

Architectural Modeling for Resident's Housing Satisfaction Indicators in Public Prototype Housing-Katsina

Babangida Hamza

Abstract—This paper is a sequel of an earlier one in which both were based on results obtained from a survey study undertaken in six different public housing schemes in Katsina State. Overall, the study was aim at empirically identifying resident's satisfaction on their houses with specific reference to some identified architectural elements, and to develop a working model using the respondents identified satisfaction indicators. In the first part the architectural elements that the occupants of these housing schemes will like to have were identified. These include elements that truly reflected their socio-cultural values, in addition to those provided in the initial design. In this second part therefore, the paper firstly, highlighted the documented architectural floor plans and secondly, proposed an architectural model in which the identified elements were integrated. The proposed architectural model was to serve as an inspiration for future designs of public and other mass housing projects. It was also meant to address the seeming design failure to reflect and accommodate the occupant's socio cultural values. Through the integration of these elements, residents will relatively feel satisfied with architectural designs and physical alterations on the houses by the occupants will be greatly reduced.

Index Terms—Housing satisfaction, Katsina, public housing, satisfaction indicators,

I. INTRODUCTION

The first paper developed from this research introduces studies carried out by scholars on the concept of housing satisfaction at different scales were presented as part of the initial literature due to their relevance. For example, studies carried out on council housing [1], and the results of these studies which were variously applied in specific situations to ascertain individuals' perception of the general quality of life [2]. Some of the reviewed definitions of the concept were also highlighted [3] - [4]. The definitions were cited in the first paper in line with the aim of the study, as they centered on identifying housing elements that satisfy the socio cultural needs of residents. Operationally, the concept was defined as the level of contentment or discontentment of the house unit the residents currently occupy, and the neighborhood facilities provided in the housing estate. The motivation for the study was also highlighted as the needs to identify housing elements that seek to socio culturally satisfy residents of public prototype housing projects in the study area.

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In Nigeria, initial literature in the first paper traces the history and criticism of public housing provision which centers on the National housing polices as reviewed periodically; first, second and third national housing development plans. it was highlighted that studies on housing satisfaction were used to determine factors that lead to the inadequacy of houses in terms of number and on not meeting the socio cultural values of residents [5] and success or otherwise of housing developments elsewhere [6]. Reviewed approaches in the selection of study variables includes the physical features of house samples, support services and neighborhood facilities (Ogu, 2002)[7]. Among the many criticisms of the housing policies in the study area include those that highlighted causes of their perceived failure [8]. Results of similar studies as reviewed in the first paper were shown to be used by various scholars to evaluate and predict the successes or otherwise of residential mobility and migration of populace [9]. The results of most, if not all studies on housing satisfaction stopped at identifying and justifying elements deduced from data collected from residents. In view of this therefore, this paper goes a step further to provide a working architectural model built upon the identified elements from the first paper.

This paper is a step up of the outcome of the initial paper which earlier identifies architectural elements that defines housing satisfaction in public prototype housing projects, with specific reference to respondent's socio-cultural values. This paper is aim at developing a working architectural model which integrates these architectural elements in addition to elements earlier provided in these housing projects. To achieve this aim three main objectives were targeted:

- 1) To explain the details of the respondents identified architectural elements which they will like to have in their houses and their architectural significance to the respondent's socio cultural values.
- 2) To analyze the documented floor plans of sample houses in order to establish the extent of modifications carried out by the occupants.
- 3) To proposed architectural model in which the identified elements by respondents which satisfied their socio cultural values were integrated.

II. THE ARCHITECTURAL ELEMENTS

The first paper empirically identifies architectural elements which seek to socio culturally satisfy respondents which were lacking in existing public prototype housing

estates. As shown in Fig. 1, the respondents identified these elements (in descending order of importance) as tap in the toilet for purification (different from wash hand basin 84%), alternative water source for domestic use in addition to the provided tap in the architectural design (83.5%), outdoor pit latrine (80.5%) and outdoor shed within the house for the use of women and children during the day (78%). Other elements identified by the respondents include a separate adolescent boys room (preferably with an external entrance door (78%), outdoor sleeping area during summer (77%), a dedicated car garage (76%) and spaces for income generation for the occupants of these houses such as an attached shop (72%), dedicated spaces for livestock (70%) and small holder poultry (69.8%).

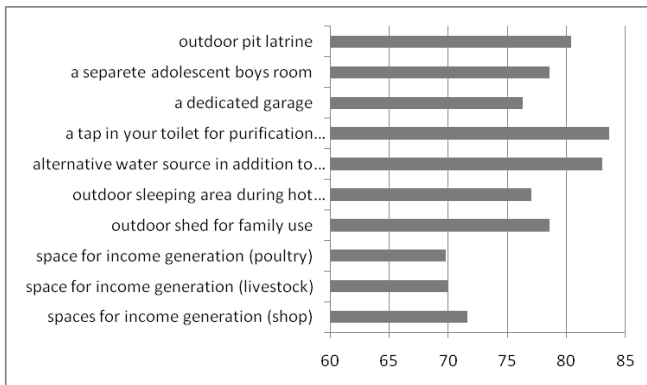


Fig. 1. Architectural elements respondents will like to have in addition to those already provided in the architectural designs in the Katsina public housing estates. These elements have a direct bearing on their socio cultural values. Source: Author's Survey, 2011

Eighty four percent of respondents felt that they need a tap for purification in their toilets. This is in addition to the wash hand basin provided in their toilets. The need for this element in the modern toilet by the respondents in their houses reflects the traditional use of kettle for the same purpose in traditional toilets. In architectural terms therefore, this element should be positioned on the right hand side position of the user and with flexible top such that the right hand could be used to draw the water while the left hand is used for cleaning. The need for alternative water source such as well by the respondents seems to be due to lack of constant flow of water from the provided pipe born water system. The water supply from authorities according to the respondents was erratic and could not be relied upon hence the need for it. In some of the houses surveyed the occupants had already provided this element themselves. Architecturally it is preferable to position the well in the courtyard, easily accessible to the women area, but appropriately protected by a fence to prevent access to the children. Similarly, the outdoor pit latrine should architecturally be at a position accessible to most of the occupants of the house and where waste water could be easily be channeled away from the house within the open courtyard. The use of the pit latrine is common in the Hausa traditional houses. If introduced in the architectural design of the public housing, it could save a lot of water (which in most times unavailable) and reduces pressure of use on the water system toilet. However, due to hygiene concerns of the pit latrine in the traditional houses, there is the need for improvised design. Introduction of the

Ventilated Improved Pit latrine (VIP toilet) is therefore suggested.

The outdoor shed within the house and sleeping area could be merged in one space and could be provided in the form of a veranda in the courtyard. Most day activities by women were carried out in the courtyard including receiving female visitors; children's play and gossip etc. This space should be appropriately designed to serve as outdoor sleeping area during summer by the occupants of the houses. The need for a separate and independent adolescent boy's room in the architectural design is predicated on privacy provision. Accommodating the unmarried young men outside the main house will ensure privacy at two levels; among the family members and between the family member and visitors. It also ensures to a great extent their independence. Provision of the room reflects the practice of the use of traditional *zaure* in the Hausa traditional houses for grown up children and male guests (Hamza, 2010). Architecturally the room could a part of the house design but with a separate entrance. The need for spaces for income generation is a practice in the Hausa traditional house. In the normative practice, a part of the *zaure* area was converted to a shop for income generation or used as a place for trade of the head of the household such as blacksmithing, mat weaving etc.

Other forms of income generation activities practiced in the traditional houses and which the occupants of the public prototype housing need spaces for include small holder poultry and livestock. In the traditional practice, animals are kept in the house for business or for use in the farms for example goats, sheep for beef production and donkey for use in the farms respectively. Architecturally, spaces for shops could be provided as part of the perimeter fence of the house where it is permissible by authorities. Although, spaces were provided in the front of the houses which could be used for parking, some respondents still prefers to have a dedicated car garages as part of the house design. This could well be understood since no provision was made for perimeter fences in all the housing estates surveyed. The residents rather built the perimeter fences themselves. The primary concern here could be the security of the vehicles. In terms of the architectural design, two alternatives are suggested; integrate the garage as part of the house, or a space for a lock up garage that could be linked to the house.

III. EXTENT OF PHYSICAL MODIFICATIONS CARRIED OUT ON HOUSES BY RESPONDENTS

According to the survey conducted, the need for the integration of the mentioned architectural elements in their house design seemed to be the primary factor for the most number of modifications in the housing estates. This is due to the importance of these elements to the socio cultural values of the occupants. However, other factors were also found to have contributed to the modifications of these houses by occupants. These include attainment of new status by occupants, increase in family size and the urge to use new and modern building materials. The following example illustrates modifications carried out on a three bedroom bungalow documented from *Goruba* road housing estate in Katsina. Fig. 2 shows the ariel views of the *Goruba* road housing estates.

Figs. 3 a & b shows the original floor plans of two and three bedrooms houses in the housing estates which in total comprises of two hundred and seventy two houses.



Fig. 2. Ariel view of *Goruba road* housing estate which is one of the public housing projects studied. It comprises of two hundred and seventy two houses of two and three Bedrooms. Source: Adapted from the Google earth, (2009)

Fig. 3 (c) shows the extent of the modifications carried out on the three bedroom house. The most significant element here according to the occupants was the integration of adolescent boys room. The bedroom was attached to the external wall of the house, self contain and has a separate external door. In this situation, the young men had some level of independence while privacy was achieved among the enlarged family members.



Fig. 3. (a, b). Original Floor plans of two and three bedroom bungalows for *Goruba road* housing estate, Katsina. The floor plans were later modified at various levels due to among other factors dissatisfaction with the design. The estate was completed in 2004. Source: Katsina State Housing Authority, (2009).

Another modified floor plan was documented in *Kofar Marusa* low-cost housing estate as shown in Figs. 4(a), (b) & (c). The houses were two bedrooms in a block of four semi detached units. The first (a) shows the four units of the houses, (b) gives out the details of one of the units while (c) shows the level of modifications carried out by the occupants. Each unit of the house consisted of two bedrooms, a living room, kitchen and a store. The toilet was separate with a

bathroom. Here the courtyard is quite vast compared with the size of the house. As shown in the Fig. 4 (c), in the modification, a one bedroom apartment was created within the courtyard. The new apartment consisted of a bedroom, kitchen toilet and a living room. The vast courtyard was thus modified to create additional one bedroom house unit. The primary motivation factor for the modifications here seems however more economic than socio cultural.

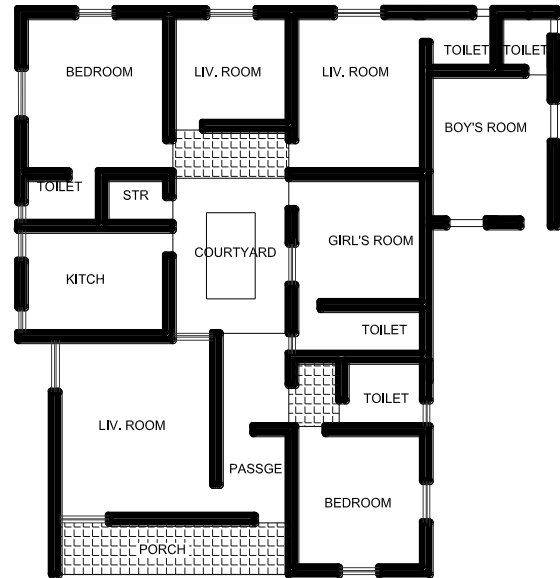


Fig. 3. (c) Example of a modified floor plan documented from house samples in *Goruba road* housing estate in which dissatisfied owners added two more bedrooms, enlarged the kitchen and integrated adolescent boy's room. (Source; Author's Survey, 2011)



Fig. 4. (a) Original Floor Plan of a two bedrooms *Kofar Marusa* low-cost house in row of four. The housing estate was completed in 1977. The prototype design was repeated across all local governments of the then Kaduna State. Source; Author's Survey, (2011)

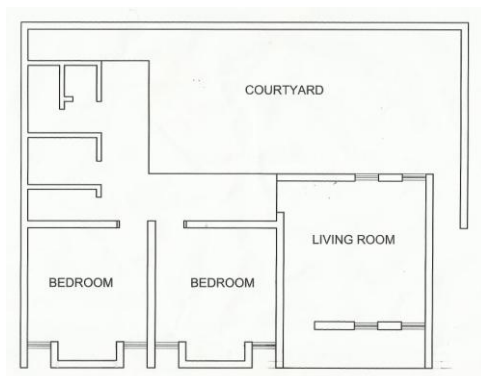


Fig. 4. (b) Details of one of the units, which consisted of two bedrooms, a living room, kitchen and a store. The toilet was separate with a bathroom. Here the courtyard is quite vast compared with the size of the house. Source; Author's survey, (2011)

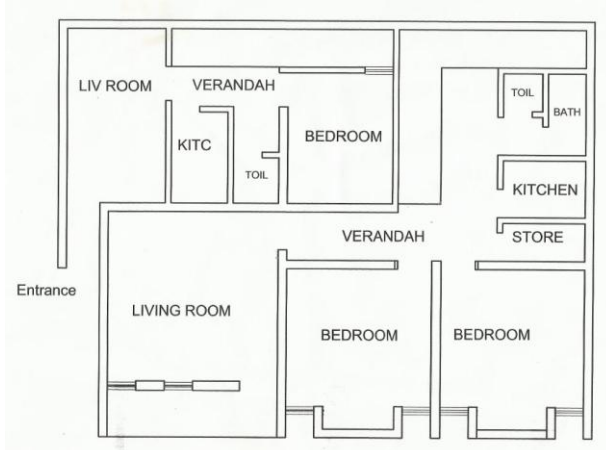


Fig. 4. (c) Modified floor plan in *Kofar Marusa* low-cost house which was modified by the owners. The house was partitioned into two separate houses, to rent the other part while the owners occupy the original part. The courtyard of the houses was used to build a one bedroom unit as shown. Source; Katsina State Housing Authority, (2011)

The third example of another modified house was documented in the *Dutsin safe* low-cost housing estate in Katsina. The housing estate was built by the then Kaduna state and completed in 1988. It comprises of two, three and four bedroom semi-detached houses in units of twos. It also consists of a one bedroom flats in units of ten. As shown in Fig. 5(a), the original three bedroom house in the housing estate consists of a living room, three bedrooms, one of which is self-contain, toilet and bath, kitchen and store and an open courtyard. Fig. 5(b) shows the modified floor plan of the house. In the modified plan, three elements were introduced by the owners. These include conversion of the living room into adolescent boy's room with a toilet and a separate door entrance, extension of the small existing veranda which linked the living room with the bedrooms area, and splitting of the shared toilet such that one of the bedrooms becomes self contain while the other part serves as a general toilet. The extended veranda served as a shed for use by women and children during the day and used as outdoor sleeping area in the summer.

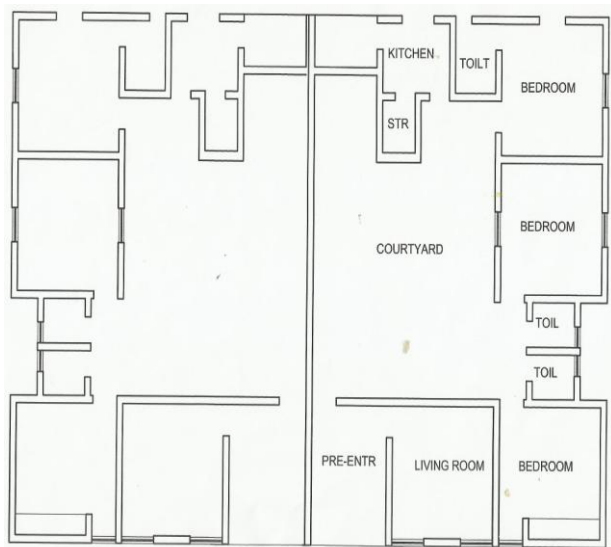


Fig. 5. (a) Floor plan of the three bedroom house in *Dutsin safe* housing estate. It was built in 1988, by the then Kaduna State. Source; Katsina State Housing Authority, (2011)

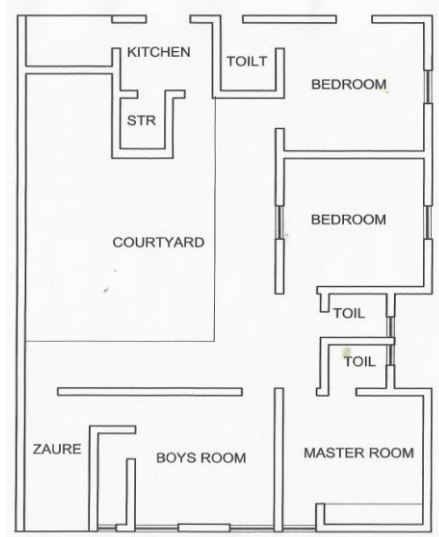


Fig. 5. (b) Modified floor plan of the three bedroom house at the *Dutsin safe* housing estate by owners in which living room was converted to adolescent boy's bedroom with a toilet. Source; Katsina State Housing Authority, (2011)

IV. PROPOSED ARCHITECTURAL DESIGN MODEL WITH INTEGRATED RESPONDENT'S PREFERENCES

The architectural model proposed here is not aim at pre-empting the previous models (designs) in existing public housing estates. Rather it is meant at improving them and as guidance towards integrating user's needs. The model is with a view to achieve an acceptable residential environment that satisfies users' spatial needs as well as their socio-cultural values and identity. It is intended not to be an entirely new model but rather an adaptation of the *Dutsin safe* housing estate model for two reasons; in the opinion of the researcher, the design of this model came close to the general design principles found in the Hausa traditional house architecture except for the none integration of these elements, and to show that government could still achieve its budget proposal in the provision of these house as well as achieve a socio culturally workable design solution. As shown in Figs. 6(a-d) respondent's most preferred architectural elements and which were not provided in the previous models were integrated.

Fig. 6(a) is the originally designed two bedroom fully detached flat. The floor plan consists of the basic functional spaces such as the bedrooms, toilets and kitchens. For the proposed model, the proposed land area should be within a 500m² perimeter area. This is because according to previous studies, greater percentage of the urban houses was built between 350m²-600m² plot area (Hamza, 2011, 2010). Figs. 6(b&c) serves as the two proposed transitional models in which some of the architectural elements could be integrated, for example, store, space for small ruminant's/poultry outdoor and kitchen. In the third model (c), the other elements such as pit latrine could be added. Here too bedrooms could be added. Fig. 6(d) is the final model which consists of the maximum number of functional spaces and elements based on the respondent's preferences. These include outside veranda, *dakali*, adolescent boys bedroom and the living room which could be converted to a master

bedroom in situations where the house accommodates enlarged family as was found in some of the surveyed houses.

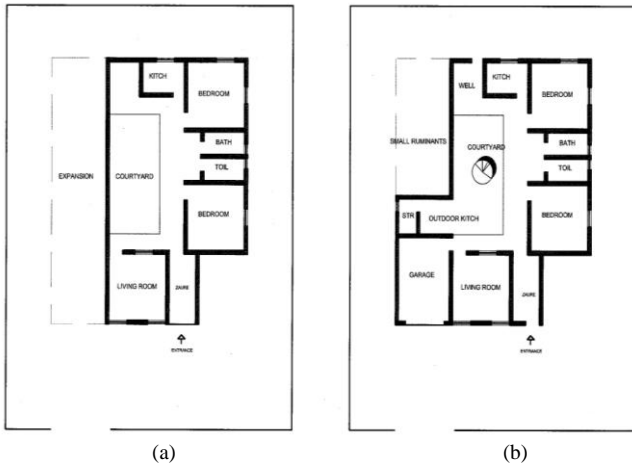


Fig. 6. (a) A two Bedroom which is could serve as the initial house to be built by the government for relocated residents, the house consists of basic architectural elements; (b) Transitional model consisting architectural elements such as store, space for small ruminant's/ poultry, outdoor kitchen and well

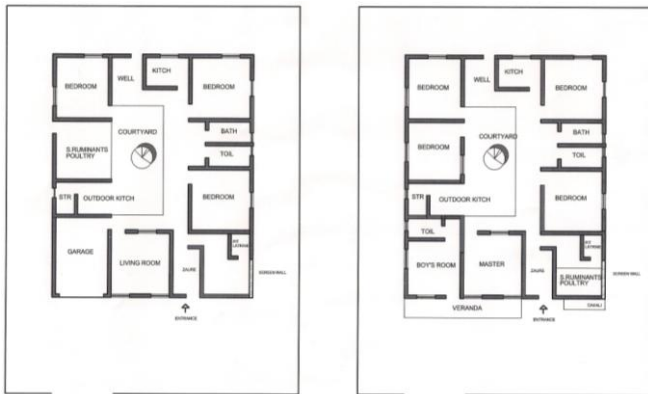


Fig. 6. (c) Transitional model consisting architectural elements such as pit latrine, and additional two bedrooms; (d) Final model consisting all respondent's preferences in terms of architectural elements and functional spaces

V. CONCLUSIONS

The architectural elements which respondents will like to have integrated in their house design were identified as outdoor pit latrine, adolescent boy's room, car garage, tap in the toilet, and alternative water source. The other elements include outdoor sleeping area in summer and for family use during the day and lastly spaces for income generation. These elements were actually not integrated in any of the surveyed housing estates across the study area. The respondents identified these elements that promote their socio-cultural values and identity. And because in most of the houses documented one or two or all of these elements were

integrated by the occupants of these houses after taking possession indicates that their non integration is the major factor that lead to modifications of the houses by their owners. If therefore these elements are considered in the initial architectural design of the houses, the level of modifications will be greatly reduced. It is hoped that the model will serve as a guide in the integration of respondents needs in future public housing projects in the study area and elsewhere. This will save cost to the government, promote cultural identity and enhance respondents economic status.

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