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An assessment of residential satisfaction in public housing using Housing Habitability System Framework in Gombe, Northeast Nigeria

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Abstract

Residential satisfaction has been employed to assess housing environments across several disciplines. However, measurement of variables remains an issue across large and small samples. This study assesses residential satisfaction in Gombe, Northeast Nigeria using the Housing Habitability System framework to ascertain it's consistency across different locations and sample sizes. A mixed methodology including informal interviews and a questionnaire survey of 41 public housing residents in Gombe analysed in SPSS for descriptive and inferential statistics revealed that findings were consistent with four characteristics of residential satisfaction studies employing the framework identified across the country from previous studies. Specifically, results established that residents of public housing in Gombe were generally dissatisfied with their housing environments. Additionally, satisfaction followed the dwelling-neighbourhood-management sequence found in literature. Eight components extracted from principal component analysis reflect housing conditions in the study area. The study concludes that measurements based on tenets of Housing Habitability System framework produces consistent results across regions and different sample sizes and is beneficial for comparative purposes towards improvement of residential satisfaction research in Nigeria.

Keywords: Gombe, Housing Habitability, Nigeria, Northeast, Public Housing, Residential satisfaction

Introduction

Housing as a basic human need has continually attracted research across various academic disciplines. One of most extensive approaches to the study of housing environments is residential satisfaction (RS) studied by architects, planners, geographers, psychologists, sociologists, builders, facility managers as well as economists etcetera. RS is a multidimensional construct measuring the extent people are happy with their housing environment and associated services as well the gap between expected or aspired housing conditions and situations (Ibem et al., 2018).

Smrke et al. (2018) assert that an issue in studies of housing environments employing RS pertains the lack of consistency in measurement. "In most cases, too little thought and effort is put into developing and validating the questionnaires employed . . . researchers so often decide to form their own measures . . . a result of which there is continued inadequacy in residential satisfaction questionnaires" (p. 79). Understanding methodological issues is important in any field of inquiry because it underscores the quality of research as well as implications arising from data collected and results presented.

In Nigeria, this is a particularly pertinent issue for at least three reasons. First, RS measures adequacy, conditions and performance of housing (Okoye & Chigbu, 2017; Ibem & Alagbe, 2015; Jiboye, 2012). Thus RS studies provide feedback on housing environments. Secondly, failure of public housing has been attributed in part to top-down approaches based on the perception of professionals and not input from end users, the lack contributing to problems observed within public housing schemes across the country (Jiboye, 2014). Thirdly, construction of housing units is set to continue as a means of reducing the housing deficit across the country as well as generating employment for many Nigerians (FGN, 2020). Direct construction of 300,000 homes in the next 12 months is part of Federal Government's (FG) strategy through its Economic Sustainability Plan to alleviate effects of the COVID-19 pandamic by providing construction related jobs as well as providing more housing units. Consequently, studies on adequacy and current conditions of housing environments are important to ensure that user input is available for policy making and design of public housing estates in future.

RS studies in Nigeria employ several frameworks. These include Aspiration gap/Purposive Approach theory (Galster, 1987) as well as theory of Housing Adjustment (Morris & Winter, 1975). Many studies also employ Housing Habitability System framework presented by Onibokun (1974) as a means of measuring RS in housing environments. It is popular in part due to it's simplicity whereby housing environments are classified under four subsystems namely tenant, dwelling, neighbourhood environment and management. Most studies employing this framework have however been conducted in large estates or across States and regions in Southern Nigeria. Few studies employ this framework in Northern parts of the country, over small samples (less than 50) or within individual estates. RS is contextual and results obtained in one part of the country or region may not be applicable to other areas. Consequently, it is unclear whether employing this framework in small samples within Northern regions will produce similar results as obtained in literature for generalisation and comparative purposes. Testing this framework in different parts of the country is important for ensuring that quality of research remains consistent for comparisons at national, regional and local levels considering prototype designs are often constructed across the entire nation, regions or States.

This paper evaluates RS from user responses employing survey instruments based on Housing Habitability System framework at estate level using a small sample in Northern Nigeria. Objectives of the study are to; i) explore satisfactory and unsatisfactory aspects of the housing environment within public estates in Northern Nigeria from user perspectives; and ii) establish factors which influence residential satisfaction from perspectives of residents of public housing in Northern Nigeria.

The underlying premise related to the second objective is that user responses reflect a combination of dwelling unit features, neighbourhood environment variables as well as management aspects of the housing environment depending on conditions and adequacy of available facilities. This premise is tested in Gombe, the Gombe State capital centrally located in the Northeast (Figure 1), a region that has received comparatively little housing research in Nigeria

(Maina, 2013). Although Ishiyaku et al. (2017) studied RS in Gombe, investigations focused on aspects of building or dwelling components, unlike the present study which assesses features of overall housing environments, building components inclusive.

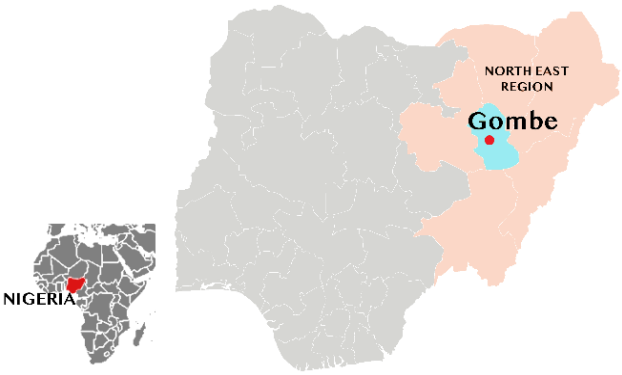
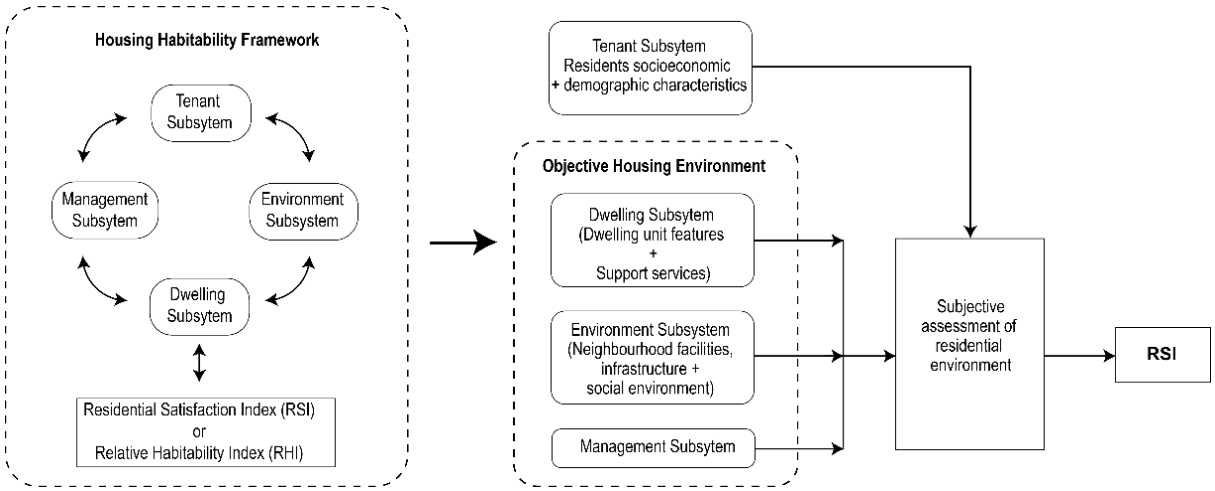


Figure 1. Location of study area

Residential satisfaction based on Housing Habitability System framework

Onibokun (1974) described habitability in terms of a system of tenant-dwelling-environment-management components based on the notion that houses are only one link in the chain of factors determining residents' relative satisfaction in the entire housing environment (Figure 2).



(Source: Adapted from Onibokun, 1974; Mohit & Azim, 2012)

Figure 2. Framework for the study

Measuring these components often take the form of specific variables in sub-categories or bundles (Ukoha & Beamish, 1997). The tenant subsystem comprises personal characteristics of residents commonly operationalised along demographic and socioeconomic status (SES) variables. These are gender, age, marital status, education, length of residency, tenure, household size, income and typology (Ibem et al., 2018; Makinde, 2015; Waziri et al., 2014). The dwelling system is often unbundled as housing features and services. Housing features are assessed using variables such as sizes, number and quality of main functional areas notably bedrooms and sitting

rooms, toilet/bathrooms, kitchens, stores, indoor environmental quality (IEQ) of interior spaces, privacy, appearance of dwelling and building materials (Ochepa, 2018; Etminani-Ghasrodashti et al., 2017; Ibem & Amole, 2012; Jiboye, 2012). Housing services pertain to the provision of basic amenities such as water and electricity supply, plumbing, cleanliness et cetera (Hassan et al., 2019; Maina et al., 2018; Jiboye, 2010). The environment subsystem, often split into neighbourhood facilties and social environment (Mohit & Azim, 2012) is measured along several variables such as quality of communal and social interactions, urban infrastructure, proximity to workplace, schools, markets and shopping facilities, recreation and sports, healthcare, school, prices of goods and services, job opportunities, level of crime and anti-social behaviour, relationship with neighbours, quality of communal activities et cetera (Ibem et al., 2016; Ibem et al., 2015; Abdu & Hashim, 2015). The management subsystem is commonly described in terms of rent/cost of housing, rules and regulations of residency, facility management (FM), allocation process and sometimes, security to life and property (Adewale et al., 2018; Jiboye, 2010; Onibokun, 1974).

Studies employing Housing Habitability System framework in public housing to assess RS in Nigeria reveal four characteristics. First, most of these studies were conducted in Lagos and parts of Ogun State, with few in Enugu and Abuja, Nigeria's capital city (Table 1). This presents a geographic skew for RS studies in favour of Southern regions. Secondly, findings from subjective user ratings of dwelling, environment and management variables generally result from two analytical approaches-descritive statistics and extraction of factors or components, or a combination of both. Thirdly, results obtained by descriptive statistics generally portray dwellings as the most satisfactory subsystem, followed by neighbourhood environments. Some studies however report dissatisfaction with dwelling components (Ukoha & Beamish, 1997; Muoghalu, 1984) as well as neighbourhood facilities (Ibem et al., 2018; Ibem & Azuh, 2014; Ibem & Amole, 2012). Management subsystems are most often dissatisfactory (Table 1). Overall, it is common to find that RS follows the dwelling-neighbourhood-management sequence from user ratings in the literature reviewed. Fourthly, results from factor analyses usually present components comprising several aspects of all three subsytems, depending on conditions of housing environments assessed by residents obtained from descriptive statistics. Tenant subsytem variables are usually assessed objectively, often emerging as predictors when included in regression models.

Table 1. RS studies on public housing in Nigeria based on Housing Habitability framework.

Author(s)	Aim	Factors/components extracted, main findings
Ibem et al. (2018)	Investigate RS and factors influencing it among low income earners in urban areas of Ogun State	Housing typology, access to social amenities, Neighbourhood facilities; Sizes of main activity areas, Privacy, access to market; Management of estates; Security; Economic environment. Satisfactory: Design, Social amenities and management Dissatisfactory: Economical environment
Okoye & Chigbu (2017)	Examine factors influencing tenants' satisfaction with dwelling units in Enugu	Proper estate management; Proximity to facilities; Appearance of buildings; Availability of facilities; Number of rooms in a housing unit
Ibem et al. (2015)	Investigate similarities and differences in the way residents understand housing adequacy and RS	Housing adequacy: Ambient condition of interiors, adequacy of security, utilities, neighbourhood facilities; Social infrastructure; Sizes of sleeping areas RS: Physical, Social and Economic environment; Size, type, location, appearance and privacy; Security Most adequate: Privacy, Sizes of bedrooms Least adequate: Recreational/sporting facilities

Ibem & Azuh (2014)	Examine housing satisfaction among women in newly constructed schemes in urban areas of Ogun State	Management; Location of residence; Size of residence; Security of residence; Lighting/ventilation of living spaces; Aesthetics of residence; Social environment Most satisfactory: Privacy, Sizes of main living areas Least satisfactory: Proximity to social facilities
Ibem & Aduwo (2013)	Examine RS in via Turnkey, PPP, Core and Shell strategies in Ogun State	Neighbourhood facilities; Management of estates; Size of housing unit; Type and location of housing unit in estate; Housing services; Housing characteristics; Social environment
Ibem & Amole (2012)	Evaluate RS of OGD Workers' Housing Estate, Ogun State	Light, ventilation and sizes of housing units; Neighbourhood facilities; Management; Safety and security; Housing services; Privacy and thermal comfort Most satisfactory: Privacy Least satisfactory: Proximity to shopping facilities
Makinde (2015)	Appraise influence of socio-cultural experiences on RS in Ikorodu low cost housing estate in Lagos	Satisfactory: Housing components (number of rooms, ceiling height, privacy) and security Dissatisfactory: Bedroom locations, parking and maintenance
Jiboye (2014)	Identify relevant attributes of tenants which contribute to improvement and provision of adequate and satisfactory dwellings	Satisfactory: Housing/neighbourhood environment, dwelling Dissatisfactory: Management components Age, Education, Income, Marital status, Occupation and Household size correlate with RS
Jiboye (2010)	Identify and examine interrelated factors which influence tenants' satisfaction with their dwellings	Satisfactory: Dwelling and environment Dissatisfactory: Management
Jiboye (2009)	Assess levels of tenants' satisfaction with public housing	Satisfactory: Environment and dwellings Dissatisfactory: Management
Ukoha & Beamish (1997)	Examine resident satisfaction with public housing in Abuja	Satisfactory: Neighbourhood facilities, quality of exterior construction and walls, water pressure Dissatisfactory: House types, building features, housing conditions, Management
Muoghalu (1984)	Point out indicators of housing satisfaction and dissatisfaction as seen by residents	Construction quality; Internal housing space; Internal house design, common house territory and maintenance; House type and facilities; Illumination and external aesthetics Satisfactory: Self-contained nature of dwellings, bedroom sizes Dissatisfactory: Internal facilities and security, storage, construction quality, shared toilet/bath, typology vis-à-vis family composition

In sum, several RS studies mostly in Southern parts of the country employ facets of Housing Habitability System framework to assess housing environments revealing common trends depending on the mode of analysis and user ratings reflecting conditions in environments assessed. This study investigates RS based on variables accruing from the framework at estate level in Gombe, Northeast Nigeria. Specific research questions to guide this inquiry are; i) which aspects of the housing environment are satisfactory or dissatisfactory from user perspectives in the study area?; and ii) which factors emerge from user ratings in the study area? Underlying this inquiry is the intention to assess how results from descriptive and factor analyses from this study fit the third and fourth characteristics of studies employing Housing Habitability System framework described in preceding paragraphs.

Method and study area

Investment Quarters, selected as the study area in Gombe, comprises 200 housing units made up of 2-bedroom semi-detached houses (Figure 3) and 3-bedroom freestanding bungalows. These were constructed by the State Government and after commissioning, sold to the public. At the time of the survey in June-August 2019, 115 units were occupied. The sample comprised approximately 50% of this occupied population.

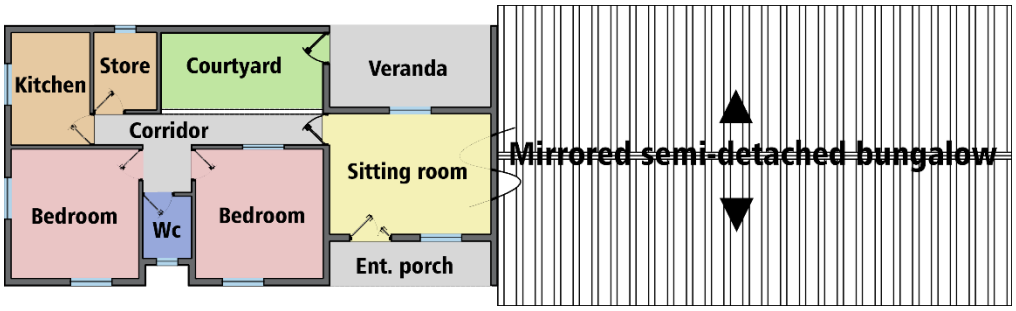


Figure 3. Plans, 2-bedroom semi-detached bungalow

Gombe is centrally located in Northeast Nigeria, a region that has faced enormous security challenges in the last decade due to insurgency. It has consequently attracted people who have relocated from neighbouring States, heightening security measures by Government, communities and neighbourhoods. Successive governments have also invested heavily in infrastructure, making the capital arguably one of the most developed in terms of roads, urban development and housing provision in the region. Water supply however remains a chronic and acute issue in need of improvement (Gombe State Govt, 2019).

Traditionally, courtyard housing is common in the study area, with cooking and diurnal activities occurring within open courtyards. Rooms constructed of earth or concrete blocks roofed with thatch or corrugated aluminium sheets surrounding centrally located open courtyards are employed largely for storage and sleeping. This configuration describes the common house-form across most parts of Northern Nigeria (Saad & Ogunsusi, 1996).

A questionnaire survey as well as informal interviews and observations addressed the study aim. Questionnaires, adapted from Ibem et al. (2018), comprise two sections. The first requested data on tenant characteristics from household heads notably gender, age, marital status, education, monthly income, household size, employment sector, tenure as well as length of stay in the estate. Results from this section describe the sample in simple frequencies and percentages (Table 2). Section two of the questionnaire comprises 31 dwelling-environment-management related variables rated on 5-point likert scales by residents. 41 (75%) completed questionnaires of the 55 distributed were retrieved after repeated visits to the estate. Reliability of responses from section two, computed via Cronbach's alpha was 0.929.

To ascertain satisfactory and unsatisfactory aspects of the housing environment in response to research question one, ratings from residents for the 31 housing environment variables were analysed for means (M), standard deviations (SD) and ranking based on mean values as presented in Table 3. Mean Satisfaction Score (MSS) of all residents across all variables was computed at 2.79. Assessment of satisfaction levels of residents within the estate was based on this value. Variables are satisfactory if mean values were higher than 2.79. Dissatisfactory variables have means below this value. For comparison with other studies, mean values for dwelling,

neighbourhood environment and management subsystems were computed and assessed based on a global value of 3.0, mid-point of a 5-point likert scale employed by majority of RS studies. Principal Component Analysis (PCA) with Varimax rotation addressed the second research question, with results presented in Table 4. KMO measure of sampling adequacy was 0.547 just above the minimum accepted value of 0.5 (Field, 2013).

Results and discussion

Demographic data from the sample generally fit profiles expected of residents in public housing estates in Nigeria from Table 2. On average, respondents were male (n 34, 83%), married (n 26, 63%), 25-40 years (n 25, 61%), educated to tertiary level (n 29, 71%) and employed in the public sector (n 22, 54%). 29 (71%) earn N51-150,000 monthly, have lived 3-10 years in the estate (n 21, 51%), accommodate households of more than 4 persons (n 20, 49%) and are owner occupiers (n 29, 71%) occupying 2 and 3-bedroom housing units (n 38, 93%).

Retired residents (M 3.02), households containing 4 persons (M 3) as well as 4-bedroom occupants were the most satisfied in the estate, although sample sizes for these categories are low (Table 2). Additionally, since original plans of units within the estate contain only 2 or 3-bedroom houses, the presence of a 4-bedroom response could mean transformation by addition of bedrooms or misinformation by residents of two semi-detached 2-bedroom housing units. While transformation is a common occurrence in public housing estates over time (Morakinyo et al., 2018), misinformation suggests a lack of public knowledge of basic typological terms in housing among respondents. This has negative consequences for the quality of data collected.

Table 2. Demographic profile of respondents

Variable	Freq	%	MSS	Status
Gender				
Male	34	82.9	2.80	Satisfied
Female	7	17.1	2.72	Unsatisfied
Marital Status				
Married	26	63.4	2.84	Satisfied
Single	15	36.6	2.70	Unsatisfied
Age in years				
<18	2	4.9	1.92	Unsatisfied
25-30	13	31.7	2.86	Satisfied
31-40	12	29.3	2.86	Satisfied
41-50	7	17.1	2.78	Unsatisfied
51-60	6	14.6	2.75	Unsatisfied
60+	1	2.4	3.16	Satisfied
Education				
O'Levels	3	7.3	1.95	Unsatisfied
Diploma	7	17.1	2.70	Unsatisfied
Tertiary	29	70.7	2.91	Satisfied
No response	2	4.9	2.68	Unsatisfied
Employment				
Public	22	53.7	2.93	Satisfied
Private	13	31.7	2.55	Unsatisfied
Retired	4	9.8	3.02	Satisfied
No response	2	4.9	2.31	Unsatisfied
Monthly Income (₦)				
<38,000	4	9.8	2.10	Unsatisfied

38-50,000	5	12.2	2.72	Unsatisfied
51-100,000	15	36.6	2.86	Satisfied
101-150,000	14	34.1	2.94	Satisfied
150,000+	3	7.3	2.78	Unsatisfied
Length of Stay				
<3 years	20	48.8	2.70	Unsatisfied
3-10 years	21	51.2	2.88	Satisfied
Household size				
<4	13	31.7	2.65	Unsatisfied
4	8	9.5	3.00	Satisfied
4+	20	48.8	2.79	Satisfied
Tenure				
Owner occupied	29	70.7	2.82	Satisfied
Rented	8	19.5	2.86	Satisfied
No response	4	9.8	2.42	Unsatisfied
Number of Bedrooms				
2	16	39	2.76	Unsatisfied
3	22	53.7	2.82	Satisfied
4	1	2.4	3.16	Satisfied
No response	2	4.9	2.45	Unsatisfied
Overall MSS 2.79				

Overall, MSS of 2.79 implies that residents were dissatisfied based on global cut-off point of 3.0. Dwelling features (M 2.9, SD 0.57) recorded the highest mean score, followed by neighbourhood environment (M 2.7, SD 0.59) and lastly, management (M 2.6, SD 0.72). This finding supports the third characteristic of RS studies employing Housing Habitability System framework presented in the literature review.

Residents rated 14 (45%) dwelling and neighbourhood related variables satisfactory (Table 3). These include electricity supply, natural lighting and ventilation, location and privacy of the dwelling, level of crime/anti-social behaviour, cleanliness, security and suitability of location to lifestyle, external appearance of dwelling, proximity to school and nearest market, dwelling type as well as bath/toilet facilities. Other variables comprising aspects of all three subsystems were dissatisfactory. Dissatisfactory dwelling related variables were sizes and number of bedrooms, sizes of living, cooking and storage spaces. Ranked last was water supply, an aspect of housing services, the only variable that recorded a mean value below 2.0 in Table 3. Dissatisfactory neighbourhood environment variables include proximity to shopping facilities, recreation/sports, workplaces, healthcare facilities, urban infrastructure, type of building materials, quality of communal activities, prices of goods and services, rules/regulations of residency, rent/cost of housing, FM and maintenance as well as availability of job opportunities. All management related variables were dissatisfactory.

In response to research question two, eight components emerged from user ratings of dwelling, neighbourhood and management variables, explaining 74% variance in Table 4. All components comprise aspects of at least two of the three subsystems. This observation supports the fourth characteristic of RS studies employing Housing Habitability framework from literature.

Table 3. Satisfaction levels of housing environment attributes based on residents' perception

Housing attributes	Mean	SD	Rank	Remark*
Electricity/power supply	3.55	1.154	1	Satisfactory
Noise levels in house and estate	3.54	0.900	2	(45%)
Natural lighting and ventilation	3.49	0.997	3	
Location of your house	3.41	1.140	4	
Level of privacy in your house	3.38	1.161	5	
Level of crime and anti-social behaviour	3.22	0.976	6	
Level of general cleanliness	3.18	0.914	7	
Level of security to life and property	3.14	0.855	8	
Suitability of location to lifestyle	3.09	0.951	9	
External appearance of your house	2.98	1.012	10	
Proximity to children's school	2.98	1.050	10	
Proximity to nearest market	2.93	0.888	12	
Type of house	2.88	1.181	13	
Bath and toilet facilities	2.83	0.946	14	
Proximity to shopping facilities	2.75	0.981	15	Dissatisfactory
Quality of communal activities	2.74	0.919	16	(55%)
Size of bedrooms	2.68	0.820	17	
Sizes of living and dining spaces	2.68	1.095	17	
Rules and regulations of residency	2.64	0.931	19	
Number of bedrooms	2.58	0.874	20	
Proximity to recreation/sports	2.53	0.979	21	
Type of building materials	2.51	0.952	22	
Prices of goods and services	2.50	1.013	23	
Sizes of cooking and storage spaces	2.49	0.914	24	
Rent and cost of acquiring the house	2.47	1.033	25	
Proximity to workplace	2.46	1.016	26	
Proximity to healthcare facilities	2.40	0.955	27	
Proximity to urban infrastructure	2.38	0.963	28	
Facility management and maintenance	2.24	0.913	29	
Availability of job opportunities	2.08	0.870	30	
Water supply/sanitary service	1.93	0.997	31	

**Based on MSS value of 2.79*

Table 4. Principal Component Analyses of RS with housing environment attributes

Components	Cronbach's alpha	Factor loading	Eigen value	% Variance	% Cumulative
#1 Noise, Electricity supply, Privacy, Location of dwelling and level of Crime	0.848		3.68	11.87	11.87
Noise levels in house/estate		0.808			
Electricity/power supply		0.776			
Level of privacy in your house		0.768			
Location of your house		0.57			
Level of crime and anti-social behaviour		0.527			
#2 Neighbourhood infrastructure and sense of community	0.881		3.68	11.87	23.74
Proximity to urban infrastructure		0.87			
Proximity to shopping facilities		0.778			
Rules and regulations of residency		0.758			
Proximity to workplace		0.635			
Quality of communal activities		0.545			

#3 Rent and IEQ of dwelling units	0.777		3.45	11.13	34.87
Rent and cost of acquiring the house		0.824			
Natural lighting and ventilation		0.68			
Sizes of cooking and storage spaces		0.64			
Sizes of living and dining spaces		0.55			
#4 Neighbourhood and dwelling facilities	0.786		3.3	10.66	45.53
Prices of goods/services		0.814			
Proximity to healthcare facilities		0.789			
Proximity to nearest market		0.635			
Bath and toilet facilities		0.461			
#5 Lifestyle amenities & water supply	0.768		2.55	8.229	53.76
Proximity to recreation/sports		0.776			
Availability of job opportunities		0.674			
Suitability of location to lifestyle		0.596			
Water supply/sanitary service		0.413			
#6 Security, cleanliness and number of bedrooms	0.646		2.24	7.23	60.99
Level of security to life and property		0.75			
Number of bedrooms		0.563			
Level of general cleanliness		0.548			
#7 Size of bedrooms & facility management	0.571		2.18	7.03	68.02
Size of bedrooms		0.759			
Facility management/maintenance		0.664			
#8 Proximity to Schools, aesthetics & construction	0.724		1.87	6.03	74.1
Proximity to children's school		0.737			
External appearance of your house		0.591			
Type of building materials		0.583			

Total variance explained = 74%

The first component, with an eigenvalue of 3.68 comprises noise, electricity supply, privacy, dwelling location and level of crime. It describes the most satisfactory items ranked one to eighth in Table 3. The second component describes neighbourhood infrastructure and sense of community and contains variables rated dissatisfactory by residents, suggesting critically important but inadequate variables going by the high eigenvalue and variance of the component in Table 4. Component three, rent, cost and IEQ of dwellings describes the economic value placed on housing as well as importance of spaces employed for cooking and living activities. This likely refers to traditional house-forms in the area where activities occur within open courtyards described in the methodology. Neighbouring and dwelling facilities, the fourth component describes essential services while component five, lifestyle amenities and water supply, describes benefits and enhancers to comfortable living conditions. These are not always readily available to residents in the study area as evidenced by RS ratings in Table 3.

The sixth component, security, cleanliness and number of bedrooms describe housing environment features that are likely constant and perceived as given within the estate. Component seven, sizes of bedrooms and facility management, describes commonly employed terms for describing dwellings in the study area. This is usually based on the number of bedrooms and may explain why residents linked it to FM. The low Cronbach's alpha of this component (0.571) is however indicative of ambivalence among respondents. Future studies are required to confirm this observation. The last component, proximity to schools, aesthetics and quality of construction describes variables associated with social class and local image of residents. It reflects status related issues as informal interviews with residents revealed that education is highly valued in the study area. The calibre of schools children attend reflects the social standing of a family within

society in Gombe. This observation also applies to the external appearance of a person's house, which in part is dependent on the quality of building materials employed in construction.

Overall, although all variables loaded above the minimum value of 0.4, lowest factor loadings were recorded for water supply related variables (bath/toilet facilities, water supply), underscoring the issue of water shortages in the study area. Residents often depend on water tankers and vendors to supply individual houses. This observation supports findings by Ishiyaku et al., (2017) regarding poor water supply and urban amenities negatively influencing RS in Gombe.

Discussion

Results from residents' assessment suggest overall dissatisfaction with the housing environment (M 2.79) in the study area based on a minimum value of 3.0 out of 5 points. This finding supports results from several other studies in other parts of Nigeria where residents in public housing were generally dissatisfied with their housing environment. Ibem et al. (2018), Ibem and Azuh (2014), Ibem et al. (2015) as well as Ukoha and Beamish (1997) report general dissatisfaction with overall housing environments. Such findings lend credence to the observation that occupants may not always approve what technocrats approve (Muoghalu, 1984). Providing dwelling units may not always translate to satisfaction, linked to overall quality of life. While government efforts in housing provision has benefitted many residents, quality of the housing environment is critical in meeting basic housing needs of occupants. This usually includes attention to other aspects of the environment notably services, neighbourhood features and management.

In line with the third characteristic of RS studies using the Habitability framework, dwelling and neighbourhood environment variables were more satisfactory than management features. This finding supports advocates of the assertion that dwelling and neighbourhood features most influence RS (Maina et al., 2018; Jiboye, 2012) and satisfaction with life (Ibem et al., 2016). Dissatisfactory dwelling features related to the number and sizes of main living spaces such as bedrooms, living and dining rooms as well as cooking areas are consistent with trends in literature (Lekjep, 2017; Ukoha & Beamish, 1997). Muoghalu (1984) asserts that dissatisfaction is often a result of the failure of planners to inadequately consider the effect of time on changing needs of users. This calls for flexible designs in public housing and neccessitate frequent evaluations and feedback from current residents to correct notable design and planning lapses in future projects.

Components extracted from residents' ratings revealed remarkable congruence with existing housing conditions in the study area, in line with the fourth characteristic of RS studies based on Onibokun's framework. This provides further proof that RS measures housing conditions and adequacy. All together, results from the present study suggest that employing the Housing Habitability framework to measure housing environments produces consistent findings across large and small samples.

Conclusion

This study investigated RS based on Onibokun's Housing Habitability System as a framework for measuring housing environments in Gombe, Northeast Nigeria. Residents were generally dissatisfied with their housing environment, although dwelling unit and neighbourhood features recorded higher means compared to management variables. Components also reflect conditions

and adequacy of the housing environment consistent with characteristics of findings from similar studies employing facets of the framework in public housing across Nigeria. The study concludes that the framework is reliable for measuring housing environments related to RS and provides a stable basis for comparison with similar studies even with small samples. This is important to aid policy formulation across national, regional, state and estate levels.

Recommendations from the study target research as well as policy makers. First, employing the framework addresses problems of inconsistent measurements, thus reducing issues of reliability and quality in research output. Further testing of the framework in other areas across of Northern Nigeria will provide more support towards generalising findings from the present study. Secondly, more RS research is required to meet current needs of users bearing in mind FG's intention to construct more housing units in the near future. Areas of particular interest include the fit of socio-cultural needs of users to urban housing typologies as well as flexibility strategies in design to address continued dissatisfaction with sizes and number of main living areas notably bedrooms, living and dining spaces as well as storage spaces. Thirdly, the policy of constructing low number of bedrooms, particularly 1 and 2 bedrooms requires revision as this is an area of contention across the country (Ukoha & Beamish, 1997, Muoghalu, 1984). Fourthly, a focus on provision of basic amenities, not only on the dwelling, is critical as urban infrastructure and neighbourhood facilities have consistently influenced RS. In the case of Gombe the study area, government effort in water supply is commendable but requires active sustenance and commitment. Fifthly, management features, though the least in terms of number of variables is particularly an issue for local authorities to investigate and improve upon. This is an area beyond the scope of the current study and presents avenues for future research across the country.

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