4.2 Factory Personal Protective Equipment (PPE)*

HMSO (2002) describes PPE as any device or appliance designed to be worn or held by and for protection against one or more health and safety hazards. Two notable regulations namely: Factory Act of 1990 and the Personal Protective Equipment (PPE) Regulations of 2002 are specifically concerned with regulating the use of PPE. The Factory Act of 1990 is the Nigerian version of the Factory Act of Britain. It is enacted and came into force in 1990. Articles 47 and 48 contain regulations on the provision of PPEs for workers. By this provision, all factories must comply with this act that stipulates workers to have protective clothing, helmet, safety boot, hand globe, eye and ear protectors.

#### *3.3.4.3 Adequate Ventilation and Lighting*

It was observed from the survey that some of the factories need to improve on the ventilation and lighting conditions to maximize the comfort of the workers. In Nigeria, it is stipulated in the Development Control Standards and Building Regulation that: "all buildings shall have adequate through and cross ventilation. All rooms shall have at least one window opening into the external air and the area of such windows shall not be less than one tenth of the floor area. If windows or a window and

door are not placed opposite themselves in a room, there shall be provided on the wall a ventilator" (FCDA, 1988). This standard must be enforced in all factories.

#### *3.3.4.4 Adequate Maintenance of Factory Buildings*

Poor maintenance practices in developing countries have negative impacts on the environment and public health (Habitat, 1993). From the survey carried out it was observed that most of the factories in Minna are poorly maintained. Planned maintenance of factory building and its facilities is of prime importance.

#### *3.3.4.5 Provision of Staff Clinics and Fire Extinguishers*

Staff clinics need to be located within the factory premises as only one had a clinic in the premises. Adequate fire extinguishers should be provided and installed at appropriate position maintaining standard regulations of the Factory Act.

#### *3.3.5 Conclusion*

The POE provided information on condition of factory workers, their attitude about the job and working environment. Organisations and individuals who own and manage factories and their occupants should be aware of the roles they need to play in ensuring that they maintain a good working environment for the workers. The Factory Health and Safety Regulations must be reviewed from time to time to take cognisance of technological developments. These regulations need to be enforced in all factories in Nigeria. It is therefore recommended that post occupancy evaluation be carried out regularly on factories so as to guarantee health and safety of the occupants.

### **3.4 POE of Motor Parks in Minna**

Motor parks in Minna were evaluated by the research team. The motor parks that were assessed are listed in Table 3.6.

**Table 3.6: Selected Motor parks in Minna and their Locations**

<b>Motor Park</b>	<b>Location</b>
Paida Motor Park	Maitumbi Road Minna
Abdulsalam Motor Park	Along Minna – Paiko Road
Kpakungu Motor Park	Minna – Bida Road
Gwadabe Motor Park	Near Old Minna Market
Niger State Transport Authority (NSTA) Park	Along Minna – Paiko Road
Kure New Market Motor Park	Minna Central Market
Mobil Motor Park	Minna City Centre
Minna Central Motor Park.	Minna City Central area

The survey of the motor parks spanned a period of 8 weeks with visits to the motor parks on different days and at different times of the day so as to obtain data from different commuters. The motor parks were grouped based on the proximity of their location so as to make the administering of the questionnaires easier and better organized. A total of 400 questionnaires were administered in the study area and this was spread evenly across the 8 motor parks.

### **3.4.1 Waiting Areas in Motor Parks**

A waiting lounge is expected to be known to every commuter who makes use of the motor park. It was observed from the evaluation that Mobil Motor Park, Central Motor Park and Old Gwadabe-Market Motor Park did not have any waiting area. It was therefore common to find commuters standing or sitting inside the cars they were to travel in. In Paيدا and Kpakungu motor parks the waiting area had been converted into dining area by local food vendors for passengers or park workers who wished to eat. The other motor parks had waiting areas for passengers to sit, however; they were often far from boarding areas for the commuters hence passengers did not make use of them as expected.

### **3.4.2 Provision of Toilets in Motor Parks**

The provision of toilet facilities is a necessity in a motor park as commuters very often wait for over 15 minutes before they can embark on their journey. Figure 5 shows that 55% of the respondents were not aware of the provision of toilets in the motor park. This implies that should the need arise for them to ease themselves they are most likely to either seek out nearby bushes or uncompleted buildings. In many of the motor parks visited the commuters are expected to pay a token of between 10 to 20 naira before being allowed to use the toilet. A few of the respondents were of the opinion that commuters should ease themselves at home before coming to the park and that while at the park they should watch what they ate so as to avoid the need for toilet. It was observed during the study that Abdulsalam Motor Park, Kure New Market Motor Park and NSTA Motor Park were the only motor parks that had fairly good toilets.

### **3.4.3 Recommendations on Motor Parks in Minna**

- There should be maintenance evaluation of the motor parks with the view of determining the state of the buildings in the motor parks so as to determine the type of maintenance to be carried out within them.
- Waiting lounges should be constructed in the motor parks that have none and the designs of such lounges should not be the open air type. In motor parks that have open air waiting areas they should be covered and furnished accordingly.
- There should be provision of good conveniences within the motor parks, designed and constructed to the quality of the type found in international airports and provided with uninterrupted water supply.
- The parking spaces in motor parks should be demarcated to ensure proper arrangement and orderly movement of vehicles.

- A service company or service unit should be engaged to maintain the motor park in terms of cleaning of the facilities, while shop owners in the motor parks should be made to dispose of their waste properly.

#### **4.0 CONCLUSION**

Post-Occupancy Evaluation has revealed that if users of public buildings are consulted at the initial design stage, better and more user-friendly designs will be produced. In office buildings POE has shown that workers productivity is enhanced when they are consulted at the initial design stage. POE has resulted in better designs that the building professionals would have overlooked.

Architects and other building professionals should never underestimate the value of the contribution of the users of the buildings. The race for the tallest building in the world is a case in point. Why do we build high? Is it to serve the user or to satisfy our ego? These are questions that developers and architects need to honestly answer.

The importance of POE must be recognised. It reveals vital information on buildings that could have been ignored. Building professionals should always have at the back of their minds the fact that we are designing for the comfort and welfare of human beings.

#### **5.0 RECOMMENDATIONS**

I hereby make the following recommendations:

- POE should be included as stage 4 of the Normal Services of architects in Nigeria. This will enable architects to improve on future designs after assessing the feedback from POEs.
- Legislation should be enacted to compel architects, facilities

managers and engineers to carry out regular POEs in order to assess the impact and effectiveness of building spaces, structure and services on the users of the building. This will lead to better building performance.

- Designers and developers of high-rise buildings should have a re-think and consider whether they are serving the users or serving themselves.
- Our legislators should enact a law that will make it mandatory that where public buildings are to be designed the opinion of the potential users should be sought before final decisions are made.
- Persons in leadership positions should never assume that they know what is best for their followers. They should always consult their followers as the best solutions or ideas may come from where we least expect them.



## ACKNOWLEDGEMENTS

First and foremost, I give thanks to God Almighty, my Creator and the one who guides and protects me at all times. I will always praise your Holy Name.

I would like to thank my late parents – my father, Prof. Joseph C. Anene, one-time head of the Department of History, University of Ibadan; my mother, Mrs. Violet Anene-Ayandele, former Vice-Principal, School of Nursing, U.N.T.H., Enugu; my step father, late Prof. Emmanuel A. Ayandele, first Vice-Chancellor of the University of Calabar. I also thank my brothers Ernest Anene and Femi Ayandele; my sisters Nkechi Anene and Amina Ayandele, my nephews and nieces Benjamin, Ekene, Nneoma, Violet, Ebuka, Tehillah and Emmanuel, thank you for your support. I remember my late brother Chuma Anene, may you continue to rest in the bosom of our Lord.

I also want to acknowledge my academic supervisor, Mr. Keith Alexander, Department of Architecture and Building Science, Strathclyde University, Glasgow; my external examiner, Dr. Francis Duffy of DEGW England; my PhD supervisors, Prof. Reuben Iyagba and Prof. David Aradeon of the Departments of Building and Architecture respectively, University of Lagos. Thank you for your guidance.

Past Vice-Chancellors whom I worked under, Prof. M. A. Daniya, Prof. H. Tukur Sa'ad, Prof. M. S. Audu, who appointed me Director CHSUD, then Dean Postgraduate School, and Prof. M. A. Akanji, it has been a pleasure to work with you all. The present Vice-Chancellor, Prof. Abdullahi Bala, you kept reminding me that you

expected my inaugural lecture, I have kept my promise today, Thank you. The Management of FUT Minna, the Deputy Vice-Chancellor (Academic), Prof. Y. A. Iyaka, the Deputy Vice-Chancellor (Administration), Prof. E. E. Udensi, the Registrar, Mr. Amos Kolo, the Bursar, Mrs. H. K. Abdullahi, the Librarian, Dr. J. K. Alhassan, thank you for your support.

My mentor in the Postgraduate School, Prof. S. L. Lamai, who taught me a lot when I was his deputy, thank you. The immediate past Registrar, Mrs. Victoria Kolo, thank you for challenging me and encouraging me.

My colleagues in the School of Environmental Technology: Prof. T. C. Mogbo, Prof. O. O. Morenikeji, Prof. Y. A. Sanusi, Prof. I. J. Nwadiolor, Prof. A. M. Junaid, Prof. J. J. Dukiya, Prof. A. Musa, Prof. R. E. Olagunju, Prof. A. E. Abalaka, the School Secretary, Mr. Ibrahim Abdullahi and other staff of the School, thank you for your support. Staff of the Department of Architecture: Dr. P. Ayuba, Dr. O. F. Adedayo, Arc. P. Haruna, Arc. J. U. Aniya, Arc. B. Mohammed, Arc. M. U. K. Yelwa, Dr. A. D. Isah, Dr. I. B. Muhammad, Dr. J. Eze, Dr. O. K. Akande, Dr. M. E. Abdulrahman, Dr. S. Oyetola, Arc O. D. Alonge and all other staff, I appreciate you all.

My colleagues in other schools, Prof. (Mrs.) I. N. Mogbo, Prof. (Mrs.) H. O. Akanya, Prof. (Mrs.) J. N. Udensi, Prof. (Mrs.) V. I. Ezenwa, Prof. (Mrs.) Z. D. Osunde, Prof. (Mrs.) C. C. Nsofor, Prof. E. N. Onwuka and Prof. A. A. Okhmamhe, I appreciate your support.

The staff of Postgraduate School whom I worked with when I was the Dean: Prof. O. K. Abubakre, Prof. E. J. Ohize, Prof. R. J. Kolo, Prof. E. C. Egwim, Prof. U. J. Akpan, Mrs. A. S. D. Usman, Dr. Garba Abdullahi, Mr. Matthew Chaba, my right hand man and all other staff, I appreciate you.

Members of ISA, St. Malachy's Chaplaincy, NDU, Parish Council of

St. Michael's Cathedral, St. Vincent de Paul Society, C. W. O. and St. Martin GRA Zone, thank you for your support.

I would like to thank Prof. Bisi Ayanwale, Dr. Jude Kur and other members of the University Seminar and Colloquium Committee. I appreciate your hard work.

My family – First, I would like to thank my husband, Prof. Mustapha Zubairu for taking care of the children while I was away for further studies at Strathclyde University. You always sent an air ticket at the end of each term to enable me come home to Nigeria. Thank you. My children, Umaru, Shehu, Ummi, Maryam and Maureen, my wards, Ruth and Mary, my grandchildren, Maryam, Aisha-Hannan, and Muhammad, I love you all. I cannot forget my late son, Mohammed, whom God called at the age of 13 years: We love you, but God loves you more.

Finally, I want to thank everyone here present, for taking time out of your busy schedules to be here today. May the good Lord reward you abundantly and guide you all safely back to your various destinations.

God bless you.

## REFERENCES

- Adedayo, O. F. and **Zubairu, S. N.** (2013). An Assessment of Facilities in Motor Parks in Minna, Niger State, Nigeria, through Post-Occupancy Evaluation. *Management*, 3(7), DOI:10:5923/j.mm 20130307.05, 360-367.
- Anunobi, A. I. and **Zubairu, S. N.** (2015). Post-Occupancy Evaluation of some selected Hotels in Minna, North Central Nigeria. *Academic Research International Journal*, 6(6), November, 94-102.
- Adedayo, O. F. and **Zubairu, S. N.** (2016). Assessment of Housing Design Decisions In Informal Housing Schemes in Urban Areas of Selected Cities in North Central Nigeria. *Ethiopian Journal of Environmental Studies & Management*, 9(1), 109-120.
- Architectureguide (2018). Headquarters NMB.  
[Architectureguide.nl/project/list\\_projects\\_of\\_architect/arc\\_id/1109](http://Architectureguide.nl/project/list_projects_of_architect/arc_id/1109). Accessed 6/8/2018.
- Brill, M., Wilson, S. and Decker, F. (1984). *Using Office Design to increase Productivity*, vol. 1, Buffalo, New York: Workplace Design and Productivity Inc.
- Cutler, L. J., and Kane, R. A. (2009). Post-occupancy evaluation of a transformed nursing home: the first four Green House® settings. *Journal of Housing for the Elderly*, 23(4), 304-334.

- Ellis, P. (1988). Post-occupancy Evaluation: Evaluating for the future. *Facilities*, 6(1), 7-10.
- FCDA (1988). *Development Control Standards and Regulations for Abuja*. Nigeria: Federal Capital Development Authority, 6.
- Habitat (1993). *The Maintenance of Infrastructure and its financing and cost recovery*, Nairobi: United Nations Centre for Human Settlements.
- HMSO. (2002). *Personal protective equipment regulations of 2002*, London: HMSO Publications.
- John, D. (2008). *Facility Performance Evaluation: The Architects Handbook of Professional Practice*, 14th Edition, N.J: John Wiley and Sons.
- Kampschroer, K. and Hearwagan, J. (2004). Strategic Post Occupancy Evaluation, Paper presented at the International Conference on Post Occupancy Evaluation, Windsor, UK.
- Olagunju, R. E. and **Zubairu, S. N.** (2016). Post-occupancy evaluation of students' hostel accommodation in Federal University of Technology, Minna. *Journal of Building Performance*, 7(1), 105-115.
- Preiser, W., Rabinowitz, H. and White, E. T., Eds, (1988). *Post Occupancy Evaluation*, New York: Van Nostrand Reinhold Co.
- Preiser, W. F. E. and Schramm P. (2002) Post Occupancy Evaluation. How to make Buildings work Better! *Facilities*, 27, 19-28.

Redroadflats (2018). Red Road Flats: Past, Present and future.  
[www.redroadflats.org.uk](http://www.redroadflats.org.uk). Accessed 7/8/2018.

Smith, C. (2010). Exhibition shows the rise and fall of Glasgow's Red Road tower block, *The Scotsman*, Glasgow, February. Accessed 6/8/2018.

Van Wagenberg, A. F. (1989). Post-Occupancy Evaluation for General Hospitals. Paper presented at first International Symposium on Facility Management, Washington D.C., May 10-12.

Wolfgang, F. E. P., Harvey, Z. R., and Edward, T. W., (1988). *Post-occupancy Evaluation*. New York: Van Nostrand Reinhold Co.

[www.alamy.com](http://www.alamy.com) (2018). Accessed 8/9/2018

[www.fosterandpartners.com/projects](http://www.fosterandpartners.com/projects) (2018). Accessed 14/8/2018

**Zubairu, S. N.** (2002). Post-occupancy Evaluation and Facilities Management – courses for the New Millennium. *Journal of the Association of Architectural Educators in Nigeria*, 2(1), Oct – March, 17-20.

**Zubairu, S. N.** (2004). Space Management in Office Buildings in Nigeria. *Journal of the Association of Architectural Educators in Nigeria*, 3(1), 38-43.

**Zubairu, S. N.** (2006). Participatory Design – Community/User Input in Design. *Journal of the Association of Architectural Educators in Nigeria*, 5(1), 55-58.

- Zubairu, S. N.** (2007). Management of Facilities in Schools of Architecture in Nigeria. *Journal of the Association of Architectural Educators in Nigeria*, 6(2), 32-38.
- Zubairu, S. N.** and Olagunju, R. E. (2012). Post Occupancy Evaluation of some selected Secondary Schools in Minna. *Journal of Economics and Sustainable Development*, 3(7), 112-119.
- Zubairu, S. N.** and Ayuba, P. (2012). Post-Occupancy Evaluation of Factories in Minna to determine the working conditions of staff. *Interdisciplinary Journal of Contemporary Research in Business*, 4(2), 698-708.
- Zubairu, S. N.** (2012). The Importance of Evaluation and Sustainability in the Built Environment. *Proceedings from the West Africa Built Environment Research Conference*, National Merit Award House, Abuja, 24th - 26th July.

## PROFILE OF THE INAUGURAL LECTURER

**P**rofessor Stella Zubairu was born over six decades ago in the ancient city of Ibadan. Her parents were late Professor J. C. Anene of the Department of History, University of Ibadan and later University of Nigeria, Nsukka, and Mrs. V. E. Anene later Ayandele, a former Vice-Principal of the School of Nursing, University of Nigeria Teaching Hospital, Enugu. She started her early education at the University of Ibadan staff school and later at the Maryhill Convent School Agodi, Ibadan. The advent of the Nigerian Civil war led to movement of the family to the East in 1966.

Prof. Stella Zubairu continued her education at Queen's School, Enugu where she took the WAEC exam, and obtained Grade 1 (Distinction). She then proceeded to University of Nigeria, Enugu Campus to study Architecture. She completed her studies with a Bachelor's degree in Architecture, second class upper division.

She did her NYSC at Niger State Housing Corporation, Minna, Niger State. She then took up appointment with the Niger State Ministry of Works where she rose to the rank of principal architect. She was involved in the design and construction of Government House as well as other health and social welfare projects. She obtained her Masters degree in Facilities Management from Strathclyde University, Glasgow in 1989.

Professor Zubairu transferred her services to Federal University of Technology, Minna in 1991 as a Lecturer 1 in the Department of Architecture. She went on study leave to the University of Lagos



in 1995 where she obtained her PhD degree in 1999. She was Head of Department of Architecture from 1999 to 2006. She was promoted to the rank of Professor on October 1<sup>st</sup> 2006. She chaired the committee that organised the first and second conferences of the School of Environmental Technology in 2007 and 2008 respectively. She was appointed Deputy Dean of the Postgraduate School in 2008. She was later appointed Director of the Centre for Human Settlements and Urban Development from 2008 to 2011.

In 2011, Prof. Zubairu was appointed the first female Dean of the Postgraduate School of the Federal University of Technology, Minna.

She is currently the acting Dean of the School of Environmental Technology.

She has supervised many PhD and Masters students. She is a registered architect and a member of the Nigerian Institute of Architects and the Association of Architectural Educators in Nigeria. She is also a member of the International Federation of Facilities Managers. She is happily married with children and grandchildren.