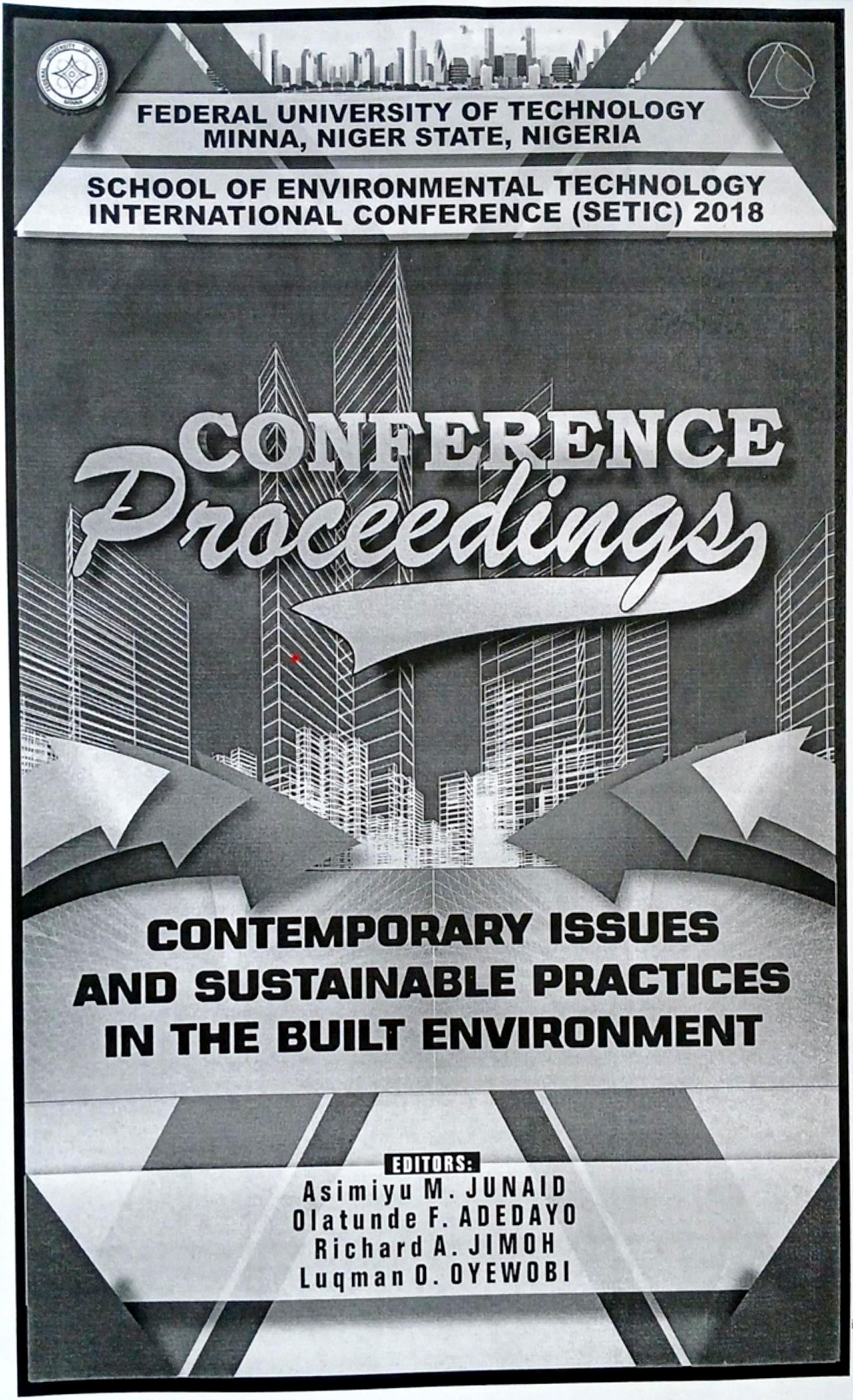
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Asimiyu M. JUNAID
Olatunde F. ADEDAYO
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Editors
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Olatunde F. ADEDAYO, Federal University of Technology, Minna, Nigeria
Richard A. JIMOH, Federal University of Technology, Minna, Nigeria
Luqman O. OYEWOBI, Federal University of Technology, Minna, Nigeria

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Correspondence:
All correspondence pertaining to the SETIC 2018 should be sent to:
Chairman SETIC 2018 LOC
School of Environmental Technology
Federal University of Technology, Minna
Main Campus,
P.M.B. 65
Minna, Niger State, Nigeria.
setconference@futminna.edu.ng: www.futminna.edu.ng

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FOREWORD

The organising committee of the 2nd School of Environmental Technology International Conference is pleased to welcome you to Federal University of Technology Minna, Niger State Nigeria.

The conference provides an international forum for researchers and professionals in the built and allied professions to address fundamental problems, challenges and prospects that affect the Built Environment as it relates to Contemporary Issues and Sustainable Practices in the Built Environment. The conference is a platform where recognised best practices, theories and concepts are shared and discussed amongst academics, practitioners and researchers. The scope and papers are quite broad but have been organised around the sub-themes listed below:

- Architectural Education and ICT
- Building Information Modeling
- Construction Ethics
- Energy efficiency and Conservation
- Environmental Conservation
- Facility Management
- Green Construction and Efficiency
- Health and Safety Issues
- Information Technology and Building Maintenance
- Information Technology and Construction
- Information Technology and Design
- Innovative Infrastructure Development
- Resilient Housing Development
- Smart Cities Development
- Social Integration in Cities
- Sustainable Building Materials Development
- Sustainable City Growth
- Sustainable Cost Management
- Sustainable Property Taxation
- Sustainable Architectural Design
- Sustainable Urban Transportation Systems
- Theory and Practices for Cost Effectiveness in Construction Industry
- Urban Ecology Management
- Urban Land Access
- Disasters, Resilient Cities and Business Continuity

We hope you enjoy your time at our conference, and that you have the opportunities to exchange ideas and share knowledge, as well as participate in productive discussions with the like-minded researchers and practitioners in the built environment and academia.

Local Organising Committee
School of Environmental Technology International Conference (SETIC) 2018
APRIL 2018

ACKNOWLEDGEMENTS

We have tried to build on the success of the maiden of SETIC held in 2016 which came with good feedbacks and memories. The success of the 2nd School of Environmental Technology International Conference holding at the Main Campus of the Federal University of Technology Minna, Nigeria is predicated on the support and goodwill from Vice-Chancellor of Federal University of Technology, Dean School of Environmental Technology and many other highly motivated people.

I sincerely wish to appreciate you for attending this Second edition of SETIC and to warmly welcome you to the city of Minna the capital of the *POWER STATE*. It is a great honour to have you in the beautiful campus of Federal University of Technology Minna, Nigeria. I am aware of the great sacrifices made by many of you to be present in this occasion and I will definitely not overlook the long distances some of you have had to cover to get to the conference venue. We genuinely appreciate all your efforts. It is our singular hope and desire that this 2nd edition of the conference (SETIC 2018) meets your expectations and gives you unquantifiable experience and tremendous developmental networking opportunities for a life fulfilling career.

We are grateful for the presence of the Vice Chancellor of the Federal University of Technology Minna Professor Abdullahi Bala whose leadership and distinguished academic career has served as inspiration and encouragement to many academics within and outside Nigeria. His desire to continue on the path of greatness for this Humble University of ours has seen the University become a destination for International conferences, Public lectures, Book Development, Presentations and Seminars that meet International standards. We are happy to have you as the Chief host to declare the conference open and deliver the welcome address.

We are grateful to the former Dean of School of Environmental Technology, Federal University of Technology Prof A.M. Junaid and the Ag. Dean of School of Environmental Technology Prof. S.N. Zubairu for providing the healthy platform, academic backing, management and guidance for the organisation of the conference. You increased the level of challenge from 2016 and provided the required resources, direction, energy and strategies for achieving its success, it is a great honour of having the opportunity to work closely with you and learning never to give up.

I wish to thank also all the special guests particularly leaders of the Industry, Built Environment and Academia.

A special thanks goes to the Bursar of Federal University of Technology, Mrs. Hajara Kuso for the timely responses to all our requests regarding the financial aspects of access to funds for the conference.

SETIC is beginning at the foundation this year and for this I wish to thank all those who have supported us through various forms of participation. Specifically I wish to thank the delegates and the partners for contributing significantly to the conferences. I wish to thank Prof. S.N. Zubairu Prof. A.M. Junaid, Prof. O. O. Morenikeji and Prof. Y.A Sanusi, who all genuinely and consistently monitored the progress of the conference preparations. My desire in 2016 was for SETIC to become a constant feature in the calendar of the University and global conference listings, am a happy person today seeing this desire fulfilled with the SETIC 2018 edition.

Delegates to SETIC 2018 are from different academic and research institutions that are spread across different countries. This offers participants a wonderful opportunity for exchange of cultural, social and academic ideas during the conference periods. It is also an opportunity to create awareness about programmes and events at the participants' individual institutions. I encourage you all to make good use of the networking opportunities that are available.

In this 2nd edition we received 258 abstract submissions because we had a wide distribution outlet as compared to the 1st edition which is an indication of growth. Using a rapid review system we accepted a total of 209 abstracts and the authors were communicated on what issues they were to examine while developing the full papers based on their titles and aim of the paper. Two hundred (200) full papers were received and reviewed. We sent back the reviewed papers and reviewers comments forms to each of the prospective authors to assist

in the preparation of the revised papers. It was after this rigorous and time consuming process that we were able to accept 172 papers for presentation at the conference. It gives me great joy therefore to congratulate all the authors whose papers made it to the conference. It is my sincere believe that the presentation of the different ideas in your paper would go a long way in improving the knowledge of the participants and also generate meaningful discussions over the tea beaks, lunch and beyond.

I wish to express my utmost gratitude to each of the Seventy-three (73) reviewers for a wonderful job done well and for tolerating our deadlines and Oliver Twist syndrome. It is your dedication and expertise that has ensured that the conference is a success.

Special thanks to all our keynote speakers, Arc. Umaru Aliyu, (ficiArb, fnia, ppnia) (*President, Architects Registration Council of Nigeria (ARCON)*, Prof. Stella N. Zubairu (*Former Dean Postgraduate School, Federal University of Technology Minna*), Dr. Julius A. Fapohunda, (*Editor-in-Chief: International Journal of Sustainable Energy Development & Leader: Sustainable Building and Urban Growth Research Unit, Cape Peninsula University of Technology).*

It is important to appreciate the roles and efforts of the following people for their selfless and very significant contributions made towards the successful organization of the conference: Oyetola Stephen, Alonge Olubunmi, Lynda Odine, Adedokun John, Idowu Oqua, Bamidele Eunice and Muhina Lami (for being available to run around at very short notice),

The organisation of this conference would not have been this easy without dedicated individuals offering to serve. My heartfelt gratitude goes to Dr. Taibat Lawanson, Dr. R.A. Jimoh, Dr. L.O. Oyewobi, Dr. N.I. Popoola, Dr. Lekan Sanni, Dr. I.B. Muhammad, Dr. A.A. Shittu and Dr. A. Saka for their unflinching support all through the process.

It is our sincere hope that this conference will serve as a forum for the advancement of research in the urban sphere towards achieving a sustainable environment. It is our sincere believe that academics and professionals in practices will continually participate in this forum.

Worthy thanks goes to the members of the Local Organising Committee for the tireless effort. The success of the conference goes to these wonderful people. You have made SETIC 2018 to ROCK.

Once again I wish to thank you all for creating time out of your busy schedule to attend this conference. Please do enjoy your stay at Federal University of Technology Minna, and the city as a whole. Ensure that you make use of the different fora created throughout the conference to build new relationships for the future and strengthen existing relationships. I look forward to seeing you all in future.

Olatunde Folaranmi ADEDAYO
SETIC 2018 LOC Chairperson
APRIL 2018

ASSESSMENT OF FACILITIES CONDITION AND USERS' SATISFACTION IN PUBLIC HOUSING ESTATES IN MINNA, NIGERIA

Hassan Shuaibu Liman
Department of Estate Management and Valuation, Federal University of Technology, Minna, Nigeria

The failure of several housing projects across different parts of the world have been attributed partly to the lack of feedback from the end-users. This study conducts a post-occupancy evaluation of the condition of housing facilities and users' satisfaction in public housing estates in Minna. Two public housing developments (M. I. Wushishi and Talba Housing Estates) were selected for the study. Data for the study were collected through questionnaire administration, personal observation and interview. A total of 400 questionnaires were administered out of which 288 were retrieved and 256 were found to be useful for analysis, representing about 26% of the total housing stock in the two estates. Data were analysed using both descriptive and inferential statistics. Likert scale was used to analyse the level of users' satisfaction, while correlation analysis was used to test the relationship between the condition and the level of satisfaction. Results from the study revealed that residents were generally dissatisfied or felt indifferent with majority of the facilities with the exception of drainage in both estates and healthcare and educational facilities in M. I. Wushishi with which the residents were generally satisfied. The correlation coefficients (0.908 and 0.721 for M. I. Wushishi and Talba estate respectively) showed strong, positive relationships between facilities condition and users' satisfaction, implying that the better the condition of these facilities, the higher the level of users' satisfaction. To achieve higher level of satisfaction, a general improvement of the condition of facilities in public housing estates was recommended.

Keywords: *Users' satisfaction; housing facilities; public housing; post-occupancy evaluation; correlation analysis*

INTRODUCTION

The importance of housing to man's existence and wellbeing has been extensively discussed in the housing literature. Housing has been recognized by the United Nations as one of the basic human rights. This implies that every individual has a right to an adequate standard of living, including adequate housing (Habitat, 2009). The right to housing has equally being recognized in the Nigerian constitution. Housing can be viewed both as a consumption good and an investment good. As a consumption good, housing fulfils man's physical need, while as an investment good, housing offers its owner a means of storing and accumulating wealth. Housing is in fact, an indicator of a person's standard of living. Housing transcend just mere shelter. The Nigerian National Housing Policy (FRN, 2006) defined housing as "the process of providing functional shelter in a proper setting in a neighbourhood supported by sustainable maintenance of the built environment for the day to day living and activities of individuals and families within the communities." For a structure therefore to satisfy this definition of housing, such structure must be of good quality.

The Niger State government reported that there is a backlog of about 120,000 housing units in the state, which meant that the government must produce 5,000 units annually to meet such demand (NSG, 2008). Like in most parts of the world, the general approach in Nigeria is that housing provision is jointly undertaken by the public and private sectors.

elhasliman@futminna.edu.ng

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While a larger proportion of the total housing stock is produced by the private sector and targeted at the high and middle income earners, the few housing stocks produced by the public sector are usually targeted at low income earners and public servants (Agbola and Adegoke, 2007). Previously in Nigeria, the public housing units developed were owned and managed by the authorities. However, recent policies have transferred both ownership and management controls to the inhabitants (Isah, 2016). This is probably in response to the current privatization trend across the country. The situation is not different in Niger State. The Niger State Government embarked on mass public housing delivery through a Public Private Partnership (PPP) initiative during the period of 2007 to 2015. For instance, in Minna alone, a total of 1090 units of 2-3 bedroom bungalows have been completed during the period. 500 units each were completed at M. I. Wushishi and Talba Housing Estates, 50 units at the Minna Airport City Housing Estate and another 40 units at the Teachers Housing Estate. In other parts of Niger State, 250 housing units each were developed in Bida and Kontagora towns, also during the same period. Efforts of past governments in the state with respect to housing provision in Minna have also yielded results. Completed housing projects by successive governments include those at Bosso Low-cost, Tunga Low-cost, Old Airport Quarters, 123 Quarters and Type B Quarters among others.

Every building is expected to perform its function in such a way that it will satisfy its users (Khalil, Husin, Nawawi and Adnan, 2009). While this may be achievable in private housing developments, it is hardly the case with public housing. The failure of several public housing projects can be linked with the lack of input from the intended occupants during the development process. Thus, Isah (2016) pointed out the need to involve potential households in design delivery process between policy, planning, design and provision phases. In addition, Jiboye (2012) noted that housing projects have repeatedly failed because of lack of proper feedback mechanism from the property users or occupants. Accordingly, Khair, Ali, Sipan, Juhari and Dauda (2015) stated that in determining the quality of housing, assessing occupants' feedback on the services provided as well as the physical environment play vital roles. One of the techniques for getting feedback from the users is the Post Occupancy Evaluation (POE) technique.

The aim of this study therefore was to conduct a post occupancy evaluation of housing facilities in selected housing estates of Minna. The study had threefold objectives. The first objective was to assess the condition of the available facilities in the housing estates. The second objective was to ascertain the level of users' satisfaction with these facilities in their present conditions. The third objective was to assess the relationship between the condition of the facilities and the levels of satisfaction. It is believed that the findings from this research will add to the existing literature and also provide useful information for policymakers when they are making decisions to embark on similar housing developments in the future.

LITERATURE REVIEW

Post Occupancy Evaluation (POE) has been defined by Preiser, Rabinowitz and White (1988) as "the process of evaluating buildings in a systematic and rigorous manner after they have been built and occupied for some time." Watson (2003) described POE as "a systematic evaluation of opinion about buildings in use, from the perspective of the people who use them." It principally focuses on the systematic study of the relationship that exists between people and the surrounding environment in which they live (Sanni-Anibire, Hassanain, and Al-Hammad, 2016).

Apart from POE, there are other techniques that are employed in building evaluation. Worthy of note however is that some of these techniques are more suitable in evaluating certain building types and not others. Some techniques and their applications have been summarized by Khair, et al. (2015). They include Building Quality Assessment (used for schools and office buildings), Serviceability Tools and Methods – STM (office buildings), Building Research Establishment's Environmental Assessment Method – BREEAM (residential), Quality Function Deployment –QFD (public housing), and Post Occupancy Evaluation – POE (student dormitories, hospitals, public housing and office buildings).

However, among all the building evaluation techniques, only POE fully takes into account feedback from the user during the building evaluation process (Flemming, 2004). Aside that, POE differs from the other techniques in that it considers all environmental aspects in the evaluation process rather than focusing on only one aspect of the housing project (Khair, et

al, 2015). POE is therefore a useful approach that provides a systematic assessment of an occupied building. It is an important tool for acquiring useful feedback on the current performance of a building as perceived by the occupants or users who have occupied the building for some reasonable time (Jaunzens, Grigg, Watson and Picton, 2003). There are several benefits of conducting POE. First, it gives room for improvement to be made over the building's lifecycle. Secondly, it helps in improving the knowledge base in the industry (Sanni-Anibire, Hassanain, and Al-Hammad, 2016). It also helps in identifying lapses in completed developments so that they can be corrected in future developments.

One of the key areas of concern in a POE is the assessment of users' satisfaction with the elements being evaluated as evident in most previous studies (see: Eyiah-Botwe, 2015; Khair, et al, 2015; Danquah, Attippoe and Ankrah, 2014; Ilesanmi, 2010). Findings from previous studies on residential satisfaction are inconsistent, suggesting that generalization cannot be made across different housing projects or locations. For instance, some studies revealed that residents are more satisfied with building design features - room height and material finishes (Eyiah-Botwe, 2015), dwelling unit features, housing conditions and location (Khair, et al, 2015), utility and infrastructural developments (Danquah, Attippoe and Ankrah, 2014), privacy and sizes of living and sleeping areas (Ibem, Opoko, Adeboye and Amole, 2013).

METHODOLOGY

Selection of the Study Areas

Having considered several public housing developments in Minna, two were selected for this study - M. I. Wushishi Housing Estate and Talba Housing Estate. A number of factors informed the selection of these two housing developments. These factors include the mode of development (PPP), target group, design and housing typology, period of development, age of the buildings, project sizes and pricing. These factors were found to be relatively consistent across the two housing developments. The projects were conceived by the state government to ease the accommodation problem of the citizens of Niger State, especially the civil servants.

M. I. Wushishi Housing Estate is a public housing development located along the eastern bye-pass of Minna, the Niger State capital. It comprises of 400 units of 2 bedroom semi-detached bungalows and 100 units of 3 bedroom fully detached bungalows. Construction of the estate started in 2007 and was completed in 2010. The houses in the estate are fully occupied either on owner-occupation or rental basis. Talba Housing Estate is another public housing estate in Minna situated along the Minna-Bida road in Minna, Niger State. The development also consists of 500 housing units - 300 units of 2-bedroom and 200 units of 3-bedroom bungalows all detached. Construction of this estate began in 2008 and was fully completed in 2012. About 70% of the houses are currently occupied.

Methods of data collection and analysis

This study adopts a qualitative data collection technique which is the survey method. Data for the study were collected through personal observation, interview and the use of structured questionnaires. A total of 1,000 housing units exist in the selected study areas, 500 in each estate. 400 questionnaires were administered (200 in each estate). Out of the 400 administered questionnaires, only 288 were returned. After careful screening of the returned questionnaires, 256 were found to be useful for analysis, 156 from M. I. Wushishi and 100 from Talba Estate. A personal evaluation of the general condition of the physical facilities in the estates was carried by the researcher. 10 facilities were assessed in the study. They are pipe borne water, electricity supply, road, healthcare facility, educational facilities, worship centers, recreational facilities, drainage system, security services and refuse disposal system all within the estates. The facilities were assessed on a 5 point scale which are: Very Bad (1); Poor (2); Fair (3); Good (4); and Very Good (5). A facility is adjudged to be in a very good condition when it is new and/ or performs its functions optimally. A facility is said to be in a good condition if it performs its functions to an acceptable standard, though not performing optimally. A fair condition is attributed to those facilities that are only partly functional. However, a facility is assessed to be in poor condition when it is available, but does not function meaningfully, that is, its performance is very minimal or insignificant. Lastly, a facility is said to be in a very bad condition when it does not perform its functions at all or non-existent.

Data were analysed using both descriptive and inferential statistics. In assessing users' satisfaction, users were asked to rank their level of satisfaction with the facilities on a scale of 5 which include: Strongly Unsatisfied (1); Unsatisfied (2); Indifferent (3); Satisfied (4); and Strongly Satisfied (5). The mean level of satisfaction was arrived at by calculating the weighted mean score. The following cut-off points were adopted. 1.00-1.49 for Strongly Unsatisfied; 1.50-2.49 for Unsatisfied; 2.50-3.49 for Indifferent; 3.50-4.49 for Satisfied; and 4.50-5.00 for Strongly Satisfied. Mean satisfaction score was used to analyse the average level of satisfaction with each facility by all the respondents. Further analysis was done by correlating the condition of the facilities against the mean satisfaction score to test if there is a relationship between the two variables. The two-tailed Pearson correlation was used.

RESULTS AND DISCUSSION

Condition of Facilities

The current conditions of the facilities as assessed in the two estates are presented in table 3. Generally, the condition of facilities were found to be relatively better at M. I. Wushishi when compared to what is obtainable at Talba estate. For instance, at M. I. Wushishi estate, three facilities were found to be in good condition. They are healthcare and educational facilities as well as the drainage system. Electricity, worship centers and refuse disposal system are in fair condition, while others (pipe borne water supply, road and security services) are in poor condition. At Talba Estate, water supply and recreational facilities were assessed as being in very bad condition. Healthcare facility and the drainage system were found to be good in this estate. However, electricity, road, worship centers and refuse disposal system were found to be in poor state, while the educational facilities and security were assessed as being fair.

Table 1: Condition of Facilities in the Housing Estates

	Condition	
Facilities	**M. I. Wushishi**	**Talba**
Pipe Borne Water	Poor	Very Bad
Electricity	Fair	Poor
Road	Poor	Poor
Healthcare Facility	Good	Good
Educational Facilities	Good	Fair
Worship Centers	Fair	Poor
Recreational Facilities	Very bad	Very Bad
Drainage System	Good	Good
Security Services	Poor	Fair
Refuse Disposal System	Fair	Poor

Analysis of Users' Satisfaction with Housing Facilities

Tables 4 and 5 provide an overview of users' level of satisfaction at M. I. Wushishi and Talba estates respectively. After analysing the responses, a mean level of satisfaction was arrived at and interpreted accordingly. Residents at M. I. Wushisi estate are generally satisfied with the healthcare facility, educational facilities and the drainage system and dissatisfied with the water supply, electricity, road, recreational facilities and security. They however felt indifferent with regards to worship centers and refuse disposal system. At Talba estate however, responses gotten indicate that users were only satisfied with the drainage system. They were not satisfied with water supply, road, educational facilities, worship centers, recreational facilities and security services. They were indifferent with regards to the electricity, healthcare facility and refuse disposal system.

Table 2: Users' Satisfaction with Facilities at M. I. Wushishi Housing Estate

	SS	S	I	U	SU	Mean	
Facilities	**5**	**4**	**3**	**2**	**1**	**Score**	**Remark**
Pipe Borne Water	0	0	32	63	61	1.81	Unsatisfied
Electricity	0	12	56	67	21	2.38	Unsatisfied
Road	0	0	7	52	97	1.42	Strongly Unsatisfied
Healthcare Facility	99	40	14	3	0	4.51	Strongly Satisfied
Educational Facilities	21	81	36	18	0	3.67	Satisfied
Worship Centers	14	54	25	55	8	3.07	Indifferent
Recreational Facilities	0	0	21	46	89	1.56	Unsatisfied
Drainage System	45	75	23	9	4	3.95	Satisfied
Security Services	0	0	29	62	65	1.77	Unsatisfied
Refuse Disposal System	20	71	35	23	7	3.47	Indifferent

SS – Strongly Satisfied; S – Satisfied; I – Indifferent; U – Unsatisfied; SU – Strongly Unsatisfied

Table 4 shows the level of satisfaction with the facilities at M. I. Wushishi housing estate. In all, the facility with the highest level of satisfaction is the healthcare facility at M. I. Wushishi with a mean score of 4.51. The healthcare facility at the estate was developed and equipped by the state government and serves not only the residents of the estate, but also other citizens of the state based on the availability of space. The level of satisfaction was then followed by drainage system and educational facilities with 3.95 and 3.67 respectively. From the bottom, recreational facilities at Talba estate recorded the lowest mean score of 1.36, indicating that residents in the estate were least satisfied with such facility among all others. It was observed during the field survey that though provision was made for such facility, it was yet to be developed as at the time of survey.

Table 3: Users' Satisfaction with Facilities at Talba Housing Estate

Facilities	SS 5	S 4	I 3	U 2	SU 1	Mean	Remark
Pipe Borne Water	0	0	14	61	25	1.89	Unsatisfied
Electricity	0	4	49	43	4	2.53	Indifferent
Road	0	0	17	41	42	1.75	Unsatisfied
Healthcare Facility	7	19	40	29	5	2.94	Indifferent
Educational Facilities	0	5	4	64	27	1.87	Unsatisfied
Worship Centers	0	11	26	45	18	2.30	Unsatisfied
Recreational Facilities	0	0	0	36	64	1.36	Strongly Unsatisfied
Drainage System	11	45	31	10	3	3.51	Satisfied
Security Services	0	2	35	48	15	2.24	Unsatisfied
Refuse Disposal System	0	27	46	20	7	2.93	Indifferent

Relationship between Condition of Facilities and Users' Satisfaction

The results of the correlation analyses for M. I. Wushishi and Talba estates are presented in tables 6 and 7 respectively. All the 10 facilities were used in the analysis in which the condition of each facility was correlated against the mean level of users' satisfaction for the facility. The result of M. I. Wushishi estate (table 6) indicates a strong, positive relationship between facilities condition and satisfaction, with a correlation index of 0.908. The relationship is significant at 99% confidence level. Likewise at Talba estate, the result shows that there is a strong positive correlation between the two variables measured, with an index of 0.721 (see table 7). It is significant at 95% confidence level.

Table 4: Correlation Result for M. I. Wushishi Housing Estate

		Condition of the Facilities	Level of Satisfaction
Condition of the Facilities	Pearson Correlation	1	0.908**
	Sig. (2-tailed)		0.000
	N	10	10
Level of Satisfaction	Pearson Correlation	0.908**	1
	Sig. (2-tailed)	0.000	
	N	10	10

**. Correlation is significant at the 0.01 level (2-tailed).

Table 5: Correlation Result for Talba Housing Estate

		Condition of the Facilities	Level of Satisfaction
Condition of the Facilities	Pearson Correlation	1	0.721*
	Sig. (2-tailed)		0.019
	N	10	10
Level of Satisfaction	Pearson Correlation	.721*	1
	Sig. (2-tailed)	.019	
	N	10	10

*. Correlation is significant at the 0.05 level (2-tailed).

It can therefore be deduced from these results that there exist a very close linkage between the condition of facilities and the level of users' satisfaction with the facilities in the selected public housing estates in Minna. This implies that the better the condition of these facilities, the higher the level of users' satisfaction with the facilities. For instance, at M. I. Wushishi estate, a look at the condition of the facilities in relation to the level of satisfaction will exhibit a relationship. It can be seen that residents expressed higher level of satisfaction with facilities like healthcare, education and drainage system, which were observed to be in better condition compared to the other facilities assessed within the estate. On the other hand, the

residents expressed their dissatisfaction with those facilities that were observed to be in poor or very bad condition. A similar scenario could be established at Talba estate where residents equally expressed their dissatisfaction with facilities that were found to be in either poor or very bad condition.

CONCLUSION

Housing is more than just shelter as it encompasses the structure itself, the immediate environment as well as the facilities therein. It follows that for a house to be fully functional and satisfy its users, it must have adequate facilities within the surrounding in which it is located. This study therefore examined the relationship between the condition of facilities and level of users' satisfaction in recently developed public housing estates in Minna. Data were collected from the field and analysed using appropriate statistical techniques. While the author has assumed certain level of similarity between the two selected housing estates, findings from the study revealed dissimilarity in terms of condition of the assessed housing facilities, as well as in the level of users' satisfaction. Overall, the quality of existing facilities as assessed seem to be a bit better in M. I. Wushishi when compared to those of Talba estate. Again, residents of M. I. Wushishi tend to be more satisfied with their facilities than those of Talba estate.

While most of the previous studies of this nature have only looked at users' satisfaction with the building elements and in some cases the available facilities, this study adds to the body of literature by assessing the relationship between the condition of facilities and level of satisfaction. As expected, there exist strong, positive relationships between facilities condition and the level of satisfaction among residents of the study area, though at varying degree when compare between the two housing estates.

The study concludes that for residents of public housing estates to enjoy higher level of satisfaction, good housing facilities must be provided in the estates. The study recommends that efforts should be put in place to improve the condition of the facilities in the estates. Particular attention should be paid on such facilities as road, water supply, security and recreational services which had the least level of satisfaction among residents. In future public housing developments, the developers should take into account the facilities requirements of intended users right from the conception stage of the project, through the design stage up to the end of the entire development process.

REFERENCES

Agbola, T and Adegoke, S. A. (2007). Economics of Housing. In Housing Development and Management: A Book of Readings. Published by the Department of Urban and Regional Planning, University of Ibadan, Ibadan, Nigeria.

Danquah, J. A., Jeanette Attippoe, A., & Ankrah, J. S. (2014). Assessment of residential satisfaction in the resettlement towns of the Keta basin in Ghana. *International Journal Civil Engineering, Construction and Estate Management*, *2*(3), 26-45.

Eyiah-Botwe, E. (2015). Assessing housing project endusers satisfaction in Ghana: a case study of SSNIT housing flats in Asuoyeboa-Kumasi. *Civil and Environmental Research*, *7*(3), 13-23.

Federal Republic of Nigeria (2006). National Housing Policy; January, 2006.

Fleming, D. (2004). Facilities management: a behavioural approach. *Facilities*, *22*(1/2), 35-43.

Habitat, U. N. (2009). The right to adequate housing. *Fact Sheet No*, *21*.

Ibem, E. O., Opoko, A. P., Adeboye, A. B., & Amole, D. (2013). Performance evaluation of residential buildings in public housing estates in Ogun State, Nigeria: Users' satisfaction perspective. *Frontiers of Architectural Research*, *2*(2), 178-190

Isah, A. D., & Isah. (2016). *Urban Public Housing in Northern Nigeria*. Springer Verlag. DOI 10.1007/978-3-319-40192-8_2

Jaunzens, D., Grigg, P., Cohen, R., Watson, M., & Picton, E. (2003). *Building performance feedback: getting started*. Building Research Establishment Digest, London, UK.

Jiboye, A. D. (2012). Post-occupancy evaluation of residential satisfaction in Lagos, Nigeria: Feedback for residential improvement. *Frontiers of Architectural Research*, *1*(3), 236-243.

Khair, N., Ali, H.M., Sipan, I, Juhari, N.H., & Dauda, S. Z. (2015). Post occupancy evaluation of physical environment in public low-cost housing. *Jurnal Teknologi, 75(10),* 155-162

Khalil, N., Husin, H. N., Nawawi, A. H. & Adnan, H. (2009). Correlation analysis of building performance and occupant's satisfaction via post occupancy evaluation for Malaysia's Public Buildings. Fifth International Conference on Construction in the 21st Century

(CITC-V) "Collaboration and Integration in Engineering, Management and Technology" May 20-22, 2009, Istanbul, Turkey. Online at http://mpra.ub.uni-muenchen.de/19634/

Niger State Government (2008). Gatewayto Land & Housing in Niger State - First Edition. Governor's Office, Minna, Niger State.

Preiser, W. F. E., Rabinowitz, H. Z. and White, E. T. (1988). Post-Occupancy Evaluation. Van Nostrand Reinhold, New York, NY

Sanni-Anibire, M. O., Hassanain, M. A., & Al-Hammad, A. M. (2016). Post-occupancy evaluation of housing facilities: Overview and summary of methods. *Journal of Performance of Constructed Facilities*, *30*(5), 1-9.

Watson, C. (2003). *Review of building quality using post occupancy evaluation* (No. 2003/3). OECD Publishing.