USER SATISFACTION WITH ARCHITECTURAL DESIGN OF SPACES IN RESIDENTIAL BUILDINGS: INSIGHTS FROM LOW-COST HOUSING IN PLATEAU STATE, NIGERIA

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DECLARATION

I hereby declare that this research titled "User Satisfaction with Architectural Design of Spaces in Residential Buildings: Insights From Low-Cost Housing in Plateau State, Nigeria" is the product of my research efforts undertaken under the supervision of Prof. Zanzan Uji Akaka. This work has not been presented elsewhere for the award of a degree or certificate. All sources have been duly distinguished and appropriately acknowledged.

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CERTIFICATION

This is to certify that the research work for this thesis and the subsequent preparation of the thesis by Ripnung Shem Lekjep (PGEV/UJ/00153/10) were carried out under my supervision.

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DEDICATION

This research is dedicated to the Almighty God, the source of my joy and the society it is intended to serve.

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ABSTRACT

User satisfaction with residential houses generally is tied to many variables, but this research aims at examining user satisfaction with architectural designed spaces of residential buildings using insights from Plateau State Low-cost housing. The designed spaces of low-cost houses constitute verandah, living room, dining, kitchen, store, bedroom, toilet/ bathroom courtyard and external spaces for parking and outdoor activities. Physical observation of low-cost houses in Plateau State, today reveals high post construction modification and alteration. These alterations have altered the initially designed spaces, appearance of the cities in the study areas, thereby manipulating the harmony of people's built environment. The alteration made to these low-cost building signals that either the design spaces did not meet the need of the user or methods applied in the provision of the building units do not often meet the needs and aspiration of the users. In order to achieve the aim of the research, the objectives of this research are to identify the composition of architectural designed spaces and the location of the State low-cost houses in Plateau, to assess the sizes of existing internal and external spaces of selected Low-cost houses in Plateau State in relation to set standards, to identify the functionality of the original designed spaces and the altered spaces of the State Low-cost housing by the users, to determine the demographic characteristics of the inhabitants of the low-cost houses in Plateau State and to determine user satisfaction with the original architectural designed spaces of selected State Low-Cost housing in Plateau State. For the purpose of this research, the low-cost housing in Plateau State was zoned into the three geo-political zones of the state: the Northern zone, Central zone and the Southern zone. This research basically studied the architectural designed spaces of the Low-cost houses in Plateau State, with focus on the alterations made to the designed spaces, the physical measurement of the spaces in relation to set standards, the functionality of the spaces provided and the satisfaction level of the users with the designed spaces. A comprehensive review of literature in local and international conditions on Low-cost houses with similar experience was conducted. Also hypothesis test on relationship between functionality of spaces and users

satisfaction with designed spaces reveals that there is significant relationship between functionality of spaces and user's satisfaction. The descriptive research methodology was adopted to characterize the data on alterations. The data was analysed using SPSS Statistics version 21, where P-value approach, short for probability was utilized in testing the hypotheses and answering some research questions simultaneously. On the basis of making scientific decision, 0.05 was used as a level of significance. The null hypothesis was rejected when the p-value is less than the level of significance (0.05) and accepted when it becomes greater than the level of significance. Also, quantitative and qualitative research techniques were adopted to handle the data on user satisfaction that were largely nominal. Inferential analytical techniques of correlation and regression were employed to test four hypotheses on relationship between satisfaction levels of respondents with the designed housing. Findings revealed that there was significant relationship between personal characteristic of respondents and the overall housing satisfaction; it also reveals that there was significant relationship between size of bedrooms and no of bedrooms. The relationship between user's satisfaction and the alteration made to buildings was revealed to be statistically insignificant. Chapter five presents discussion while chapter six presents recommendations, limitations, and suggestions for further study and contribution to knowledge. It is believed that when designing with understanding of how and why these alterations became necessary, it would be easier to take care of that need so that future changes will be minimized, and successful design that meets the needs and aspiration of the people will be achieved. This research will serve as future references in design of residential spaces and guide to professionals in architecture and the building industry.

CHAPTER ONE
INTRODUCTION

1.1 BACKGROUND TO THE STUDY

The question about space is perhaps one of the most asked questions in the vast areas of knowledge, especially those that are concerned with physicality for example, physics, geometry, engineering and architecture. This is because we are basically surrounded by two things: space and matter. In our conception of these, space is the more flexible and ambiguous. We can see trees, lands, grasses, et cetera are made into parks, streets or horizon. In buildings, we see walls, columns, windows, et cetera but conceive space and apprehend it into various things, rooms, corridors, verandahs, et cetera. Space is both neutral and subjective; the philosopher's space seems to be different from the architect's space which is also different from many people's spaces. However, in reality (of our everyday life) we conceive space in similar ways especially when spaces are designed for specific purposes. This research, therefore, focuses on architectural space which is the key to understanding architecture. Only through the use, not design, will space become architectural space and begin to be very ambiguous not only in how we use space but also, as a result, in how we design space.

Practically and theoretically, architectural space is often taken for granted as one substance in opposition to or in complement of its envelope. Here lies the problem of how a piece of architecture can be recognized as either a social or artistic object when it is both. Why do buildings designed for similar purposes look different or why are similar designs used differently in actual activities? The answers to these questions lie with the people (user) and the architectural space. Generally, we can rely on our intuition in dealing with architectural space; that is, we seem able to find our way through buildings by following the natural mechanisms of movement and perception, or as Bergson puts it in (Savanjala, 2010). For many 20th-century philosophers, this phenomenon is systematic and perhaps

universal because space in philosophy is often seen in a purely abstract environment of cause and result at a conceptual level. This abstract level is necessary as it shapes the general understanding people have about space as ‘priority’ telling us that we are able to act intelligently upon this abstraction or even begins to see it in a new way (Deleuze, 2011). This is why, in the built environment, a philosopher’s space is important to architects (as they often cite philosophy). But their spaces are not the same because architecture is never built for just anybody whose needs and conceptions are universal. As a social and artistic concept, architecture adds to pure space the socio-cultural aspects that convey different values to different people either in the forms of symbol or use. In this way, the conceptual system and universal qualities of space become very complex as the reality sets in.

In modern days, a designed residential house is a basic icon of dwelling where people can plan to live and work in a protected environment. An architecturally designed house is supposed to be an abode which should be conducive to living and working. Before professionalism, the design and creation of space were more of a social and vernacular process seamlessly integrated with all other aspects of culture. Today, space has also become a matter of economics, of technology and of art. Space is both that which brings us together and simultaneously that which separates us from each other, because it can be close or enclose.

Several attempts have been made by relevant authorities to define minimum space standards in residential spaces, but this approach has become progressively more sophisticated over the years because of economy technology and art, which vary from person to person. Bamisele (2004) stated that Nigerian cities are fraught with numerous problems which impair the quality of buildings, with inappropriate space for specific functions in residential buildings as one of such problems.

The importance of housing design is pronounced by Chowdhurry (2009) He observes that it is the most difficult task in the field of architecture, because a proper understanding of the nature of human needs is of crucial importance in the formulation of houses and space standards. It has been observed by Afag, et al., (2011), that designers are not always fully aware of the consequences of their design solution. Only through post-occupancy survey will the designer usually realize what mistakes or bad decisions have been taken during the design process.

Duff as cited by Nwankwo (2013) described post occupancy evaluation as a process of systematically evaluating the performance of buildings after they have been built and occupied for some time. It aims at discovering how the completed building performs, to possibly determine the misfits, mistakes or omissions and to pave the way for the accumulation of information for future programming and design. Three levels of typical building evaluation have been identified as follows: Indicative, Investigative and Diagnostic (Preiser & Vischer, as cited in Nwankwo, 2013).

Indicative evaluation gives an indication of major strengths and weaknesses of a particular building performance. Investigative evaluation, on the other hand, goes into more depth whereby objective evaluation criteria are explicitly stated. Diagnostic evaluation requires considerable effort and expense and utilizes sophisticated measurement techniques. Based on this information, the researcher adopts the investigative evaluation for this research work because it is more depth whereby objective evaluation criteria are explicitly stated.

The Nigerian Housing condition is identified primarily as that of a crises situation, manifesting and expressing itself in quantitative and qualitative form Nwankwo, (2013). Physical observation of low-cost houses in Plateau State, today reveal high post construction modification. After low-cost houses were privatized in 2008, there was serious modification and alteration of the buildings. These modification and alteration

have altered the initially designed spaces and appearance of the cities in the study areas, thereby manipulating the harmony of people's built environment. The modifications signal that the methods applied in the provision of the building units do not often meet the needs and aspiration of the users. For the purpose of this research, the low-cost housing in Plateau State was zoned into the three geo-political zones of the state. The zones are The Northern Zone comprising the following Local Government Areas, Jos North, Jos South, Riyom, Bassa, Jos East and Barkin-Ladi. In these zones, the low-cost houses are located in Jos South, Bassa and Barkin Ladi. The Central Zone comprises the following Local government Areas: Mangu, Pankshin, Bokkos and Kanam. The Low-cost houses in this zone are located in Mangu, Pankshin and Kanam. The Southern Zone comprises the following Local Government Areas: Langtang North, Langtang South, Wase, Shendam and Quanpan. The low-Cost houses in the Southern Zone are located in Shendam, Langtang North and Wase. Each of these zones has similar characteristics such as topography, ethnicity and cultural background. The housing units are of the same design with the exception of the alterations made to the designed spaces in some cases. The zoning enhanced fairness in the study, without limiting the study to a particular ethnic or cultural group alone.

This research basically studied the architecturally designed spaces of the Low-cost houses, the alteration made to the designed spaces and the satisfaction level of the users with the designed spaces, because when designing with understanding of how similar buildings perform, mistakes will be minimized and successful designs that meet the needs and aspiration of the people will be achieved. In order to achieve this, a comprehensive review of literature and research methodology was adopted in order to obtain an acceptable result that will serve as a reference point in the design of public residential spaces.

The proper utilisation of the findings arising from this study will improve the design of future public residential buildings and minimize the incidence of alteration of designed spaces which always result in defacing the housing layout. The findings of the research will establish the design factors that require adequate consideration at the programming and design stages. The information and data from the research can be used as a reference material for teaching architects and future operators in the area of public residential building development. The research can also be used to document deficiencies as part of the justification of new construction or remodeling projects.

1.2 STATEMENT OF THE PROBLEM

In Nigeria, the government has actively sought to alleviate the problem of housing by addressing basic needs of the urban poor through ambiguous initiatives such as public housing schemes (Wahap, 2005). These public housing initiatives have been implemented for some years now across the states of this nation, but are the users of these low-cost houses satisfied? Where they carried along in the design process?

The incessant alteration and modification of low-cost building plans exist after completion of Low-cost houses of study areas as observed. This has caused a lot of concern because it has altered the landscape of the housing area. The same occupiers of these buildings started to alter the original designed plan of their apartments immediately when they took possession of them. The question could be that, are the occupiers of such buildings not satisfied with the initial designed spaces of their buildings? Or what prompted them to make such changes? Could it be because of a change in their social status? And what are the implications? All these form part of the research questions. It has also been observed that these alteration of spaces fall under the following:-

a) **Physical alteration of buildings**: This involves structural alteration, alteration of form, Spatial alteration, material alteration, finishing, and increase in overall built up space area
b) **Security**: For security purposes wall fence and gate house were introduced.

c) **Parking lots:** Garage and car ports were introduced apart from parking spaces.

The alteration of the original designed spaces of low-cost houses across Plateau State is an attempt by the building consumers to presumably personalize the houses to meet their unattended needs and aspiration during design. There is a challenge therefore to carry out a study on user satisfaction with architectural designed spaces of these residential buildings. This study observed that these alterations have become so frequent that it needs to be investigated.

One of the problems this research need to address is the lack of adequate feedback information from the public housing consumers on the performance of buildings in-use that necessitate the frequent alteration of residential buildings in low-cost houses across Plateau State. Residential satisfaction studies within the context of housing research have become paramount due to their significant role in providing evaluative feedback (Canter & Rees, 2009). Such feedback from residents increases the likelihood of improved design features in buildings and the planning of residential developments as a whole, and has been identified by Canter and Rees (2009) "as being an integral part of the design process".

According to Chowdhury (2009), the life of an individual and family is unfolded in the space within a shelter. That is, every activity of man is carried out within a given space. Therefore a proper understanding of human nature as it relates to human needs is of critical importance in the formulation of houses and space standards. With the recent alarming rate of population growth within the urban centres within the State, it has been observed that most residential buildings do not meet users need. It was also observed that insufficient housing has mounted pressure on available housing. Growing housing demand in these urban centres has also paved the track for improper and faulty designs and construction which does not give regard to space and user satisfaction (Sati, Lekjep & Salihu 2009). Growing demand of housing in urban centres which has paved way for improper and faulty designs and constructions with no regards to space and user

satisfaction. The recent high technological household equipment requires re-examining of residential spaces.

This research work therefore, attempts to examine occupier's level of satisfaction with the designed internal and external spaces of the Low-cost houses.

1.3 RESEARCH QUESTIONS

The following research questions are to be investigated in order to elicit a clearer understanding of user satisfaction with architectural designed spaces of Plateau State Low-Cost Housing.

1. What constitutes architectural designed spaces of State Low-cost Housing of Plateau State?
2. What are the functions of these designed spaces and how does it support occupants' activities?
3. How satisfied are the occupants with the sizes of designed spaces of the low-cost houses?
4. What are the alterations/ modification made to the original architectural designed spaces of the low-cost houses?
5. What prompted such modifications or alterations?

1.4 AIM AND OBJECTIVES OF THE STUDY

The aim of this research is to investigate user satisfaction with architectural designed spaces of Plateau State Low-Cost Housing, focusing on indoor and outdoor spaces of the Low-Cost Houses with the view to improve the design of future public residential buildings by the relevant professionals and minimize the incidence of alterations which always results in defacing the general layout of residential buildings.

In order to achieve the above aim, the specific objectives of this research are:

1. To identify the composition of architectural designed spaces and the location of the State low-cost houses in Plateau State.

2. To assess the sizes of existing internal and external spaces of selected Low-cost houses in Plateau State in relation to set standards.
3. To identify the functionality of the original designed spaces and the altered spaces of the State Low-cost housing by the users.
4. To determine the demographic characteristics of the inhabitants of the low-cost houses in Plateau State.
5. To determine user satisfaction with the original architectural designed spaces of selected State Low-Cost housing in Plateau State.

1.5 HYPOTHESES

In order to address these research questions, the following hypotheses were formulated.

Hypothesis 1

Null hypothesis H_o: Demographic characteristics of the inhabitants such as ethnicity; age; education; occupation and income do not have a significant influence on users' satisfaction and architectural designed spaces.

Hypothesis 2

Null hypothesis, H_o: The sizes of rooms, number of rooms and the location of rooms do not have a significant relationship with users' satisfaction and architectural designed spaces.

Hypothesis 3

Null hypothesis H_o: The alterations to the existing low-cost housing do not a have a significant relationship with the satisfaction level with the designed spaces of the original houses.

Hypothesis 4

Null hypothesis H_o: The functionality of the spaces provided and how they supported the activities of users do not have a significant influence on users' satisfaction and designed spaces of Low-cost housing in Plateau State.

Hypothesis 5

Null hypothesis H_o: Housing quality and performance of buildings such as basic services and social services do not have a significant influence on users' satisfaction and designed spaces of Low-cost housing in Plateau State.

1.6 JUSTIFICATION/SIGNIFICANCE OF THE STUDY

Every Nigerian desires to own a house, but the affordability of such houses is not the matter, rather it is the quality and the space designed that are more important to the user. This research is justified by the authors desire to project the interest of the silent beneficiaries of the state low cost houses in Plateau State with a view of finding from them, their impressions on the existing architectural designed spaces of their houses and to present their suggestions at the end. When such suggestions and findings are properly adopted in subsequent projects it will make houses more meaningful and conducive to occupants.

This research work is very significant because Architects seldom receive useful feedback about the performance of their completed and occupied buildings, except from satisfied or dissatisfied consumers who demonstrate their displeasure through frequent alterations. At the design stage, architects and planners profound some hypotheses which inform their design, but these hypotheses are never tested once the design is realized. The outcome of this research is expected to improve the design of future public residential buildings and minimize the incidence of modification or alteration which always results in defacing the Low-cost housing. The modification or alteration of public residential buildings does not only change the cityscape but also touches on the psychology of the people (Nwankwo, 2013). When designing with understanding of how similar buildings perform, mistakes will be avoided and successful design that meets the needs and aspiration of the people will be achieved. The result of this research work will establish the design factors that require adequate consideration at the programming and design

stages and minimize frequent modifications and alterations to buildings. The information and data from the research will be a reference material for teaching architects and future operators in the area of public residential building development. This research can also be used to document deficiencies as part of the justification of new construction or remodeling projects.

The proper utilization of the result arising from this study will enhance government and private developers' competitive standing in the market and improve public image and reputation. It is important that this research analyze Low-cost housing situation in Plateau State, because the state government is proposing a mass housing scheme which will save the state from repeating the mistakes of the past.

The result of this study will also serve as a platform for empirical studies on public residential buildings performance in any state of Nigeria.

1.7 THEORETICAL/CONCEPTUAL FRAMEWORK

Scholars provide the concept of housing satisfaction variously. Park (2009) initially tried to establish the concept of housing satisfaction, who asserted the residents' satisfaction is more appropriate than the characteristic of construction to evaluate the housing quality among various residential concepts (Park, 2009).

Housing satisfaction not only evaluates the quality of residential environment by measuring the satisfaction level of individuals' residential environment and its value, but also is a valid method to deduce designs or policies to improve the quality of residential environment. This study defines the housing satisfaction as the status to evaluate the overall satisfaction of apartment houses that residents reside. According to Amerigo & Aragones (2008) the study of satisfaction dates back to the 1940s and is currently used in many disciplines (e.g. housing, consumer satisfaction, marketing, landscape architecture, the health and medical fields). Users' satisfaction in residential building is considered as a

criterion of residential quality. Residential spaces are expected to meet the required standard and to satisfy the user.

Residential satisfaction has been studied in a variety of housing settings ranging from low-income housing; owner occupied homes and government residential buildings with variables such as culture; age; individual with severe handicaps; life satisfaction, financial status; house and neighbours; perceived atmosphere, apartment evaluation; maintenance and friends nearby have been significant to resident satisfaction (Amerigo & Aragones, 2008). The measurement of users' satisfaction has been the subject of continuous research endeavors in many disciplines, including architectural and urban design. Information about users' satisfaction is critical in assessing alternative design options or to predict potential market shares. According to Afag et al., (2011), if the current trend towards user- centered design will continue or even intensify, a valid and reliable, understanding of user satisfaction is paramount to designers.

Research outcome of Amerigo and Aragones (2008) suggested that, users' satisfaction in residential spaces is a true standard for evaluating housing quality. The studies insist that residential satisfaction is a true standard of evaluating housing quality. Studies by Varady and Preiser (2014), Virba and Combs (2010) record that the facilities and services quality available in a housing unit are vital in determining satisfaction with the housing unit. The studies further add that housing satisfaction is influenced by variables such as users characteristics, dwelling unit characteristics, management and environmental and location factors. According to Park (2009), one of the most common ways that researchers measure housing satisfaction is through the use of a one-to-ten point or one-to-five point scale where usually "1" represents the lowest score and "5" or "10" represent the highest score. Questions can be designed for a singular analysis, such as, "What is your opinion of your housing quality?" Questions can also be structured

categorically, for example, a resident's level of satisfaction with different areas in various locations (e.g. bedrooms, kitchen, front entry, and bathroom).

Beamish (2006) developed and tested two instruments intended to measure the livability of single-family houses. One instrument was called the House Plan Evaluation Checklist (HPEC), and the other instrument was called the Housing Satisfaction Scale (HSS). The HPEC was used by housing professionals to evaluate the livability of a house plan. They would evaluate the house plan using the following ratings: (0) Does not have, (1) Poor, (2) Fair, (3) Good, and (4) Excellent. The HSS was used by residents to evaluate their satisfaction with specific features of their house. Each item had a scale that rated importance (1-Very Unimportant to 6-Very Important) and satisfaction (1-Very dissatisfied to 6-Very Satisfied) (Beamish, 2006).

Common statistical tests that are used to measure housing satisfaction range from very simple mean score calculations (Friedman & Panelopoulos 2012) to more complicated multiple regression analysis (Ukoha, 1995). Other statistical analysis includes the use of one or more of these methods: chi- square, ANOVA, path analysis, and correlation. Housing satisfaction is defined by Galster cited in Varady & Preiser, (2014) as the perceived gap between a respondent's needs and aspiration and the reality of the current residential context. Beamish and Day (2008) refer to housing satisfaction as the degree of contentment experienced by an individual or a family member with regard to the current housing situation. Housing satisfaction is a complex attitude (Campbell, Converse, & Rodgers, 2009). It encompasses satisfaction with the dwelling unit and satisfaction with the neighbourhood and the area (Onibokun, 2013). According to Ogu and Ogbuozobe (2008) the concept of housing or residential satisfaction is often employed to evaluate residents' perceptions of and feelings about their housing units and the environment. Lastly, the concept of housing satisfaction has been used as a key predictor of an individual's perceptions of general quality of life (Campbell et al., 2009).

Some scholars have argued that residents' perception of their environment defines the quality of their lives (Andrews & Whitney, cited in Ogu, & Ogbuozobe 2008). There is considerable evidence in the literature that shows that housing satisfaction is influenced by a broad array of objective and subjectively perceived conditions (Adraanse 2007). Habitability of a house, according to Onibokun (2013), is influenced not only by the engineering elements, but also by social, behavioral, cultural, and other elements in the entire societal-environmental system. The house is only one link in a chain of factors that determine people's relative satisfaction with their accommodation.

Overall, the concept of housing does not lie on the individual's dwelling. It is a composite of the overall physical and social components that make up the housing system (Francescato et al., 2009). Further, housing satisfaction is influenced by the numerous components in the system and the background characteristics of the occupants. Factors that have been found related to housing satisfaction include: age (for example Varady & Preiser, 2014; Kaitilla (2010), marital status (vanKamp et al., 2003), number of children and family size (Miller & Crader, cited in vanKamp et al., 2003), socioeconomic status - income, education, employment and welfare (Brown, Freeman, cited in Kaitilla, (2010), length of residency (Varady & Preiser, 2014), housing physical characteristics (Yeh 2009), satisfaction with housing physical condition and management services (Varady & Carrozza, 2000), social participation and interaction (Mohd 2000; Varady & Preiser, 2014) and past living conditions as well as residential mobility and future intention to move (Morshidi, et al., 2011; Yeh, 2009).

Housing satisfaction also is defined as A state of the level of contentment with current housing conditions ... that falls along a continuum of satisfied to dissatisfied (Correa, 2009). Deficits may be in the form of inadequate space (lack of storage and crowding), poor housing conditions (leaking roof, no air conditioning), neighborhood location, and the like. The level of satisfaction is dependent on the user's perceived deficits

in the form of cultural, community, or household norms. When the level of satisfaction is low, there is a propensity for the household to engage in housing adjustment behavior (Ogunjobi). Previous research has demonstrated that a household's housing satisfaction is a major factor affecting the feeling of general well-being (Campbell, Converse, & Rogers, 2009; White & Schollaert, 2008) and an indicator of quality of life (Wish, 2008). With this understanding, housing becomes a very personal reflection of one's personality and, thus a strong relationship exists between one's environment and satisfaction. Satisfaction or dissatisfaction can be measured both subjectively and objectively. According to Wish (2008), objective components refer to environmental aspects, such as number of bedrooms, whereas subjective components refer to psychological aspects, such as one's satisfaction with the layout of their kitchen. A homeowner's satisfaction or dissatisfaction is influenced by their personal experiences and expectations (Mohd, 2000).

Although housing research has established that housing satisfaction is higher for homeowners than renters (Morris & Winters, 2011; Rent & Rent, 2010; White & Schollaert, 2008) there still can be problems associated with homeownership, such as housing quality, size of dwelling, maintenance, and mobility. Therefore, the implementation of post-occupancy evaluations by developers of affordable housing becomes a vital tool to measure how well the built environment supports the satisfaction of its occupants. There are many predictors of housing satisfaction. Several housing research studies have focused on residential housing satisfaction particularly related to residential mobility (Bonnes et al., 2012), housing quality (Memken & Canabal, 1994), and neighborhood satisfaction (Combs & Vrbka, 1993). Also of importance are predictors of housing satisfaction for special populations such as elderly, single parents, and minorities (Baillie & Peart, 1992; Crull, 2005). For the purposes of this study, an examination of the literature with respect to satisfaction as it applies to housing quality and design features of a house will be discussed.

The failures of many housing and dwelling projects stem from lacking knowledge on the determinants of Residential Satisfaction (RS) concept (Salleh, 2008). Residential Satisfaction reflects the degree to which individuals' housing needs are fulfilled (Salleh, 2008). The achievement of housing programmers does not only depend on the development of housing units, but also on other factors that Influence the needs of residents (Salleh, 2008). However, Residential Satisfaction is a subjective phenomenon, and there is a strong relationship between another concept namely residential preference (Ge & Hokao, 2006). Residential Satisfaction has always been cited as one of the most significant factors which should be considered in design and planning process for different nations (vanKamp et al., 2003).

Architects define Residential Satisfaction as the feeling of happiness when one gets what he/she needs in a house (Mohit et al., 2010). Not recognizing Residential Satisfaction in designing projects leads to severe problems. These problems include the fact that projects do not meet the occupant's needs, in terms of comfort, social, cultural and religious needs. Consequently, it influences the quality of life and affects the psychosocial aspects of the inhabitants (Mohit et al., 2010). Architects generally believe that Residential Satisfaction is directly related to three main rubrics. These include residential dwelling units, services provided by the developers and neighbourhood facilities and the finally environment (Salleh, 2008). For a dwelling units variables such as living area, kitchen area, dining room area, bedroom area, toilet area, room arrangement, air circulation, number of socket, level of socket, clothes line facilities, garbage line and noise are important. The second main rubric is services provided by the developers that include water pipelines, electrical wiring, and water supply, refuse disposal and eventually the safety. The last rubric is neighbourhood facilities and environment. It includes pre-school, primary school, secondary school, clinic/hospital, telephone, market, children's playground, public transport, parking lot, place of worship, community hall, facilities for

handicapped, police station and fire brigade (Salleh, 2008). Ukoha and Beamish (2009) have found that Residential Satisfaction is influenced by four variables such as habitants' characteristics, building characteristics, management, and environmental and location factors. Moreover, the facilities and services available in a building are very important in determining Residential Satisfaction (Ukoha & Beamish, 2009). The availability of basic neighbourhood facilities to satisfy the needs of habitants is another rubric. It covers shops, schools, and clinic (Ukoha & Beamish, 2009). On the contrary, there is not Residential Satisfaction once habitants should travel long distances to take their children to school, to go to their working place and to go medical centres). The knowledge about parameters that shape Residential Satisfaction is essential to an appropriate planning (Baillie, 2005).

Mohit et al., (2010) stated that, there are some housing norms attributes to Residential Satisfaction. These housing norms include the following factors:

1. Structure type such as single family, multifamily, bungalow.
2. Space (building features such as location of living room, location and size of the living room, location of kitchen, location of dining room, size of the bedrooms, size of the kitchen, size of the dining room, number of wardrobes or closets, number of bedrooms).
3. Quality includes housing conditions such as the quality of exterior and interior construction, the pressure of the water, the lighting of the stairwell, the quality of the doors, the quality of the floors.
4. Neighbourhood facilities such as closeness to schools, landscape of the neighbourhood, closeness to hospitals/clinics, shops/markets, recreational facilities, work, general cleanliness of the neighborhood, physical condition and appearance, location of the house, public transportation and services, parking facilities and security (Ukoha & Beamish, 2009).

The theoretical framework selected for this research was from Morris and Winter's (2011) Causal Model of Residential Satisfaction, more commonly known as Housing Adjustment Theory. The components of their housing satisfaction model include demographic

and socioeconomic characteristics, normative housing deficits, and neighborhood satisfaction. More specifically, demographic and socioeconomic characteristics incorporate the following: stages of the family life cycle, income, occupation, education, and family structure. Normative housing deficits incorporate tenure, structure type, space, quality, expenditure, and neighborhood. This theory suits this research work because, the transformation seen around the study area are consequences of dissatisfaction.

Using Morris and Winter's model, there are four ways to measure a household's satisfaction with their housing: (1) Causes of satisfaction; (2) Consequences of satisfaction; (3) Intervening role of stress in families with housing deficits; and (4) The process of becoming dissatisfied or satisfied (Morris & Winter, 2011). An analysis of a household's family, cultural, and community norms is important because these elements assist in the determination of whether or not a household is satisfied or dissatisfied (experiencing a housing deficit) with their housing. A household will probably be more satisfied with housing that conforms to their perceived norms and values.

Morris and Winter make a special point to note that when housing satisfaction of low-income families is analyzed, the measurement of housing satisfaction becomes more complex. For example, it would seem low-income households, given their financial constraints, would experience more housing adjustments or housing deficits than middle- or upper-income households that would lead to decreased housing satisfaction. However, they report ... the propensity to adjust housing is reduced by the tendency for low-income families to be satisfied with less than optimum housing conditions (Morris & Winter, 2011).

From the literature review, housing satisfaction is a major determinant of one's general well being and an indicator of quality of life. Housing research studies have shown that there are many predictors of housing satisfaction including housing quality. Apart from failure of public housing in Nigeria, there has been a lack of consideration of personal preferences which is being responsible for unsatisfactory housing as perceived by

users. In Nigeria, existing studies focus on the general performance of public housing in meeting occupants needs and expectation. From these studies, it is established that the physical characteristics of residential buildings have significant influence on occupants' satisfaction with their residential environment. This implies that the dwelling unit component of housing plays a vital role in determining the quality of the residential environment in particular and the performance of housing projects, in general. However, very few studies have specifically examine the performance of dwelling units (building) constructed in public housing schemes in meeting occupant's needs and expectations in Nigerian context. As a result, little is known of the different dimensions occupants/users respond to in their evaluation of satisfaction with residential buildings in public housing in the country (Morris, et al., 2010).

It is against this background that this research work assessed the performance of residential space plan design and housing quality, using Low-cost housing in Jos metropolis as the case study. The key objectives of the study were to examine the physical characteristics of the buildings in low cost houses constructed by the Plateau State government in 1978 within the study area, to assess residents satisfaction with physical; spatial; location and aesthetics of the buildings. It is expected that the research work will bridge some gaps in literature on user satisfaction and performance of mass-constructed residential buildings, especially now that the Plateau State Government has just awarded a title document worth N30billion for the construction of a Garden City and 300 housing units in the state. (Weekly Standard, January, 10th, 2014). Also, the Federal Government of Nigeria is set to inject 200billion into the nation's housing sector to provide decent accommodation for Nigerians out of the N60 trillion required to meet housing deficit in the country. This portrays the research work as timely. This will also extend our understanding of key elements that could be manipulated to improve residents' satisfaction with, and the performance of residential building in public housing scheme.

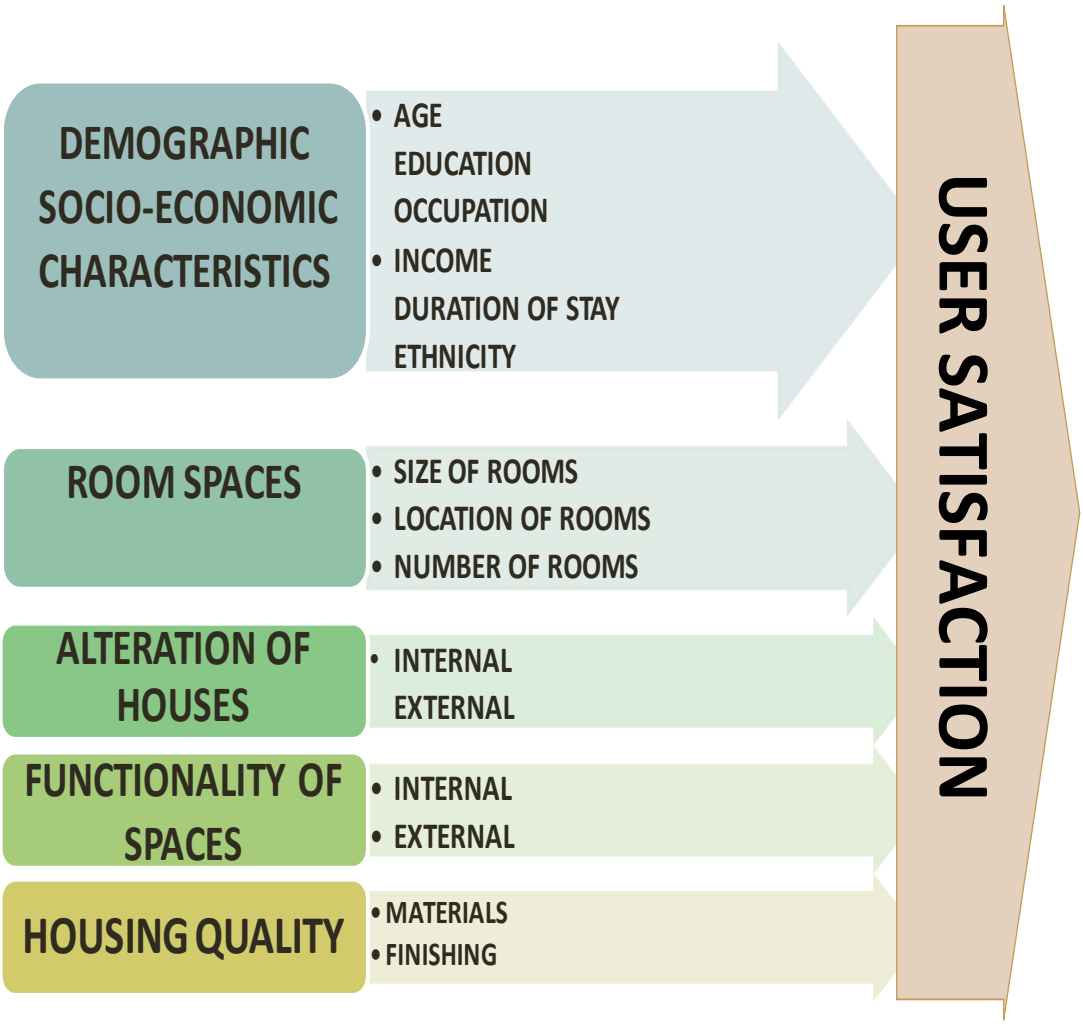


Figure 1: Conceptual Framework for Housing Satisfaction
Source: Author, (2014).

1.8 SCOPE OF THE STUDY

The study covered the low-cost houses in Plateau State. For the purpose of the study the low-cost houses were zoned into three; namely: northern zone, central zone and southern zone. Random sampling techniques through ballot where names of location of low-cost houses were written and wrapped and were picked at random was adopted for the selection of the three study areas. The three study areas are: Miango Low-cost housing in the northern zone, Pankshin Low-cost housing in the central zone and Shandam Low-cost housing in the southern zone.

This research equally examines the alterations/modifications made to low-cost houses, which are as follows:

i. **Roofs/Ceilings**: Most roofs were changed from their original iron roofing sheet to long span aluminum roofing sheets. The original ceilings sheets were replaced, in most cases with PVC ceiling and POP ceiling

ii. **Doors and Windows**: It was observed that the original wooden flush doors were replaced by steel doors for external doors while steel flush doors were introduced for internal doors. The original louver windows were replaced with aluminum sliding/projected windows. In some cases the sizes of windows were made wider for living rooms.

iii. **Introduction of Additional Rooms**: It was observed that most houses introduced additional rooms to the existing rooms. Such additions were mostly bedrooms and toilets.

iv. **Increase in Sizes of Rooms**: It was also observed that most occupants increased the sizes of their existing rooms such as kitchen, store, dinning, bedroom, living room and toilet.

v. **Introduction of Car Porch/Entrance Porch**: Most houses modified their existing entrances by introducing a car porch at the frontage.

vi. **Floor Finishing**: Most floor finishing was changed from cement sand-screed floor finish to modern floor tiles.

vii. **External Fence**: The original low-cost houses do not have fence but most occupants introduced a fence/gate house.

viii. **Drainage System**: It was observed that the original plan has poor drainage system; therefore, the modifications made to these buildings now have new drainage system introduced.

1.9 OPERATIONAL DEFINITION OF TERMS

The following terms used in the study are defined operationally:

Architectural Design: This refers to the detail, plan and layout of spaces within the low-cost houses. It also refers to the composition of the shape, appearance of the low-cost houses.

Housing: Housing here refers to the collective residences of low-cost house, the lodging or accommodation provided.

Satisfaction: This is the state of fulfillment of the inhabitants of the low-cost houses with the architectural design spaces.

Space: This refers to the physical psychological area one needs within which to live and carry out his or her activities.

User: User here refers to the occupants of the Low-cost houses.

CHAPTER TWO
LITERATURE REVIEW

This chapter presents a review of relevant literature under the following major subheadings: Architectural Space, Space and Place, Concept of Architectural Space, The Structural Dimension of Architectural Space, The Experiential Dimension of Architectural Space, The Functional Dimension of Architectural Space, The Architectural-Element Dimension of Architectural Space, Space Determinant, Architecture Synthesis of Form, Function and Technology, Housing Design Features and Standards, Definition of Housing And Housing Types, Historical Background Of Low-Cost Housing Scheme in Nigeria, Housing Scene And Housing Provision In Nigeria and Summary Of Literature Review. The purpose of reviewing relevant literature is to find out what has been done already as far as this research is concerned.

2.1 ARCHITECTURAL SPACE

Space is consciously and physically created and humanized by design of enclosing features such as fences, walls, roofs and other physical boundaries (Uji, 1999). Space is that which brings us together and simultaneously that which separates us from each other. Space is also known as an unlimited three-dimensional expanse in which all material objects are located. Space is the essential stuff of a very fundamental and universal form of communication (Lawson, 2001). It is thus crucial to the way our relationships work.

Space can and should be perceived through the capabilities (potentially) of movement or lack of such capabilities and how that movement took action, flow or stoppage. Mere space has two features: “Spatium” and “Extensio”, Space is created by a specific set of natural and artificial things whose architecture is involved in its creation, everything which has no space is not architecture. Every building creates two spaces at the same time: interior space and exterior space. Interior space is the essence and basis of architecture (Lawson, 2001).

2.2 SPACE AND PLACE

Although we use the word ‘space’ very commonly in our daily life, the concept of space is quite complicated and makes it difficult to define. However, attempts to offer a definition for space are assigned to Plato and Aristotle. Heidegger (2005) did not consider space as something which stands in front of the humans, rather than in his view, space is neither an external nor an inner experience. Space is not something predetermined and fixed; In fact, it is the personal location which defines the space. Space, based on its English lexical concepts, can be classified into three types of geographical space, interior or central architectural space. The research tackles the question of relations in space which involves both internal properties and the external relation of each space to the whole spatial system. Intelligibility of space has to achieve both internal and external relations so that the space is unique and thus makes the recognition of a piece of architecture a unique experience. The intelligible process in movement happens in the unconscious state; the awareness of the whole while being in the parts is the example given by Bergson**.** He stated that, ’Whenever we speak of the other rooms in the house, of so many perceptions absent from your consciousness and yet going outside of it’. It is this unconscious state that represents the state of intuition in relation to intelligibility in space. To this point, the idea becomes the pre-structural aspect of space. Bergson then goes on to discuss the relation of past and present; he wrote “Practicality we perceive on the past, the pure present being the invisible progress of the past growing into the future” (Bergson 2004). General ideas of memory must be considered together with the representation and resemblance characteristic of things in one's perception. With the overlapping of the past into the present, the resemblance and the individuals are perceived in the relationship of the whole and the parts; that is we perceive there semblance, as the whole, before we perceive the individuals as the parts which are resembled. It is through the relations of parts to the whole that space can exist in one's experience. Bergson places much

importance on the memory mechanism when explaining how space and matter exist in our experience. However, the research will not over emphasize this issue but rather refer to it as the link in Bergson's idea on the succession and sequence of parts that leads to a complete picture of the whole. No spatial or visual continuity is possible with adjacent spaces without openings in the enclosing planes of a spatial field.

Doors offer entry into a room and influence the patterns of movement and use within it. Windows allow light to penetrate the space and illuminate the surfaces of a room, offer views from the room to the exterior, establish visual relationships between the room and adjacent spaces, and provide for the natural ventilation of the space. Passages link two or more spaces together within a designed building. While these openings provide continuity with adjacent spaces, they can, depending on their size, number, and location, also begin to weaken the enclosure of the space (See Figure 2). This figure show enclosed spaces at the scale of a room, where the nature of the openings within the room's enclosure is a major factor in determining the quality of its space.

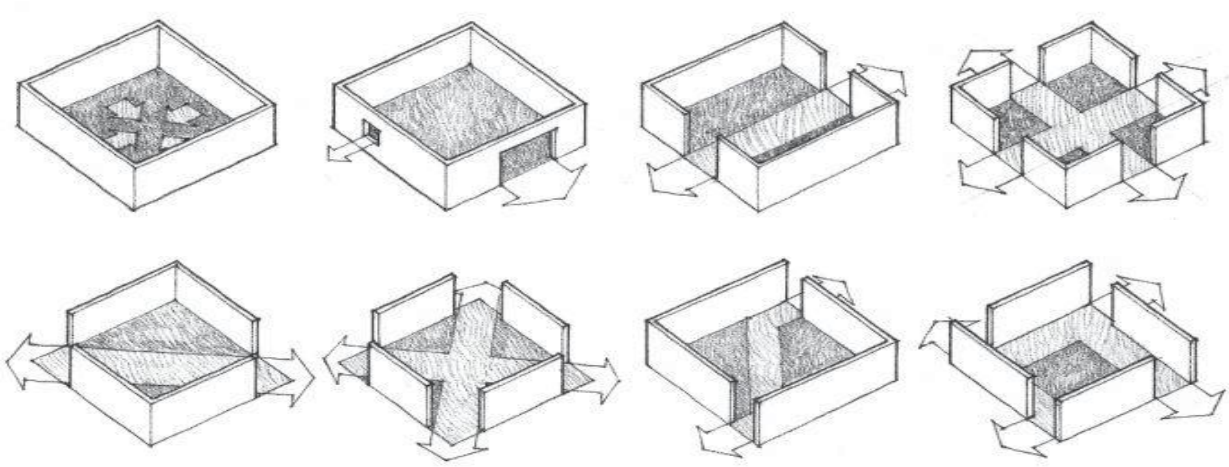


Figure 2 Examples of openings in space-defining elements and also space flow between spaces.
Source: Ching, (2003)

Architecture has to be represented in a kind of geometry as seen above, the solution of the paradox of mere form and self referential sign must be in the literal use of architectonic elements to deal with the sources of intelligibility which lie in our perception and movement (Savanjala, 2010). Architecture needs to be here and there to verify the concept. It is here that we have to move beyond pure space to the idea of symbolic form. Base on all these statements, space can be regarded as the basis of architecture which architecture obtains its characteristics based on it.

Bergson (2004) seems to have the idea of spatial configuration as he writes: "A place could be absolutely distinguished from another place only by its quality or by its relation to the totality of space, so that space would become, on this hypothesis, either composed of heterogeneous parts or finite. But to finite space we should give another space as boundary, and beneath heterogeneous parts of space we should imagine a homogeneous space as its foundation: in both cases it is to homogeneous and indefinite brace that we should necessary return". It is this homogeneous and indefinite space or the whole that would carry the conceptual value for one's reading of a certain experience, of a piece of architecture. Heterogeneous parts or the finites thus become the idea of a series of configurationally reading that through accumulation process in movement constructing three or even four dimensional experience of space and its envelope. Bergson's philosophy sees space in its pure conceptual state free from any value-laden concept. Space is as natural as the body and its movement; it is in between thing and representation. In the conclusion part of Matter and Memory, Bergson confirms his belief in self-existing state of matter as "my consciousness of matter is .not subjective, for it is in things rather than in me. It is not relative, because the relation between the phenomenon and the thing is not that of appearance to reality, but merely that of the part to the whole." Table 1 presents the characteristics of Space and Place in Architecture.

Table 1: Characteristics of Space Place in Architecture

SPACE	PLACE
i. Space can and should be perceived through the capabilities	i. Spaces obtain their pure existence from the place and not from 'mere space'. Spaces, which we come across among them, have been formed by the place. The purity of these places is hidden in things like buildings.
ii. (Potentially) of movement or lack of such capabilities and how that movement took action, flow or stoppage, mere space has two features: ''Spatial'' and ''Extension''	ii. If space gives the possibility of movement, place creates pause.
iii. Space is created by a specific set of natural and artificial things whose architecture is involved in its creation.	iii. The Unity of gestalt, form and space are the characteristics of places and where the living occurs.
iv. Everything which has no space is not architecture. Every building creates two spaces at the same time: interior space and exterior space. Interior space is the essence and basis of architecture.	iv. The place does not need to be occupied or determined by a particular object. Even the environmental conflicts are enough to determine a place.
v. Architectural space can be perceived objectively and feel directly and it can identify by its defining elements.	v. The place can be considered as a result of the interaction of three components: human behavior, concepts and physical characteristics.
vi. The relation between inside and outside, which is the first aspect of objective space, shows that spaces have various levels of extension and surrounding.	vi. Paolo Portoghesi did sometimes define it as the ''system of places ''.
vii. Gidion agreed that the architecture can be perceived by two main aspects: organizing of space and built form.	vii. The place is a combination of memory, sensory experiences and narratives.
viii. Space can be identified by its limitation elements and its character followed by the condition and the order established among these elements. These elements include: floor, ceiling, wall, material and surface, openings.	viii. The place can be realized as the synthesis of space organization and built form and its meaning is indicated by architectural language or tradition.
	ix. The most important role among the factors which give character to a place is opposition to the environment. It means topologies, form, and material and color opposition.

Source: Ching (2003)

Spaces obtain their pure existence from the ‘place’ and not from mere ‘space’. Spaces, which we come across among them, have been formed by the place. The purity of these places is hidden in things like buildings. If space gives the possibility of movement, place creates pause. The Unity of gestalt, form and space are the characteristics of places and where the living occurs. The place does not need to be occupied or determined by a particular object (Shiraz, Bushehr & Iran, 2014). Even the environmental conflicts are enough to determine a place. The place can be considered as a result of the interaction of three components:

i. Human behavior
ii. Concepts and physical
iii. Characteristics

Paolo Portoghesi did sometimes define it as the ‘‘system of places’’ The place is a combination of memory, sensory experiences and narratives, the place can be realized as the synthesis of space organization and built form and its meaning is indicated by architectural language or tradition. The most important role among the factors which give character to a place is opposition to the environment. It means topologies, form, and material and color opposition (Shiraz & Bushehr, 2014).

2.3 CONCEPT OF ARCHITECTURAL SPACE

Research by Savanjala (2010), argues that it is necessary to differentiate between spatial dimensions in order to apprehend man-made spaces. It is here that our understanding of space, or even our appreciation of space, begins to project itself outward from pure intuition. It is projected and cast into the environment, into artificial experience that provides one with the understanding of use in relation to socio-cultural frameworks. As we build a specific-purpose building, the structural and experiential dimensions are fused together so that we are able to comprehend the 'being' of things with the 'action' of our movement. We tend to divide our time into sections and our space into locations thus

separating activities by means of physical differences in the environment. The recognition of location is spontaneously dealt with in use and intuitively in design before any other requirement, even before we actually move in the space. We realise that the location of and the amount of time spent doing an activity will differentiate our space into many pieces that fit together like a jigsaw. In this way, we understand buildings, as a whole or as parts, firstly by referring to locations of spaces or in terms of topology, which is shapeless, prior to any geometrical aspects of space. Every acceptable space has a topological property from the way it is connected to other spaces in the building. Similar to engineering designs of bridges or roofs structures etc. (Gordon, 1991 as cited in Savanjala, (2010), the structural understanding of how we design and use architectural space make the whole building intelligible and not just scattering bits of space.

In the design process, architects often start from ‘where’ they want you to start your intelligible journey through their imaginary buildings. They often try their hardest to 'construct' such a journey in order to sustain an intelligible picture of such a configuration of space so that its structure does not fall on your brain and cripple your movement; that is, the building makes sense in our social activities. Using methods such as activity or bubble diagrams, architects construct a building like engineers calculate the structure of roofs, walls, floors etc. With a little bit of help from philosophy, architects are able to finalize their ‘structure’ of space according to social needs and movement. However, it is very difficult to assess the strength of architects' structure in a straightforward way unlike engineers' structure, because architecture does not yield only to equations and matter. Hillier and Hanson (2008) as cited in Savanjala (2010) proposed ‘Space Syntax’ theory that allows numerical assessment and comparison of a piece of space (they call it a ‘convex space’) in relation to every other spaces in a building. This process is done through a structure-like linear graph that differentiates spaces by their topological properties such as connections and locations in the sequence that architects structure the designs of our residential houses,

institutional buildings, commercial buildings etc. This research acknowledges this topological abstraction as the structural dimension of architectural space.

When architects construct the structural dimension in each space of the buildings, they do so with the recognition of movement that is, the next question architects ask is of 'how can we move inside these spaces? Naturally, we move through the spaces that lie in between the start and the end points of our activities. Based on our experience of being in buildings, most people would expect to walk through a doorway before getting into a building or along a corridor to go to a room, etc. The mechanism of our movement in architectural space therefore consists of three fundamental experiences: passage, junction and place (Savanjala, 2010). One experiences ‘passage’ when moving in a space such as a corridor or experiences ‘junction’ when moving through a doorway or making a turn or experiences 'place' when moving in a room. With these experiences the users, not the architects, begin to deal with architectural space in an intelligible way; that is, we are able to predict and memorise the movement required to complete the journey and thus its whole architecture. In this way, architectural space also has the experiential dimension superimposed on its structural dimension allowing people to understand and even define space in relation to their bodies in a similar way to dancers in space (Savanjala, 2010).

2.4 THE STRUCTURAL DIMENSION OF ARCHITECTURAL SPACE

The structural aspects of space were explored in the sciences, mathematics and geometry prior to architecture (Stevens 1990 as cited in Sunanaja, 2001). The idea of describing space in its structural sense has been one of the most favoured methods in architecture, though the idea is young compared to the idea of describing space as experience. Many architectural theorists have discussed architecture and its space in a so-called ‘structural’ way (Hillier & Hanson, 2008). These authors imply either a combinatorial approach or a relational one when discussing space and architecture. Methodologically, there are few works that offer this approach to space (e.g. Hillier & Hanson, 2008). The

word ‘structure’ refers to the idea of system and the specific idea and methodology used to analyse space that is known as ‘Space syntax’ introduced in ‘The Social Logic of Space’ (Hillier & Hanson, 2008). The idea of structure defined by Hillier and Hanson is essentially the idea of a configuration that creates intelligibility in space through a relational, not combinatorial process (Hillier, 2011).

Space Syntax theory describes each space in relation to its social structure that in turn makes any spatial configuration of built environment possible. Here the idea of intelligibility of space is achieved from the relation of parts and whole. The idea of convex spaces represents the idea of constitutive parts that make up the whole, spatial configuration (Hillier & Hanson, 2008). At a macro scale, the context of this system is social relations in which any other relations, in a micro scale, take place among at least three convex spaces. As the idea of spatial configuration is confined to human knowledge, the structural dimension of space has to be confined to the logic of intuition and intelligibility. Moreover, architectural space eventually has to make symbolic and functional sense for people when they use and move in a building. This fact automatically disqualifies many abstract configurations that do not fit into our intuition of being in architecture.

Due to the complexity of the relations among different properties of architecture, the idea of type is employed to identify elements in each relation. In The Logic of Architecture, Mitchell (2011) emphasizes how different strategies using parts can contribute to a different concept of the whole. For Mitchell, the structural dimension of architectural space is made of relations under different rules and only those that make architectural sense. He classifies architecture as having different qualities in different paradigms: design world, real world and construction world, though they are all related to one another. The logic of columns, which are below beams, must support beams and so

on, are put into relation using the structure of language. It serves the purpose of what Mitchell calls, ‘depiction relation’ of the intuition system in architecture (Mitchell, 2011).

However, it is the representative but not the representation of the structural dimension in architecture. The idea has, once again, fused abstract properties with concrete properties of architecture. Mitchell’s attempt to understand architecture from its design process to the construction world shares the research's theoretical goal his idea of using types to clarify relations is also useful and practical for conducting an analysis.

In this research, a complete understanding of architecture is achieved by practical application of intelligibility. It is not enough to understand how the system works without knowing how to put it to work. To start with, one of the ways, such as Mitchell’s, is to use typology and give it a rule. Where does the rule come from? It either comes from the rule that is embedded in the nature of the types used or from the actual observation of events.

This may well be the best way to assess and analyse the structural dimension of a building, but it does not have a clear indicator in terms of spatial structure itself. Moreover, it might be vulnerable to the fusion of abstract properties with concrete properties of architecture. The research has adopted the analytical procedure of Space Syntax as the basis and indicator that will link, but not fuse, structural dimensions to other dimensions in relational syntax.

Before we move onto Space Syntax theory and procedure, another interesting idea is discussed in Christopher Alexander’s works which concern with social activities and their relation to the structure of space. Alexander calls this structure 'pattern' because he relates its concept with the idea of repeated events associated with both space and objects. By defining the structure of space in this way, it takes away the autonomy of space to be considered as something that has its own logic. The idea is so connected to many everyday activities that, instead of unlocking the relations among many dimensions embedded in

space; architectural space becomes intuitively loaded with many similar things that are difficult to differentiate.

Alexander gives many examples of what he considers to be the generators of the patterns that happen in a building. They are, for example, walls, rooms, ceilings, door handles, terraces et cetera. These items definitely have effects on the space they are in, but the research proposes that these effects are conceived by people in different senses and are thus reacted to differently on different occasions. This is a vital point for consideration, as one relates to space either as a designer or user; ultimately it is people's action and movement that verifies everything. As far as the research's concept is concerned, we need to be very clear about different dimensions in space. For example, the structural dimension has to be considered in its own terms; that are according to its topological properties, while the experiential dimension must be considered in terms of its actual mechanism in space with people's actions and movements. This fact brings Space Syntax's theory on spatial configuration to the discussion.

Space syntax is a theory that gives no importance to shapes only to configurations. The concept of shape obscures the fundamental relational notions that underpin human spatial Order (Hillier & Hanson, 2008). As a result every space is treated objectively as an equal. Space is quantified by its topographical characteristics which correspond to the topological concept of its containers; e.g. rooms, walls, lines of columns, stairs or furniture etc. A space defined by way of filling up its architectural surrounding has been called a convex space, which is the concept the research refers to when mentioning a 'space'. Automatically, every convex space has at least one convex space adjacent to it and becomes a system with its own logic. Furthermore, a linear graph can be drawn to illustrate all the connections among the building's convex spaces consisting of points and lines connecting all the points (Savanjala, 2010).

In a graph, points represent convex spaces while the lines connecting them represent real connections in space. Hillier and Hanson (2008) call this graph a justified graph which can be drawn for every building and normally its root represents exterior space. Every space is seen in relation to all spaces and has different integration values based on the nature of its relation, mostly in terms of location, to the whole graph. These values, together with other values, are numerical and can be calculated manually or by computer. In a justified graph, points are connected to other points in different ways. According to Hillier, there are four types of space, differentiated by types of connection; they are a-b-c-d-type spaces. By definition, an 'a-type' space has one connection to and from it; a 'b-type' has two connections: one connection is from other spaces and the other is to an 'a-type' space or isolated groups of sub-complex spaces. The other two space-types are more flexible; a 'c-type' space has two connections or more and has to be a part of a ring (a complete roundabout of connected cells). A d-type space has three connections or more and has to be on the intersection point of at least two rings.

2.5 THE EXPERIENTIAL DIMENSION OF ARCHITECTURAL SPACE

Space has its qualities firstly because of its structural dimension; that is, as a member of a relation in a configuration. From its structural dimension, space outwardly generates other consequences. However, people conceive space from the other end of the process, from the most concrete end; that is, from their experience of architectural elements.

Consequently, for them space has its qualities firstly because of its experiential dimension; that is, as a function in a form that they can move in or occupy in some way. As architectural space seems to acquire its qualities as a whole, people seem to know it as parts in their experience. While it is important that the structural dimension of space makes sense as a whole, the experiential dimension of space need only make sense of its parts. But it is also because of this interaction between these two ends of approach that architectural reality is made possible.

Space contains various experiences which are narrated as one move about in space. When moving through spaces one interacts with them through movement and at the same time one learns about them through experience. Besides the configuration of spaces, one experiences architecture as the experience of being in the room, on the staircase, walking in the hallway, going through the doorway, looking out of the window, turning at the corner, etc. In such a simple experience, architecture clearly provides a structure for different individuals and creates different experiences as the consequence of being and moving in its space. The example is the experience of going into the building (the state institution) and going to the room, (the dayroom). We tend to use space and make social contacts through movement whereas architecture also enables the existence and characteristic of space through the movement that people make in their social activities. These simple types of experience make us understand space as the product of social activities simply by looking at our basic movements (Savanjala, 2010).

The first and the most straightforward experience is the passage representing the linearity of human movement that tends to create a horizontal volume of space. It is common to experience a passage in everyday life since it is a consequence of being connected with other spaces. As a result, most of the movement that happens in a passage is more global and dynamic in terms of the to-and-from relationship between spaces than the movement that happens in junctions and places. In architecture, spaces that offer such a quality of passage are translated into walkway, corridor, hallway, and staircase etc. Passage provides rich experiences of type, number, sequence, and location of architectural space with which it is associated. The experience becomes more interesting when taking into account the socio-cultural aspects of everyday activities (Savanjala, 2010).

Junction is usually attached to and is experienced by movement along a passage. There is always at least one junction in every occupiable space, in between two or more different spaces and is where activities or experiences change. Its physical and spatial

properties are found where a movement exist one spatial context and enters another means that most spaces can become junctions to other spaces. In comparison to the passage, junction type is a much more condensed experience. The situation such as a pocket space of doorway, a group of columns or the planes of a wall or the drop of a ceiling defines a change in space and thus the experience of junction. Physically, this is the point where movement is most integrated with architecture because it is the movement itself that cuts through parts of architecture, for example a doorway. It is not described as 'threshold' since junction is the concept of pure space and movement that a space has before gaining social function. The integration quality of this spatial type is expected to be in between those of passage and place. Its experiential quality, however, may be the highest of all three types considering that it always involves at least two out of three different types of space (Savanjala, 2010).

The experience of place completes our architectural experience and it is usually introduced by the junction type. Compared to the other two experiences, 'place' is the most static. It is the local convex movement that is usually connected with global linear movement or passage through junction. Place indicates a different scale of movement which is smaller than 'passage' but larger than ‘junction’. The integration quality of place might be at the lower scale if it is an enclosed room (Savanjala, 2010).

In conclusion, a passage-type space is a space that suggests to and from movement in a form of architectural space used to connect at least two functions together, e.g. a corridor. A junction type-space suggests an in-between changing movement in a decision-making space which is a form of architectural space used to introduce the change of architectural conception of space, either in movement or function, e.g. a doorway. A place-type space is thus movement that can be seen as static compared to the former two types suggesting an occupying type of movement in a function-setting space in a form of architectural space used to signify a particular function, e.g. a room. These three types do

not approach intelligibility in relation to the presence of every space in a building rather they approach it in relation to the sequence and presence of every involving space as people use and move in architecture. Any space can become a passage, a junction or a place in the sense that they are developed and established as consequences of actual activities that occur in space. These experiences are expressed through patterns of movement with or without architectural elements, in this way, convex spaces can sometimes be defined by social activities (Savanjala, 2010).

2.6 THE FUNCTIONAL DIMENSION OF ARCHITECTURAL SPACE

A man-made object is known practically by its function. Function in its traditional meaning means utility which architects normally assign to space in different parts of a building. The research discusses function using its traditional meaning while considering socio-cultural aspects of the society in which a building is used as the instrument to understand the deeper meanings behind various utilities. The idea of function is one of the basic aspects of architecture since every architect must ask how the space will be used before proceeding to the design process. In this research, the idea of function in architecture is straightforward because its evidences come from real uses in active buildings. However, it is well worth looking at the background of the idea of function to establish our understanding of the simple ideas in architecture like circulation space entrance, toilet, dining, kitchen, bedroom etc (Mckeen et al., 2010).

Despite many definitions in different fields, functionalism is always related to the idea of structure and system. In philosophy and sociology, function implies the existence of some kinds of structure for it to take place. In architecture, functionalists may relate function to form as in the modern movement starting from Sullivan (2007) onwards. In this respect, functionalism is seen as post-symbolism for modern architecture. However, in traditional architecture functions seem to originate from and serve both everyday and symbolic activities. The utilisation of a system is at the heart of functionalism. The

research uses a structural approach in order to classify data from space while interpreting and formulating this data into a theoretical argument via a functional approach. Architectural space is always a functional substance because a structure exists for a purpose or function. This approach is especially true in this research through the on-site observations of the selected buildings in use. Without such a procedure, further understanding of the functional dimension of architectural space is almost impossible. It is what Abrahamson calls ‘real knowledge’ in structural theories that renders our conceptual understanding of space. Hillier’s ‘architectural possibility' also suggests this conceptual understanding in the design process (Mckeen et al., 2010).

In short, what function inculcates in space is the preliminary ground for our deeper understanding of space; for that is the way we know how to add socio-cultural meanings to our pure movement. Therefore, in comparison to the structural and experiential dimensions, the functional dimension is more straightforward and most of the time needs less explanation. One will understand it in terms of ‘real knowledge’ or ‘architectural possibility’.

There are five different categories of function that have been investigated in twentieth-century architectural criticism: structural articulation, physical, psychological, social and cultural-existential function (Ligo, 2003). These categories can be broadly divided into two paradigms: abstract and physical; that is, the idea is either seen from the subject/people's side or the object's side. The research attempts to make clear that in order to understand how architectural space works for our social needs one has to separate functions, how we use space, from their architectural elements. As we are approaching the twenty-first century this difference in function and its physical counterpart becomes even stronger than those in Ligo's discussion during the first eighty-years. Sullivan's notion that form follows function has been exhausted and criticised, even declared by some as a non-functionalism (Johnson & Abernathy, 2010). From the designers rather than users’ point

of view, function must be seen as being in a different dimension independent from that of architectural elements. This leads to the idea of self-reference in object, suggested by architects such as Kiesler, Kahn, and Eisenman.

Body movement is recognised together with, if not prior to, the concretion of function types where architects and users arrive at the meeting point in their conception of space in architectural reality. Kiesler (2012) does not suggest that form must follow function but that functions in architecture exist independently from what is holding them. People recognise functions together with forms; especially in buildings that have become institutional types. When one sees specific forms or elements of houses, for example step terraces or pitched roofs respectively, one automatically recognises the functions those buildings serve in the same way as how one learns to use the space of room. It is the reality of structure-experience and our body movement in various activities that form the functional dimension of architectural space.

2.7 THE ARCHITECTURAL-ELEMENT DIMENSION OF ARCHITECTURAL SPACE

This dimension is the final transformation of abstraction in ideas into things as well as the first step towards architectural space. It is argued here that apart from socio-cultural meanings, architectural elements carry with them their own logic by which space gains its artistic quality in parallel with its social quality. The research emphasises that there must be a clear-cut understanding of the dimension of architectural elements that is different from that of the functional and other dimensions. Firstly, the review will look at the architectural elements in their own terms. The sources are from multi-disciplinary fields, although with a similar quest for something more than a mere functional space or object (Liller & Hanson, 2008).

Secondly, this approach to architectural elements will be discussed in terms of its relation to other dimensions. The realisation of different architectural elements is not as straightforward as that of functions, at least for people who use buildings but do not design

them. Like function, experience and structure, architectural elements are concepts, but the dimension is different from others because it exists in both our knowledge and in objects. Therefore, the discussion of architectural elements involves the issues of design and real situations in actual buildings based on architects' rather than users' view. For example, doorways or gateways are not discussed because of how they function but what they are, and in what way simple items: room, kitchen, doorway, window etc., relate to one another. In other words, the discussion is about architectural elements as tools used in design strategies in order to achieve pure architectural effects in space. As always, no matter how independent they are as objects, these architectural elements are sensitive to other dimensions as they are sub-concept within a whole concept of relations.

Like space, the logic of architectural element used to create a piece of architecture is a configurationally one or the part-whole concept. To understand the whole, each and every architectural element must be understood that they are there to portray a configuration of a specific system which, like experience, is unique in each piece of architecture. In this way, we then return to the concept of the intelligibility of architecture and the idea of a self-referential sign which has been the main interest in Eisenman's (2004) works. As a counter post-modernism, Eisenman proposed the idea of a 'better' object which is able to speak for itself (Eisenman, 2004). In his 'Towards an understanding of form in architecture' essay (2004), Eisenman is concerned with the relation of the transitional parts and the establishment of the whole, to which end he used the word 'future pattern' as the means to indicate the intelligibility of form.

A specific form then is first considered as the attachment of symbolic function, but there again, if we consider its working function, a specific form could be imagined with a range of architectural elements that contribute to its conceptual whole. Self-reference/Self-existing is the interaction between 'message' and 'meaning'. The idea of becoming independent from messages that already mean something and acquire the immediate

meaning as would characterise the intelligibility of an architectural element in the sense that it becomes a ‘being’ and detaches itself from the functional dimension. In this research, a room is detached from what it serves and becomes one of the devices that is used, together with other elements, to achieve pure architectural effects. However, design strategies, are not expected to be independent but relational and sensitive to all independent dimensions of architectural space and may even have a fixed syntax for the effects they want.

It is usually not enough to only understand the structure in order to appreciate the rest of the meaning of something like architecture. For Eisenman, forms or architectural elements are for the purpose of indication not poetic content (Eisenman, 2004). The process of recognition and intelligibility deals with decidability and it may be said that this is one version of intuition. Architecture becomes more like a text in the sense that it can be understood through the system of self-referential signs in architectural elements. Then, the question is not about looking good or bad, colour or touch; an object and space are independent from their traditional properties. So, it is what is 'becoming' to one's understanding that is important; it is what Bergson calls a ‘virtual object’ (as cited in Savanjala, 2010).

What Eisenman proposes in his examples of a word like ‘c-a-t’ is that it could also be understood as a-c-t is about the negation of the preoccupied value of sign in architecture using language as the metaphor. He suggests that architecture should be as transparent to the value-laden elements as possible, like the text which is capable of transparent transformation, i.e. c-a-t or a-c-t then cattis (cat is + act is). It is through the idea of language that Eisenman (2004) conceived his idea and because it is the nature of language to be either opaque or transparent; this is very useful when thinking about architecture. To be free from the concept of the value-laden object, one needs to approach

architecture ‘as-is'’ and be open to what architectural elements have to offer to one's experience; that is, to appreciate object and space in their immanence.

Eisenman (2004) How about other combinations or structures; are they going to make sense of architecture? Are they going to be just mutated objects? As long as one proceeds with the practical framework of occupying space when working with structures, the answer to these questions is likely to be a positive one. However, this way of looking at each element of a system needs further analysis concerning how each element relates to each other. In language, each word contains purely abstract elements while in a piece of architecture each element has its own interiority and usually connects to others in specific ways in order to make the whole, and all of the elements involved occupiable (Kewin, 2006). These elements are independent from the constraints of other dimensions and exist in their own logic.

The role of architecture as an artistic object seems to work subtlety behind its functional aspects. Its configurational quality is still very much intertwined with design technique and strategy. Unlike the structural dimension, the architectural element dimension does not carry social information in its formation and thus often relates to people's movement more than activities. In this way, the logic of architectural elements has often been compared with music or dance for its rhythmic and ephemeral quality. Architectural elements themselves are sometimes compared with the body in order to express their ability to enhance or surpass traditional architectural functions (Kiesler, 2012).

The concept of instrumentality makes architectural elements exist independently from other dimensions. This is a new symbolism with different aims from that which relates architectural elements to something else. Instead architectural elements are related to the architectural performance of objects, which is different from the mechanical performance of objects. In this research, architectural elements are seen first in their most basic definitions like room, doorway, window etc. and second in their special definitions

that differentiate corridor from cloister or veranda from terrace for example. These terms represent architectural elements by their architectural performances, which can then be related to design strategies that grasp those elements by their sense of instrument.

In contemporary culture, people increasingly tend to see space, activity, function and architectural elements as separate identities. What people do and what architecture does become less and less attached to each other. Space and architecture can only start anew when we detach our understanding of function from what we think its container should look like or, when we have explored all our possibilities and lived it out. Either way, structures or architectural elements will resume their neutral states.

2.8 SPACE DETERMINANT

Architectural space is determined by human activity within a given space. Residential spaces with regard to this research constitute the following spaces: living room, dining, store, kitchen, bedrooms, garage/car porch and eternal landscape. All these spaces were designed to create comfort for human activities. The size of space created is base on human size, furniture size and allowable space for human movement. Below are the dimensions of furniture in relation to human body. This standard serves as guide for architects in designing spaces. Data which concerns the dimension of human beings is referred as Anthropometrics.

Architects must ensure that the products they designed are the right size for the user and therefore comfortable to use. Architects have information regarding sizes and space required through books like Architects Data, which documents data regarding sizes and human movement and activities. Figures 3-12 are few examples of such data that aid the architects in determining space requirement for any given design (Neufert, 2012).

Architects' determination of space, when someone is standing or sitting was presented in Figure 3. The height of the person standing will help in determining the room

height of a building. Also when someone is in a sitting, the space occupied can easily be determined

Also, in Figure 4, the dimension of a person standing and sitting in millimeters. Space requirement between walls, space requirement for groups, steps measurement showing marching and strolling with dimensions was presented in Figure 5. Also space requirement for various body postures, space requirement with luggage and space requirements with sticks and umbrellas can be seen in this Figure.

Space requirement for various postures such as squatting, lying and stretching hands, kneeling and sitting and writing was presented in Figures 6 – 8.

Figure 9 is on how different human activities translate into architectural design of a space. The Figure shows how a typical kitchen space can be generated using anthropometrics. This figure shows the floor plan and the interior perspective of the kitchen.

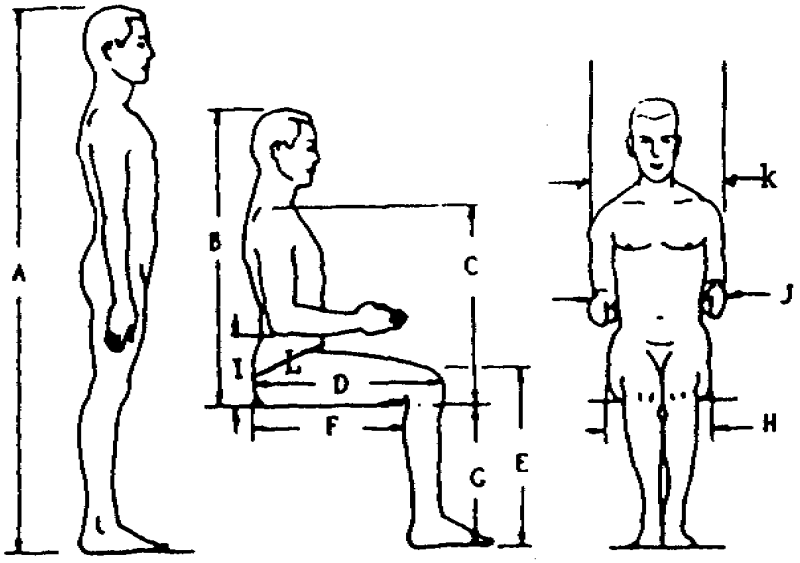


Figure 3: Space Occupied by Human Being in Standing and Sitting Positions.
Source: Neufert (2012)

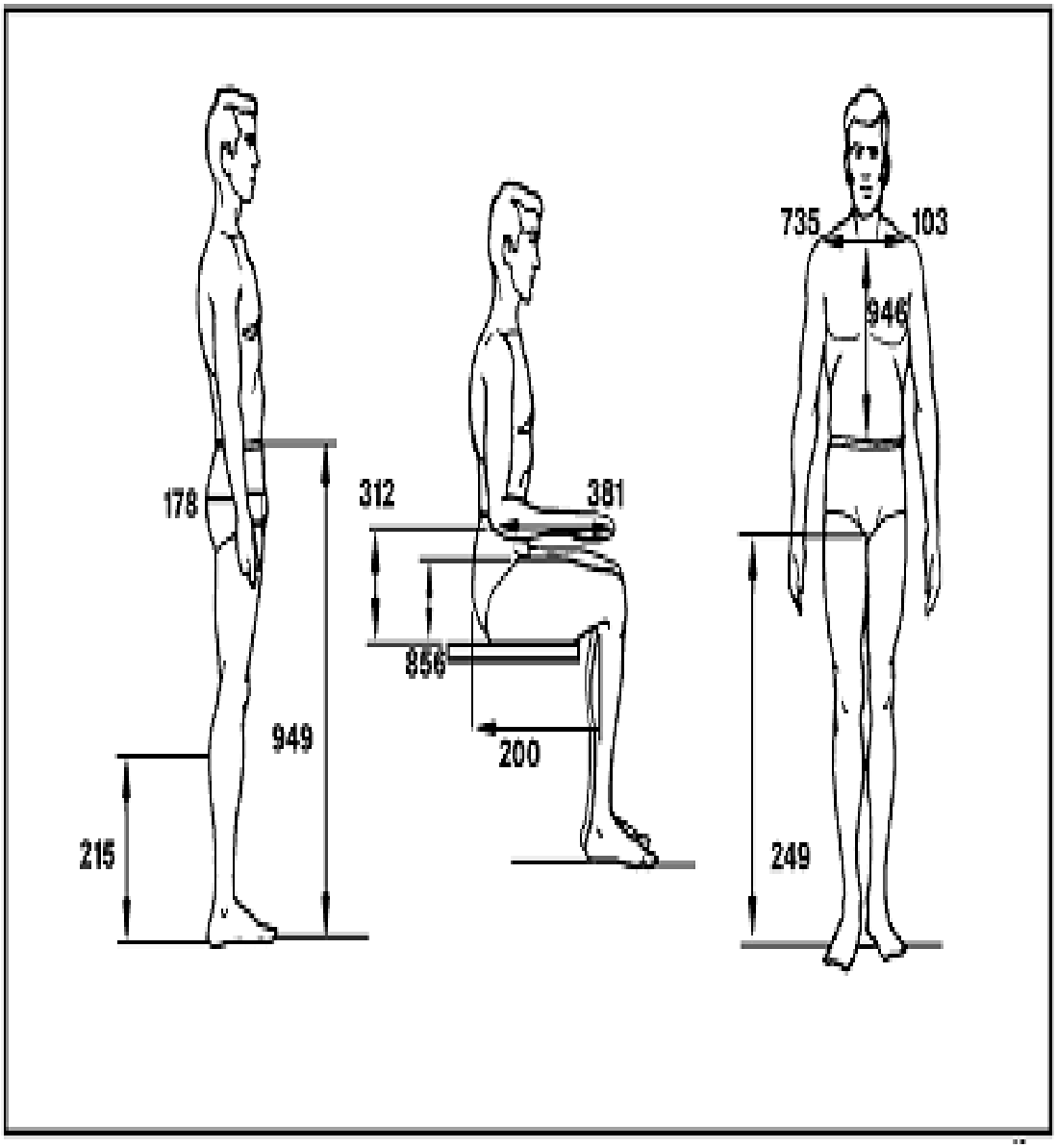


Figure 4: Space Dimension for Standing and Sitting Position.
Source: Neufert (2012)

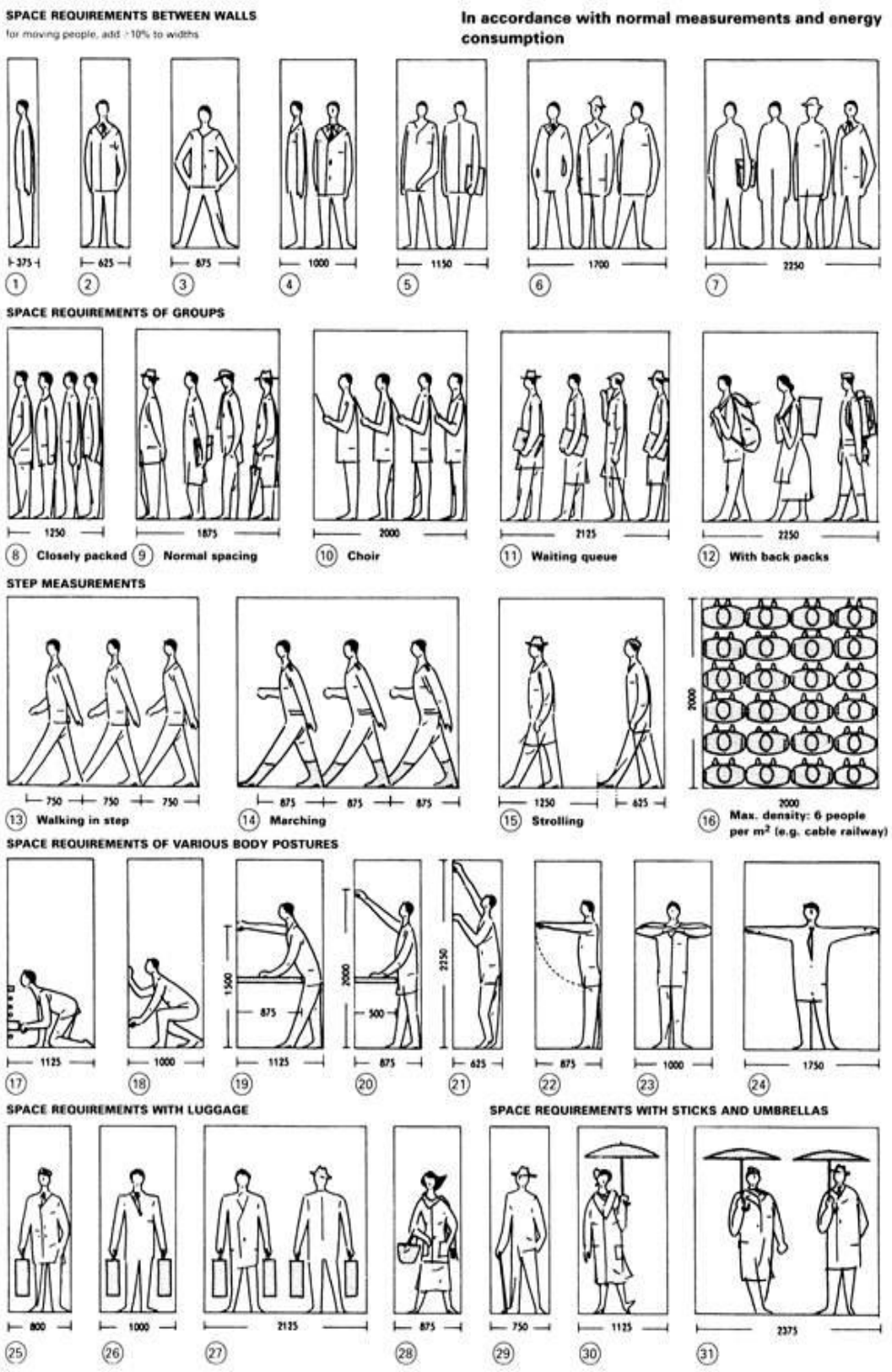


Figure 5: Space Requirement with Dimensions for Different Activities
Source: Neufert (2012)

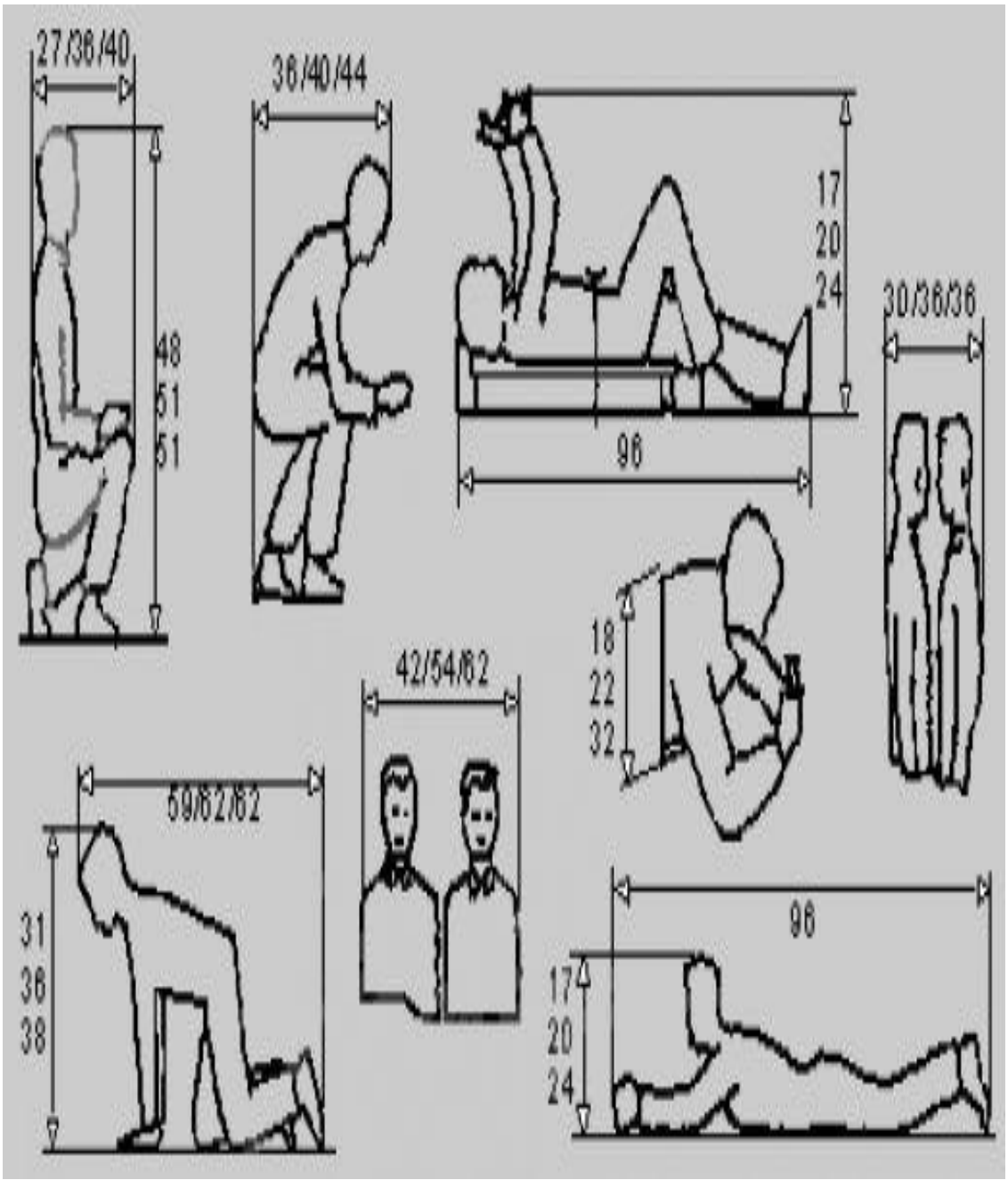


Figure 6: Space Requirement with Dimension for Different Human Postures.
Source: Neufert (2012)

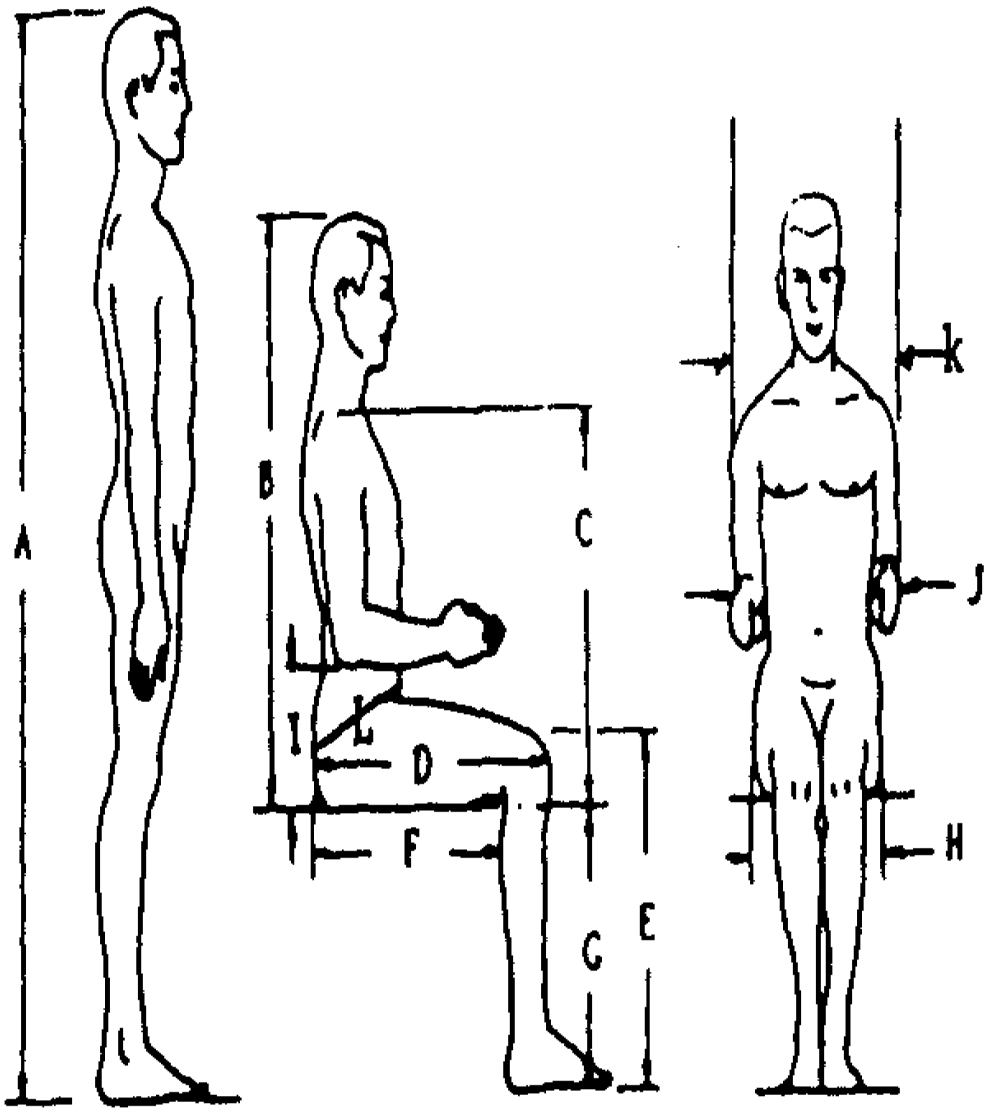


Figure 7: Anthropometrics of Human Posture
Source: Neufert (2012)

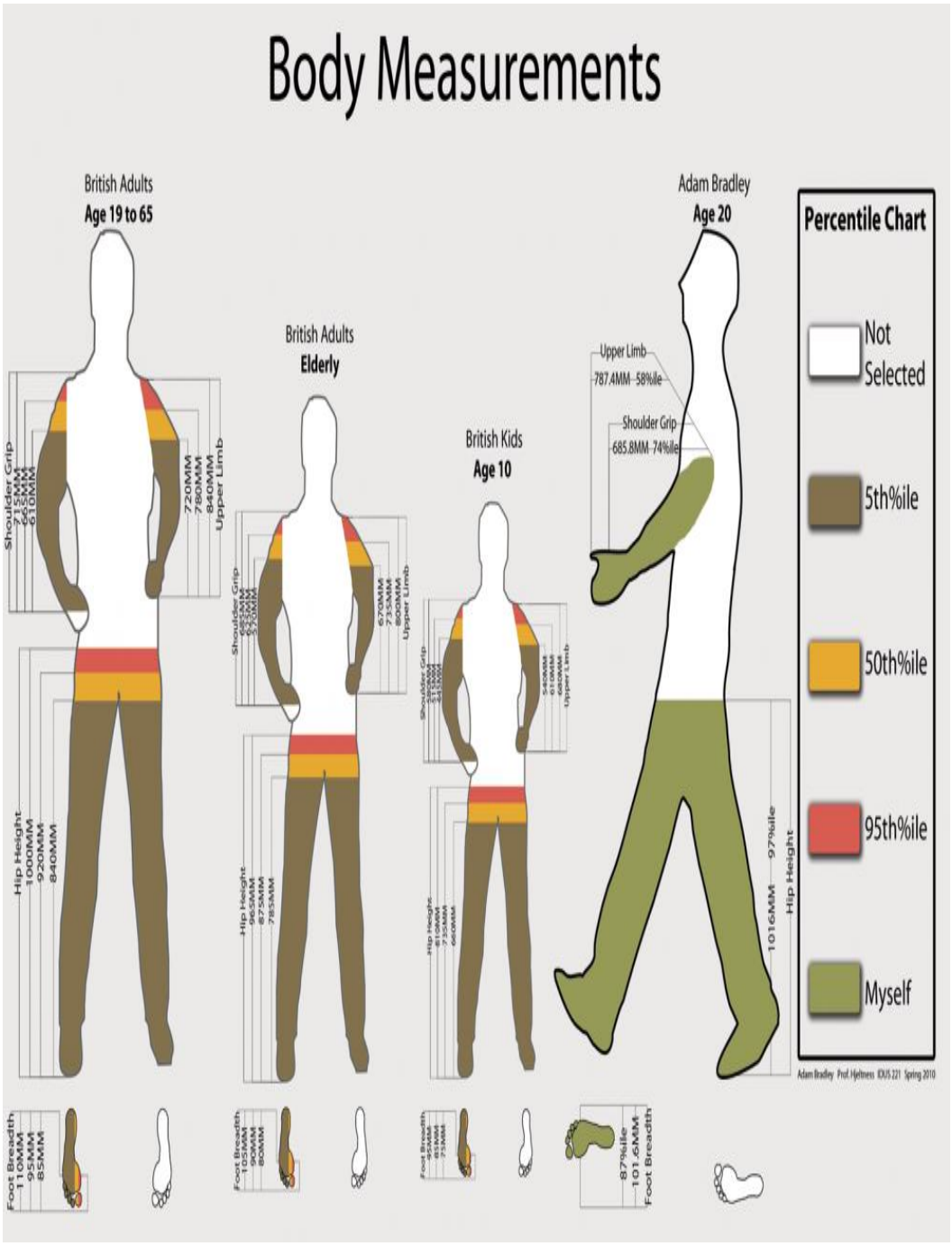
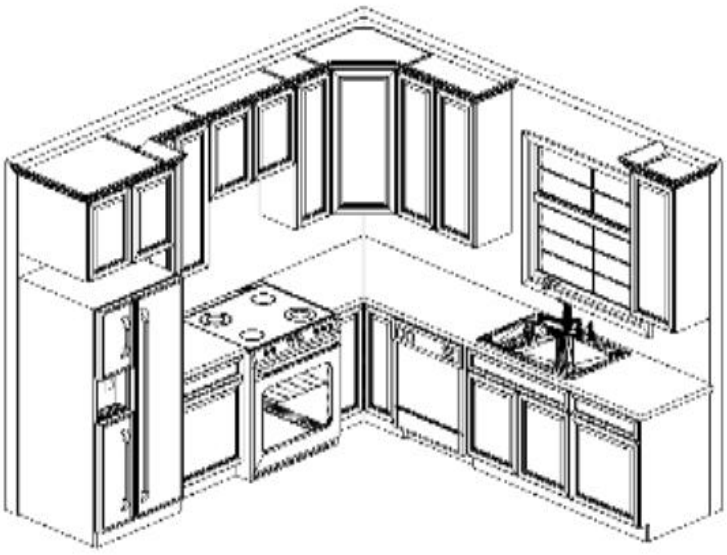


Figure 8: Human Posture and Body Measurement
Source: Neufert (2012)



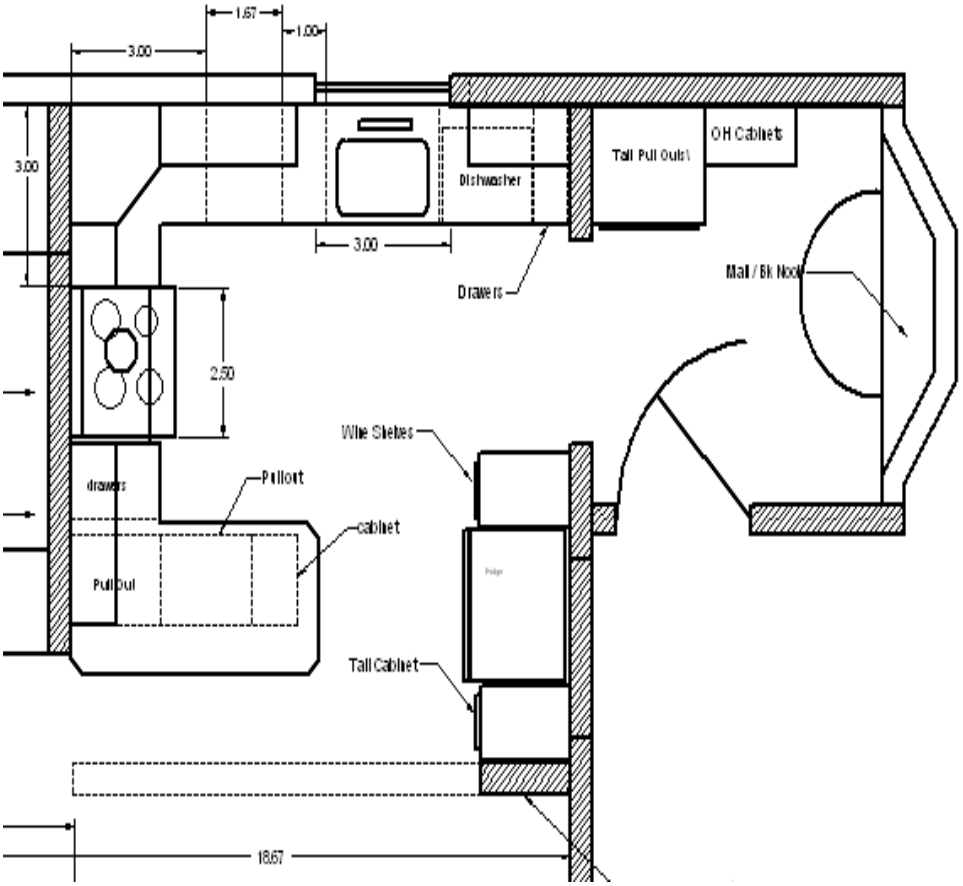


Figure 9: Floor Plan and Interior Perspective of a Kitchen Using Anthropometrics. Source: Neufert (2012)

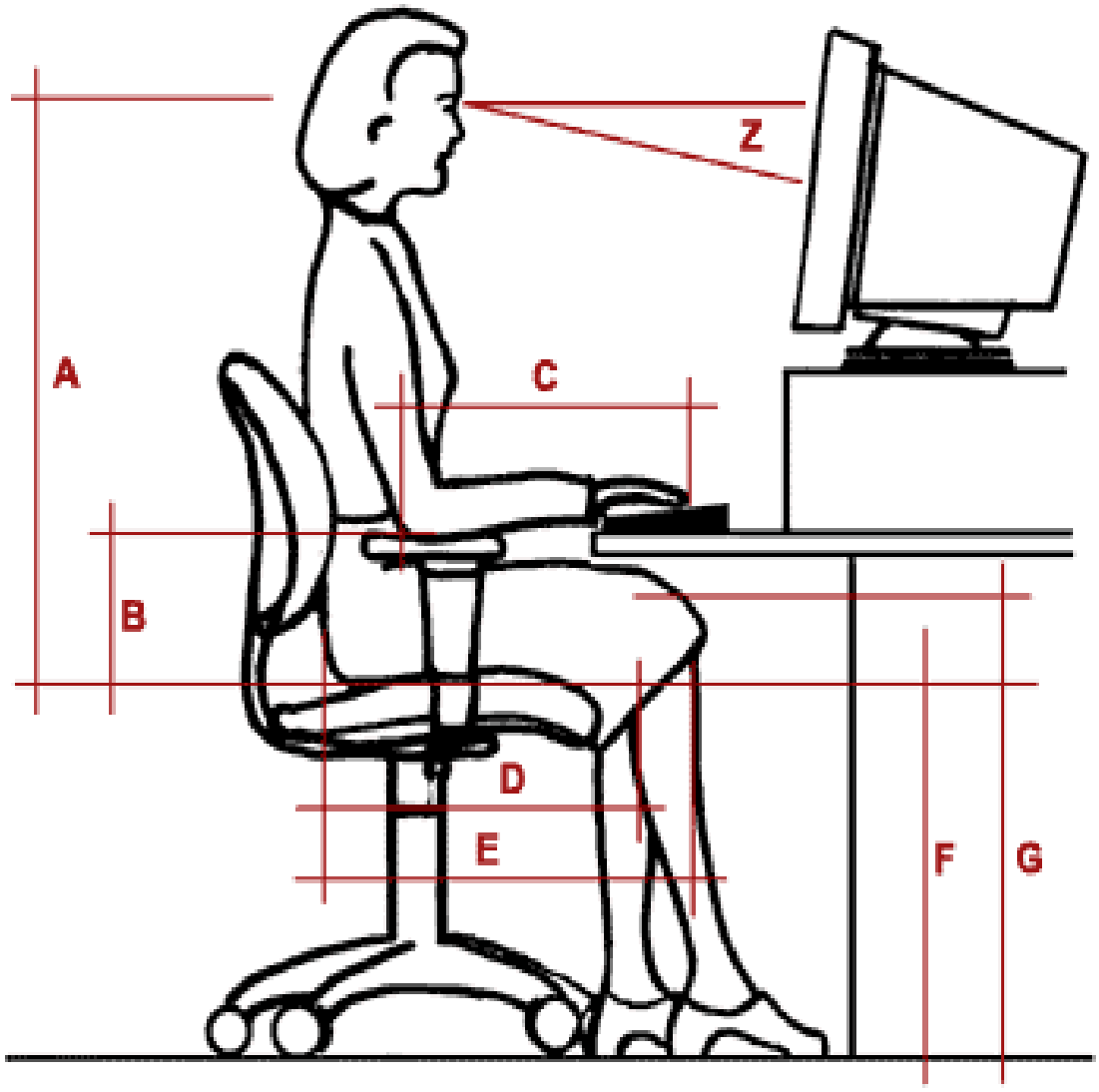


Figure 10: Anthropometrics of a Lady Working on a Desk Top Computer.
Source: Neufert (2012)

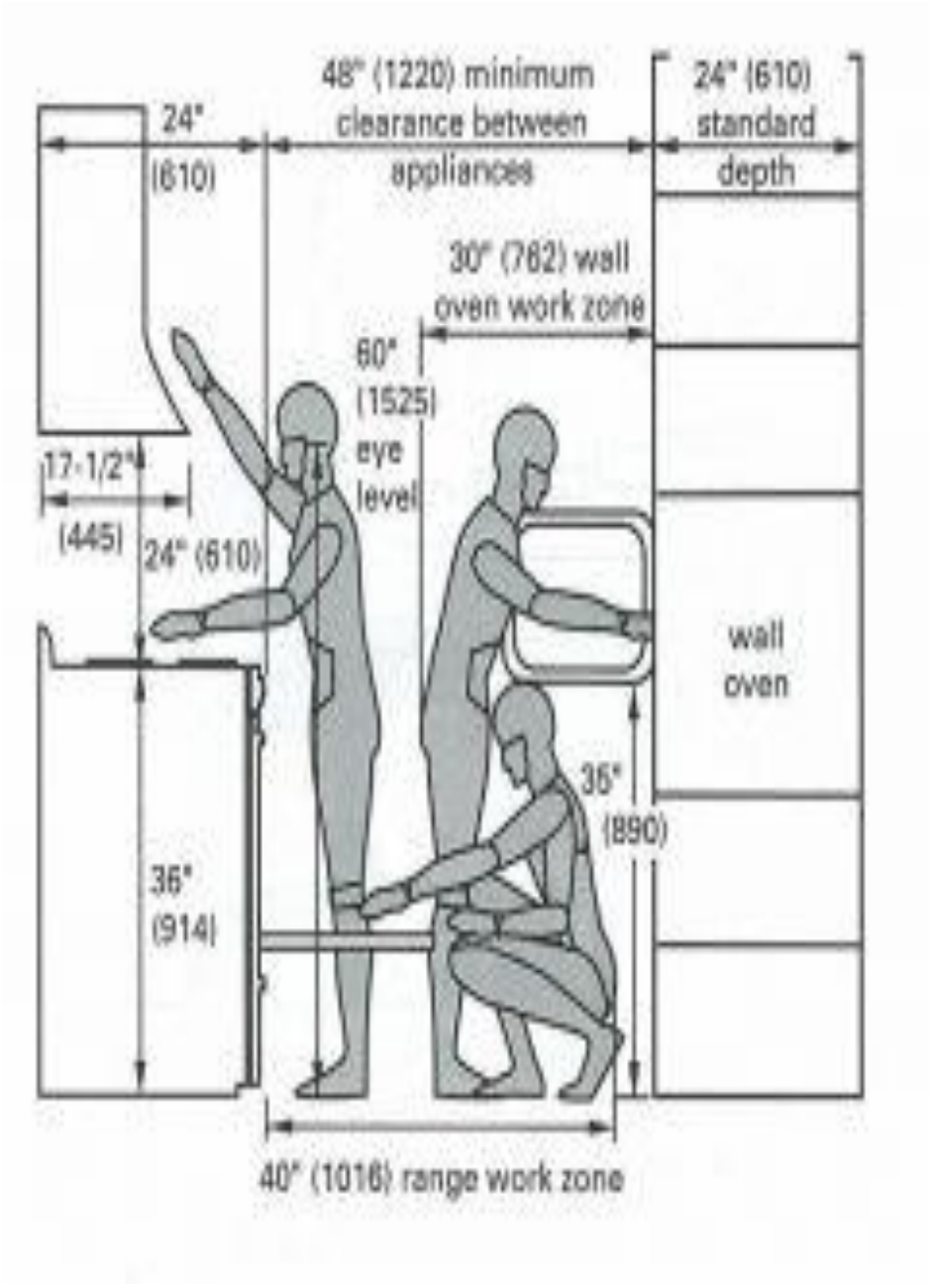


Figure 11: Anthropometrics of Human Activities in a Design Space
Source: Neufert (2012)

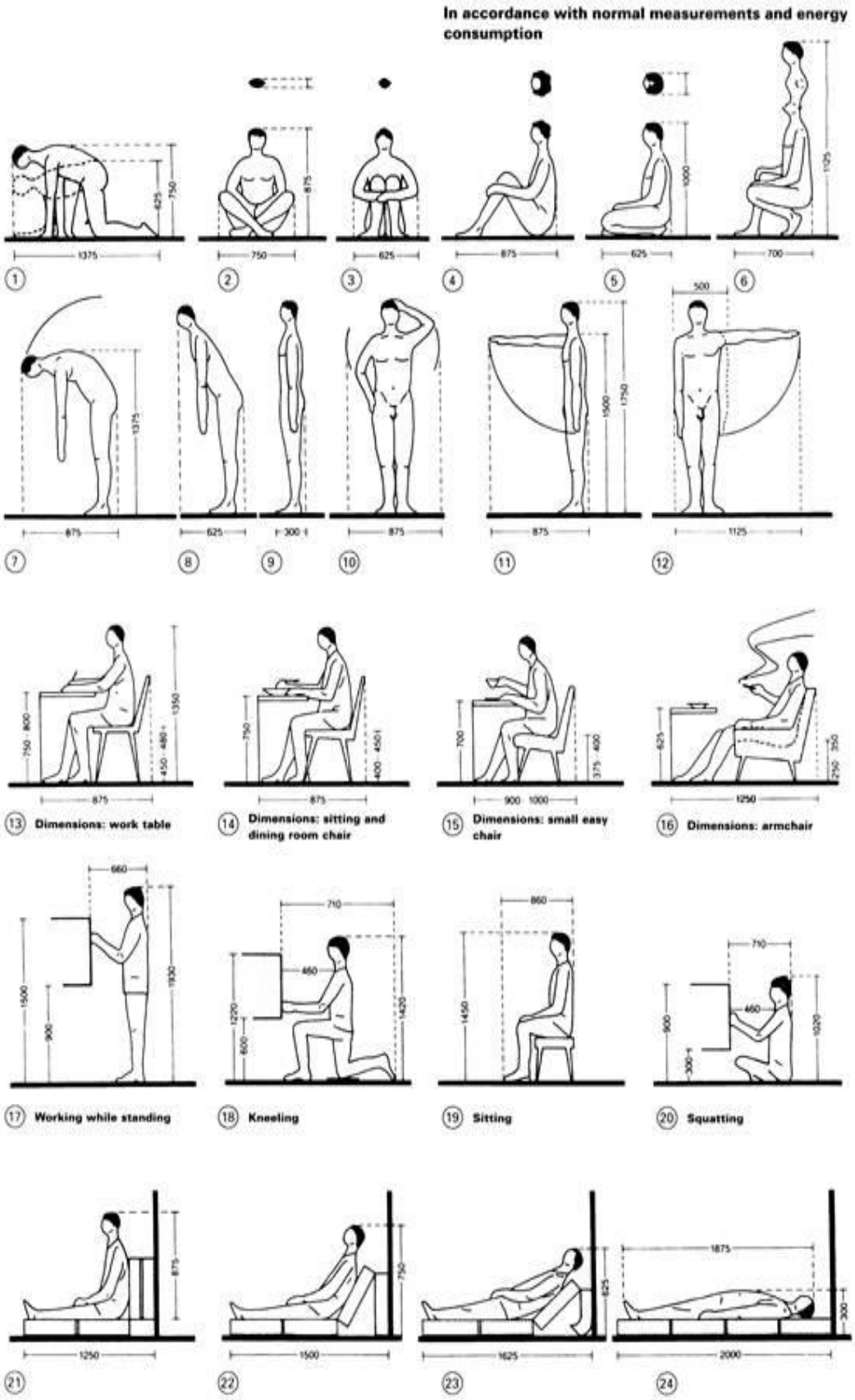


Figure 12: Space Requirement for Different Activities that Aids the Designer.
Source: Neufert (2012)

2.9 ARCHITECTURE SYNTHESIS OF FORM, FUNCTION AND TECHNOLOGY

According to Preiser and Vischer as cited in Nwankwo (2013), Architecture is often thought of as a synthesis of form, function and technology subject to specified conditions such as time, money and regulations. They opined that the tripartite quality of architecture goes back more than 2000 years to the time when Vitruvius distinguished three components of architecture: *utilitas* (functionality or the utility value: the social dimension), firmitas (strength and rigidity: the technological dimension) and Venustas (beauty: the artistic or aesthetic dimension). There seems therefore to be a permanent consensus on the importance of functional quality in architectonic design. From this view the researcher agrees and wants to show how the concept of functional quality can be made measurable and expressed in concrete terms with particular reference to the design of residential buildings that gave rise to various low-cost houses in Plateau state. Preiser, 1998; Benes and Vrijing, 1990 as cited by Nwankwo (2013), suggested a more detailed item to be included in post- occupancy evaluation of buildings which include:

a. FUNCTIONALITY
    i. Accessibility
    ii. Efficiency
    iii. Safety
    iv. Spatial orientation
    v. Territoriality, privacy and social contact
    vi. Physical well- being (lighting, noise, heating, draughts, humidity)

b. AESTHETIC
    i. Visual quality
    ii. Order and complexity
    iii. Representational quality
    iv. Symbolic and semiotic value
    v. Visual as cultural history

c. TECHNICAL/CONSTRUCTIONAL
    i. Strength and stability

ii. Fire safety
iii. Constructional safety
iv. Building physics
v. Environmental friendliness
vi. Sustainability

Voort and Vrielink as cited by Nwankwo (2013) established the functional quality of a building to include the following sub qualities:

a. Functional quality or utility value: this has to do with the usability of the building in practice, the extent to which the building is suitable for activities that have to take place inside it.
b. Aesthetic quality: the extent to which the building is perceived as beautiful, stimulating or original; the way it is experienced, whether as pleasant, cozy, spacious, homely or simple commercial; the extent to which it is seen as a piece of culture, e. g. whether it is representative of a particular style or period of building, and the extent to which the building evokes different meanings.
c. Structural/Technical quality: the extent to which the foundation, the load bearing structure, the shell, the infill kit, and the technical services satisfy technical requirements relating such matters as strength, rigidity, stability, sustainability and limited need for maintenance. An important component of physical quality, the extent to which building is capable of achieving an attractive, safe and healthy interior climate, measured in terms of a temperature, humidity illumination, natural lighting and acoustic in an environmentally friendly and energy saving way.
d. Economical quality: the extent to which financial resources are applied effectively and efficiently, i.e. the price-performance ratio.

This review moves on to give a bird- eye view of school of thoughts in the history and practice of architecture. The main question is how different architectural school of thoughts deal with the relationship between function, aesthetic/form and structure? At

what stage does the consumer be part of the building process, programming, design or after completion? How does a designer arrive at his choice of form? What are the factors that influence the special image, size, scale and rhythm of building mass, the spatial arrangement, the choice of colour and materials? What are the basic design factors that needed to be considered at the programming and design stage? To what extent does form follow from the requirements imposed on the intended use? Many answers have been given to these questions over the course of time; some are based on theoretical considerations over the course of time; some are based on theoretical considerations while others on personal attitudes and influenced by the spirit of the age. The study reviews a number of ideas about relationship between function and aesthetic/form, with reference to different movements in architecture.

From all the school of thoughts in architectural history reviewed, it is possible to distinguish three main lines of thought:

2.9.1 Form Creation by Functional and Constructional Efficiency

This view includes well-known “form follows function” –with the variant “form follows behavior” – and “form follows construction”. According to the first of these principles, a design must be based primarily on utility value and the wants and needs of the consumers. The motto, ‘form and function are identical’, goes one step further. Here the underlying thought is that functionality automatically leads to beauty. According to the second principle, ‘form follows construction’, form follows the construction and the materials.

2.9.2 Form follows Context

This view holds that form is mainly determined by context. Factors that exert a significant influence include the sites architectonic and urban design characteristics, geographical situation, socio-cultural context, historical context, legal context and

economic context. The importance of this last factor is expressed in the motto 'form follows economics'.

2.9.3 Form Autonomy

According to this approach, form is not primarily derived from user's needs and aspirations or construction but rather from principles of form, possibly geometrical, and the perceptual experiences that such principles evoke. Mottos are 'form follows meaning', form follows meaning' or 'form follows fun' in which 'fun' refers both to the pleasure experienced by the designer and pleasure that the user gets from the building. Yet another motto is 'form proceeds function (Handler, 2007) reflecting the rejection of purely functional approach.

2.10 URBAN RESIDENTIAL SPACE

In creating urban form, the urban designer is helping to decide how the space of the urban environment will be used. At the most general level the urban designer is helping to decide where the solid walls of buildings will go, and in so doing choosing what will be the outside and what will be the inside environment (Riddulph, 2007).

2.10.1 Types of Urban Space

According to Chowdhurry (2012), urban space is not merely distinguishable as either outdoor or indoor. Instead, from an urban design perspective, it is better to distinguish between four types of outdoor space which reflect who will have access to the space and how it will be perceived and used.

i. **Public space:** Public space refers to urban space which is easily accessible to the general public at any time of day or night (Afag et al., 2011). Streets are an obvious type of public space which people can physically enter and exit. There is a degree of management or control of what you can do within street space which is influenced by laws and cultures, whilst the physical design shapes quite clearly if it lends itself to, for example, playing sports, walking, running, cycling or driving. Despite tremendous

variation in what you might do in public space, however, physical access is maintained.

ii. **Semi-public space:** Compared to public space, semi-public space is a type of space in which some greater degree of control is exerted over when access is allowed. These tend to be spaces which allow general public access. However, due to a far stronger management regime, they might, for example, be closed for certain hours. In addition, management may also influence who can use the space (Ching, 2003).

Let's use the example of an urban square with a small park in the middle of it. If that park is always open to the public then it would be regarded as a public space. If, however, a boundary was erected, and the park was closed at night, then it would be a semi-public space. The benefit of making it a semi-public space may be that access to the public is safer, or that a slightly more sensitive environment can be protected from vandalism or other types of misuse.

i. **Semi-private space:** A semi-private space is a piece of the urban environment that tends to be private and which a member of the general public will only enter if they have a reason to (Riddulph, 2007). This might be a small space that is distinguished from the paved public street by only a change of surface (a gravel path and grass lawn, for example), but still we tend to be socially conditioned to only enter that space if we are visiting the property. Another type of semi-private space might be a communal garden area for use only by specific residents. If the park, referred to in the discussion on semi-public space above, is only available to certain residents living around the square, then it would, despite its identical design, be semi-private. Sometimes, however, semi-private spaces are also included behind houses for residents living in an urban block to share.

ii. **Private space:** The final space is exclusively for the use of the residents of a property. Outdoor private spaces form gardens, although sometimes roof gardens or balconies

serve an identical purpose. Such spaces allow private residents complete control and a higher degree of both security and privacy, so that they can use the space for what they wish; for example, gardening, storing rubbish, sunbathing, playing or fixing the bike (Canter & Rees, 2009).

A residential area is made up of these types of space, and differently designed urban forms will result in different patterns and relationships emerging between these types of space. Public spaces tend to form a network which provides a pattern of access for residents (Sati, 2014). Sometimes semi-public spaces may be introduced, typically as open spaces or play areas, into the pattern of public spaces. Semi-private areas tend to be located between the public spaces and people's homes so that a zone of control is introduced between a public street and a private property. However, semi-private spaces can also form shared private gardens, and these may be included in a scheme between private gardens. Finally, private gardens, where they exist tend to be accessible from the home, but, as a matter of principle, they should not abut a public space.

2.10.2 Interfaces in Residential Spaces

According to Dekker et al., (2011), the boundaries between the different types of space are sometimes referred to as interfaces. For example, the front wall between a front garden and a public space of the street can be referred to as the interface between semi-private and public space, just as the front wall of the house can be described as the interface between the private interior of the home and the semi-private front garden. Such interfaces are important as they can be designed in a particular way to achieve a particular urban design effect. Housing schemes that have semi-private front gardens but no wall at the interface with the public street space may, for example, result in quite a different street character to a situation where high front walls or even hedges have been introduced.

2.10.3 Fronts and Backs of Residential Spaces

A common concept in residential urban design is that homes have both a front and a back interface; that the public front of the homes should face the street and the private backs of the homes should face the private spaces (Riddulph, 2007). Why this is so can be argued from the perspectives of either achieving outdoor privacy and security around the back or creating a focus for public life within the public realm around the front.

i. Around the Back: Achieving Outdoor Privacy and Security

The idea that homes should have a backspace stems from the observation that privacy is a very important feature of the domestic realm and that people can enjoy privacy both inside and outside the home. The private garden is a direct result of this, although the balcony or the semi-private shared gardens are good surrogates. If private gardens are to be built into a scheme, then it makes sense to group them together. This is so that the privacy of the homes is shared, and the gardens are secure (Opoko, 2008).

ii. Around the Front a Focus for Public Life within the Public Realm

The public realm of a residential area refers to the space that forms between the buildings which, although containing semi-public or semi-private spaces, will tend to be dominated by the comings and goings of the public street network (Riddulph, 2007). Despite the subtle variations inexperience and expectation that such semi-public or semi-private spaces might allow, there is an expectation that public life will ensue. Within certain quieter parts of a residential area this may be dominated by the chance of meeting neighbours, children playing or pedestrians and vehicles passing through. In other areas, the public environment will be busier, possibly with a few shops or community uses supplementing the busier comings and goings of residents. Despite this variation in the intensity of activity, the qualities of this public environment need to be carefully looked after if it is to feel safe and be convenient (Riddulph, 2007).

One of the ways this sense of safety and convenience can be achieved is by ensuring that the front doors and windows of homes overlook the street. This allows public activity to focus on the public realm, as people come and go from their home through front doors that face the streets, whilst the windows allow overlooking or surveillance of the public realm.

2.11 HOUSING DESIGN FEATURES AND STANDARDS

In the development of housing designs, it is important to understand the housing needs of the target market (Chambliss, 2007; Wentling, 2011). Household composition such as economic status, household size, and age of occupants are important components to consider when designing residential space plans. Design features should be flexible (use of space, furniture arrangement) and reflect the needs of both private and shared activities. Chambliss (2007) stresses that in addition to designing spaces which reflect the specific needs of users based upon needs assessments, there are other factors to consider. For example, it is important to choose: low maintenance materials and finishes; energy efficient materials and products; designs that allow for a variety of furniture arrangement, and to incorporate both private and communal areas within a unit. He stresses that better-designed housing increases the chances of residential comfort and satisfaction of the users.

Chambliss (2007) discusses the merits of good design when planning an affordable housing project. He emphasizes that attention to quality can produce lower turnover rate, higher occupancy and provide a better return to the owners and their financial partners. Developers, financial investors and ultimately the users of affordable housing can benefit from quality design. Previous research has established that certain design features, such as adequate storage, room size, number of bedrooms, size of dwelling, and quantity of amenities (dishwasher, washer and dryer) influence occupants' housing satisfaction. Friedman and Pantelopoulos (2012) investigated the spatial needs of twenty-five Montreal

households who owned wartime homes. Their investigation included interviews and field studies that pertain to space management and changes to the layout of the original plans.

The analysis was divided into the following spatial areas: kitchen, bedrooms, living room, bathroom, storage, and windows and stairs. Two findings are noteworthy. First, homeowners were willing to sacrifice living in a smaller house when they realized the potential for the layout to be modified when the homeowner's financial situation improved. Second, first-time homeowners were more likely to accept a smaller house because they anticipated that this would not be the only house that they owned (Andraanse, 2007).

According to Jinadu (2004), Design consideration is important in housing delivery process. A building structure must be well-designed to perform its functions and provide comfort for its users. Thus, design consideration is part of the requirements for adequate housing provision, and its design must be tailored towards achieving a good home. Such a good home must be designed with proper consideration of functionality and future requirements of the prospective users.

Agbola (2008) stated that housing design determines the success or failure of any housing project. He outlined the three basic design considerations to include: - cost; functionality and standards. The cost of executing the project is an important consideration in housing design. This is important because different designs have different cost implications, and the general design cost adds to the overall cost of housing production. There are two dimensions of functional requirement in design making. The first is in terms of structural functionality and the second is in terms of user satisfaction.

Design standards requirements are an important consideration in housing design. Housing standards according to Shlay (2013) are meant for materials specification and their composition, building design, building use, etc. the ultimate objective of housing standard is to promote or improve the health and safety of occupants. A design that fulfils the user' needs should contain the basic elements of a functional home.

Jinadu (2004), defined standards as established specifications that are used in development control. They are generally accepted estimates that serve as guidelines or criteria in the planning process. Standards are the means by which authorities control construction activities for the purpose of ensuring safety and health in built environment. They are often expressed in quantitative terms. These are the minimum and maximum standards, which express the lower and upper limits acceptable.

Housing Standards are mainly for the regulation of building construction e.g. the types of material used and their composition, and the use to which a building is put amongst others (Sadalla & Oxley, 2008). Generally, the goal of settlement planning is to achieve human comfort. The ultimate objectives of housing standards are to ensure stipulated quality construction of products and to improve the health and safety of the inhabitants of the houses. It is also to ensure sound and safe building construction ethics in Nigeria. The overall goal of standards is summed up by Shlay (2013) who observed that standards must seek to determine the extent to which shelter provides for man's biological needs, such as clear air, water and food; his psychological needs, such as satisfaction, contentment, privacy, choice, freedom and security for life and property; and also for his social needs such as interaction with others, human development and cultural activities.

According to the United Nations, effective standards have four main characteristics:-

i. They are normative propositions, i.e. they imply and express what is desirable rather than what exists.

ii. They are feasible; i.e. the required performance can be expected from those for whom the standards are made.

iii. They contain the promise and prediction of a sanction, e.g. penalty for non-compliance and reward for compliance.

iv. They originate from recognized authorities that are capable of enforcing them.

2.11.1 Types of Standards

Housing standards could be categorized based on their sources and functions or the issues they address. On the basis of origin, Mabogunje et al., (2003) has identified both official and cultural standards in developing countries. The official standards are codified operational rules and regulations meant to regulate and control the type and character of development activities. These sets of standards have some elements of law, and they carry sanctions from non-compliance. The cultural standards, on the other hand, refer to the traditionally implicit ways of controlling development activities. These sets of standards are normally not clearly defined or established but they are known and acceptable ways of doing things, which has guided generations of people within the same cultural entity for several decades back.

On the basis of functions, there are three broad categories of planning standards (Jinadu, 2004). These include:-

i. Specification Standards
ii. Performance Standards
iii. Threshold and Range Standards.

2.11.2 Specification Standards

Specification standards are space standards mostly expressed in quantitative terms and are used to define the minimum and the maximum limit of the form and function of various land uses. These set of standards may be expressed in minimum lot sizes, number of buildings per unit area, building bulk per unit area, number of buildings/person per unit area (density) as well as number of persons per room (occupancy ratio) in Tables 2, 3, 4 and 5.

Table 2: Standards for Block length and Plot Dimension in Layouts

Land use type	Block length(m)		Plot Dimension and area	
	Minimum	Maximum	Min.Dim(m)	Area (m^2)
Residential	120	320	12x30	360
Commercial	75	150	12x25	300
Industrial	200	600	30x60	1800

Source: Adopted from Jinadu (2004)

Table 3: Density Standards for Residential Development

Density class	No. of Persons per Net		Occupancy Rate	No. of Habitable Rooms per Net	
	Hectare	Acre		Hectare	Acre
Residential	1-75	1-30	1.0	1.0-75.0	1.0-30.0
Medium	76-200	31-80	1.5	50.7-133.3	20.7-53.3
High	201-375	81-150	1.75	114.9-214.3	46.3-85.7
Special high	376-600	151-250	2.0	188.0-300.0	75.5-125.0

Source: Jinadu (2004)

Performance Standards according to Jinadu (2004) are standards expressing the acceptable level of use or activity at a given time and place in reference to a given set of cultural, environmental, economical and technical conditions. They define the acceptable quality of the environment in terms of quality of construction/buildings, types of construction material to be used and the tolerable level of toxicity amongst others. Building codes and bylaws, water, fire and noise regulation are examples of performance standards.

Threshold and Range standards are standards applied to facility provision and they define the lower and upper limits of population size, minimum area or area to be serviced by community facilities. The range standard specifies the minimum while the threshold standard specifies the maximum service areas. They are expressed as per capita water supply, number of hospitals, schools, etc. per population and maximum distances to basic community services among others (Kinsey & Lane, 2010).

Table 4: Planning and Design Standards for Residential Development in Abuja, Nigeria

Building components	Required Construction Standards
Building Height	Height of residential buildings may not exceed two floors in low-density areas, 3 floors in medium density areas and 4 floors in high-density areas The maximum height of hedges, fence or wall around plots shall not be more than 1.5m in front and 2m at the back.
Ventilation	All buildings shall have adequate through and cross ventilation. All rooms shall have at least one window opening into the external, and the area of such window(s) shall not be less than one-tenth of the floor area. If windows and doors are not place opposite themselves in a room, there shall be provided on the wall a ventilator. Verandah/passage windows must be free of obstructions; louvers and centre pivoted windows are recommended, except where specified.
External Doors	All external doors to be solid or glazed metal doors and in case of flush doors to be solid cored with waterproof finishes and provided weather bar with throatings. Width of doors not less than 900mm, height not less than 2100mm
Roofing members and materials	All steel members must comply with structural steelwork engineer's specifications. All timber roof members must be approved sawn timbers and painted with anti termite paints. The roof sheets must be of approved standards e.g. aluminum metal sheet, copper, zinc, etc.
Electrical installation (surface/conduit)	All surface wiring must align with wall corners and ceiling corners and can only be on the wall surface only at the point of switches and sockets outlets. All conduit wiring must be laid to have at least 25mm cement cover. Approved quality materials must be used.
Water supply main and materials	Where there are no water supplies, water tanks must be provided at a height to flow on to the houses. Where public water supply exist main supply pipes from the houses must be connected to the main.
Fencing and material	All fencing materials must be in metal, concrete materials and block walls. Heights must be less than 2000mm from the ground floor level to the top fencing. Gate of minimum of 1000mm and must be provided at the main entrance and between fence walls. Height of gates must not be less than 2100mm.

Source: Culled from Development Control Standards and Regulations FCDA, Abuja (2011)

Table 5: Recommended Site and Access Standards for Neighbourhood Facilities and Services

Facilities	Population to be served	Maximum service radius (m)	Site area required (hectares)
Nursery school	1,500	400	0.8-1.8
Primary school	3,500	400-800	1.6-3.2
Neighbourhood centre or market	3,000-20,000	800	0.8-1.6
Shopping centre or market	NA	800	1.6-4.0
Retail shop	NA	100-150	0.05-0.1
District playing ground	25,000	400-800	1.6-2-4
Neighbourhood park	25,000	400-800	0.8-2.4
Children playing ground	2,000	100-150	0.2-0.5
Dispensary	5,000	100-150	0.1-0.2
Health Centre	20,000	800	0.4-0.6
Places of Worship	3,000	800	0.3-0.4
Post Office	10,000	800	0.1-0.2
Police Station	10,000	800	0.2-0.4
Petrol Station	15,000	800	0.3-0.4

NA= Figure not available

Source: Jinadu (2004)

2.12 DEFINITION OF HOUSING AND HOUSING TYPES

Housing is generally referred to as a shelter or lodging for human habitation. It is a structure designed as an abode for one or more persons or a building that provides a home for one or more families (Deasy, 2012). According to Jinadu (2004), a house is a physical structure which human beings use for shelter. The term housing has been viewed as an important component of human settlement, which renders tremendous service to humanity.

Among others, housing is viewed as a bundle of services or a basket of goods which includes physical structure itself, the ancillary facilities and services within and around it, as well as the general environmental qualities and amenities that surround the building. This view of housing as a composite whole is reflected by Bourne (2008) who defines housing as a packaged bundle of services. According to Agbola and Alabi (2000), this view of Bourne (ibid) recognizes that occupancy of housing involves the consumption of neighbourhood services (e.g. parks and schools), a location (e.g. accessibility of job and amenities) and the proximity of certain types of neighbours (a social environment).

From all these definitions, housing is portrayed as important and indispensable element of human settlement. Housing is therefore seen as a basic human need as well as a social requirement. It comes next to food and clothing. It is a product that must be provided for all to ensure good life and security.

According to Jinadu (2004), Housing types based on location or settings are: Rural housing and Urban Housing. On the other side housing based on the ownership structure are:

i. private housing
ii. public housing
iii. cooperative housing
iv. community housing
v. Condominiums housing.

He further defines private housing as houses owned and managed by private individuals in the society. While public houses are houses constructed and owned by the public outfits such as the government and its agencies e.g. government residential quarters located in towns and cities and government low-cost housing. Cooperative housing on the other side are houses owned and managed by cooperatives societies. They are the product of private cooperative efforts. Community housing are houses owned by the community. Examples of such houses include community town halls and guest inns. Such housing may be constructed through community effort or built by Community Based Organizations (CBOs) such as town unions (Jinadu, 2004).

The type of housing adapted for this research work is the low-cost buildings located in Plateau State.

2.13 HISTORICAL BACKGROUND OF LOW-COST HOUSING SCHEME IN NIGERIA

The idea of low-cost housing according to Uji (2007) stemmed from the people's inability to pay for housing, and that, governments would solve the problem by building and subsidizing the necessary housing units. He further stated that this policy was based on the belief that quantitative housing need by the low-income section of the population would largely be met by the provision of sufficient number of these finished low-cost housing units. The scheme was supposed to be heavily subsidized by the government including writing off some of the capital and running costs, fixing of affordable and non-economic rents and generous rates of cost repayments. This, it was assumed, would ensure that the average urban worker, instead of spending as high as 40% of his monthly income on rent as he was being forced to do (Awotona in Uji, 2007), he would be required to pay only 20%.

Gyuse as in Uji (2007) notes that in Nigeria, this policy only dates back from the post-civil war years, particularly during and after the 1970-74 -five-year Second National

Development Plan period. The Low-Cost Housing Scheme was initiated by the Federal Ministry of Housing and Environment (FMHE) in 2004, which about 47,500 housing units were built between 1979 and 1983 (Jinadu, 2004). It was the same period the Miango low-cost housing and Bukuru Low cost housing were built where the case study of this research work is taken. The 1980 National Housing Policy was formulated during the civilian regime of Alhaji Shehu Shagari (1979-1983), and it represents government's housing objectives in the fourth National Development Plan period (1980-1985). The policy was a reflection of the state's constitutional obligation, which seeks to provide suitable and adequate shelter for all citizens (FMHE, 2004).

The 1980 National Housing Policy by its objectives reveals Federal Government's high commitment to housing development. According to the Federal Ministry of Housing and Environment (FMHE), the Federal Government operated three sets of policies/ programmes within the housing sector in the plan period. These include National Housing Programmes for the low and medium income people, Loan Scheme and Staff Housing Scheme. Essentially, the main thrust of the government programme was direct housing construction and mortgage loan financing. However, the former was emphasized in policy implementation. Hence, the major programme embarked upon by the government in the plan period was the National Low-Cost Housing Scheme. The low-cost housing scheme aimed at constructing 40,000 units annually nationwide with 2,000 units located in each State and the Federal Capital Territory (FCT).

The low-cost housing stems from the growth of slums, the high cost of building materials, high cost of living and squatter settlements which can be dated back around 1950's and 1960's which resulted in government effort to solve the problem of building and subsidizing the necessary housing units (Uji, 2007). The mass housing scheme can be dated back from post civil war years, particularly during and after the 1970-74-five- year Second National Development Plan period (Uji, 2009). The Second National Development

Plan proposed the construction of 60,000 units throughout the country. According to Uji (2007), this target was not attained. The third and fourth National Development Plans (1995-1980 and 1981-1985) increased the target to 200,000 units, and States were required to build their quotas within their respective states. Building plans were prepared by government agencies for the execution of prototype housing units of one bedroom, two bedrooms and three bedrooms for low and medium income earners respectively without any input from the targeted group. Despite the good and laudable intention of the government towards these plans, the targets were never met still (Uji, 2007).

According to Uji (2009), for government intervention in housing to provide any meaningful relief through mass housing, it has to be on a much larger scale than already available or otherwise a complete overhaul or abandonment of the entire mass housing policy. He further stated some of the features of mass housing which constitute potential problems for its effectiveness as a policy option as follows:

i. The various components of the scheme are delivered to household in a single, fixed and finite package- the dwelling unit; may not be affordable and may not meet the needs of the user.
ii. Public housing agencies have complete control over the settlement process of their clients. It is they who decide what types of design, form or size of dwellings, are suitable. They are the one to decide what speed and in what number of these dwellings will be supplied and the method of allocation. They decide how much rent to be paid, in other words, how fast households will repay the cost of their dwelling units, and, therefore, how much they must spend on housing from their family budgets. (Awotona in Uji, 2009).

Bruin and Cook (2012) however stated that inevitable results from these outside decisions are as follows:

i. The housing provided ostensibly for the low-income earners is often too expensive for them and is consequently taken over by the middle class and upper income groups who can afford to pay the rents, or where purchase is an option, to pay the necessary deposit.

ii. The housing is often located in areas that are distant from the main activity centres of the community, or from the sources of income of the poor, so that, the cost of commuting to work makes it unattractive to all users; except those that have their own means of transportation, or earn a sufficiently high income to absorb the additional cost of commuting. Again only the middle or upper-income earners can afford to live in these areas under the given circumstances.

iii. Due to corrupt practices of government officials, or contractors, construction work may be negligently handled resulting in housing of inferior quality in terms of materials and technology used, and is therefore likely to deteriorate rapidly and become slum areas in a short time.

iv. There is a serious lack of amenities and infrastructural services just like or worse than in squatter neighbourhoods. In some cases there are no schools and children have to trek long distances to attend school; there are no opportunities as dwellers are forbidden from converting any part of their dwelling into shops, or workshop or even subletting any part thereof, as they were used to, in their earlier places of residence within the city. (Gyuse as in Brolin & Zeisel, 2009).

Wood (2003) pointed out that these problems emanating from ignoring the necessity of incorporating decision-making of potential users of mass housing have made it unsuccessful as a policy option. He further stated that, countries like Asia and south America and other parts of East Africa has acknowledged long ago that mass housing has failed and opted out for new framework such as Self Help by enabling low-income families to take their own decisions, and indeed, build a large part of the low income housing themselves whether aided or not.

2.14 HOUSING SCENE AND HOUSING PROVISION IN NIGERIA

The ever mounting crisis in the housing sector of the developing world has various dimensions, which range from absolute housing units shortages, to the emergence and proliferation of the slums/squatter settlements, the rising cost of housing rent, and the

growing inability of the average citizen to own their own houses or procure decent accommodation of their taste in the housing market (BRE, 2011).

In Nigeria, even though there are no accurate data on the nation's housing stock, earlier studies and observations strongly suggest quantitative and qualitative housing problems across the country (Onibokun, 2013; Agbola, 2008; Egunjobi, 2012; Olatubara, 2008; Mabogunje, et al., 2003; Ademiluyi & Raji, 2008). Thus, while Fadahunsi (2008) observed that policymakers in Nigeria are not really aware of the magnitude of the housing problems facing the low-income earners in the country, Kappelman, and Mclean (2005) were of the view that the increasing high rent is a pointer to the fact that there is a decrease in housing stock.

A study by Onibokun (2013) estimated that the nation's housing needs for 1990 to be 8,413,980; 7,770,005 and 7,624,230 units for the high, medium, and low-income groups, respectively. The same study projected the year 2000 needs to be 14,372,900; 13,273,291 and 12,419,068, while the estimates for the year 2020 stands at 39,989,286; 33,570,900; and 28,548,633 housing units for high, medium and low income groups, respectively (Agbola, 2008; Olokesusi & Okunfulure, 2000), Again, the national rolling plan from 1990 to 1992 estimated the housing deficit to increase between 4.8 million to 5.9 million by 2000. The 1991 housing policy estimated that 700,000 housing units needed to be built each year if the housing deficit was to be cancelled. The document, in fact, indicated that no fewer than 60 percent of new housing units were to be built in the urban centers (Ogu & Ogbuozobe, 2008; Federal Republic Nigeria, 2000). This figure had increased at the time the 1991 housing policy was being reviewed in 2002. In 2006, the Minister of Housing and Urban Development declared that the country needed about ten million housing units before all Nigerians could be sheltered. Another estimate in 2007 by the president put the national housing deficit at between 8 and 10 million

(www.nigeriaworld.com. 2007). The present minister for Housing put the national housing deficit as 16 million.

Despite this confusion as to the number of new additions, it has been quite obvious that a critical gap exists between the housing supply and demand; the reasons why successive governments have made policy statements, enunciated, and have made efforts to actually deliver new housing units. However, out of their targeted provision, a very minute percentage is always met. This could be attributed to the fact that most government housing programs have been frustrated by corruption, politicization, insufficiency of technical staff at building sites, and lack of infrastructure (Olokesusi & Okunfulure, 2000).

Housing conditions, especially those portrayed by the availability and efficiency of facilities and utilities, have been worsening since 1980 (Olokesusi & Okunfulure, 2000). Toilet facilities, for instance, have more pit constructions than other better and more ideal provisions. This is evident from the construction quota, which increased from 25.6 percent in 1980/81 to 63.3 percent in 1993/94 and 62 percent in 1995/96. Existing data shows that while 72.4% of urban households were connected to electricity in 1980/81, this proportion declined to 54.34% in 1995/96 (Federal Office of Statistics, 2014). The same trend existed for most neighborhood facilities and utilities within the country, especially those concerning water supply road construction, sewage, etc. In response to these housing challenges, Nigerian governments, since pre-independence, have shown a remarkable concern for housing. Also, successive governments in Nigeria have intervened in a number of ways in the housing sector in order to bring about the much-needed improvement and transformation.

Because the shelter is necessary to everyone, the problem of providing adequate housing has long been a concern not only to individuals, but to governments as well. Thus, most nations, in one form or another, continue to place access to affordable housing at the top of their priority lists (https://searchworks.standord.edu. 2007).

In Nigeria, the major steps taken, so far, towards solving the housing crisis in the country include:

i. The establishment, in 1928, of the Lagos Executive Development Board (LEDB). The Board was empowered to carry out slum clearance, land reclamation, and the development of residential and industrial estates.

ii. The setting up of Nigerian Building Society (NBS) in 1956 to provide housing loans to both civil servants and the Nigerian public.

iii. The creation of the National Site and Services Scheme (NSSS) in 1986 to provide land with essential infrastructural facilities, such as roads, drainage and sewage system, water supply, and electricity for housing developments in well-planned environments. The schemes are planned to provide well laid-out and serviced plots in each of the 36 state capitals of the federation, including FCT Abuja.

iv. The establishment of the National Prototype Housing Program (NPHP) by the Federal Ministry of Works and Housing (FMWH) to complement the objectives of the National Site and Services Scheme (NSSS). The project was embarked upon to demonstrate the feasibility of constructing functional, effective, and affordable housing units for imaginative designs, judicious specification of materials, and efficient management of construction.

v. The setting up of the State Housing Corporation (SHC) to provide housing to the populace at affordable prices.

vi. The creation of the Federal Mortgage Bank of Nigeria (FMBN) in 1977 to finance housing loans to prospective housing developers at minimal interest rates.

vii. The setting up of the National Housing Program (NHP) in 1991 and the National Housing Fund (NHF) scheme by Decree No 3 of 1992 to provide self loans to prospective housing developers and also monitor developments in the housing sector.

viii. The deconsolidation of the Federal Mortgage Bank of Nigeria (FMBN) through the establishment of the Federal Mortgage Finance Limited (FMFL) to take over retail mortgage portfolios previously handled by the bank and also to facilitate effective management of the National Housing Fund (NHF) Scheme.

ix. The setting up of a Housing Policy Council (HPC) to monitor development in the housing sector and also to set up the machinery for the review of the 1978 Land Use Decree (LUD) in order to make more land available for large-scale land developers.

x. The creation of the ministry of Housing and Urban Development in June 2003.

xi. The review of the mandate given to the Federal Housing Authority (FHA) to include provisions for the National Social housing as part of the strategy towards meeting the Millennium Development Goal. The authority also plans to facilitate the provision of two million housing units within the next four years.

xii. Others are the formulation of the National Housing Policy (NHP) in 1984, the establishment of the Infrastructural Development Fund (IDF) in 1985, and the Urban Development Bank (UDB) in 1992 (Federal Republic of Nigeria, 1997).

Furthermore, on the legal and regulatory framework for enhancing housing delivery, eight (8) housing related laws are now before the National Assembly. They are:

1. The Federal Mortgage Bank of Nigeria Act 1977 (replacement)
2. The National Housing Fund Act 1992 (replacement)
3. The Mortgage Institution Acts 1992 (replacement)
4. The Social Insurance Trust Fund Act 1993 (amendment)
5. The Investment and Securities Act 1999 (amendment)
6. The Trustees Investment Act 1962 (amendment)
7. The Insurance Act 2002 (amendment)
8. The Land Use Act 1978 (amendment)

In addition to the above, virtually all the introduced National Development Plans (NDPs) from 1962-1985 and the National Rolling Plans (NRPs) from 1990 to date explicitly recognize the importance of providing adequate housing in the country as a tool for stimulating the national economy (Gbolagade, 2015). The First National Development Plan (1962-1968) accorded low priority to housing with a focus on accommodating government staff in the regional capitals and Lagos. A low proportion/percentage achievement was recorded. In the Second National Development Plan (1970-1974) the target was to construct 60,000 housing units (15,000 units in Lagos and 400 units in each of the remaining capitals). There was a marginal improvement at the end of that period. Efforts were intensified in the Third National Development Plan (1975-1984) to improve the condition of the housing. Highlights of the programs include: direct construction of low-cost housing units by both the federal and state governments; increased construction of housing quarters for government officials, expansion of credit facilities to enhance private housing construction, and increased investment in domestic production of cement. A sum of N2.5 billion was allocated to the housing sector with a target production of 202,000 units (50,000 units for Lagos and 8,000 units for each of the then, 19 states). At the end of the period, a success of 13.3% was recorded. During the plan period, the Federal Ministry of Housing, Urban Development, and Environment was created while the Federal Government bought over the shares held by the Commonwealth Development Corporation in the Nigeria Building Society and converted it to the Federal Mortgage Bank of Nigeria (FMBN) with an enlarged capital base from N21 million to N150 million to provide loans to individuals, state housing corporations, and private estate development firms (Garling, 2010).

During the Fourth National Development Plan (1984-1985) period, three schemes were embarked upon: the direct housing construction, under which 2,000 housing units were to be built in each state annually, while the FHA was to construct about 143,000 low-

cost housing units across the country. Site and Services Schemes were also to be provided. At the end of the plan period, a success of 20% was recorded. During the 1990-1992 rolling plan periods, efforts were intensified on the sites and services scheme. About 2,892 serviced plots were provided in Anambra, Lagos, Imo, Kano, Kwara, Ondo, and Rivers states while the second phase commenced in other states. On prototype housing schemes, 72 housing units were constructed and allocated in 1990 while the construction of 218 units commenced in Lagos and Abuja. During the plan period, the National Housing Fund Decree No. 3 of 1992 was promulgated, and Primary Mortgage Institutions (PMIs) were licensed. The Housing Policy Council was also set up to monitor the development in the housing sector. The 1993-1995 rolling plan period witnessed allocation of about 10,474 plots of the three residential categories to the public. The impact of FHA was also felt in Lagos and Abuja.

During the 1994-1996 rolling plan, the national housing program was launched with the target of constructing 121,000 housing units in various models all over the country by the end of 1996. However, by the first quarter of 1997, fewer than 2,000 housing units had been completed. The federal and the state governments were expected to spend N2.0 billion on housing provisions during the 1996-1998 National Rolling Plan (NRP). Over N3.00 billion was expected to be spent by the two levels of governments during the 1999-2001 National Rolling Plan (Federal Republic of Nigeria, 2000). As part of the efforts to increase houses for the masses in the country, the Federal Government in 2004 pledged to adequately fund research pertaining to the manufacture and the use of local materials in the sector, with the aim of providing 40,000 houses with at least 1,000 per state before year 2007. However, as observed by Ademiluyi and Raji (2008), little had been done to meet this target barely two months into the year 2007.

Despite these interventions and efforts by the governments, actual achievements in terms of providing adequate housing in the country remain essentially minimal for a number of reasons. These include:

1. Problem of plan implementation. There is often a wide gap between what is on paper and what is happening on the ground. For example, only 13.3% achievement was recorded in the federal government's housing program in the Third National Development Plan (Mabogunje et al., 2003).
2. Lack of adequate data relating to the magnitude of the problem, due partly to the absence of the national data bank on housing.
3. Inconsistency in government policies and programs, including frequent changes of policies with changes of government and without proper assessment of the existing ones.
4. Lack of efficient and sustainable credit delivery to the housing sector.
5. People's incomes are relatively low in comparison with house market prices, resulting in an affordability problem.
6. High cost of building materials. For example, a recent survey has shown that a 50kg bag of cement has risen from N650 in 2000 to about N1, 600 today.
7. The rapid annual growth rate of the Nigerian population, which was estimated at 3.3% on the basis of annual birth rate of 49.3 per 1,000. Coupled with the rapid population growth/urbanization is the problem of an increasing poverty level among the citizenry, which has risen from 65% in 1996 to about 70% in 2007, according to UNDP and World Bank estimates.
8. Lack of effective coordination among Housing Agencies. While all the three tiers of the government are involved in one way or the other in housing matters, their activities are hardly coordinated.
9. Politicization of housing issues, including government involvement in what Onibokun (2013) referred to as the 'game of number'.

For instance, between 1974 and 1980, there was the plan to deliver 202,000 housing units to the public, but only 28,500 units representing 14.1% were delivered. Also, out of 200,000 housing units planned to be delivered between 1981 and 1985 only 47,200 (23.6%) were constructed. Under the National Housing Fund (NHF) program, initiated in 1994 to produce 121,000 housing units, it was reported that less than 5% was achieved. In spite of a series of government policies towards improved housing delivery, one thing that is clear is that successive governments in Nigeria have not been able to match their words with action. In fact, the situation in the Nigerian housing sector remains like that of a child to whom much is promised but little is delivered. It is no surprise, therefore, that there exists a gap between housing supply and demand. Table 6 below gives the summary of public housing provision in Nigeria.

Table 6: Summary of Public Housing Provision in Nigeria

PERIOD	PROGRAMME TARGET	ACHIEVEMENT LEVEL
First National Development plan (1962-1968)	Planned construction of 61,000 housing units	Only 500 unit (less than1%) of planned units were constructed. The political chaos and the resulting civil war(1966-1970) contributed to the margin and progress recorded during the period.
Second National Development plan (1971-1974)	Establishment of National Council on Housing (1992) to advice the government on housing matters and Federal Housing Authority (FHA) in 1973 to coordinate housing provisions. Plan direct construction of 59,000 low-cost housing units across the federation.	7,080 housing units representing 12% of planned houses were actually built.
Third National Development Plan (1975-1980)	Creation of Federal Ministry of Housing Urban Development and Environment. Conversion of Nigerian Building Society to Federal Mortgage Bank of Nigeria (FMBN) Promulgation of the Land Use Decree (1978) Planned construction of 202,000 low-cost housing units nation wide	30,000 housing units representing less than 15% of planned houses were actually completed.
Fourth National Development Plan (1981-1985)	National housing program launched for the first time in 1980 embarked on N1.9billion for the construction of 160,000 housing units for low income earners.	A total of 47,234 housing units representing about 23.0% was planned. Housing units were constructed in the first phase. The second phase was cut short by the military coup of 1983. The second phase of the housing program set out to construct 20,000 units across the country.
Military Government (1986-1999)	National Housing Program planned 121,000 houses on site-and-services housing program between 1993 and 1995 1998 National Housing Policy was launched with the good of granting all Nigerians access to decent housing for the year 2000 in response to the slogan “Housing for All by the year 2000” of the United Nations.	5,500 housing units (less than 5%) of planned houses were actually constructed. Provision of rural infrastructure through the Directorate of Food Roads and Rural Infrastructure (DFFRI)
Civilian Government (1999-2010)	The new National housing and Urban development Policy (NHUDP) launched in 2002 with the goal of ensuring that all Nigerians own or have access to descent housing through private sector- led initiatives. Planned construct about 10,271 housing units through the public-private partnership (PPP) arrangements in different PPP housing schemes across the country. Planned construction of 500 housing units in the presidential mandate housing scheme in all the 36 states capital and Abuja.	200 serviced plots through PPP site and service in Ikorodu, Lagos. 4,400 housing units completed in Abuja, Port Harcourt, Akure and Abeokuta through PPP. The Presidential mandate Housing Scheme did not take off in many states. In Ogun state about 100 housing units representing 20% of the planned units were constructed.
	Government planned a pilot project involving the construction of 40,000 housing per annum nationwide.	Records of achievement level of pilot projects are not available.

Source: Ibem, E. O., Anosike, M. N., & Azuh, D. E. (2011)

Apart from the failure of public sector housing to provide planned number of housing units suggest, unimpressive result has been recorded in the provision of quality housing in Nigeria. Although each of 1988, 1991, 2002 and 2006 National Housing Policies set outs to provide Nigerians access to qualitative and satisfactory housing at affordable cost, several studies have succinctly shown that these policies and the housing scheme derived from them achieved minimal success in this area (Awotona, 1978, Ukoha and Beamish, 2009, Fatoye and Odusami, 2009; Olatubara and Fatoye, 2007, Jiboye, 2009, Ibem and Amole, 2010). Each of the above-cited works identified lack of consideration of personal preferences as being responsible for unsatisfactory public housing as perceived by users.

2.15 SUMMARY OF LITERATURE REVIEW

From the literature, research into architectural spaces by Savanjala (2010), Hillier and Hanson (2008), and Virba and Combs (2010), revealed that the recognition of location is spontaneously in use and intuitively in design before any other requirement, even before we actually move in space. Space is differentiated by activities we carry. They are of the view that in design process architects in their imaginary journey, conceived the space in relation to function. In line with this, it is believed that the architect that design the low-cost houses conceived a space for different function in the house, but this research examine how functional and adequate are the designed spaces to the user?

It was established from the literature that architectural spaces are viewed in terms of the structural dimension, experimental dimension, functional dimension and architectural element dimension. All these provide the architect with the basis in order to arrive at an acceptable design. When these design basis for the space are followed, a satisfied space design will be achieved.

The literature reviewed the school of thought in the history and practice of architecture. The main question is how different architectural school of thoughts deal with

the relationship between function, aesthetics/ form and structure? At what stage does the consumer be part of the building process, programming, design or after completion? How does a designer arrive at his choice of form? What are the factors that influence the special image, size, scale and rhythm of building mass, the spatial arrangement, the choice of colour and materials? What are the basic design factors that needed to be considered at the programming and design stage? To what extent does form follow from the requirements imposed on the intended use? Many answers have been given to these questions over the course of time; some are based on theoretical considerations over the course of time; some are based on theoretical considerations while others on personal attitudes and influenced by the spirit of the age. The study reviews a number of ideas about the relationship between function and aesthetic/form, with reference to different movements in architecture.

From all the school of thoughts in architectural history reviewed, it is possible to distinguish three main lines of thought:

Form is determined by functional and constructional efficiency. This view includes well-known "form follows function" –with the variant "form follows behavior" – and "form follows construction". According to the first of these principles, a design must be based primarily on utility value and the wants and needs of the consumers. The motto, 'form and function are identical', goes one step further. Here the underlying thought is that functionality automatically leads to beauty. According to the second principle, 'form follows construction', form follows the construction and the materials.

Form follows context. This view holds that form is mainly determined by context. Factors that exert a significant influence include the sites architectonic and urban design characteristics, geographical situation, socio-cultural context, historical context, legal context and economic context. The importance of this last factor is expressed in the motto 'form follows economics'.

Form is Autonomous: according to this approach, form is not primarily derived from user's needs and aspirations or construction but rather from principles of form, possibly geometrical, and the perceptual experiences that such principles evoke. Mottos are 'form follows meaning', form follows meaning' or 'form follows fun' in which 'fun' refers both to the pleasure experienced by the designer and pleasure that the user gets from the building. Yet another motto is 'form proceeds the function (Handler, 1970) reflecting the rejection of purely functional approach.

The literature review urban spaces with an emphasis on types of urban space and the interface in residential spaces. Four types of space were identified: public space, semi-public space, semi-private space and private space. This review enables the researcher to differentiate types of spaces obtained in urban centres, because most of the low-cost houses are located in the urban areas. Whether these low-cost houses were located based on these types of urban spaces and whether this will form the part of user satisfaction with spaces of the low-cost houses.

It was established from the literature that there are housing design features and standards. The standards were set for regulation of building and construction e.g. the types of material used and their composition and the use to which a building is put among others. With the help of this literature the researcher investigates whether such standards were followed in the design and construction of the low-cost houses.

The literature review tackles architectural spaces generally and user satisfaction based on quantity and quality of building. This research focuses on architectural spaces of residential buildings both interior and exterior spaces of residential buildings and user satisfaction with these spaces. The use of case studies in design research, on the other hand, is meant to acquaint the designer with the workability of similar existing projects, in order that, he may anticipate and appreciate the complexity and multifarious nature of human needs and requirements and the correspondingly multifaceted complexion of

solutions that are feasible under differing circumstances. The designer is then expected to employ his sensitivity and ingenuity, to identify the circumstances most suitable to his present situation, and appropriately respond to them.

According to Uji (2009), as far as case study in design research is concerned, the question of filling gaps in the existing body of knowledge does not necessarily arise, as may be expected of literature review in research in conventional sense. With case studies, it is believed that no matter the level of sophistication of a given design, the built environment can always be improved upon. A solution may meet user's needs and environmental requirements at a particular time and in particular way, but different needs and circumstances will definitely call for more befitting solutions. The issue usually considered for analysis under case studies include: the client, the consultants and contractors on the one hand, then the functional analysis of space provided, circulation, construction materials, structural form, aesthetics and to what extent the goals of the design were achieved, on the other hand. Many scholars have worked on user satisfaction with housing provision in Nigeria. The gap created by previous researchers is the issue of architectural designed spaces. Satisfaction with any house is anchored on the architectural design, which deals basically with the spaces provided. It is on this basis that this research is carried out to establish users' satisfaction with architectural designed spaces of residential buildings.

The outcome of this research is expected to improve the design of future public residential buildings and minimize the incidence of alteration which always resulted in defacing the Low-cost housing. The alteration made to public residential buildings does not only change the cityscape but also touches on the psychology of the people (Nwankwo, 2013). When designing with understanding of how similar buildings perform, mistakes will be avoided, and successful design that meets the needs and aspiration of the people will be achieved. The result of this research work will establish the design factors

that require adequate consideration at the programming and design stages and minimize the frequent modification or alterations to buildings. The information and data from the research will equally be a reference for teaching architects and future operators in the area of public residential building development. This research can also be used to document deficiencies as part of the justification of new construction or remodeling projects.

The proper utilization of the result arising from this study will enhance the government and private developers' competitive standing in the market and improve public image and reputation. It is important that this research analyzed Low-cost housing situation in Plateau State because the state government is proposing a mass housing scheme which will save the state from repeating the mistakes of the past.

The result of this study will also serve as a platform for empirical studies on public residential buildings performance in any state of Nigeria.

CHAPTER THREE
METHODOLOGY

This chapter discusses the study area, research design, population and sample of the study, the sampling techniques, instruments for data collection, description of the instrument, instrument development procedure, validity and reliability of the instrument, procedure for data collection and method of data analysis.

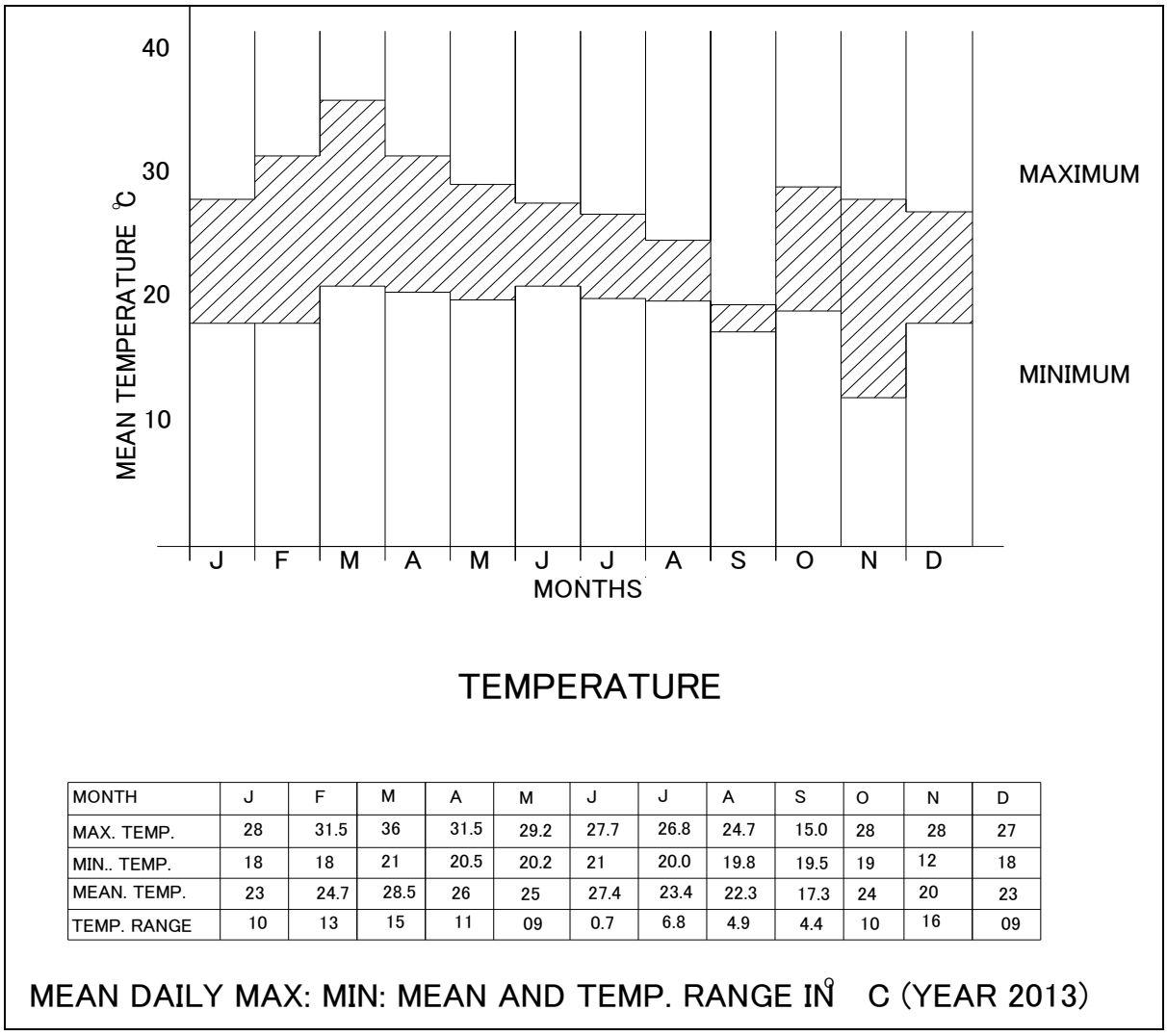
3.1 THE STUDY AREA

Plateau State is located in the Middle-Belt zone of Nigeria; it lies between latitude 80˚24´North and Longitude 80˚32´and 100˚38´ East (see Figure 13 and 14). Plateau State of Nigeria derives its name from the geographical landscape that predominates in this part of the country, which is often referred to as the Jos Plateau. It is the higher of the two plateau found in Nigeria, the other being the Mambila in Taraba State. Plateau Highlands stand at an average height of 400metres above sea level. It covers land mass of about 26,899 square kilometers and projected population of 2,716,995. The state shares boundaries with four states of the 36 states of the federation. It is bounded to the south-west by Nassarawa State while to the North West and North East of Kaduna and Bauchi States and to the South East by Taraba State (See Figure 13).

The State has over 30 ethnic groups each with proud cultural heritage with no single group large enough to claim majority position. The people are hospitable and accommodating and have similar cultural and traditional ways of life. People from other states coexist peacefully with the indigenes. Some major tribes in the state are as follows: Berom, Ngas, Taroh, Goemai, Youm, Montol, Rukuba, Kwagalak, Piapung, Buji, Irigwe, Mushere, Jarawa, Anaguta, Gashish, Pyem, Amo, Chip, Meryang, Fier, Bogghom, Mwaghvul, Ron-kulere, Chawai, Aten etc.

Plateau State enjoys temperate climate nearly the same with that obtains in some parts of Europe and United States of America. It is often cold between 18 degrees Celsius

and 38 degrees Celsius as maximum (see Figure 13). The minimum annual rainfall of between 25mm and maximum of 380 mm are recorded (see Figure 14). Several river sand hillocks are interspersed among the highlands giving the landscape striking scenery. The unique and near temperate climate makes the thriving of exotic vegetation cover of both temperate and tropical stock. The relative humidity ranges between 35% minimum and 78% maximum (see Figure 15). North East trade wind blows across the state between November and February every year. It is usually referred to as 'Harmattan' wind. It is dry and characterize with dust. South west trade wind blows across the state between March and September. It is characterized by rainfall and thunderstorms (see Figure 16).



MONTH	J	F	M	A	M	J	J	A	S	O	N	D
MAX. TEMP.	28	31.5	36	31.5	29.2	27.7	26.8	24.7	15.0	28	28	27
MIN.. TEMP.	18	18	21	20.5	20.2	21	20.0	19.8	19.5	19	12	18
MEAN. TEMP.	23	24.7	28.5	26	25	27.4	23.4	22.3	17.3	24	20	23
TEMP. RANGE	10	13	15	11	09	0.7	6.8	4.9	4.4	10	16	09

MEAN DAILY MAX: MIN: MEAN AND TEMP. RANGE IN °C (YEAR 2013)

Figure 13: Minimum, Maximum Mean and Mean Daily Temperature,
Source: Meteorological Station, Department of Geography and Planning, University of Jos, Jos (2014).

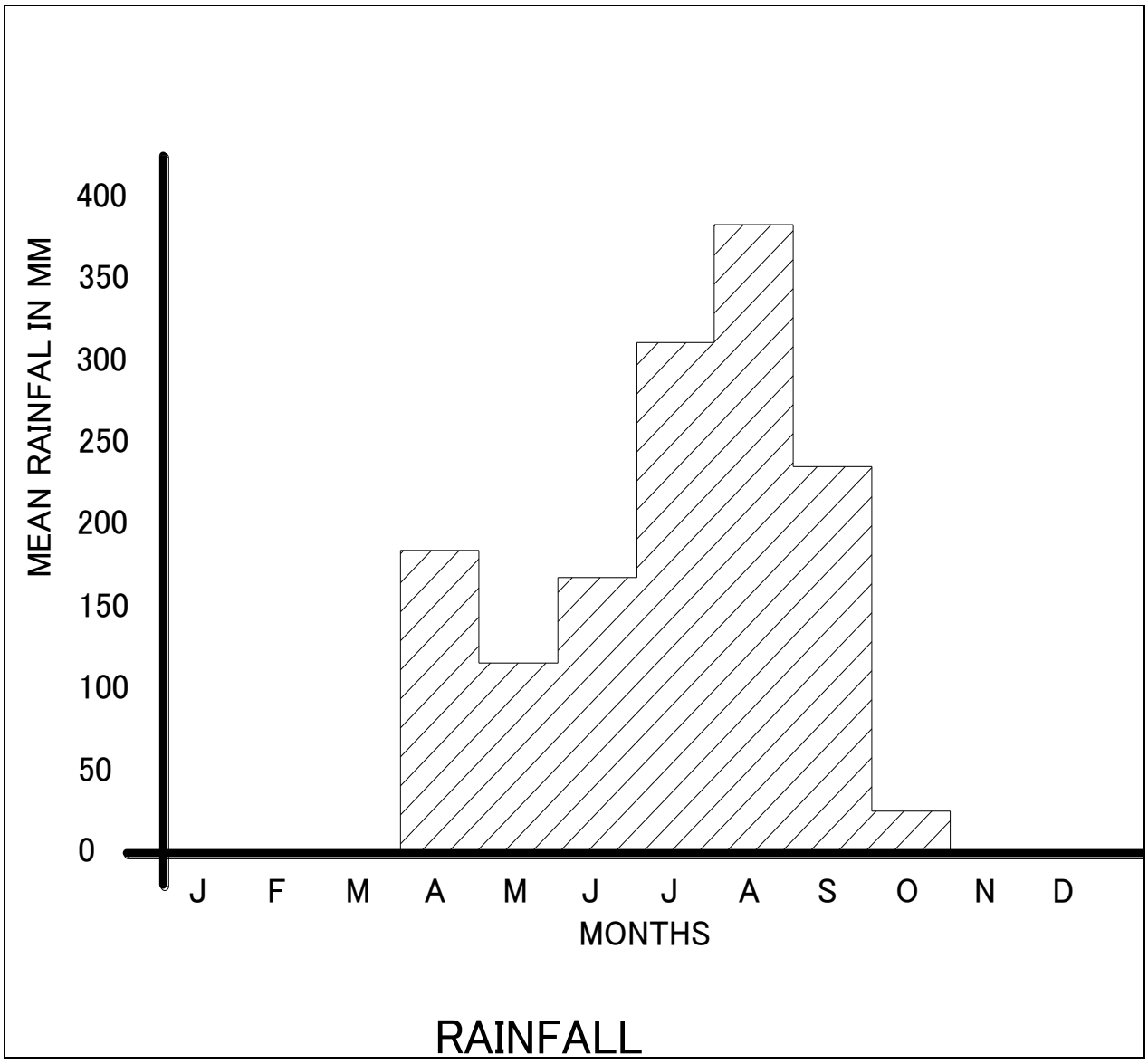


Figure 14: Annual Rainfall Reading for Plateau State
Source: Meteorological Station, Department of Geography and Planning, University of Jos (2014).

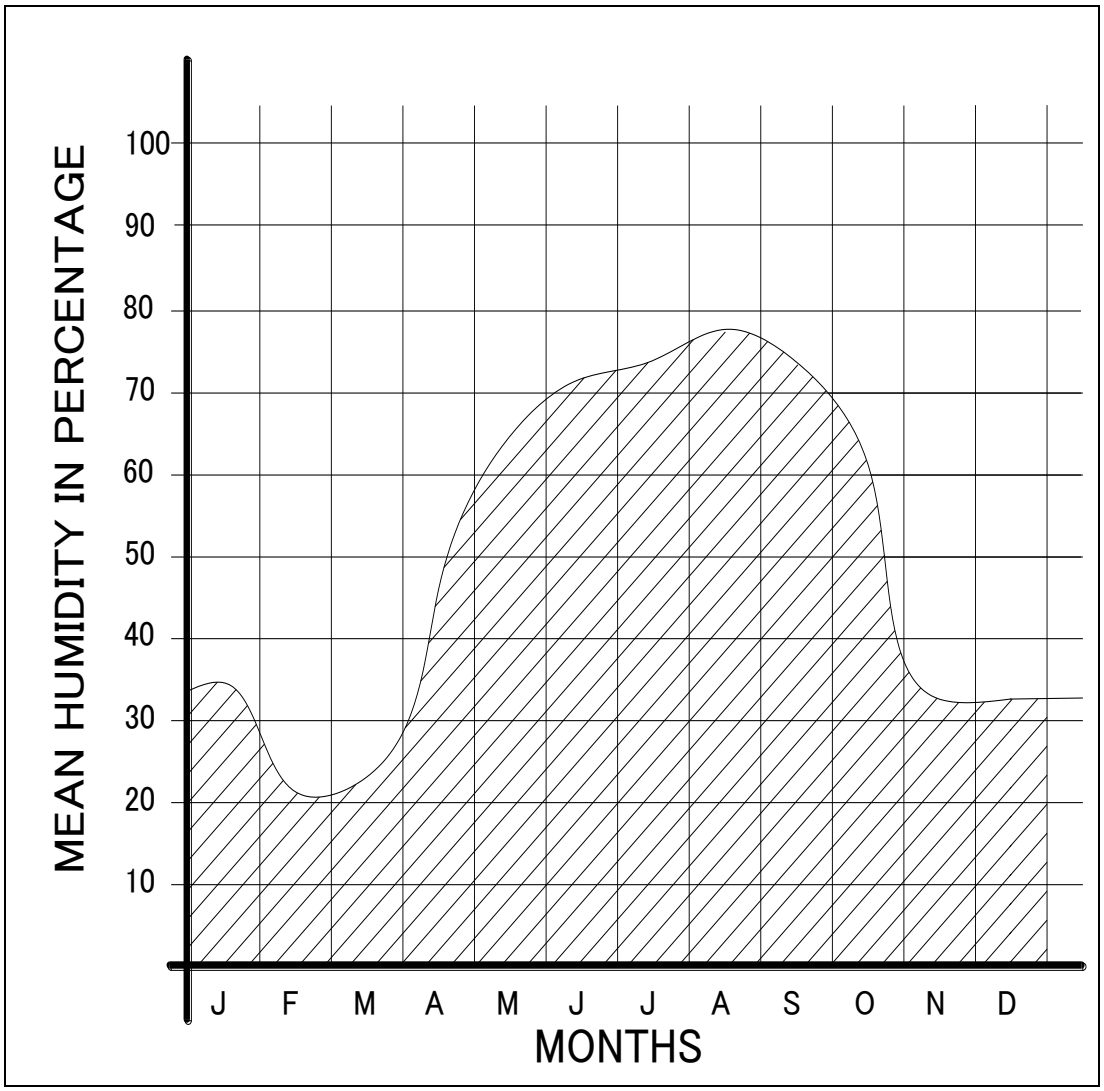


Figure 15: Relative Humidity (2013)
Source: Meteorological Station, Department of Geography and Planning, University of Jos (2014)

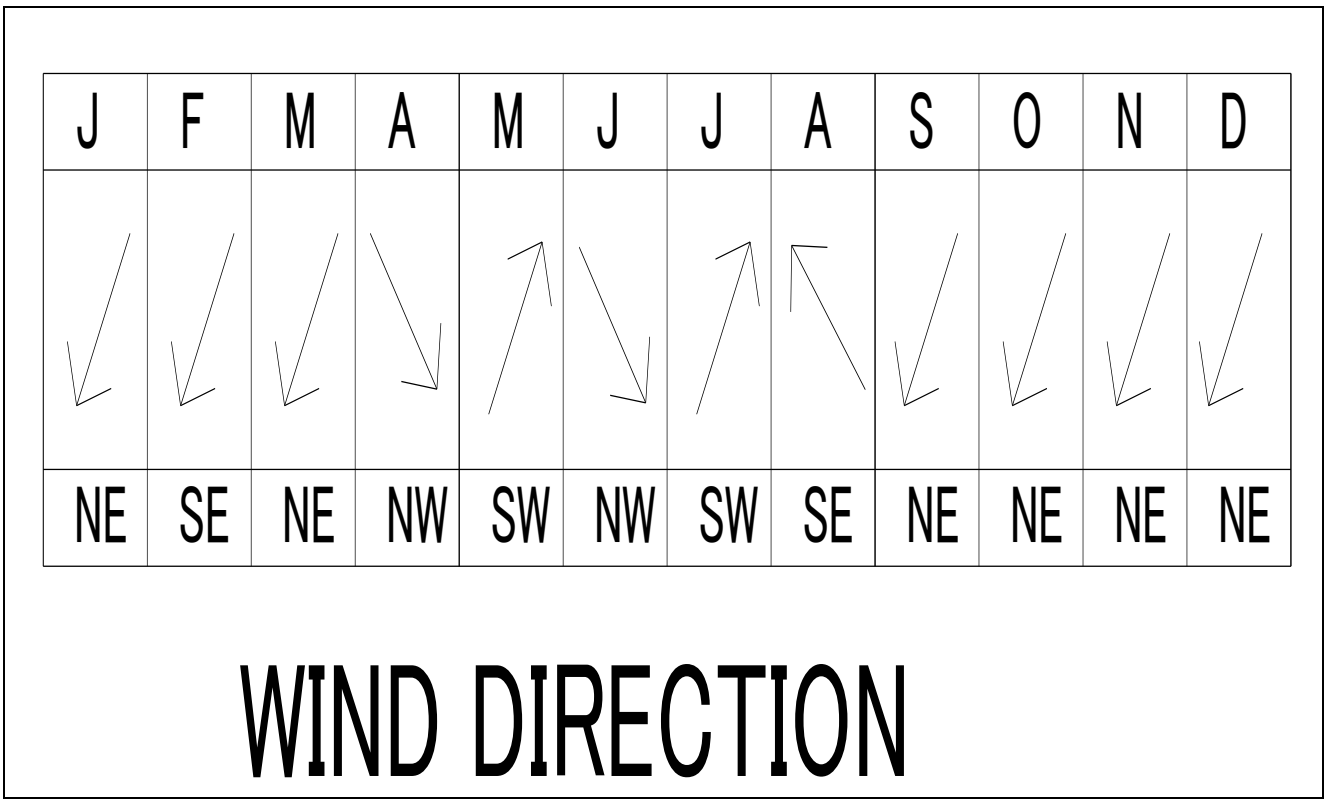


Figure 16: Wind Direction, Jos (2013).
Source: Meteorological Station, Department of Geography and Planning, University of Jos (2014).

The study area of this research covers the following Local Government Areas in the State: - Jos south, Pankshin and Shendam. These areas were selected using random sampling from the three zones of Plateau state. The Northern Zone comprise of the following areas where low-cost houses were built (Bukuru Low-cost housing; Miango Low-cost housing; Bassa low-cost housing and Barkin Ladi low-cost housing). Using the random sampling technique Miango state low-cost housing was selected from the northern zone.

The central zone of the state where low-cost houses were built comprise of Miango low-cost housing; Pankshin low-cost housing and Kanam low-cost housing. Using random sampling technique, Pankshin low-cost housing was selected for the study.

The Southern zones of the state where low-cost houses were built are as follows: Wase low-cost housing; Langtang North low-cost housing and Shendam low-cost housing. Using the random sampling technique for the zone, Shendam Low-cost housing was selected for the study.

This study considers Plateau State appropriate because of the government strives towards achieving the Jos Master plan. The present government in plateau state is resolute in transforming the Metropolitan areas and its environs to an enviable one. This is aimed at decongesting the central Business District, some neighbourhoods and extending infrastructural development in its periphery. The government is making a proposal of building mass houses to cater for her civil servants in the state; therefore this research is timely. The greater Jos Master Plan, which agreed by many as a timely and necessary for any meaningful development proposes to allocate different land use activities to different zones and areas of the city. In specific terms, every acre and parcel of land, every area linear or dotted spot as captured in the Plateau Geographical Information System (PLAGIS) will be committed to a productive and meaningful function. Just like any master plan, that comprehensive, scientific and realistic provision ought to be made for

both private and public housing, so that the greater Jos being expected will satisfy the demands of user in line with best practices (Draft of Jos Master Plan, 2011).

The study also considers Plateau to be appropriate because of the rapid housing development going on in the state as a result of the relocation of some individuals after the crisis that engulfed the city and its environs. This housing development is both private and public in nature, so this research gives direction to private and public housing developers within the state. It is believed that this research which coincided with the implementation phases of the master plan will go a long way in addressing user satisfaction in housing and housing need. This will eventually result in quality housing unit within the Jos Master Plan. There is no doubt that this work will give direction to the authorities vested with the responsibility of achieving qualitative housing in both private and public housing within the state. The weekly Standard of January 10th, 2014, reported that plateau State Government has awarded a title document worth about N30 billion for the construction of a Garden City and 300 housing units in the state. The 300 housing unit is to house the low, middle and high-income earners. In view of this laudable project, this research is timely because it will direct the government, not to repeat the past mistakes being committed in housing delivery.

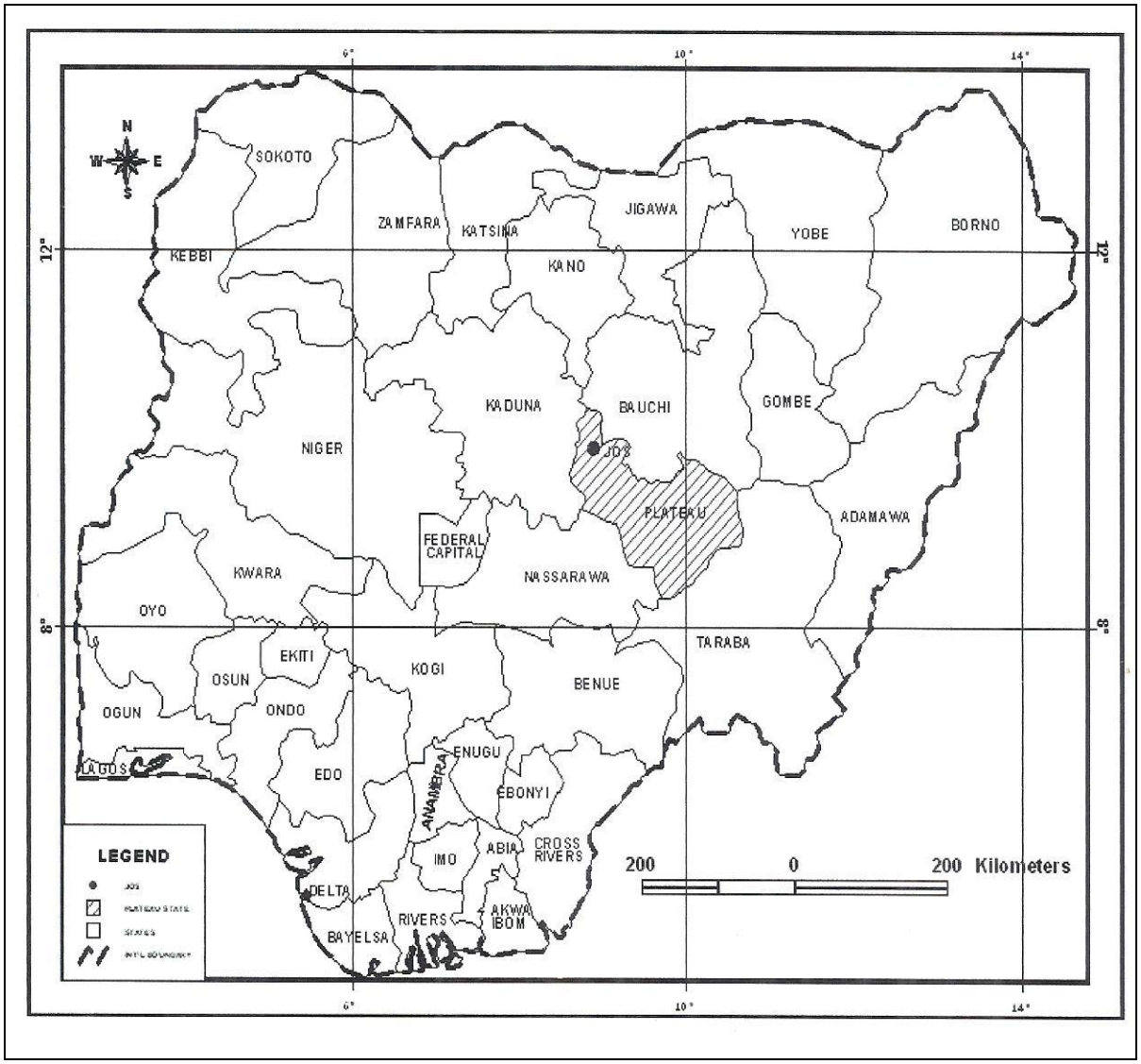


Figure 17: Map of Nigeria showing Plateau State and the Location of Study Area
Source: GIS Laboratory University of Jos (2008).

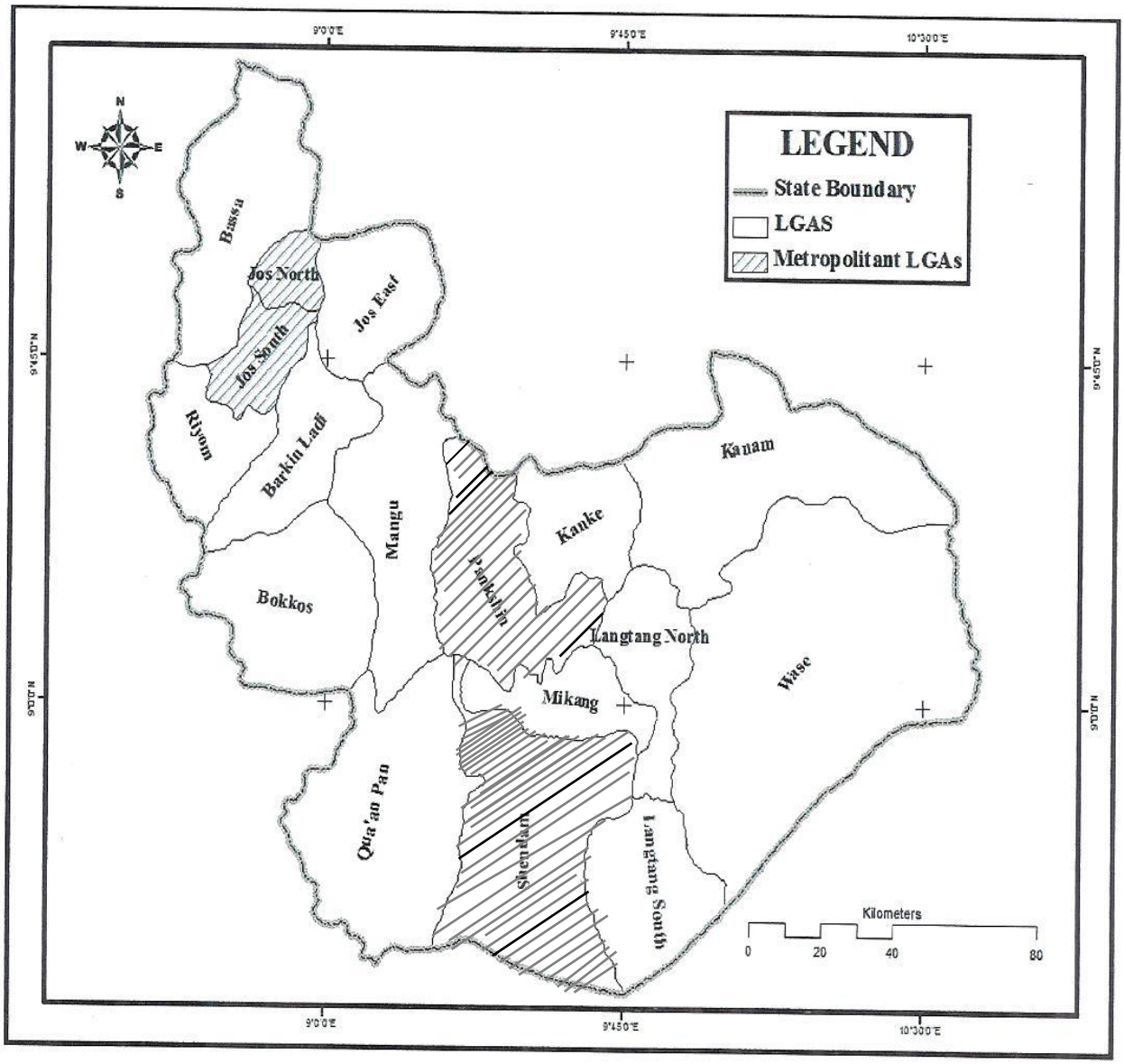


Figure 18: Map of Plateau State showing Jos Metropolitan Areas and other Local Government Areas.
Source: GIS Laboratory University of Jos (2008).

3.2 RESEARCH DESIGN

According to Uji (2009) research design denotes the art of putting in place the research strategies that will ensure that the study provides the answer to the fundamental question raised in the research. Research design can be thought of as the logic or master plan of a research that throws light on how the study is to be conducted. It shows how all the major parts of the research study; the samples or groups, measures, treatments or programs etcetera work together in an attempt to address the research questions. Research design can be seen as actualization of logic in a set of procedures that optimises the validity of data for a given research problem (Groat & Wang, 2002).

According to Groat and Wang (2002), the research design serves to plan, structure and execute the research to maximize the validity of findings. It gives direction from the underlying philosophical assumptions to research design and data collection. The study adopted quasi experimental design, where the researcher manipulates one variable, control and randomizes the test of the variables. In this study, one or more variables were manipulated to determine the effect on a dependent variable which is user satisfaction.

Groat and Wang (2002) further expanded that the design is best employed when group of subjects are comparable and can be assumed to be about the same on the traits being measured (intact classes) before the treatment was given to the subject. This justifies the choice of quasi experimental design for the present study.

3.3 POPULATION AND SAMPLE

3.3.1 Population

A research population is a collection of individuals or objects that is the main focus of a scientific query. It is the benefit of the population that the researches are done. However, due to the large sizes of populations, researchers often cannot test every individual in the population because it is too expensive and time consuming (Uji, 2009). The study consists of eight hundred and sixty eight (868) housing units. These housing

units are spread across ten local government areas of Plateau State. Table 7 captured the location of the low-cost houses and the number of housing units and their senatorial zones. The researcher considers it cumbersome to study all the eight hundred and sixty eight housing units. Therefore, for the purpose of this study, Plateau State was zoned into three senatorial zones of the state; namely- northern zone, central zone and southern zone. Random sampling technique where names of locations of low-cost houses were written, wrapped and were picked at random was used to select a low-cost housing in each zone. The selected housing units in each zone are: Miango low-cost housing in the Plateau State northern senatorial zone, Pankshin low-cost housing in central senatorial zone and Shendam low-cost housing in the southern senatorial zone. The selected number of housing unit in each selected senatorial zone was presented in a tabular form in Table 8. The total housing units considered for the study are four hundred and ten (410) housing units.

3.3.2 Sample

The total sample size for this study was one hundred and thirty two (132) housing units. Miango low-cost housing has eighty (80) housing units; Pankshin low-cost housing has twenty six (26) housing units and Shendam low-cost housing has twenty six housing units also. The selection of sample size was based on sample size created by the researcher advisors. The research advisors are group of researchers that assist academic and cooperate researchers in the development of research method. They provide guidance and advise that leads to accurate research and valid conclusion (www.research.advisors.com). The table as presented in Appendix B1 was created to help researchers avoid formulas altogether.

Table 7: Location and Number of Low-Cost houses in Plateau State

S/N	Location	No. Housing units	Senatorial Zone
1	Bukuru State Low-cost Housing	40	Northern zone
2	Miango State Low-cost Housing	250	Northern zone
3	Bassa State Low-cost Housing	66	Northern zone
4	Barkin Ladi State low-cost Housing	70	Northern zone
5	Mangu State Low-cost Housing	70	Central zone
6	Pankshin State Low-cost Housing	80	Central zone
7	Dengi State Low-cost Housing	66	Central zone
8	Wase State Low-cost Housing	66	Southern zone
9	Langtang State low-cost Housing	80	Southern zone
10	Shendam State Low-cost Housing	80	Southern zone
	Total	**868**	

Source: Field survey, (2014).

Table 8: Location and Selected Number of Housing Units in Each Zone

S/N	Location	No. Housing Units	Zone
1	Miango State Low-cost Housing	250	Northern zone
2	Pankshin State Low-cost Housing	80	Central zone
3	Shendam State Low-cost Housing	80	Southern zone
Total		**410**	

Source: Field Survey (2014)

3.4 SAMPLING TECHNIQUES

There are several sampling techniques in research but the selection of sample of neighbourhoods for the research was carried out using Stratified Sampling Technique (SST). This technique according to Uji (2009) is the modification of both simple random sampling and systematic sampling, were groups of the population have certain different characteristics, and it is desired to reflect such attributes in the sample in such a way that reflects similar proportions of their presence in the population. This type of sampling according to Uji (2009) will ensure that each building types are represented in the sample in the same fraction they appear in the population. All the selected location of Low-cost housing in the three geopolitical zones used the stratified sampling technique in distribution of questionnaires to the respondents.

Sample size table was created by the **Research Advisors**. The Research Advisors are a group of researchers that assist academic and cooperate researchers in the development of research method. They provide guidance and advice that leads to accurate research and valid conclusion. The sample size table presented in Appendix B1 was created to help researchers avoid formulas altogether. (www.research-advisors.com). From the Table, the first column represents population size, followed by 3.50% 2.50%, 1.00% margin of error and confidence level = 95%. To determine the values, simply determine the size of the population down the left most column (use the next highest value if your exact population size is not listed). The value in the next column is the sample size that is required to generate a margin error of +or -5% for any population.

Sati (2014) used this sample size chart in his research on ‘User Perception and use of green Spaces as Elements of Architectural Composition of Jos Metropolis, Nigeria’ and was able to obtain reliable results and conclusion. On this basis the chart was also used for this research to determine the sample size for the field survey.

The sample size for the study was determined from the required sample size table shown in the Appendix B1. From the Table, the total housing units in Plateau State low-cost housing was eight hundred and sixty eight (868), this figure is not on the sample size table, therefore the next higher value is 1000. To determine the sample size, 1000 in the population column was cross reference 95% level of confidence and 5% margin of error gives the sample size of 278. The total selected houses for all the three zones are 410 (see Table 9). Therefore to determine the sample size for each location in the three zones, the ratio of the figure in each location and the total number of apartments, multiplied by the required sample size obtained from the sample size Table in Appendix B1.

(No. of housing units in location ÷ Total no. of Low-cost houses) x Sample size obtained.

1. Miango state Low-cost = $\frac{278}{868}$ x $250 = 80$
2. Pankhshin State Low-cost = $\frac{278}{868}$ x $80 = 26$
3. Shendam State Low-cost = $\frac{278}{868}$ x $80 = 26$

From the calculation, the sample size for each location is presented in Table 9.

Table 9: Sample Size Table

S/N	LOCATION	NO. OF HOUSING UNITS	SAMPLE SIZE FIGURE
1	Miango State Low-cost Housing	250	80
2	Pankshin State Low-cost Housing	80	26
3	Shendam State Low-cost Housing	80	26
	Total	**410**	**132**

Source: Field Survey (2014.)

3.5 INSTRUMENTS FOR DATA COLLECTION

According to Akogun cited in Uji (2009) research instruments are tools with which data can be collected from a given population in pursuit of the objectives of research. According to him the choice of appropriate tool for data collection is based on the following:-

i. The objective of study
ii. The variables of interest i.e. those factors which when measured, will provide information on the objectives.
iii. Identification of tools that will be used to measure (collect information about) the listed factors.

Five research methods of approach have been employed to elicit the data used in this research and they have been derived from the text 'Architectural Research Methods' (Groat & Wang, 2002, Voordt & Wegen, 2005). The instrument includes: Morphological Mapping, Physical Trace Analysis (PTA), observing Environmental behaviour, questionnaires, oral interviews, focus group discussion, library and internet.

3.5.1 Description of the Instrument

1. The first method employed is Morphological mapping of the low-cost houses for study and establishment of their geographical location. The mapping made the researcher understand the architectural characteristics of the buildings within their specific contexts in the study area.
2. The second method adopted was Physical Trace Analysis (PTA) which enables the researcher to understand the nature and extent of alteration in the study areas and to understand the building layouts. The advantage of this technique is to help the researcher identify the aspects of the buildings that were retained as part of the original dwelling after modification. It further helped in identifying the nature and extent of post occupancy alteration carried out in the buildings (Devous, 2012).

3. Thirdly, observing Environmental behaviour' was a technique used to investigate the relationship between human activities and physical settings in the Low-cost houses. According to Zeisel (2008), this technique is ideal for identifying the relationship between human activities and physical settings. This method helps the researcher to identify the effects of the altered houses and the spaces on the users. Photographs and physical measurements of building units were employed at this stage.
4. Fourthly, questionnaires: The questionnaire was divided into five sections. The first Section was designed to know the demographic characteristic such as ethnicity, age, occupation and income of the respondent. The second section was designed to critically evaluate residential spaces both internal and external. The third section of the interview/questionnaire was on alterations made on the houses. This was carried out to identify differences between actual use of space by housing residents and the original design intentions for its use. This allowed the researcher to analyze and make a comparison between original residential building design and the modifications identified during the research. The fourth section on functionality of spaces provided and how it supported respondents' activities.
5. Oral Interview and focus group discussion were used to explore, what people think, feel, do, know, believe and expect from their buildings.

3.5.2 Procedure for Instrument Development

The procedures for the development of the five methods mention above are fully identified thus:

1. **Morphological Mapping of Low-cost Houses**: This was to widely consult literature on the said concept. This was to generate basic facts and information on the low-cost houses through maps, studying existing maps in relation to architectural characteristics of the builders. In addition, an internet was used to access Google images of the study areas. The

mapping of the low-cost houses is very vital and helps in the administration of the questionnaire to the occupants of the low-cost houses.

2. **Physical Traced Analysis (PTA)**: The first step here is to locate existing site layout of the low-cost houses in order to understand the layout of buildings. This will help in identifying buildings that have been altered or modified.
3. **Observing Environmental Behaviour**: According to Uji (2009), observations are usually employed when proper description of a phenomenon, event, or process is the required need. Participant observation was employed in this research, because the study is such that seeks to examine the physical conditions of buildings, the nature and extent of post-modification or alterations. Here, the researcher is part of the group throughout the period of observation. Also the research assistants took part in the participant observation. The researcher and his research assistants spent a period of one week in each location taking part in the activities of the users as a member. This observation seeks to examine the physical condition of spaces provided and the utilization of these spaces within the dwelling unit. The researchers often posed questions in order to understand the performance, attitudes, and feelings of public housing consumers. Notes were made at the course of the observations as well as photographs. The procedure for the development of this instrument is through photograph and physical measurements of building units. Here the researcher uses camera to capture the building and made use of measuring tapes to take dimensions of internal and external spaces of low-cost houses.
4. **Questionnaires**: The field study was carried out by administering questionnaires to respondents within the study areas. Based on the sampling size established, a total of 132 respondents are surveyed representing different demographic and socio economic status. The targeted category of respondent includes residents of the Low cost houses. Professionals in the building industry and other populace within the Low cost houses are

targeted. This survey was carried with the assistance of three Research Assistants drawn from the under graduate students of Architecture Department, University of Jos.

The questionnaire for the study was divided into five schedules namely:

i. Schedule 1 was on personal data and demographic data of the respondent
ii. Schedule 2 was on building spaces.
iii. Schedule 3 was on modification of houses.
iv. Schedule 4 was on functionality of spaces.
5. Schedule 5 was on housing quality.

5. **Focus Group Discussion**

Focus Group Discussion according to Uji (2009) is an instrument of data collection using a small, carefully selected, group of fairly more knowledgeable individuals (say about 6-8) representing a larger group, in order to discuss the subject matter of interest in a free and unlimited manner and guided by the researcher (called the facilitator of the FGD). The reason for using this instrument is because the information collected is more reliable than that from one-to-one oral interview, and provides a cross-section of well-informed opinions on the issue (Uji, 2009). During the preliminary field survey, the researcher came across a number of professionals in the building industry that reside within the Low cost houses. Also most residents of the Low-Cost houses are knowledgeable, which necessitate the use of this instrument.

The focus group discussion was zoned into three Geopolitical zone of the State, using random sampling technique as obtained in the sample size of study. The northern zone is having Miango Low-cost Housing, for the Central Zone is Pankshin Low-cost Housing. The southern zone is Shendam State Low-cost Housing. A total of three focus group discussion was adopted for this research work. The home owners in these locations are homogenous groups who share common characteristics income, house plan design, and majority have spent more than ten years in the locations.

6. **Library**

The researcher uses the library as an instrument for data collection. The Library visited in this study include: the Jos National Library; University of Jos Library, Department of Architecture, Data Room; Plateau State Ministry of Housing Library; the Author's Library and Archives of Plateau State Investment and Property corporations which form part of the literature review.

7. **Internet Websites**

The researcher uses the internet service as part of his designed research instrument. The researcher visited many internet websites, which include Google, Wikipedia, Library, Yahoo, etc. to gather enough information on the research topic. This instrument was used in the review of literature as well.

3.6 VALIDITY AND RELIABILITY OF INSTRUMENT

3.6.1 Validity

Uji (2009) pointed out that, before data collecting instruments are deployed to use, they must be tested as to their validity in performing that task of data collection as envisaged in the research. The researcher recognized that before data collecting instrument are employed for use, they must be tested to establish their validity in performing the task of data collection as envisaged in the research. The research instrument used in this study satisfied content validity in terms of adequate coverage of the scope of the post-occupancy survey. There are four ways indicated in literature by which this can be done (Devous, 2012).

i. By using the instrument twice on the same group of persons (test- retest correlation}
ii. By split half correlation
iii. By average item-total correlation or by correlating each item with other items, and averaging the coefficients (average inter-item correlation).

3.6.2 Reliability

This study will therefore employ the Cronbach's alpha to give a measure of reliability, as it is considered to provide all the possible ways of splitting the test items. According to research conducted by Field (2000) as cited in Adraanse (2007), the degree of reliability is considered to be accepted when Cronbach's alpha is greater than 0.70.

According to Uji (2009) it is possible to try out the instrument on a smaller but similar practice sample in a pilot survey, where even test-retest may be carried out. A pilot study was undertaken to test the reliability of instrument. The questionnaire instrument was tested for reliability, referring to its precision, dependability and predictability. This was determined by test-retest method.

3.7 PROCEDURE FOR DATA COLLECTION

This study has adopted the distinctive and reliable data collection procedure which comprised sites visits, structured and unstructured interview, oral interview, focus group discussion, photography and questionnaire survey. At first the researcher visited the sites under study and identified the nature and extent of housing in these locations, considering the alteration and modification made to these buildings and people's level of satisfaction with the housing.

In the second stage, observations were structured by researcher and the set of objectives and variables to be observed were identified and listed, alongside itemizing the sequence of residential buildings to be observed which were systematically selected. Photographs were taken to support the investigation survey. The survey tool in a form of questionnaire had been designed for the purpose of eliciting information from respondents. The function of the questionnaire was to determine the nature of the low-cost houses, size of spaces provided for every activity, functionality of the spaces, alterations and modifications made to these buildings. The third stage, interviews were conducted using focus group discussion to elicit responses and information in relation to assess the

effectiveness of the proposal evaluation study. The letter of introduction enabled the researcher to personally visit the low-cost houses to collect the necessary data from respondents (See Appendix A2).

In this study, a total of one hundred and forty (140) questionnaires were administered to the inhabitants of Miango, Pankshin and Shandam state Low-cost houses with the help of three research assistants. These research assistants were Undergraduate Students of the Department of Architecture, University of Jos. The selection of sample of neighbourhoods for the research was carried out using Stratified Sampling Technique (SST). This technique according to Uji (2009) is the modification of both simple random sampling and systematic sampling, were groups of the population have certain different characteristics, and it is desired to reflect such attributes in the sample in such a way that reflects similar proportions of their presence in the population. This type of sampling according to Uji (2009) will ensure that each building types are represented in the sample in the same fraction they appear in the population.

The questionnaires were administered in April, 2014. Three weeks was used for the administering and retrieving of the questionnaires. Out of the one hundred and forty questionnaires administered, only one hundred and twenty (120) were retrieved and properly filled by respondents. Ten (10) of the questionnaires were misplaced by respondents, while ten (10) were returned not filled by respondents, making the total of ten (20) invalid questionnaires.

3.7.1 Training of Research Assistants

For effective and proper organisation and coordination of the research, two research assistants were utilized. These research assistants were BSc. Undergraduate students of the Department of Architecture for 2013/2014 session. The two research assistants were used throughout the study. The justification for using them was that, they were participants of the research right from the inception of the research. They were

carried along right from the beginning; therefore they were familiar with the purpose, content and objectives of the instruments for data collection.

The simple random sampling method was used in selecting the two respondents from their course mates in Department of Architecture, University of Jos. This was done through simple lottery method, where students picked the wrapped pieces of paper with the inscription Yes or No. Students that picked Yes became part of the study. The research assistants were picked from Architecture Department in order to ensure that the had the understanding and knowledge of the content of research as well as the professional qualification required. The training took place in my office at Department of Architecture. The first two days of the training, research assistant were introduced to the site. The third and forth day was used for training on morphological mapping or low-cost houses, Physical Traced Analysis (PTA), observing environmental behaviour, focus group discussion and questionnaires. Total of one hundred and forty questionnaires were administered to the inhabitants of Miango, Pankshin, and Shendam low-cost houses by the research assistants. Out of the one hundred and forty (140) questionnaires administered, only one hundred and twenty (120) were retrieved and properly filled by respondents. Ten (10) of the questionnaires were misplaced by respondents, while ten (10) were returned not filled by the respondents, making a total of twenty (20) invalid questionnaires.

3.7.2 Administration of Pre-Test

The instrument used for the pre-test was physical observations, focus group discussion and questionnaires. This was conducted with the help of the two research assistants in Miango low-cost housing. The researcher visited the Miango low-cost housing together with the two research assistants. Physical measurements were taken for both internal and external spaces. Focus group discussion was conducted along side with the questionnaires. Forty questionnaires were administered for the pre-test and they were

fully filled and returned for pre-test analysis. This was basically carried out to test all the instruments that will be used in the post-test.

Multiple regression was used to test the hypothesis on user characteristics and user satisfaction. Correlation was use in testing hypothesis on sizes of rooms and number of bedrooms; alteration made to buildings and user satisfaction; functionality of spaces and user satisfaction, housing quality, performance of building, basic services and user satisfaction.

3.7.3 Administration of the Treatment Programme

The administration of the treatment programme in the research was based on the research tools used. The administration of the focus group discussion was conducted in the three study areas. The home owners in the locations are homogenous groups who share common characteristics income, house plan, design and majority have spend more than ten years in the location. A random number table was used to determine which household to contact. The research assistants who were fluent in both English and Hausa language contact the home owners. The research assistances were trained to first introduce themselves and the purpose of the focus group to each house owner contacted. The research assistants went ahead to inform them about time commitment, tape recording, location, value of the contribution and their confidentiality that would be maintained. The research assistants were trained to respond to al question or concern about their participation in the focus group discussion.

The administration of the questionnaires was done by the help of the two research assistants, the targeted category of respondents include residents of the low-cost houses, professionals in the building industry and other populace residing in the study areas. The questionnaires were administered using stratified random sampling. The questionnaires were divided into five schedules and every respondent was expected to answer all the sections:

Schedule 1: Personal data and demographic data of the respondents

Schedule 2: Internal and external spaces of the building

Schedule 3: Modification/alterations made to low-cost buildings

Schedule 4: Functionality of the architectural design spaces of low-cost houses

Schedule 5: Quality of the low-cost housing.

Physical observation was carried out on all the three study areas with the help of the research assistants were physical measurements of both internal and external spaces were carried out. The floor plan, roof place, elevations of the original low-cost houses was reproduced by the researcher in order to carry out the study on existing spaces, because the researcher was not able to find the existing architectural drawing of the low-cost houses. The physical observation focus on the roof/ceilings, door and windows, floor plan, walk car porch/entrance porch, floor finishing, external fence/gate and drainage system. Also the condition of the low-cost houses was carried out through observation. The result was presented in Appendix A4.

3.8 METHOD OF DATA ANALYSIS

The analysis of data was conducted based on the research questions and statistical test used for testing the hypothesis of the study. After collecting data from the field, the data collected were in state of disarray and needed to be organized into meaningful order and patterns to facilitate analysis. A major source of this sorting-out task involved determining the variables of interest and placing the data in patterns by the distribution of scores in a data set or responses to the variables. In order to facilitate the process of analysis, variables and scores, as well as responses and other pattern of data were coded in the most convenient manner. The organization and presentation of data were done using appropriate tittles that correspond to each research question raised, and each hypothesis to be tested. According to Uji (2009) the presentation of results means putting the results in

factual and original raw form, without any attempt to interpret and draw inferences. The most common ways in which data collected in this research were organized, summarized and presented included the use of illustrations such as frequency distributions, tables, graphs, charts, maps, diagrams, pictures, drawings and sketches. This mode of presentation enabled data organized to be seen and interpreted at a glance and it is derived from the research submissions made by Akogun (2002) cited by Nwankwo (2013) as presented in Table 10.

Table 10: A Set of Heuristics to Guide the Use of Illustration

S/No	What is important	Types of illustration
i.	If exact values are what is important	- Use tables
ii.	If trends and relationships are more important than exact measures	- Use graph (if data permit it)
iii.	If location with regard to data is important	- Use maps (with appropriate shading of areas)
iv.	If a series of steps need to be presented	- Use algorithms
V	If process or direction is required	- Use flow charts
Vii	If exact description is required	- Use pictures, or picture charts

Source: Akogun (2002) cited by Nwankwo (2013)

After data are gathered, using the instruments outlined above, the data is organized into meaningful order and patterns to facilitate analysis, which is referred to as sorting out. A major aspect of this sorting out task involves determining the variables and placing the data in the patterns created by distribution of scores in data set, or responses to the variables. For computer analysis, the variables and the scores are properly coded in a convenient manner. Appropriate titles that correspond to each research question raised and hypothesis to be tested are properly presented. The presentation of result is done by the use of frequency distribution tables; graphs; bar charts and pie charts. The research questions involve so many variables, therefore, the method appropriate for multivariate analysis such as multiple and partial correlation, multiple and partial regression were employed.

Central to this study was the identification and evaluation of the hypotheses discussed in section 1.6 which the research questions of the study as outlined in section 1.5 developed the background relating to user satisfaction with architectural designed spaces of buildings selected neighbourhoods of Jos Low-Cost houses of Miango Low-Cost, Pankshin Low-cost housing and Shendam Low-cost housing. The tests of the hypotheses sought to verify whether there is a significant difference or relationship between personal characteristic of the respondents and the overall user satisfaction. Also to determine whether there is significant relationship between size of the rooms and no of bed rooms; To determine whether there is significant relationship between users' satisfaction and alterations made to the low-cost houses; to determine as well whether there is significant relationship between the functionality of the spaces provided and users satisfaction. Before testing the hypothesis, the variables of the study were selected and organised into independent and dependent variables which were cross tabulated to determine their relationships and association.

Variables for the Study

A variable is a concept (symbol or characteristic) whose values can vary and can take more than one value of a quality or characteristic that varies among the subjects of investigation. There are different types of variables, the independent and dependent variables; an independent variable is the presumed cause or influence or explanation of the dependent variable, whose values are presumed to be dependent on or affected by the independent variable. The dependent variable is the presumed effect or function of the independent variable (Adigun and Isma'il cited by Sati, 2014).

The independent variables of the study are the characteristics of users and the dependent variables are the user satisfaction and were measured in order to determine their relationship. The variables were measured using structured questionnaire, through scored scale response technique such as Likert attitudinal scaling or semantic differentials. The various relationships sought were expected to be evaluated at four levels;

i. The relationship between users' characteristics and user satisfaction
ii. The relationship between size of the rooms and no of bed rooms
iii. The relationship between users' satisfaction and alterations made to the low-cost houses
iv. The relationship between the functionality of the spaces provided and users satisfaction

The main techniques of analysis used here were generally those of multivariate analysis, which commonly utilize various forms of factor analysis, multiple regressions and correlation analysis. To be specific, the individual techniques used to test the specific hypothesis postulated in this work are tabulated below (Table 11):

Table 11: Hypothesis and Analytical Techniques Applied

S/N	HYPOTHESIS	ANALYTICAL TECHNIQUE
1	User characteristic and user satisfaction	Multiple Regression
2	Sizes of rooms and number of bedrooms	Correlation
3	Alteration made to buildings and user's satisfaction	Correlation
4	Functionality of spaces and user's satisfaction	Correlation
5	Housing quality, performance of buildings, basic services and user's satisfaction	Correlation

Source: Author, 2015

The Regression Test

When variables are found to be related, such relationship may either be associational or causal. If the relationship is merely associational, a change in one may accompanied by, or associated with some change in the other so observed in the other. The two variables are only measured after monitoring them, unobtrusively, and after observing the change.

On the other hand, when a change in one variable by definite amounts creates a constant change in the other, in such way that manipulation of one is possible to induce a predictable constant change in the other, the relationship is said to be predictive, causal, linear, or a regression relationship. Thus, if Y changes in a given way, as X changes, it should be able to say something about the value of a given Y score, once that of X is known. This is the basis of prediction associated with causal relationships. But the test is used as a parametric test to test the hypothesis when such relationship may also either is associational or causal.

The equation is given by:

$Y = a + bx$

Where:

Y = dependent variables

X = independent variables

A study by Giovanni, and Francesco, (2006) of Residents' perception of urban green spaces: the case of Bari; used the linear regression model which gave a degree of relationship between one behavioural and one attitudinal as dependent variables gave a p-value of 0.436. Those which fit the model have a high statistical significance of (p0:05). It gave a satisfactory result that deficiency of green spaces is being perceived as an element which can defect the improvement in the quality of the built environment.

The simple linear regression test was used in this study to find the degree of relationship that exists between two variables in order to predict the value of one variable given the other.

The Correlation Coefficient Test

When a study seeks only the degree of association between two variables, for instance, a study may wish to find out if an architecture student's performance at Free Hand Drawing course examination is indicative of his ability in Design Studio. The concept of correlation according to Uji, (2009) cited in Sati, (2014) page 163 involves a study in two or more variables are measured to find the direction and degree to which they are related. Kiess emphasises that, neither variable is manipulated as would happen is causal relationships. Thus, there is no independent or dependent variable with the designation of a variable as either X or Y. The degree of correlation between X and Y is usually measured by Pearson's product moment correlation coefficient.

The Pearson product moment of correlation (r) indicates measures of relationship between two or more variables. When the degree of correlation between two variables is computed as an index, the correlation index is referred to as coefficient of correlation. In its simplest form, the Coefficient of Correlation formula is as indicated below:

$$r = \frac{n\sum XY - \left(\sum X\right)\left(\sum Y\right)}{\sqrt{\left[n\sum X^2 - \left(\sum X\right)\right]\left[n\sum Y^2 - \left(\sum Y\right)^2\right]}} \quad -1 \le r \le 1$$

The r (coefficient of correlation) is defined as an index representing the strength of correlation between the sets of variables.

Where:

X = Scores in variables (X)

Y = Scores in variables (Y)

$\sum X$ = Sum of X

$\sum Y$ = Sum of Y

$(\sum X)^2$ = sum of X squared

$(\sum Y)^2$ = sum of Y squared

n = number of pairs of scores

$n\sum X^2$ = product of n and sum of X Squared

$n\sum Y^2$ = product of n and sum of Y Squared (Sati, 2014)

This test was used by Sati, (2004) to test whether green spaces perceived by users have a significant relationship with the architectural composition of Jos metropolis.

The correlation coefficient statistical tool used in this study to test hypothesis, the result showed that there is no association between green spaces perceived by the users and architectural composition within the selected neighbourhoods of Jos metropolis, since the P-value of 0.114 is more than level of significance 0.05.Therefore, the Null Hypothesis ($\mathbf{H_0}$) was accepted while the Alternative ($\mathbf{H_1}$) was rejected.

Also, a study by Sun-Hwa, cited by Sati (2004) examined the association between an organisational employees perception of green spaces within their work environment, correlation coefficients were computed among their scales. The results of correlation revealed that the employees perception of green spaces within the organisational work environment were statistically significant at $\alpha = < .05$ level. Among the variables, perception of green spaces had strong correlation to the work environment (r = .38). It clearly showed that green spaces are positively correlated to the organisational employees' perception of the work environment. Based on this result, correlation test was carried out for hypothesis 2, 3 and 4 in this research work.

CHAPTER FOUR
RESULTS

This chapter dealt with the detailed presentation of result from physical observation, questionnaires and focus group discussion from the study. The data obtained from the study consist of results of responses to the main questionnaire schedule, physical observation and focus group discussion through structured interviews as shown in Appendix A3, A4 and B1. Descriptive statistics, frequencies and percentages were considered important in answering some of the research questions. According to Uji (2009), after data of raw scores have been collected and made ready for handling, one way of putting these data (which will naturally be in a disarray) into some form of order, involves the employment of frequency distribution. Frequency distribution is an organization (usually in a tabular arrangement) of scores obtained from data set, showing the frequency with which each score occurs. Tables 12–46 and Figures 19–53 represents frequency and percentage distribution of the questionnaires administered.

Table 12: Location of Areas of Preliminary Survey /Questionnaires Distributed

	Location of Low-cost Housing			
	Frequency	Percent	Valid Percent	Cumulative Percent
Maingo Low-cost				
Street 1	24	20	20	20
Street 2	20	16.7	16.7	36.7
Pankshin Low-cost				
Street 3	16	13.3	13.3	50
Street 4	12	10	10	60
Shendam Low-cost				
Street 5	24	20	20	80
Street 6	24	20	20	100
Total	**120**	**100**	**100**	

Source: Author's Field Work, 2014

Table 12, presented above from the data obtained from questionnaires employs the frequency categorical distribution, grouped and ungrouped frequency distribution. This table represents the preliminary distribution of questionnaires showing the number of valid questionnaires retrieved and the frequency and percentages. Out of the one hundred and fifty questionnaires administered, only one hundred and twenty (120) were retrieved and properly filled by respondents. Eleven (11) of the questionnaires were misplaced by respondents, while nineteen (19) were returned not filled by respondents, making the total of 30 invalid questionnaires. From the table, twenty four (24) questionnaires were retrieved from street 1 representing 20% in Maingo Low-cost housing; from street 2, also in Maingo low-cost housing twenty (20) questionnaires were retrieved representing 16.7%. In street 3, Pankshin Low-cost housing, sixteen (16) questionnaires were retrieved representing 13.3%; from street 4 also in Pankshin Low-cost housing, twelve (12) questionnaires were retrieved representing (10%). Streets 5 and 6 in Shendam Low-cost housing twenty four questionnaires were retrieved from each street representing 20% each. Bar chart in Figure 19 was used to represent the frequency data shown on Table 12.

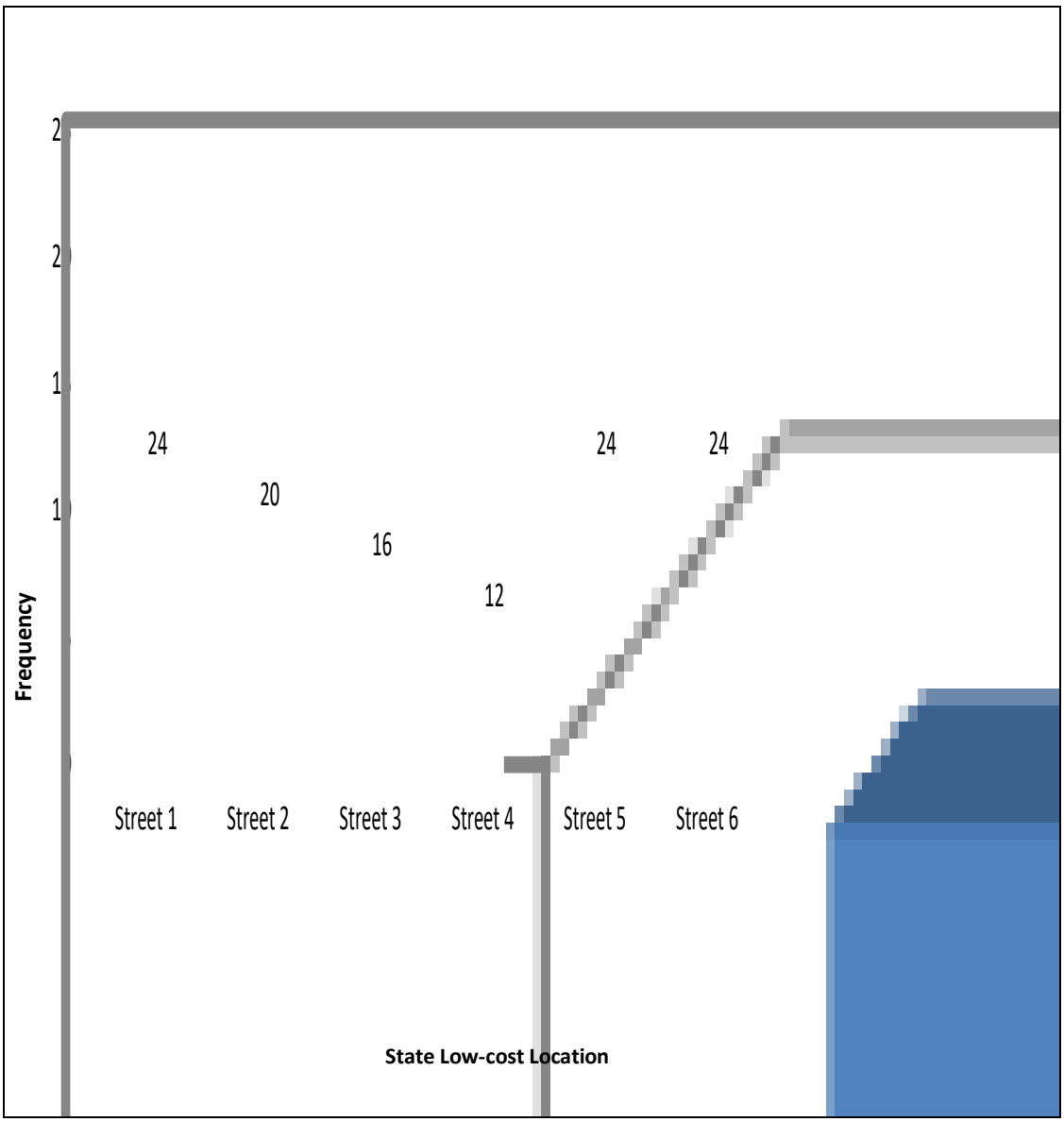


Figure 19: Bar Chart showing Areas of Preliminary Study/Bar Chart Distributed

Table 13: Ethnic Group of Respondents

Ethnic Group	Frequency	Percent	Valid Percent	Cumulative Percent
Mwanguul	20	16.7	16.7	16.7
Taroh	16	13.3	13.3	30
Bogom	4	3.3	3.3	33.3
Jhar	12	10	10	43.3
Ngas	20	16.7	16.7	60
Goemai	16	13.3	13.3	73.3
Berom	8	6.7	6.7	80
Idoma	4	3.3	3.3	83.3
Ron	4	3.3	3.3	86.7
Miryang	4	3.3	3.3	90
Chip	4	3.3	3.3	93.3
Yong	4	3.3	3.3	96.7
Piapung	4	3.3	3.3	100
Total	**120**	**100**	**100**	

Source: Author's Field Work, 2014

Table 13 represents the ethnicity of respondents in the preliminary study areas. Twenty (20) respondents each are Mwangvul and Ngas, by tribe, representing 16.7% each, followed by Taroh and Geomai with sixteen (16) respondents each, representing 13.3%. Twelve respondents are from the Jhar tribe, representing 10%. Eight (8) respondents are Berom by tribe, representing 6.7%. Four (4) respondents each from the following tribes, Bogom, Idoma, Ron, Miryang, Chip, Yong and Piapung representing 3.3% each. This signifies that the random selection for the distribution of questionnaires cut across the various tribes in plateau state. This confirms that most of the inhabitants of the low-cost houses are not dominated by one tribe.

Bar chart (Figure 20) below was use to represent the frequency distribution obtained from Table 13 above for proper understanding of the frequency distribution of the ethnic groups.

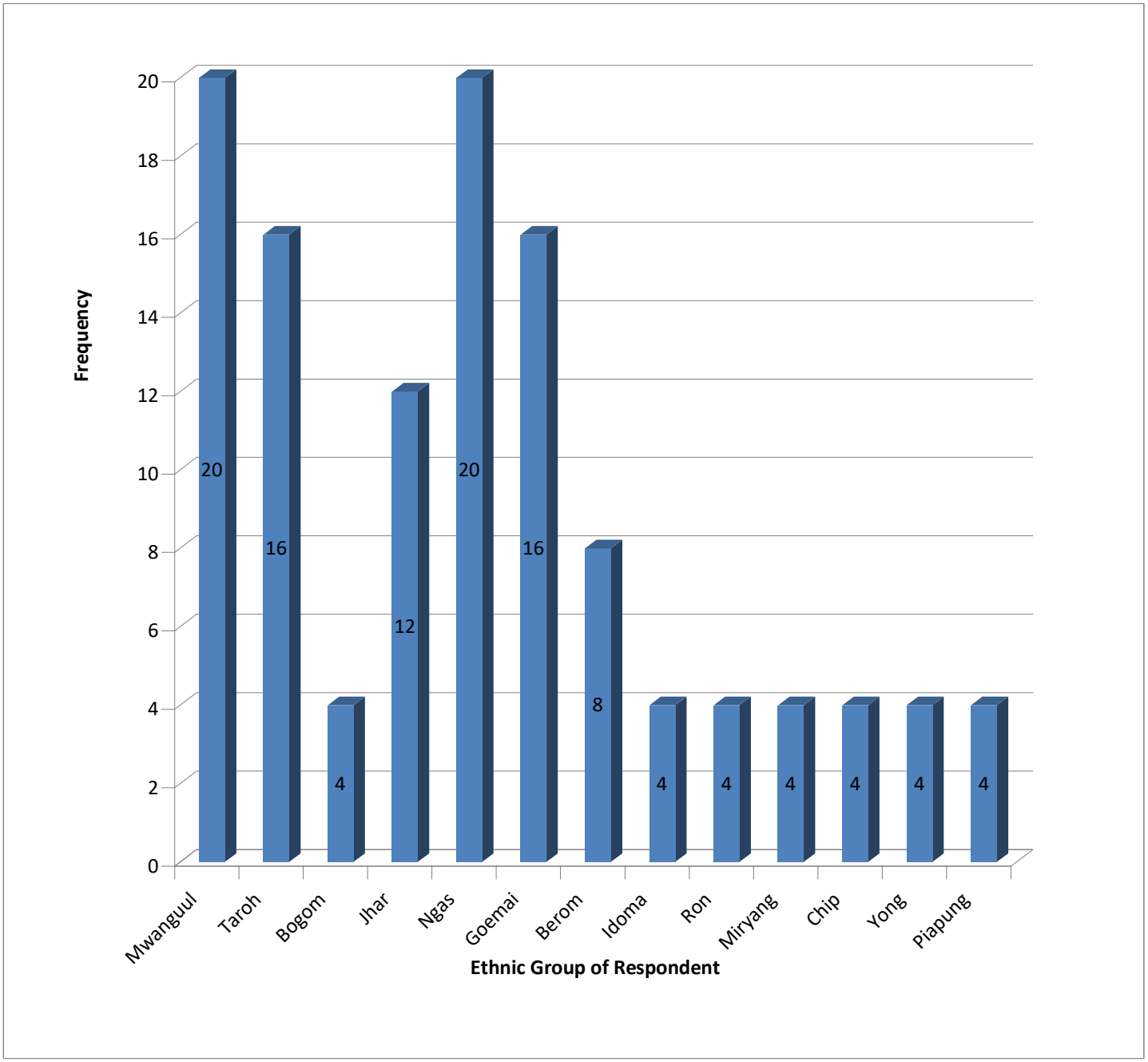


Figure 20: Bar Chart Showing Ethnic Group of Respondent

Table 14: Religion of Respondent

Religion	Frequency	Percent	Valid Percent	Cumulative Percent
Christian	111	92.5	92.5	92.5
Islam	9	7.5	7.5	100
Total	**120**	**100**	**100**	

Source: Author's Field Work, 2014

From Table 14, the respondents are predominantly dominated with Christians with 93%. Islam is 8%. This confirms the information supplied during the Focus Group Discussion. From the Focus Group Discussion it was established that majority of the inhabitants of low-cost housing are Christians. This confirms the fact that Plateau State is dominated by the Christians.

Bar chart was drawn in Figure 21, to represent the frequency percentage of the respondent's religion. One hundred and eleven (111) representing 92.5% respondents are Christians, while nine (9) representing 8% of the respondents practice Islamic religion.

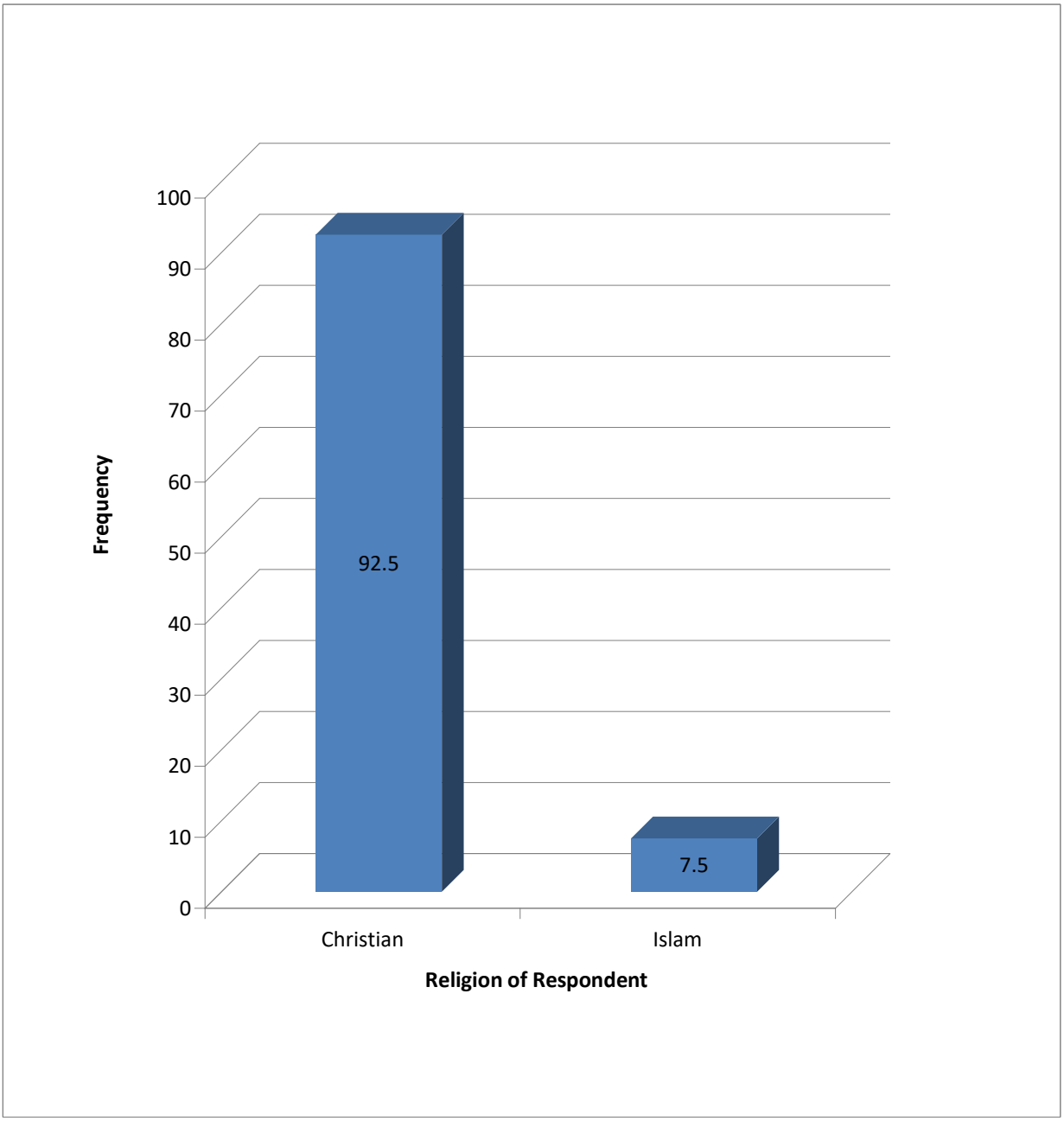


Figure 21: Bar Chart Showing Religion of Respondent

Table 15: Educational Attainment Level of Respondent

	Frequency	Percent	Valid Percent	Cumulative Percent
Primary educator its equivalent	4	3.3	3.3	3.3
Secondary educator its equivalent	4	3.3	3.3	6.7
Tertiary education its equivalent	112	93.3	93.3	100
Total	**120**	**100**	**100**	

Source: Author's Field Work, 2014

Table 15 above, shows the educational attainment of the respondents. From the Table, 112 of the respondents had tertiary education or its equivalent which translate to 93.3%. Four respondents each with primary education and secondary education respectively, this translates to 3.3% each.

A bar chart was presented in Figure 22 above, to represent the educational attainment percentage. Primary education and its equivalent of the respondents is 3.3%; secondary education and its equivalent is also 3.3%; tertiary education and its equivalent is 93.3%

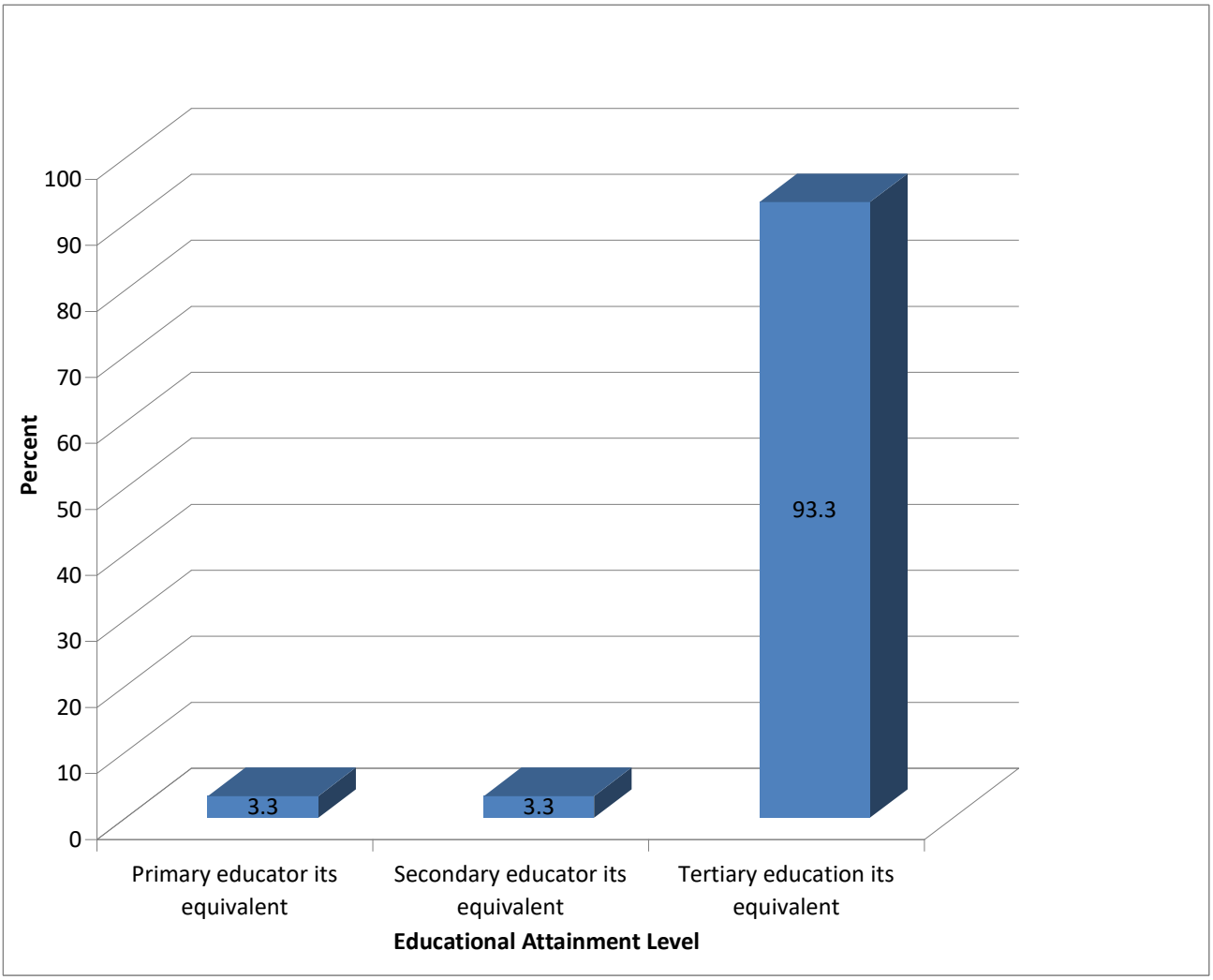


Figure 22: Bar Chart Showing the Educational Attainment Level of Respondents

Table 16: Occupation of respondents

Occupants	Frequency	Percent	Valid Percent	Cumulative Percent
Civil servant	100	83.3	83.3	83.3
Trader/Businessman	12	10	10	93.3
Student	4	3.3	3.3	96.7
Applicant	4	3.3	3.3	100
Total	**120**	**100**	**100**	

Source: Author's Field Work, 2014

Table 16 above, represents the occupation of the respondents and it reveals that 83.3% of the respondents are civil servants. It further reveals that 10% are traders and businessmen. 3.3% of the respondents are students and applicants respectively. This confirms the fact that the houses were designed and allocated for civil servants in the state.

Bar chart was drawn in Figure 23 below to represent the frequency of respondents' occupation. From the chart, one hundred (100) respondents are civil servants; twelve (12) of the respondents are traders/business men; Four (4) are students; while another four of the respondents are applicants.

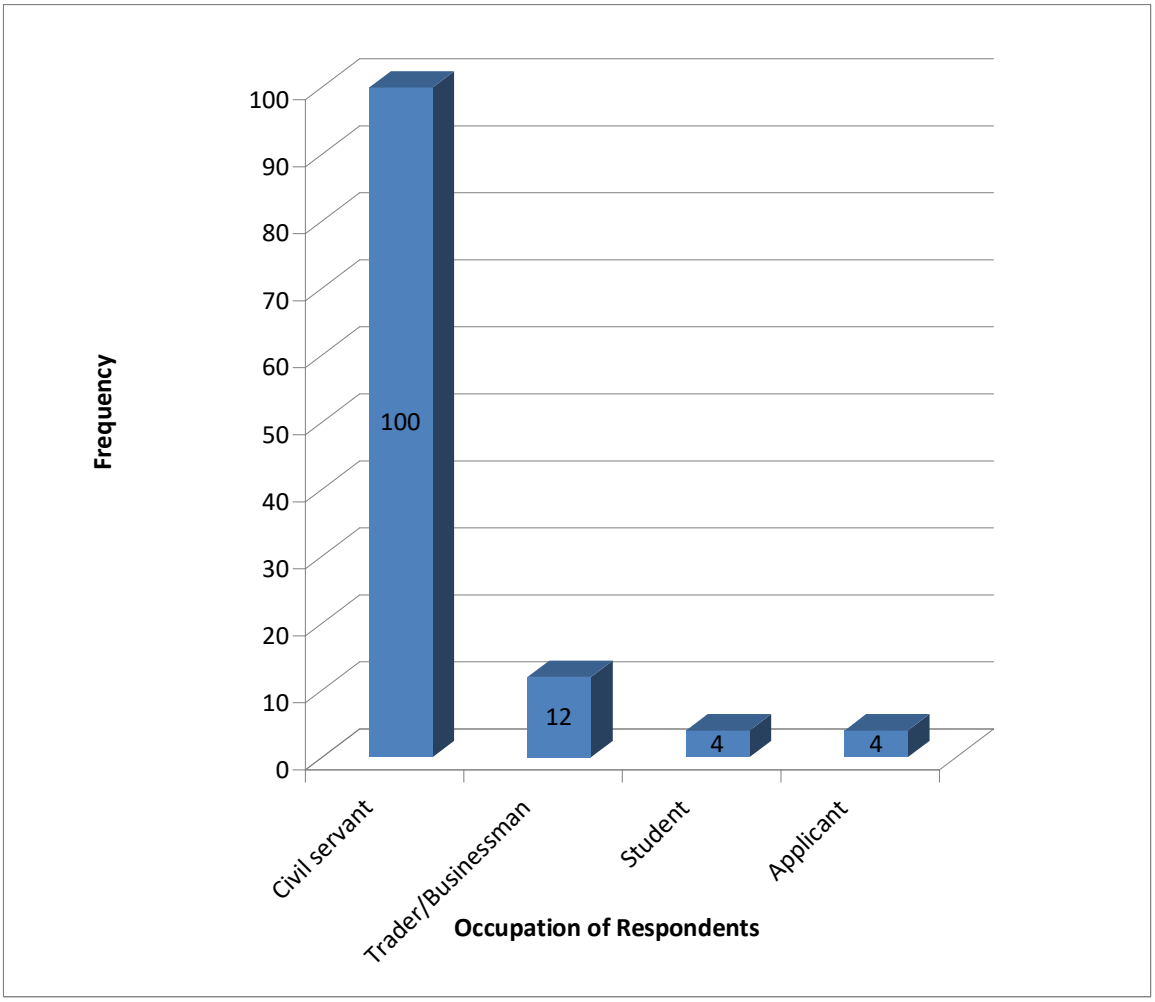


Figure 23: Bar Chart Showing Occupation of Respondents

Table 17: Income Level of Respondents

Income Level	Frequency	Percent	Valid Percent	Cumulative Percent
Low (<50,000.00 per month	16	13.3	14.3	14.3
Medium (between N50,000.00 – N100,000.00 per month)	44	36.7	39.3	53.6
High (>100,000.00 per month)	52	43.3	46.4	100
Missing System	8	6.7		
Total	**120**	**100**	**100**	

Source: Author's Field Work, 2014

From Table 17, the income level of the respondents reveal that 43.3% are high income earners, 36.7% are medium income earners and 13.3% are low income earners. This reveals that majority of the inhabitants of the Low-cost houses are high income earners. This contradicts the initial intention of government towards the Low-cost houses which were purposely designed for middle income earners. It was confirmed that most of the inhabitants were allocated the house while they were in the category of low income earners, but remain in the same house despite their elevation to higher ranks as a result of shortage of houses. There is need for the government to move those of higher rank to the appropriate quarters meant for higher income earners.

Bar chart in Figure 24 was used to present the frequency of the income level of respondents. Sixteen (16) of the respondents are low income earners with less than fifty thousand naira (N50, 000.00) per month; forty-four (44) respondents are medium or middle income earners with earnings of between fifty thousand and one hundred thousand naira (N50, 000-N100,000.00) per month; fifty two of the respondents are high income earners with above one hundred thousand naira per month (N100,000.00) per month.

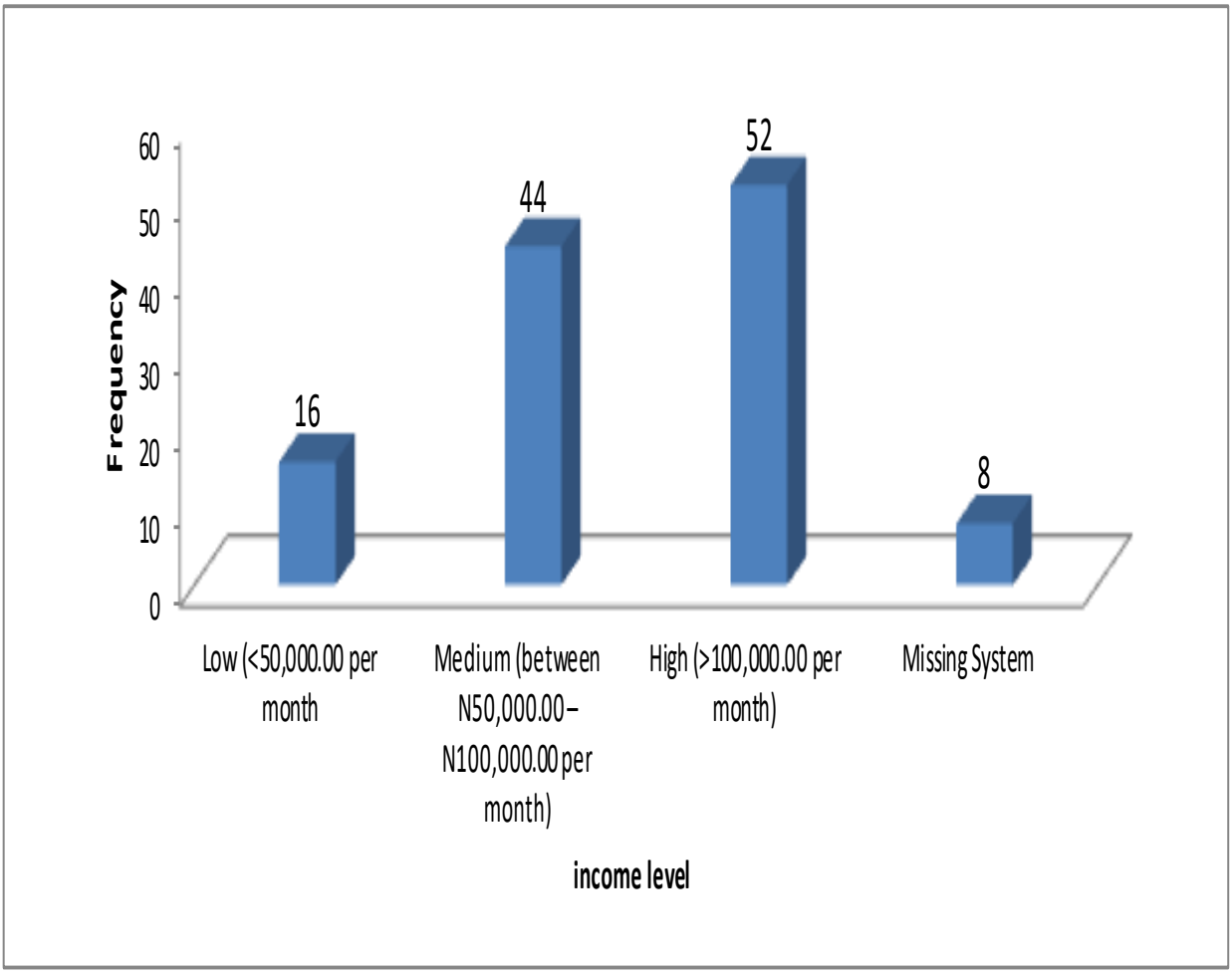


Figure 24: Bar Chart Showing Income Level of Respondents

Table 18: Duration of Respondent in Neighbourhood

How long have you lived in this house or neighbourhood?				
	Frequency	Percent	Valid Percent	Cumulative Percent
< 5 yrs	24	20	20	20
5 – 10yrs	12	10	10	30
15 – 20yrs	12	10	10	76.7
> 20yrs	28	23.3	23.3	100
Total	**120**	**100**	**100**	

Source: Author's Field Work, 2014

Table 18 reveals that 36.7% of the respondents have lived in the neighbourhood between 10-15 years, 23.3% have lived in the neighbourhood for a period of 20 years and above. It further reveals that 20% have lived in the neighbourhood below 5 years and 10% of the respondents have lived in the neighbourhood between 10- 15 years. From the table, frequency distribution chart is also drawn as shown in Figure 25 below. Base on this, one can say that majority of the respondents have lived in the neighbourhood for a period of ten years and above.

In Figure 25 below a frequency chart was drawn to show the frequency of the respondents' duration of stay in the neighbourhood. From the chart, twenty four (24) of the respondents indicated that they have stayed in the neighbourhood for less than five (5) years; twelve of the respondent have stayed in the neighbourhood for a period of five (5) to ten (10) years in the neighbourhood; also twelve (12) of the respondents have stayed in the neihbourhood for the period of ten (10) to twenty years (20); while twenty eight of the respondents have stayed in the neighbourhood for more than twenty years.

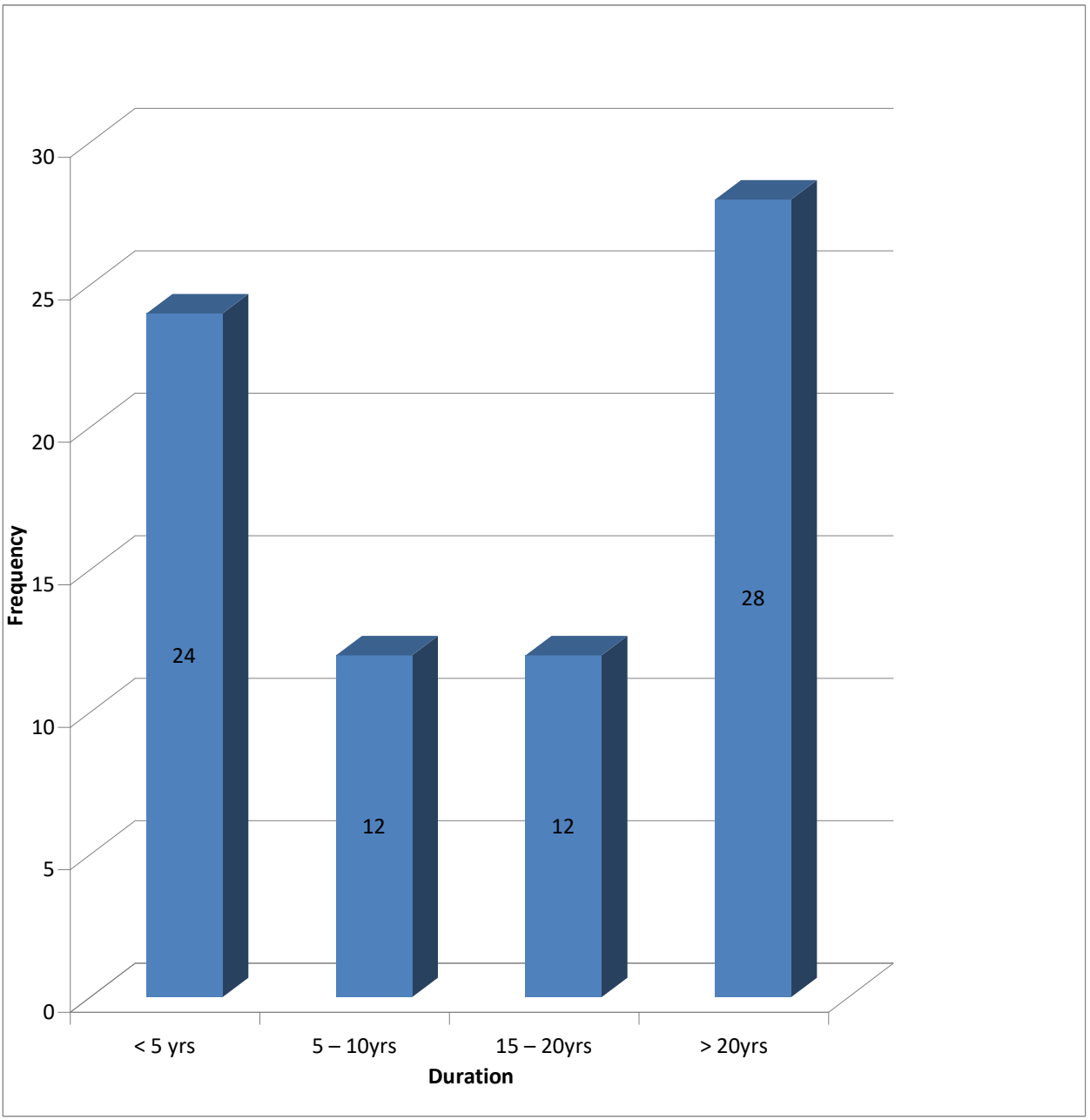


Figure 25: Bar Chart Showing Duration of Respondents in the Neighbourhood

Table 19: Type of Residential Building Occupied by Respondent and how they acquire the House

	Frequency	Percent	Valid Percent	Cumulative Percent
Two bedrooms	108	90	90	90
Three bedrooms	12	10	10	10
Total	**120**	**100**	**100**	

Source: Author's Field Work, 2014

From Table 19, ninety percent (90%) of the respondents occupied two bedrooms semi-detached houses. This revealed that this number of respondents have not altered or modified their apartments. If there is any work done on their apartments, it must be renovation work. Ten percent (10%) of the respondents occupied three bedrooms. All those that occupied three bedrooms are those that have altered or modified their buildings to suit their needs, because the houses were initially designed as two bedrooms semi detached houses.

Bar chart was drawn in Figure 26, showing building types occupied respondents, it was stated earlier above that the low-cost houses were two bedrooms semi detached buildings, but due to individual alteration and modifications additional spaces were created. From the chart, one hundred and eight (108) respondents occupied two bedroom semi detached buildings. On the other hand Twelve (12) of the respondents occupied three bedrooms.

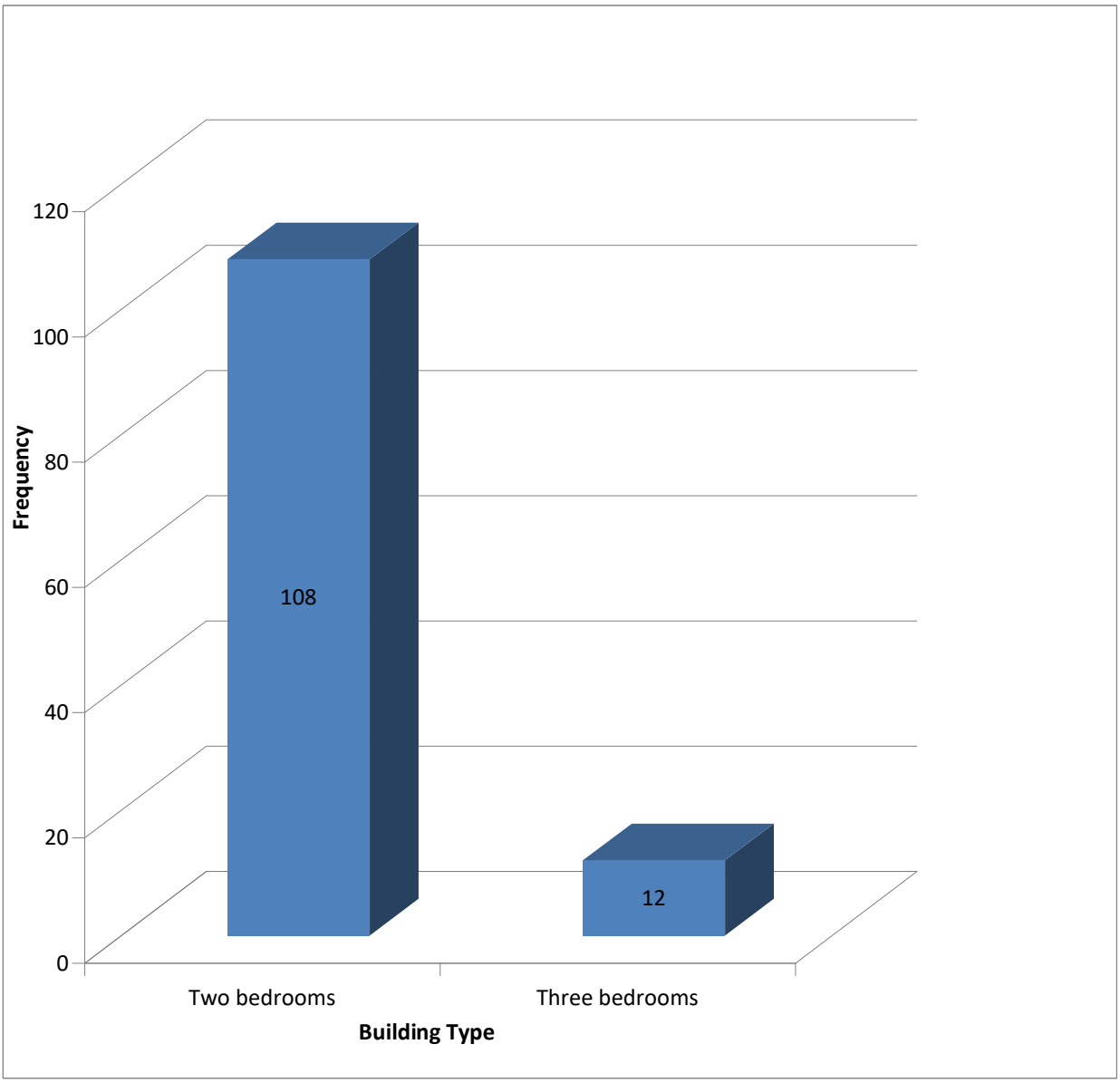


Figure 26: Bar Chart Showing Building Type Occupied by Respondent

Table 20: How the House was acquired

How did you get the place where you are living now?	Frequency	Percent	Valid Percent	Cumulative Percent
I rented it from the owner	32	26.7	26.7	26.7
I bought it from the owner	84	70	70	96.7
Other means (specify)	4	3.3	3.3	100
Total	**120**	**100**	**100**	

Source: Author's Field Work, 2014

From Table 20, seventy percent (70%) of respondents indicated that they bought the houses from the government. Twenty seven percent (27%) rented it from the owners that bought from government. While, three percent (3%) indicated they got the houses through other means. This confirms the fact that the houses were sold to the civil servants. This also indicates that 27% of the house owners rented their apartments.

From the bar chart in Figure 27 below, thirty two (32) of the respondents rented the apartments; eighty four (84) of the respondents bought the apartment from government. While, four of the respondents indicated that they got the houses through other means.

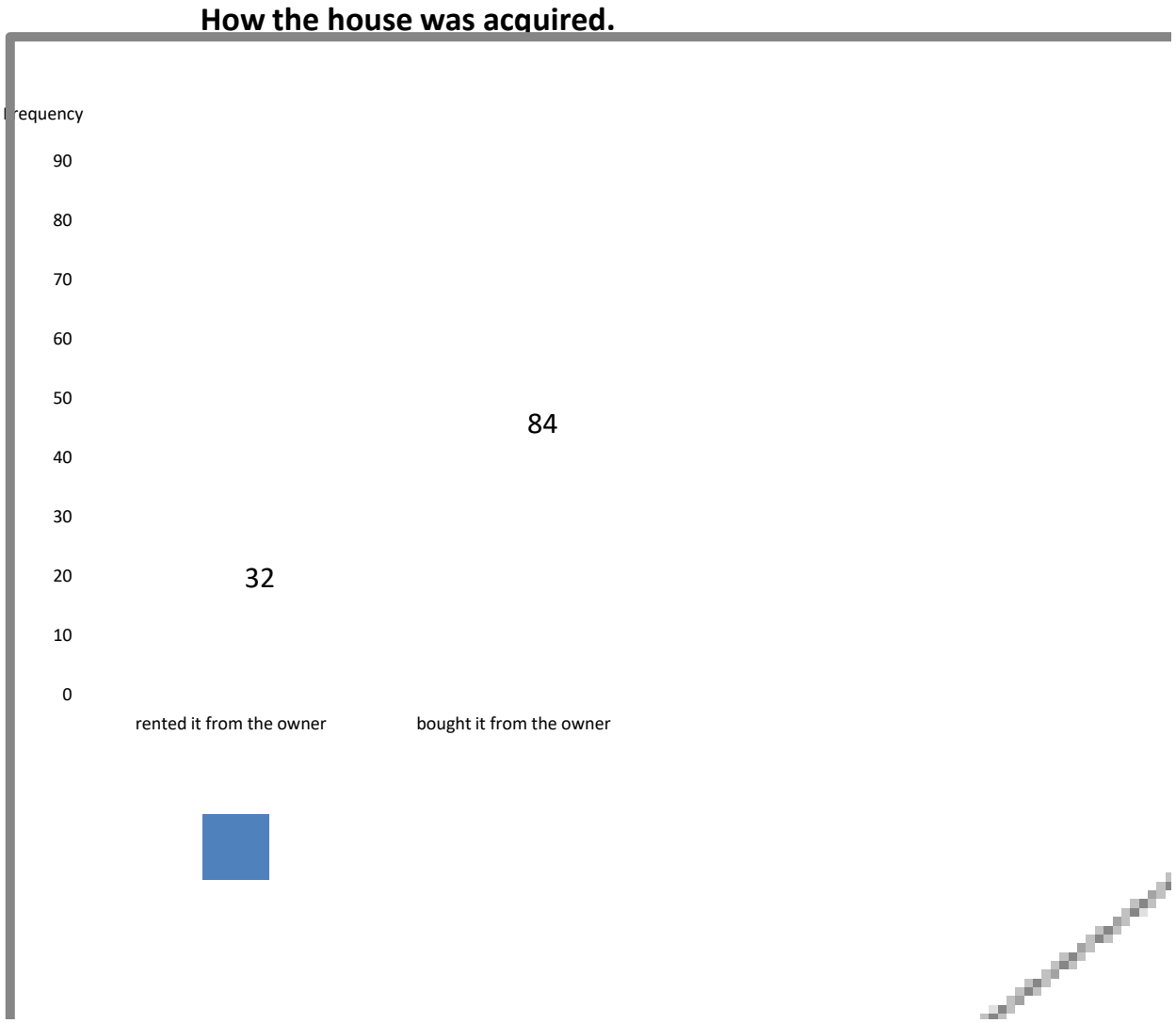


Figure 27: Bar Chart Showing How the Respondent Acquired the House

Table 21: Respondents Satisfaction with Designed Size of Living Room

	How satisfied are you with the size of living room?			
	Frequency	Percent	Valid Percent	Cumulative Percent
Very dissatisfied	44	36.7	36.7	36.7
Dissatisfied	4	3.3	3.3	36.7
Neutral	0	0	0	0
Satisfied	68	56.7	56.7	96.7
Very satisfied	4	3.3	3.3	100
Total	**120**	**100**	**100**	

Source: Field Work, 2014

Table 21 is on residence satisfaction with designed spaces of their houses. 56.7% of the respondents are satisfied with the size of their living room, while 36.7% of the respondents are very dissatisfied with their living rooms. 3.3% of the respondents indicated that they are very satisfied with their living room, while 3.3% of the respondents are dissatisfied. None of the respondents were neutral.

The bar chart drawn in Figure 28 showed the respondents satisfaction with size of living room. From the chart, forty four (44) respondents were very dissatisfied with size of their living room; Four (4) of the respondents were dissatisfied; Sixty eight of the respondents were satisfied; Four (4) of the respondents were very satisfied.

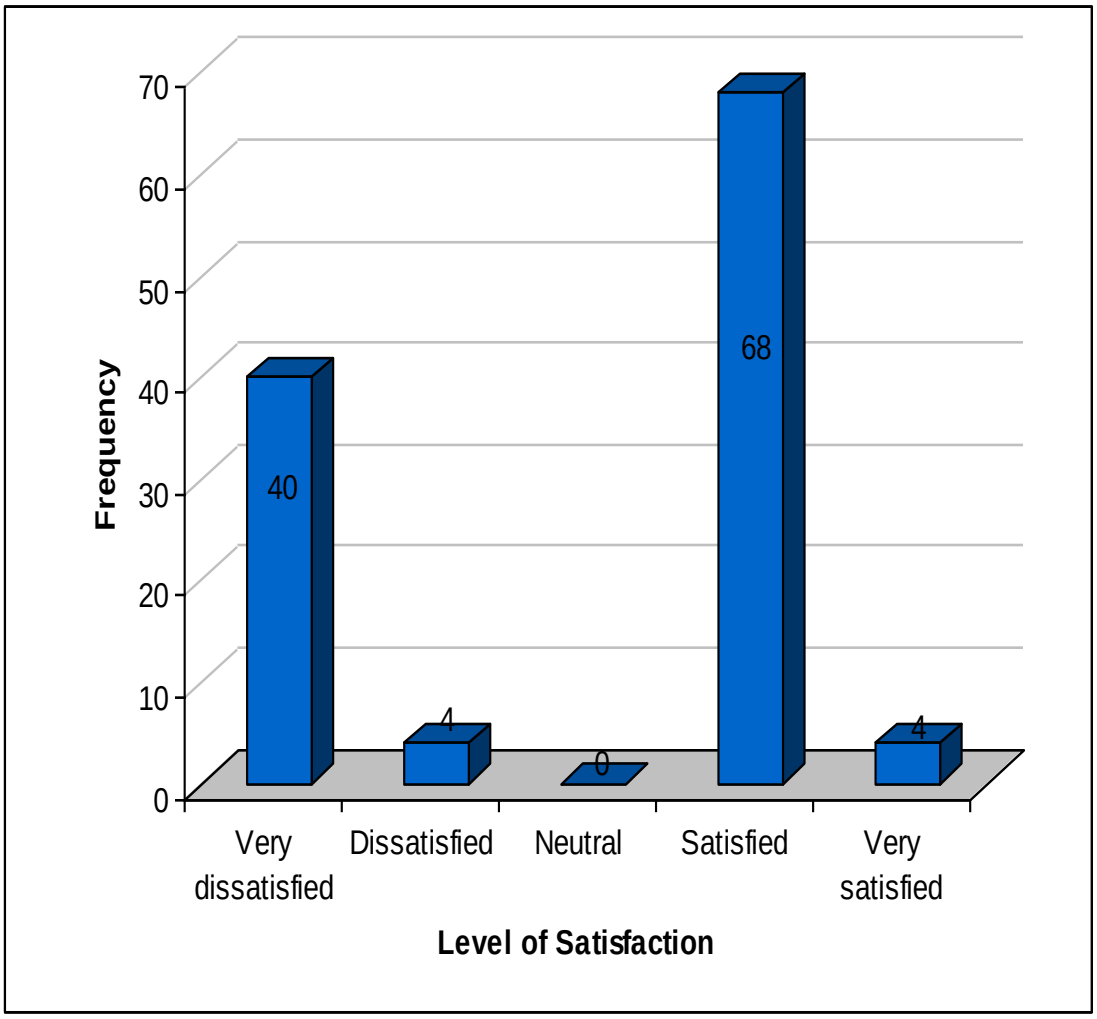


Figure 28: Bar Chart Showing Respondents Satisfaction with Size of Living Room

Table 22: User Satisfaction with Size of Dinning

How satisfied are you with the size of dinning?				
	Frequency	Percent	Valid Percent	Cumulative Percent
Very dissatisfied	60	50	50	50
Dissatisfied	4	3.3	3.3	53.3
Neutral	0	0	0	0
Satisfied	52	43.3	43.3	96.7
Very satisfied	4	3.3	3.3	100
Total	**120**	**100**	**100**	

Source: Field Work, 2014

On satisfaction with the size of dining space, from Table 22 above, 43.3% are satisfied, 50% are very dissatisfied with the dining space. 3.3% indicated dissatisfied and very satisfied respectively. None of the respondents indicated neutral. It can be seen that majority of the user of low-cost houses were not satisfied with the size of the dinning spaces. From the physical observations carried out, most dinning spaces were converted into sitting room, while others demarcated it into bedroom.

Figure 29 below, showed bar chart representing user satisfaction with dinning space. From the chart, sixty (60) of the respondents indicated very dissatisfied with dining space; four (4) of the respondents are dissatisfied; on the other hand, fifty two (52) of the respondents are satisfied with the dinning space; also four (4) of the respondents are very satisfied.

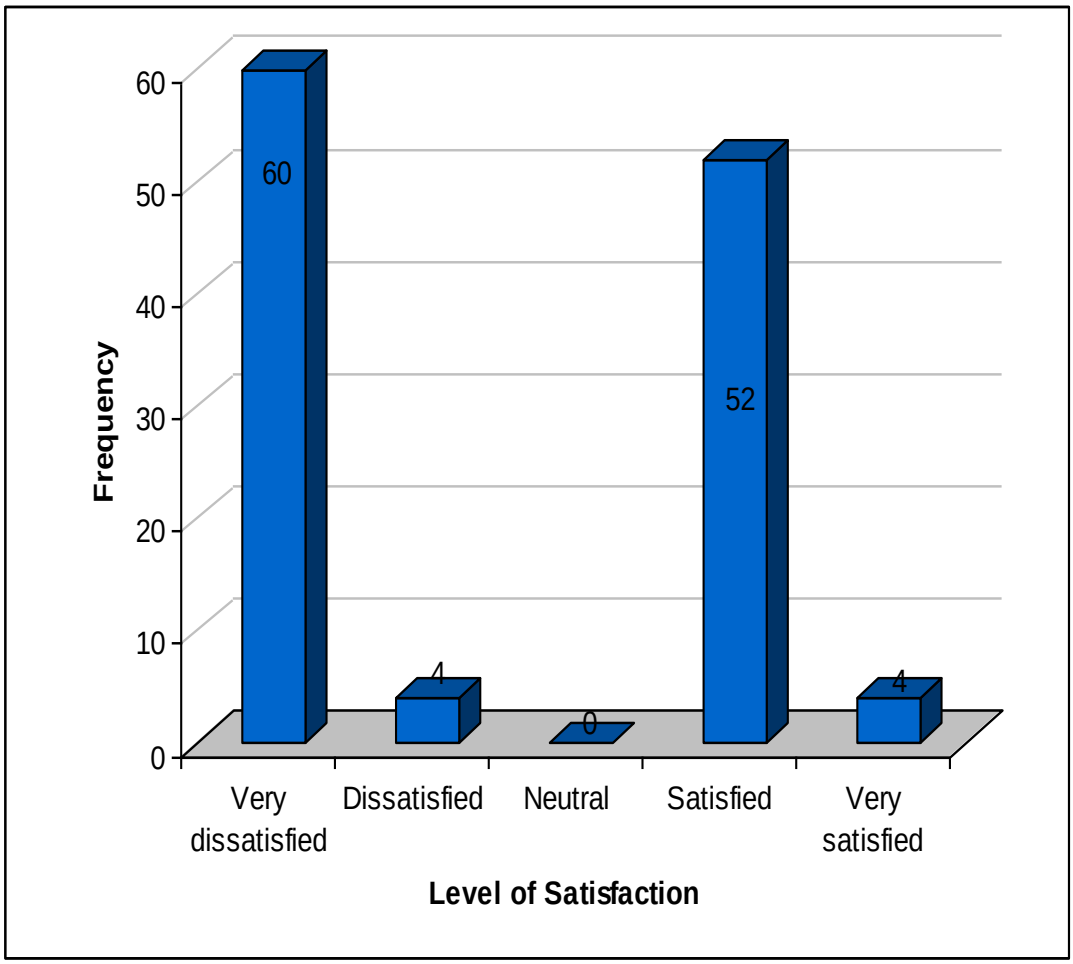


Figure 29: Bar Chart showing User Satisfaction with Dinning Space

Table 23: User Satisfaction with Size of Kitchen

How satisfied are you with the size of kitchen?				
	Frequency	Percent	Valid Percent	Cumulative Percent
Very dissatisfied	52	43.3	43.3	43.3
Dissatisfied	4	3.3	3.3	46.7
Neutral	0	0	0	0
Satisfied	56	46.7	46.7	93.3
Very satisfied	8	6.7	6.7	100
Total	**120**	**100**	**100**	

Source: Field Work, 2014

From Table 23 above, satisfaction with kitchen spaces, 60% of the respondents indicated very dissatisfied, while 33.3% are satisfied. 3.3% indicated dissatisfied and very satisfied respectively. None of the respondent was neutral. Majority of the respondents were not satisfied with the size of their kitchen. From physical observation carried out, most kitchen spaces were converted to store, while others converted it to bedrooms. It was also observed that most users cook outside the house, while others created temporary structure for their kitchen outside the main house.

The bar chart in Figure 30 below, present the user satisfaction with the kitchen size. From the chart, fifty two (52) of the respondents are very dissatisfied with the size of the kitchen; four (4) of the respondents are dissatisfied with the kitchen size; fifty six (56) of the respondents are satisfied with the kitchen size; while eight (8) of the respondents are very satisfied with the kitchen size.

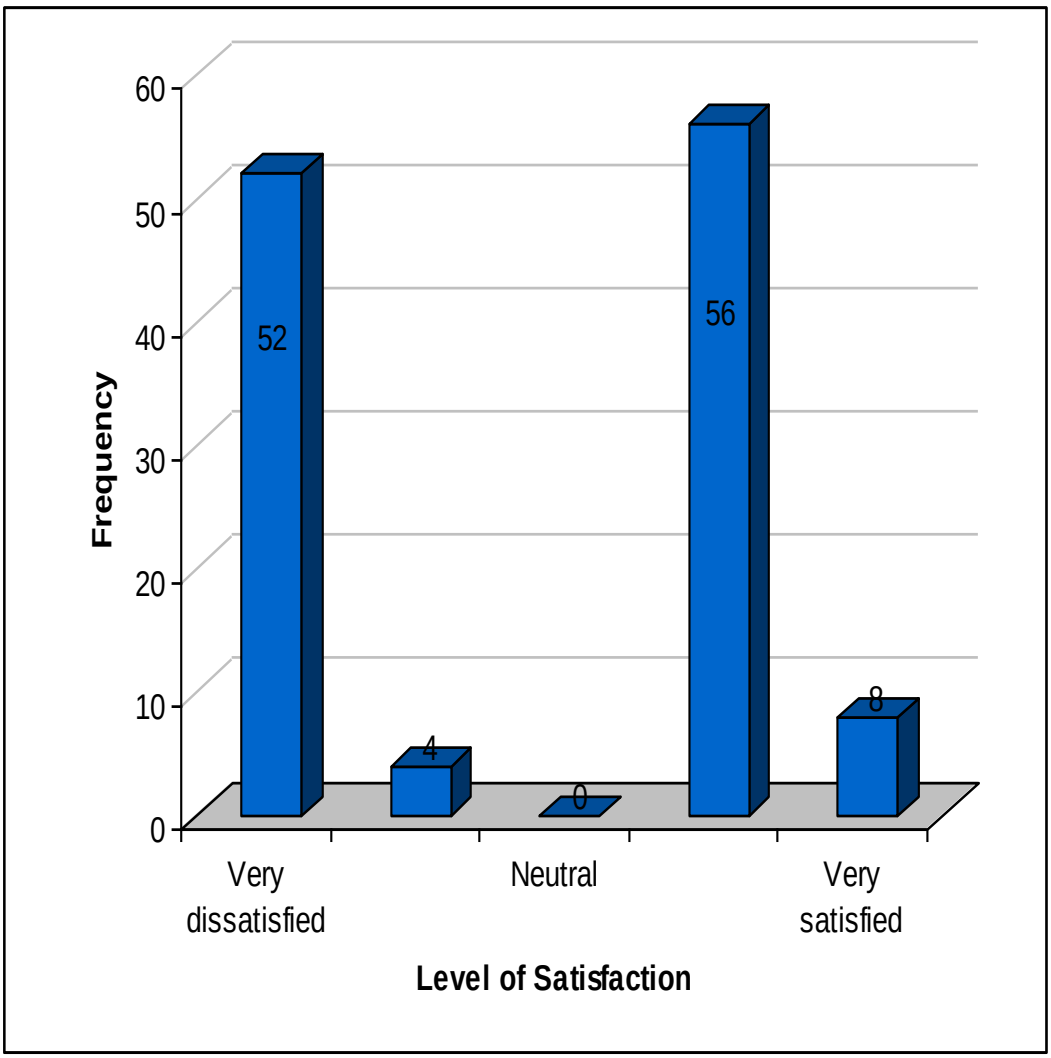


Figure 30: Bar Chart Showing User Satisfaction with Kitchen Space

Table 24: User Satisfaction with Size of Store

How satisfied are you with the size of store?				
	Frequency	Percent	Valid Percent	Cumulative Percent
Very dissatisfied	72	60	60	60
Dissatisfied	4	3.3	3.3	63.3
Neutral	0	0	0	0
Satisfied	40	33.3	33.3	96.7
Very satisfied	4	3.3	3.3	100
Total	**120**	**100**	**100**	

Source: Field Work, 2014

From Table 24, 60% of the respondents indicate very dissatisfied with the size of their store, 3.3% are dissatisfied, while 33.3% are satisfied. 3.3% also indicates very satisfied with size of their store. This reveals that the size of the store is not appropriate to the users. In this case when the user is given an opportunity, he or she will alter the size of the store. This confirms the observation made during the physical survey that some of the users use their kitchen space as store, in addition to the main store.

The bar chart in Figure 31 below represents user satisfaction with store space, from the chart seventy two (72) of the respondents are very dissatisfied with the store space; four (4) of the respondents are dissatisfied with the store space; while forty (40) of the respondents are satisfied with the store space; also four (4) of the respondents are very satisfied with the store space.

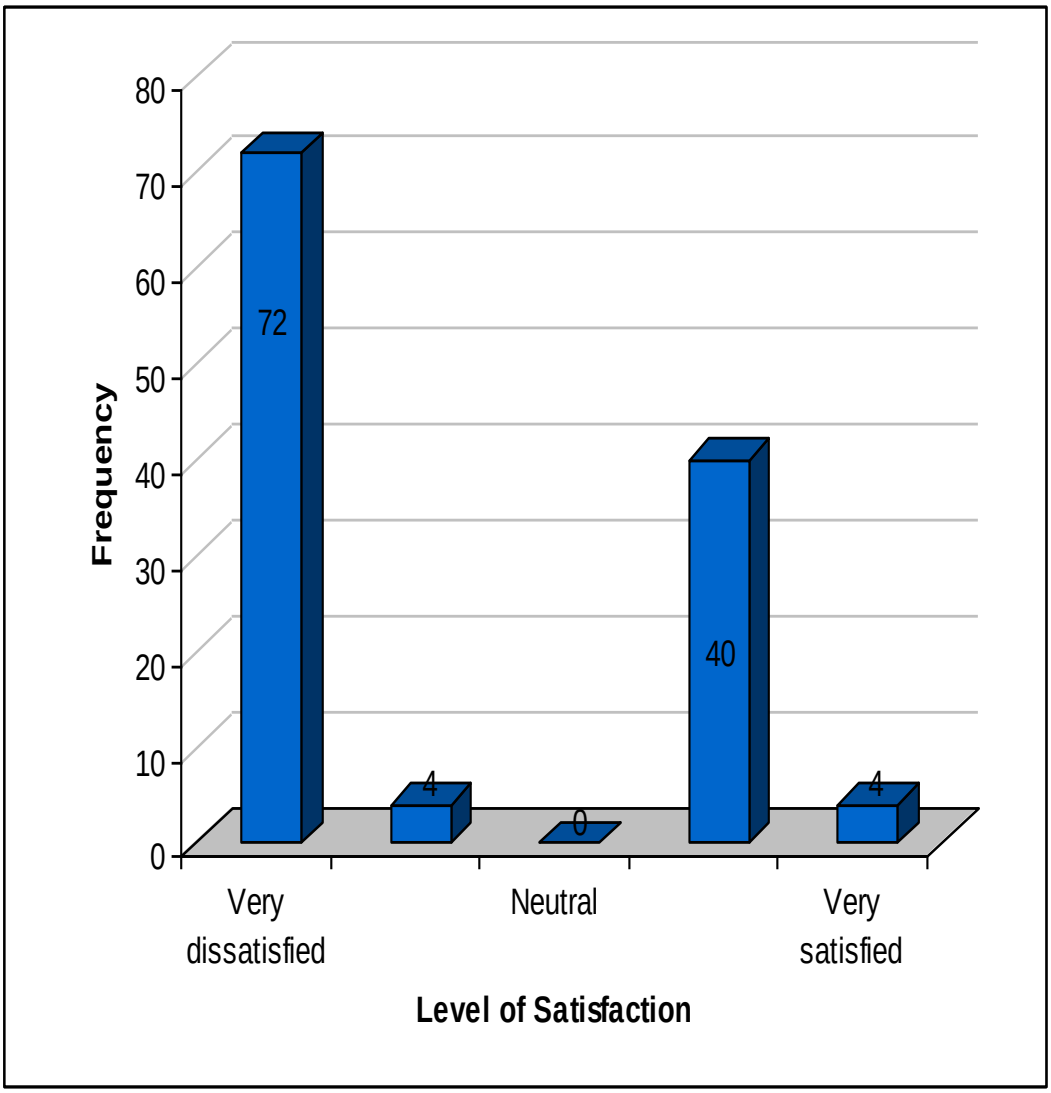


Figure 31: Bar Chart Showing User Satisfaction with Store Space

Table 25: User Satisfaction with Size of Bedrooms

	How satisfied are you with the size of bedrooms?			
	Frequency	Percent	Valid Percent	Cumulative Percent
Very dissatisfied	32	26.7	26.7	26.7
Dissatisfied	84	70	70	96.7
Neutral	0	0	0	0
Satisfied	4	3.3	43.3	96.7
Very satisfied	4	3.3	3.3	100
Total	**120**	**100**	**100**	

Source: Field Work, 2014

From Table 25 on satisfaction with the size of the bedrooms, 70% are dissatisfied with the size of their bedrooms. 26.7% are very dissatisfied. 3.3% with very satisfied and satisfied respectively. No respondent was neutral. During the physical observation carried out, many that altered the initial plan of the low-cost houses were in the size of the bedrooms and number of bedrooms. People that altered the initial plan of their apartment confirmed that, they are satisfied with the size and number of bedrooms and other spaces altered.

The bar chart in Figure 32 presents the respondents satisfaction with size of bedrooms. From the bar chart, thirty two (32) of the respondents are very dissatisfied with the size of bedrooms; eighty four (84) of the respondents are dissatisfied with the size of their bedrooms; four (4) of the respondents are satisfied with the size of bedrooms; also four (4) of the respondents are very satisfied with the size of bedrooms.

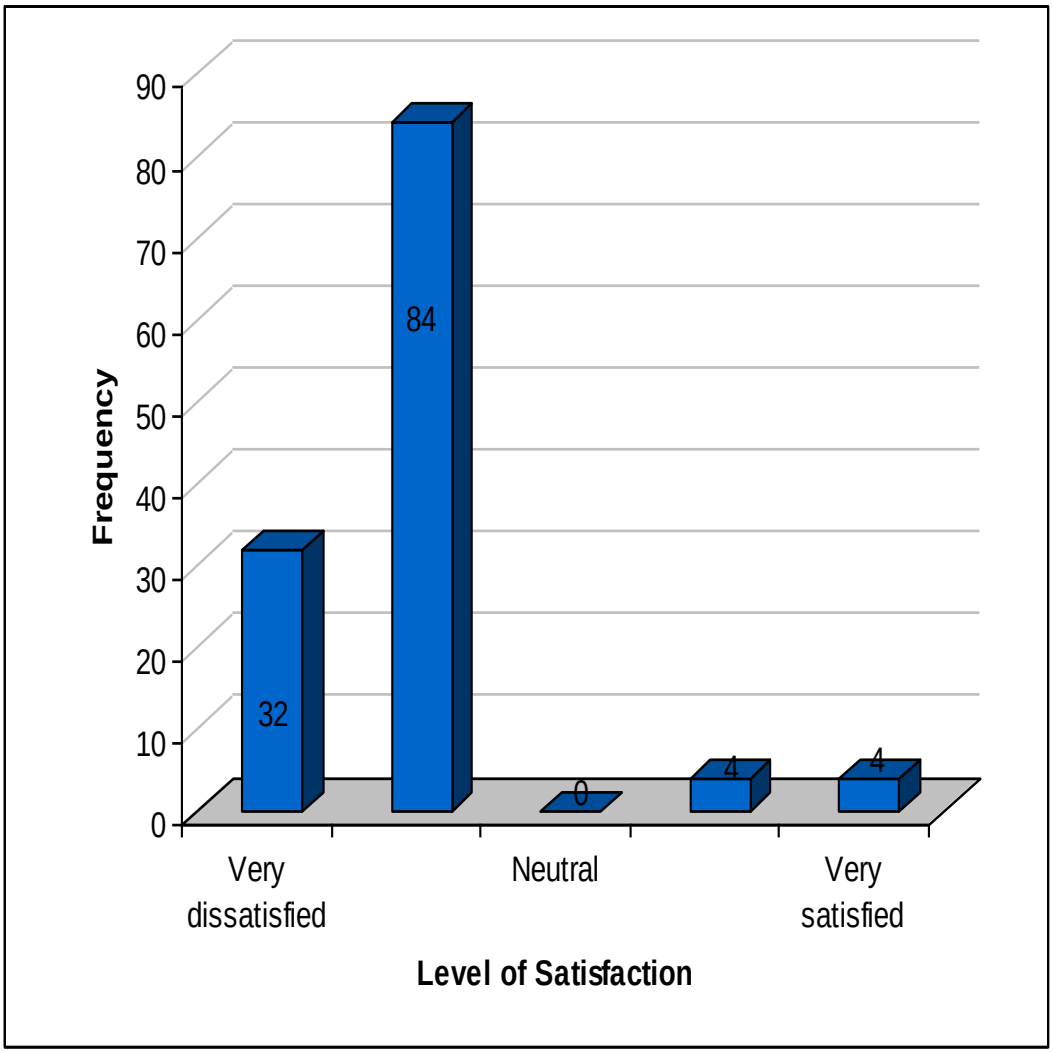


Figure 32: Bar Chart Showing User Satisfaction with Size of Bedrooms

Table 26: User Satisfaction with Size of Toilet/Bathroom

How satisfied are you with the size of toilet/bathroom				
	Frequency	Percent	Valid Percent	Cumulative Percent
Very dissatisfied	60	50	50	50
Neutral	0	0	0	0
Satisfied	56	44.7	46.7	96.7
Very satisfied	4	3.3	3.3	100
Total	**120**	**100**	**100**	

Source: Field Work, 2014

From Table 26, user satisfaction with the size of toilet/bathroom are represented as follows: 50% of the respondents are very dissatisfied with the size of the toilet and bathroom, 44.7% are satisfied with the size of toilet and bathroom, 3.3% indicates very satisfied with the size of the toilet/bathroom. From the data above, majority of the users are not satisfied with the size of their bedrooms.

Figure 33 below represents the respondent satisfaction with toilet and bathroom in form of a bar chart. From the chart, sixty (60) of the respondents are dissatisfied with the size of toilet and bathroom; fifty six (56) of the respondents are satisfied with the size of toilet and bathroom; also four of the respondents are very satisfied with the toilet and bathroom.

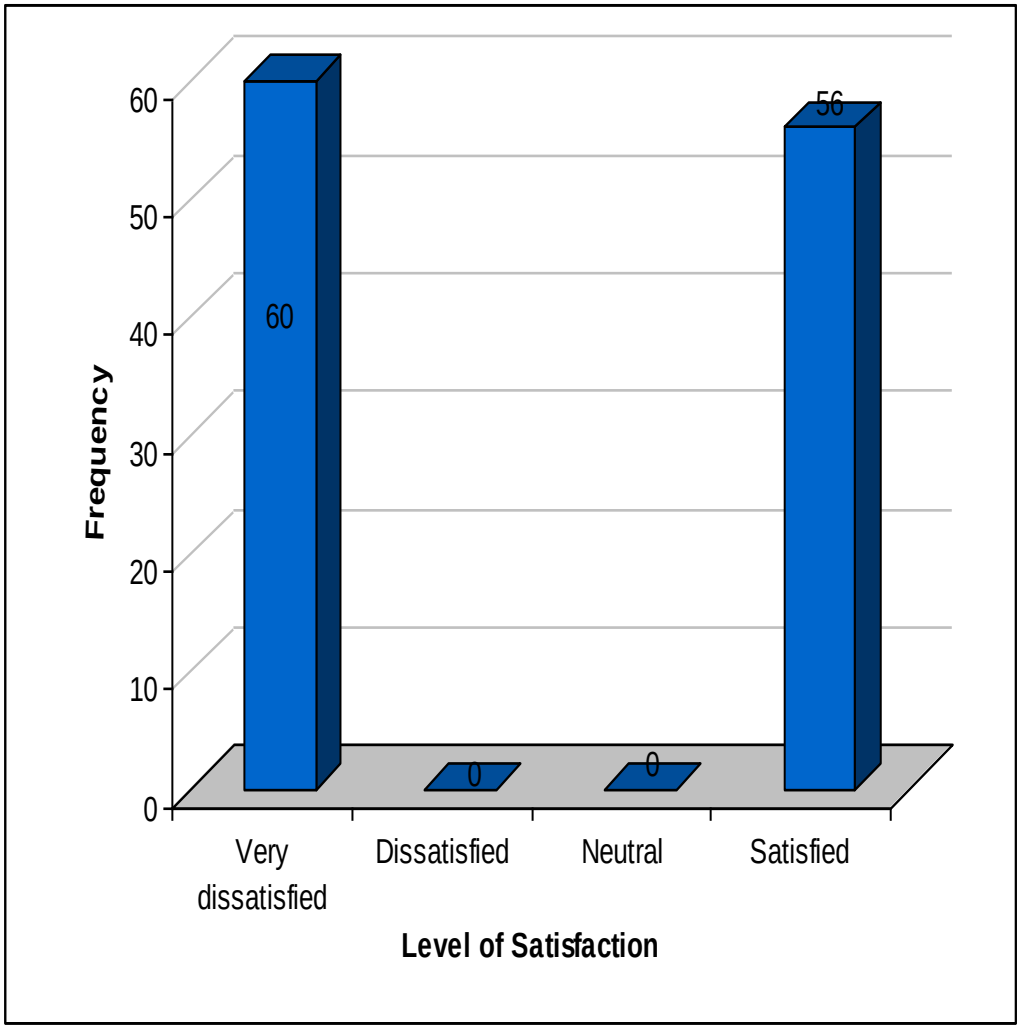


Figure 33: Bar Chart Showing User Satisfaction with Size of Toilet and Bathroom

Table 27: User Satisfaction with Size of Parking Spaces

How satisfied are you with the size of parking space?				
	Frequency	Percent	Valid Percent	Cumulative Percent
Very dissatisfied	32	26.7	26.7	26.7
Dissatisfied	16	13.3	13.3	40
Neutral	0	0	0	0
Satisfied	68	56.7	56.7	96.7
Very satisfied	4	3.3	3.3	100
Total	**120**	**100**	**100**	

Source: Field Work, 2014

From Table 27, Satisfaction with parking spaces, 56.7% of the respondents are satisfied, while 26.7% are very satisfied. 13.3% are dissatisfied and 3.3% indicated very satisfied. Majority of the occupants are satisfied with their parking spaces. From the physical observation carried out, there are enough external spaces for car park. Even though the car park was not design, some users create parking spaces and garages for their use.

The bar charts above in Figure 34 present the respondents satisfaction with size of parking space. From the chart, thirty two (32) of the respondents are very satisfied with the size of parking space; sixteen (16) of the respondents are dissatisfied with the size of parking space; on the other hand, sixty eight (68) of the respondents are satisfied with the size of parking space; four (4) of the respondents are very satisfied with the size of parking space.

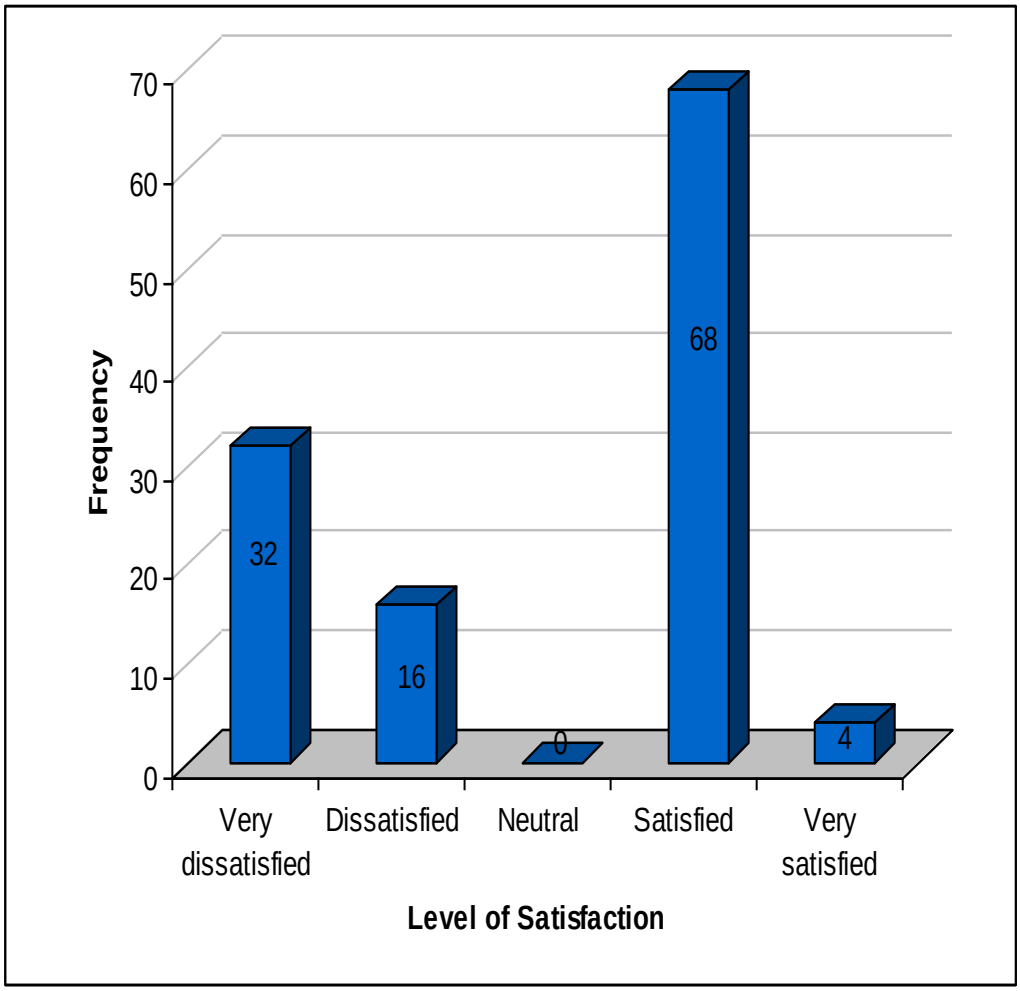


Figure 34: Bar Chart Showing User Satisfaction with Size of Parking Space

Table 28: User Satisfaction with Surrounding External Spaces

	How satisfied are you with the external space?			
	Frequency	Percent	Valid Percent	Cumulative Percent
Very dissatisfied	36	30	30	30
Dissatisfied	4	3.3	3.3	3.3
Neutral	0	0	0	0
Satisfied	76	63.3	63.3	96.7
Very satisfied	4	3.3	3.3	100
Total	**120**	**100**	**100**	

Source: Field Work, 2014

On satisfaction with the size of external spaces of building, from Table 28, 63.3% indicate that they are satisfied. 30% indicated that they are dissatisfied; this respondents might have used up there external spaces through alteration and modification made. 33.3% are very dissatisfied and 3.3% are dissatisfied, they also form part of people that are left with small spaces as a result of modification or alterations made to their buildings.

The bar chart presented in Figure 35, showed the respondents level of satisfaction with the size of external spaces of the low-cost building. From the chart, thirty six (36) of the respondents are very dissatisfied with the size of the external spaces of the building; four (4) of the respondents are dissatisfied with the size of the external spaces of the building; on the other hand seventy six percent of the respondents are satisfied with the size of their external space of the building; four of the respondents are very satisfied with the size of their external space of the building.

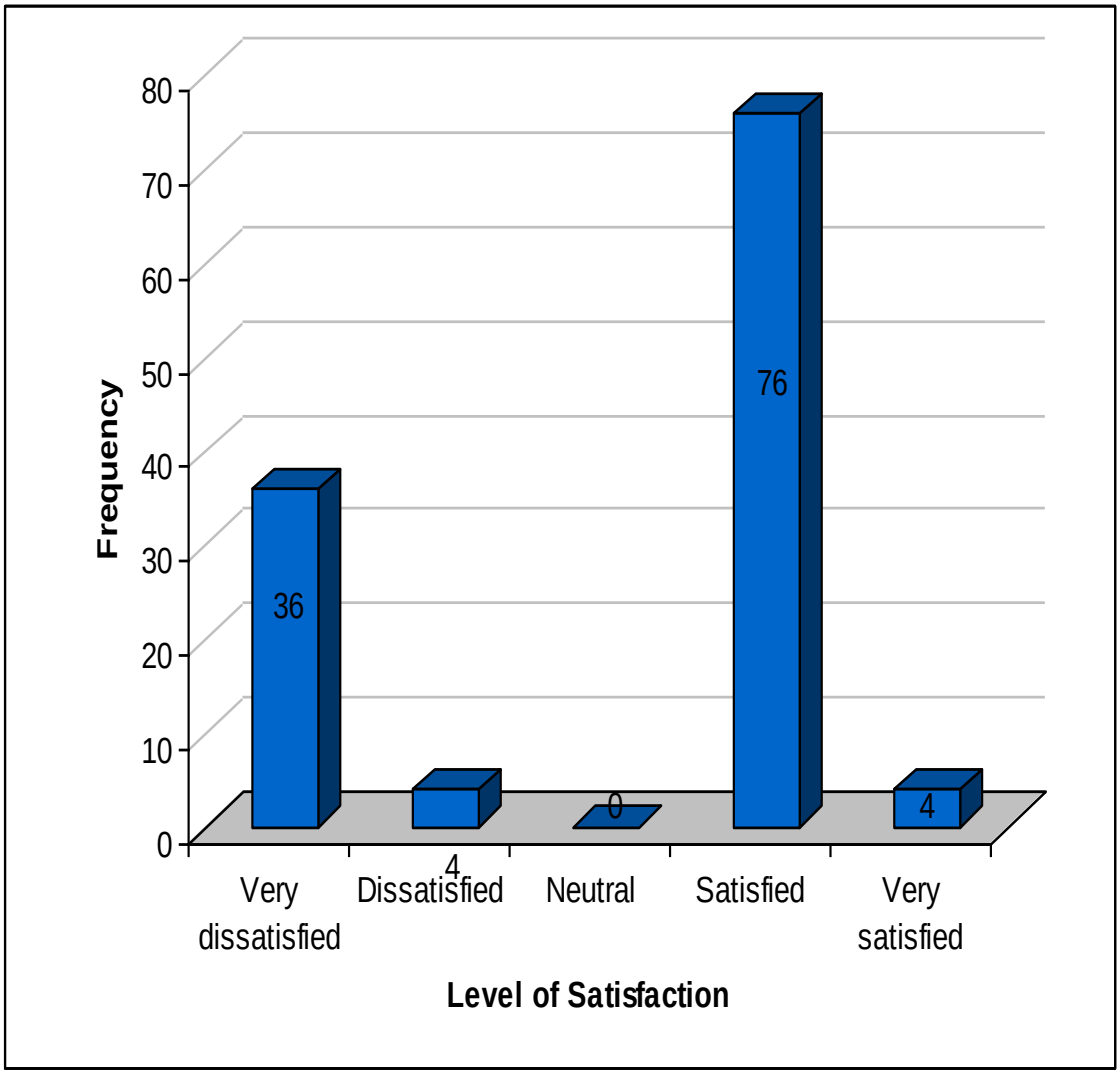


Figure 35: Bar Chart Showing User Satisfaction with the Size of External Space

Table 29: User Satisfaction with Overall External Space of the Low-Cost Housing

How satisfied are you with the overall opinion of external spaces?				
	Frequency	Percent	Valid Percent	Cumulative Percent
Very dissatisfied	40	33.3	33.3	33.3
Dissatisfied	4	3.3	3.3	3.3
Neutral	0	0	0	0
Satisfied	76	63.3	63.3	100
Very satisfied	0	0	0	0
Total	**120**	**100**	**100**	

Source: Field Work, 2014

On the overall opinion of external spaces of low-cost building, from Table 29 63.3% are satisfied, while 33.3% are very dissatisfied and 3.3% are dissatisfied. From the physical observation carried out, the general external spaces of the low-cost houses are quite large. Most of these external spaces are use for farming, because there no element of landscaping around the buildings.

The bar chart Figure 36 below showed respondents' satisfaction with the overall space of the low-cost housing. From the chart, forty (40) of the respondents are very dissatisfied with the overall space of low-cost housing; Four of the respondents are dissatisfied with the overall external space of low-cost housing; On the other hand, seventy six (76) of the respondents are satisfied with the overall external space of low-cost housing. Also four (4) of the respondents are very satisfied with the overall external space of low-cost housing.

Figure 36: Bar Chart Showing User Satisfaction with the Overall Space of Low-Cost Housing

Table 30: Modification or Alteration made to Bedrooms

Was there any alternation or modification was made to bed rooms?				
	Frequency	Percent	Valid Percent	Cumulative Percent
Yes	52	43.3	43.3	43.3
No	68	56.7	56.7	100
Total	**120**	**100**	**100**	

Source: Author's Field Work, 2014

Table 30 is on modifications made to bedrooms by respondent. 56.7% of the respondents have not made any modification to their bedrooms, while 43.3% indicated they have altered the original plan of their bedrooms. From the physical observation made, the modification was made to bedrooms are: ceiling, doors and windows. Most Louvre windows were replaced with aluminum sliding windows. The Celotex ceilings are being replaced with PVC or POP ceiling. The initial panel doors are replaced by foreign and locally fabricated doors.

Pie chart was used in Figure 37 below to represent respondents alteration made to bedrooms. From the pie chart, fifty two (52) of the respondents which translated to 43.3% made alterations to the bedrooms; on the other hand, sixty eight (68) of the respondents which translated to 56.7% did not make any alteration to the bedrooms.

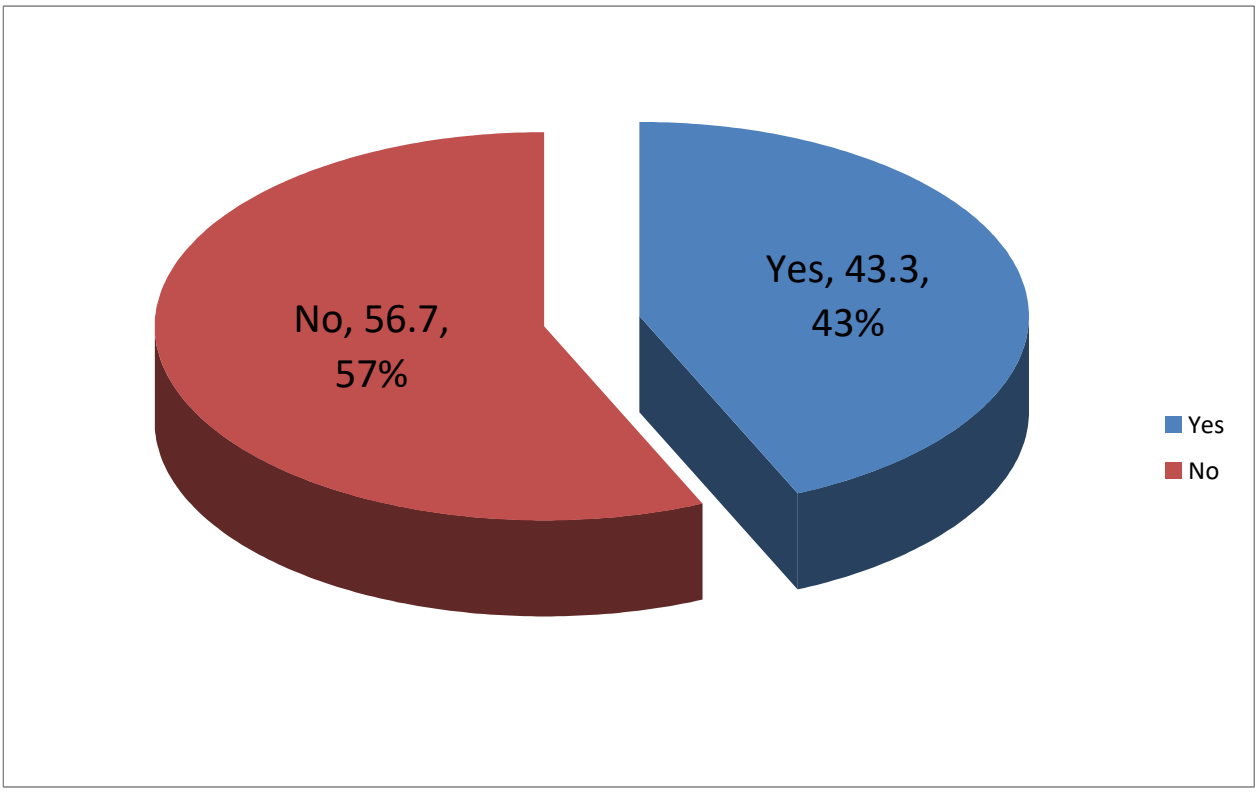


Figure 37: Pie Chart Showing Alteration Made to Bedrooms

Table 31: Modification or Alteration Made to Dining Room

	Any alternation or modification was made to dining?			
	Frequency	Percent	Valid Percent	Cumulative Percent
Yes	24	20	20	20
No	96	80	80	100
Total	**120**	**100**	**100**	

Source: Author's Field Work, 2014

On the dining space (Table 31) above, 80% indicated that modification was not made to their dining, while 20% signified that modification was made to their dining spaces. From the physical observations carried out, the modification or alteration made to dinning are: conversion of the dining space to form part of the living room. Also, the Celotex ceiling are replaced with PVC or POP ceiling, louvers windows are being replaced by aluminum sliding windows. The sand screed floors are replaced with vitrified floor tiles.

The pie chart in Figure 38 below present the respondents' alteration made to dining room. From the chart, eighty of the respondents did not make any alteration to the dining room; on the other hand, twenty (20) of the respondents made alteration to the dining room.

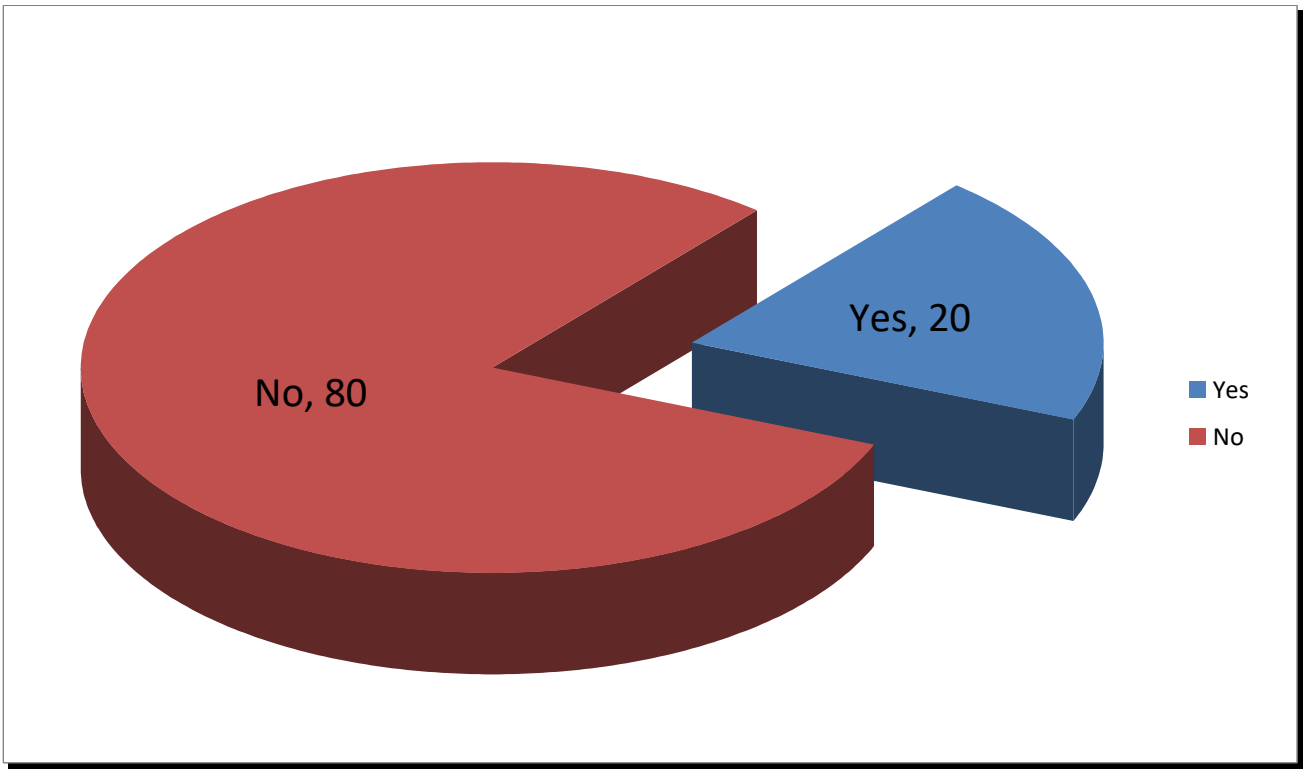


Figure 38: Pie Chart Showing Alteration Made To Dining Room

Table 32: Modification or Alteration made to Kitchen

Any alternation or modification was made to kitchen				
	Frequency	Percent	Valid Percent	Cumulative Percent
Yes	32	26.7	26.7	26.7
No	88	73.3	73.3	100
Total	**120**	**100**	**100**	

Source: Author's Field Work, 2014

From Table 32, 27% of the respondents have made modification to kitchen space, while 73% indicated that no modification was made to kitchen space. This signifies that majority of the users have not made an alteration or modification to their apartments. From the physical observation carried out, those that made alteration or modification are in the following areas: replacing the sandscreed floor with vitrified floor tiles, louvers windows replaced with aluminum sliding windows and wooden panel doors replaced with foreign wooden panel doors and celotex ceiling replaced with POP ceiling or PVC ceiling.

Figure 39 below, present alteration made to kitchen space by respondents. From the pie chart presented, thirty two (32) of respondents made alterations to kitchen space; while eighty eight of the respondents did not make any alteration to the kitchen space.

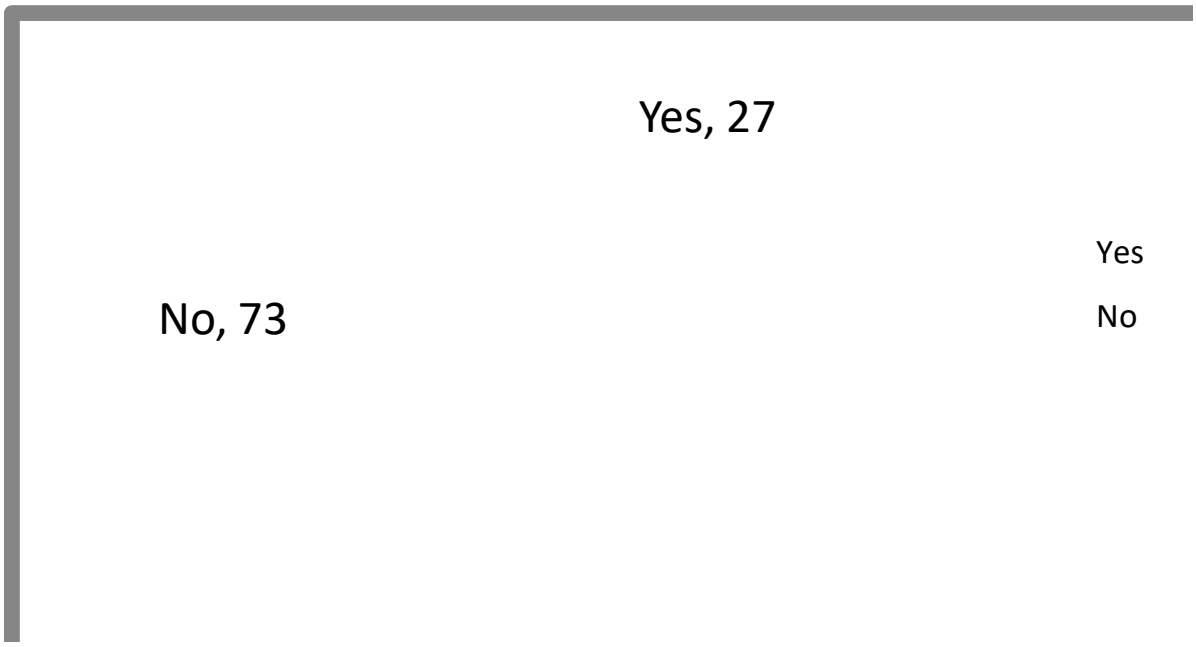


Figure 39: Pie Chart Showing Alteration Made to Kitchen

Table 33: Modification or Alteration made to Store

	Any alternation or modification was made to store?			
	Frequency	Percent	Valid Percent	Cumulative Percent
Yes	16	13.3	13.3	13.3
No	104	86.7	86.7	100
Total	**120**	**100**	**100**	

Source: Author's Field Work, 2014

From Table 33, only 13% made modification to the store space, while 87% indicated that no alteration has been made to the store. Even though, the size of the store is too small, yet majority of the users did not alter or modified their stores. In most cases the modification carried out was on floors, ceiling and windows through the use of vitrified floor tiles, PVC or POP ceiling and aluminum sliding windows respectively.

Pie chart in Figure 40 below present the alteration made to store space. From the pie chart, thirteen percent (13%) which represents sixteen (16) of the respondents did not make any alteration to store space. On the other hand, eighty seven percent (87%) which translated to one hundred and four (104) of the respondents did not alter the store space.

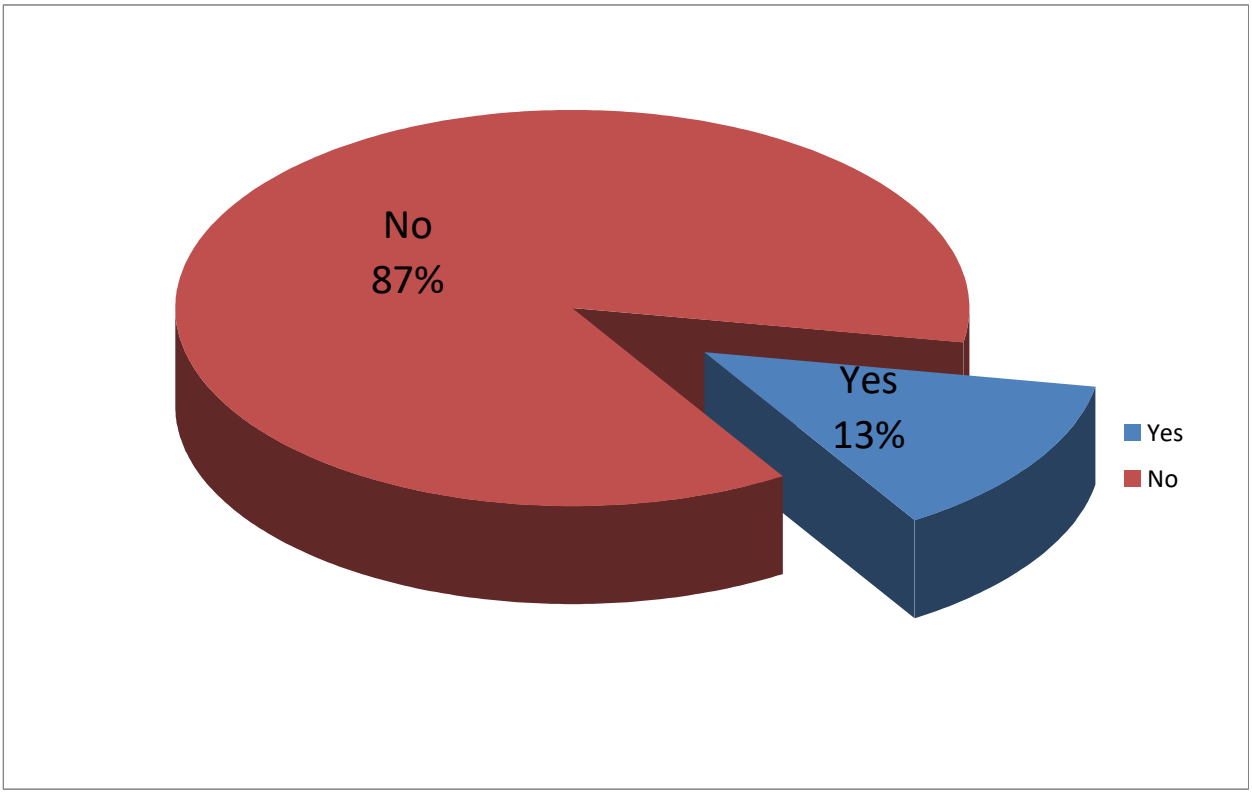


Figure 40: Pie Chart Showing Alteration Made to Store

Table 34: Modification or Alteration made to Living Room

Any alternation or modification was made on living room?				
	Frequency	Percent	Valid Percent	Cumulative Percent
Yes	8	6.7	6.7	6.7
No	112	93.3	93.3	100
Total	**120**	**100**	**100**	

Source: Author's Field Work, 2014

On living room from Table 34, ninety three percent of the respondents (93%) of the respondents have not altered the original plan of living room; while on the other hand, seven percent (7%) altered the living room space. From the physical survey carried out most of the alteration made to the living room is seen on the floor; ceiling; window and doors.

This result is equally plotted in a pie chart in Figure 41, from the pie chart, ninety three percent (93%) which translates to one hundred and twelve (112) of the respondents indicated that no alteration was made to the living room. Also seven percent (7%), which translated to eight of the respondents altered the living room.

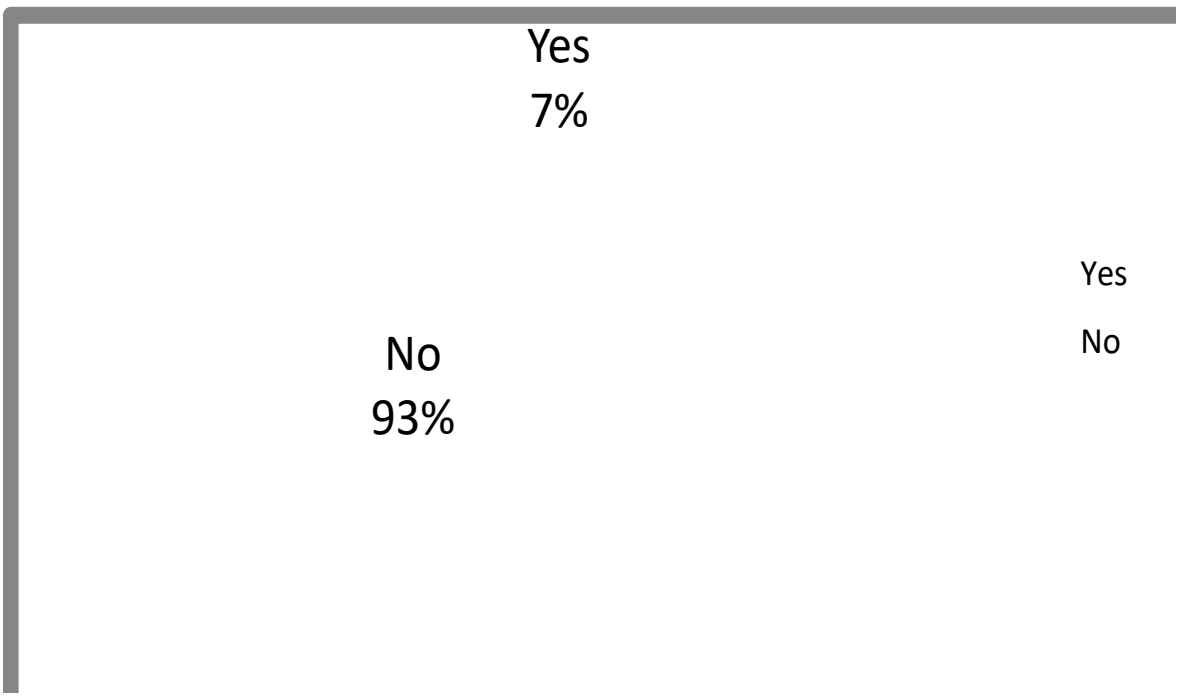


Figure 41: Pie Chart Showing Alteration Made to Living Room

Table 35: Modification or Alteration made to Fence/Gate

	Any alternation or modification was made on fence/gate?			
	Frequency	Percent	Valid Percent	Cumulative Percent
Yes	20	16.7	16.7	16.7
No	100	83.3	83.3	100
Total	**120**	**100**	**100**	

Source: Author's Field Work, 2014

On fence and gates introduced to apartments, from Table 35, 13.3% of the respondents indicated that they have introduced fence and gate to their apartments. 86.7% of the respondents have not introduced fence to their apartments. This confirms the observations that were made during the physical survey. Few of the apartments in the low-cost houses introduced fence and gates to their houses.

From the pie chart presented in Figure 42 below, eighty three percent (83%) which translated to one hundred (100) of the respondents did not introduce fence and gate to their apartments; On the other hand, seventeen percent (17%) which translates to twenty (20) of the respondents introduced fence and gates to their apartments.

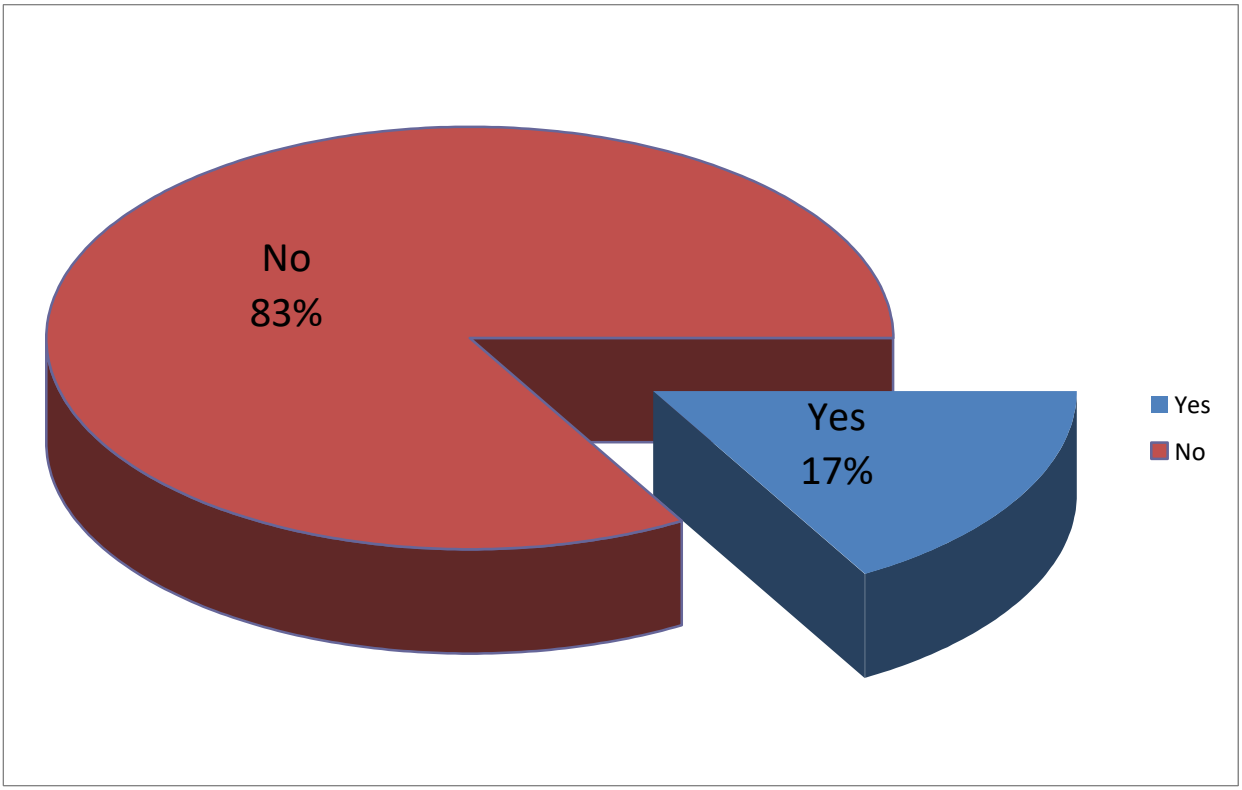


Figure 42: Pie Chart Showing Introduction of Fence and Gate to Apartments

Table 36: Modification or Alteration made to Landscape

Any alternation or modification was made on landscape?				
	Frequency	Percent	Valid Percent	Cumulative Percent
Yes	16	13.3	13.3	13.3
No	104	86.7	86.7	100
Total	**120**	**100**	**100**	

Source: Author's Field Work, 2014

On landscaping, 13.3% of the respondents have introduced landscaping elements to their apartments, while 86.7% have not introduced any landscaping. During the physical observation, it was observed that some houses introduced good landscaping to their external spaces surrounding their apartments. It was also gathered that there was no any form of landscaping in the low-cost houses.

From Table 36, a pie chart was drawn from the result obtained. From the pie chart in Figure 43, thirteen percent (13%) which represents sixteen (16) of the respondents indicated that landscaping was introduced to their apartments; on the other hand, eighty seven percent (87%) which represents one hundred and four (104) of the respondents did not introduce any form of landscaping to their apartments.

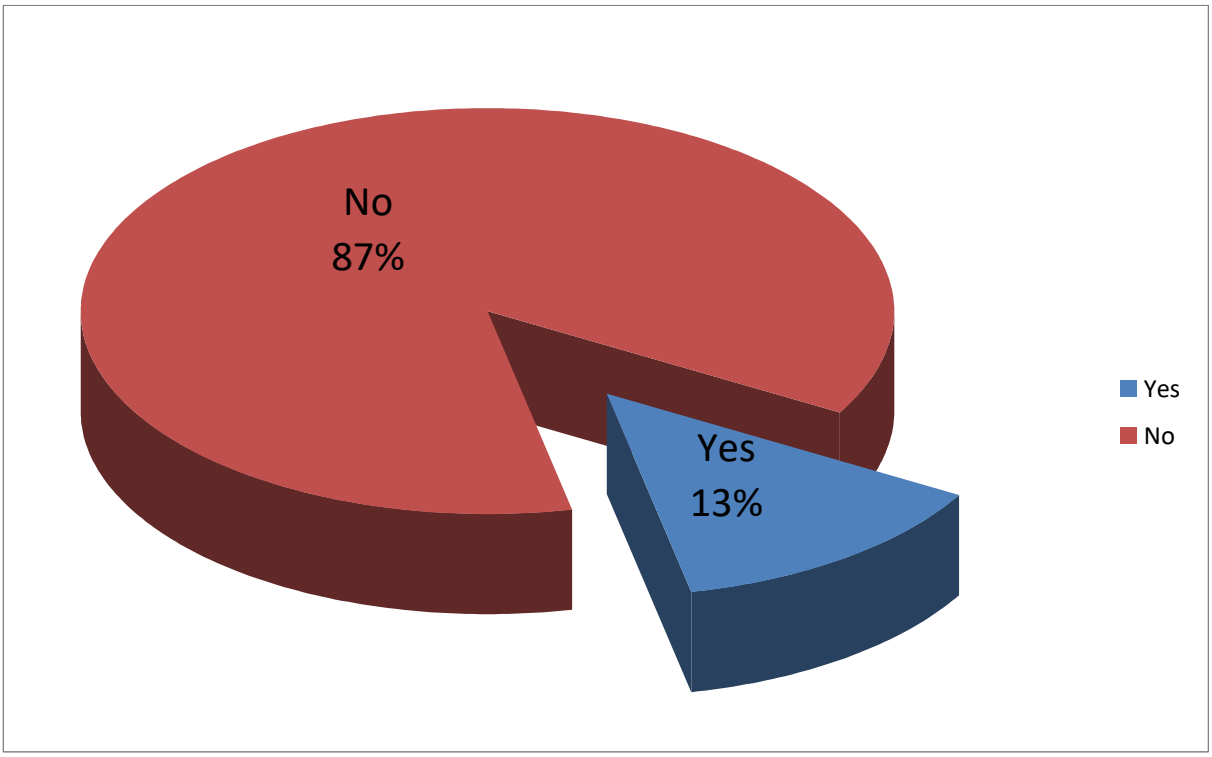


Figure 43: Pie Chart Showing Alteration Made to Landscape

Table 37: The Modification/Alteration Carried by an Architect

	Frequency	Percent	Valid Percent	Cumulative Percent
Yes	16	13.3	13.3	13.3
No	104	86.7	86.7	100
Total	**120**	**100**	**100**	

Source: Author's Field Work, 2014

Table 37 intends to verify whether the modification made to apartment was carried out by professionals in the building industry**.** 86.7% of the respondents signified that modification to their apartments was not carried by architect; only 13.3% of the respondents indicate that they engage an Architect in modification.

The pie chart in Figure 44 was presented to ascertain whether professionals were engaged in the alteration made to these buildings. Thirteen percent (13%) which translated to sixteen (16) of the respondents engaged the service of an architect in the alteration made to their apartment. Also, eighty seven percent (87%) representing one hundred and four (104) of the respondents did not engaged the service of an architect.

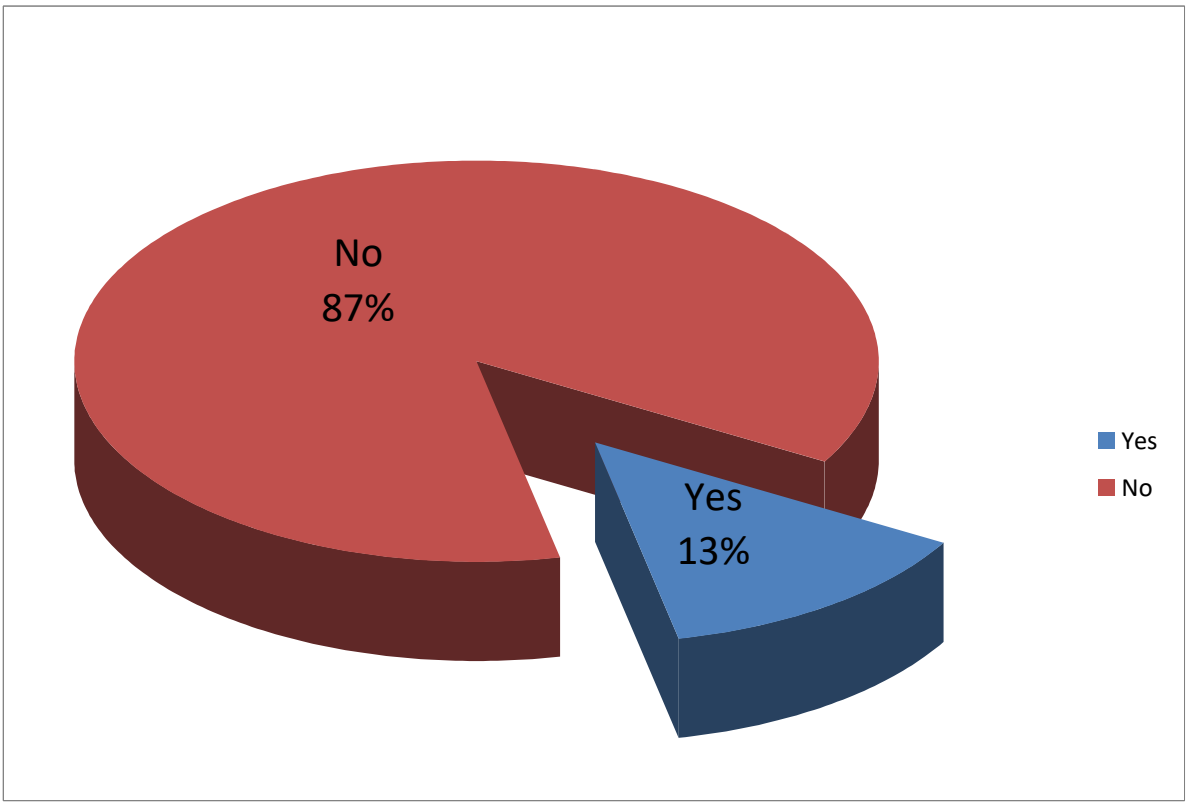


Figure 44: Pie Chart Showing Alteration Carried Out By an Architect

Table 38: The Modification/Alteration carried by out by Builder

	Frequency	Percent	Valid Percent	Cumulative Percent
Yes	12	10	10	10
No	108	90	90	100
Total	**120**	**100**	**100**	

Source: Author's Field Work, 2014

From Table 38, eighty seven percent (87%) of the respondents indicated that the alteration/modification was not by Builder; only thirteen percent (13%) indicated that the modification was carried out by builder.

The result obtained in Table 38, was plotted into pie chart. From the pie chart (Figure 45) below, twelve (12) of the respondents engaged the service of a Builder in the alteration carried out, while one hundred and eight did not engaged the service of a builder in the alteration work.

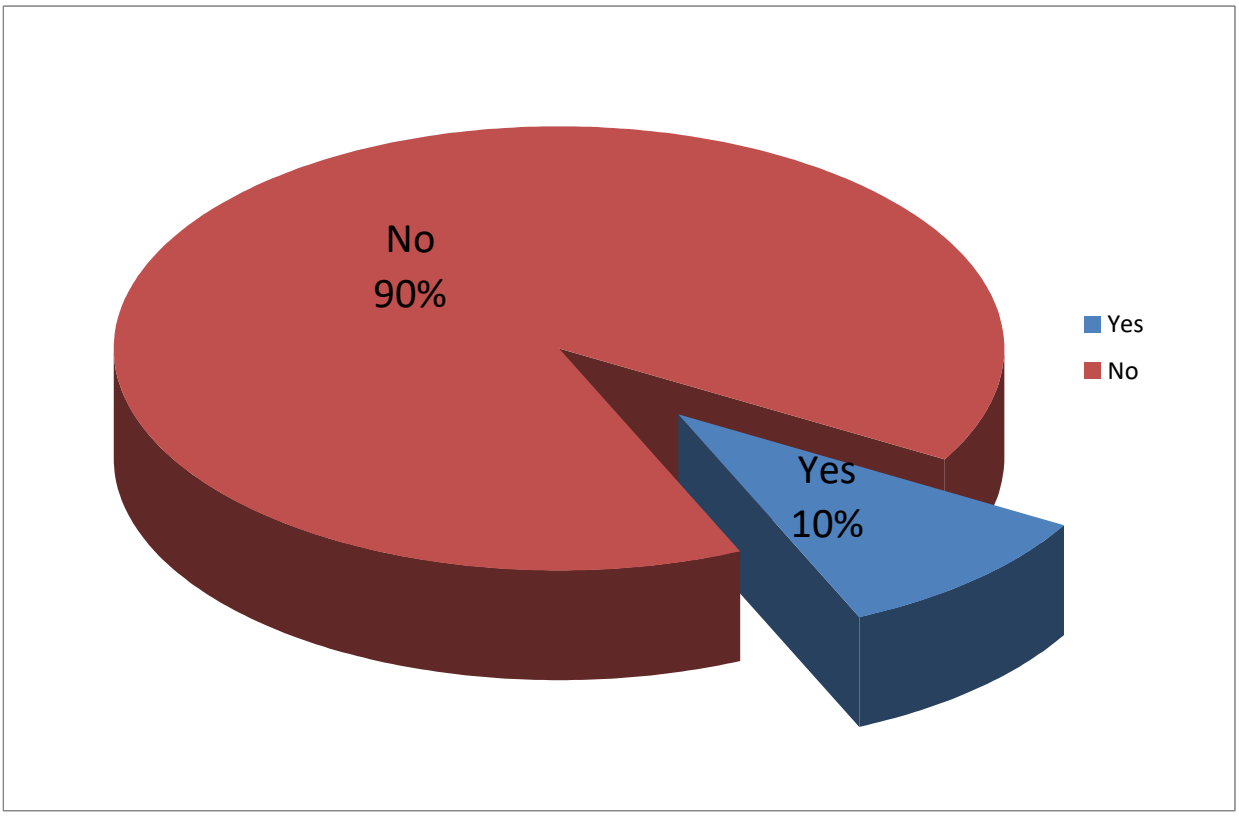


Figure 45: Pie Chart Showing Alteration Carried Out By a Builder

Table 39: The Modification/Alteration carried out by an Engineer

	Frequency	Percent	Valid Percent	Cumulative Percent
Yes	16	13.3	13.3	13.3
No	104	86.7	86.7	100
Total	**120**	**100**	**100**	

Source: Author's Field Work, 2014

Whether the service of an Engineer was engaged, eighty seven percent (87%) of the respondent did not engage the service of an Engineer, on the other hand, thirteen percent (13%) of the respondents engaged the service of an Engineer in modification of their apartment.

The result obtained in Table 39 was plotted into pie chart for proper understanding and clarity. From the pie chart in Figure 46, sixteen of the respondents (16) engaged the service of an engineer in the alteration/modification of their apartments. While, one hundred and four of the respondents did not engaged the service of an engineer in alteration /modification of their apartments.

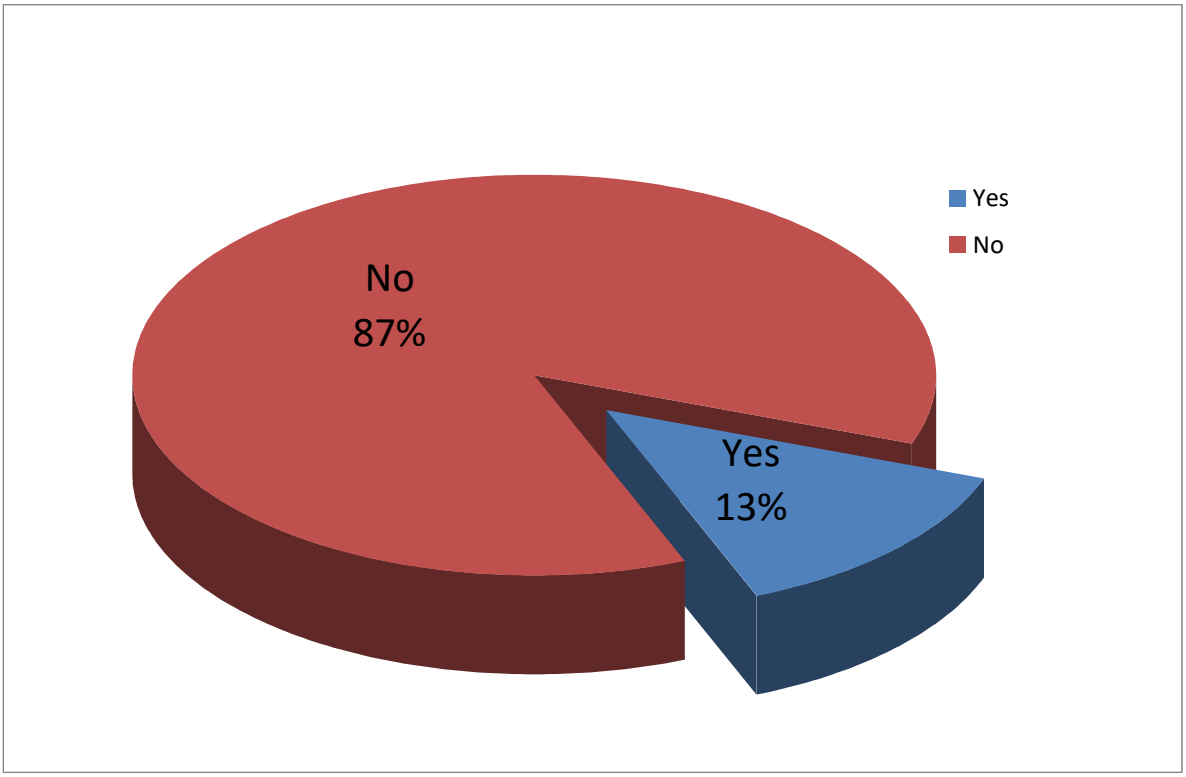


Figure 46: Pie Chart Showing Alteration Carried Out by An Engineer

Table 40: The Modification/Alteration was carried by oneself

	Frequency	Percent	Valid Percent	Cumulative Percent
Yes	4	96.7	96.7	100
No	116	3.3	3.3	3.3
Total	**120**	**100**	**100**	

Source: Author's Fieldwork, 2014

From Table 40, ninety seven (97%) of the respondents indicated that alteration/modification made to their apartment was carried out by self; while three percent (3%) indicated modification was not carried out by self. It can be summarized, that most of the modifications made to apartments was not done by any professional in the building industry. This result is equally presented in pie chart in Figure 47 below for clarity.

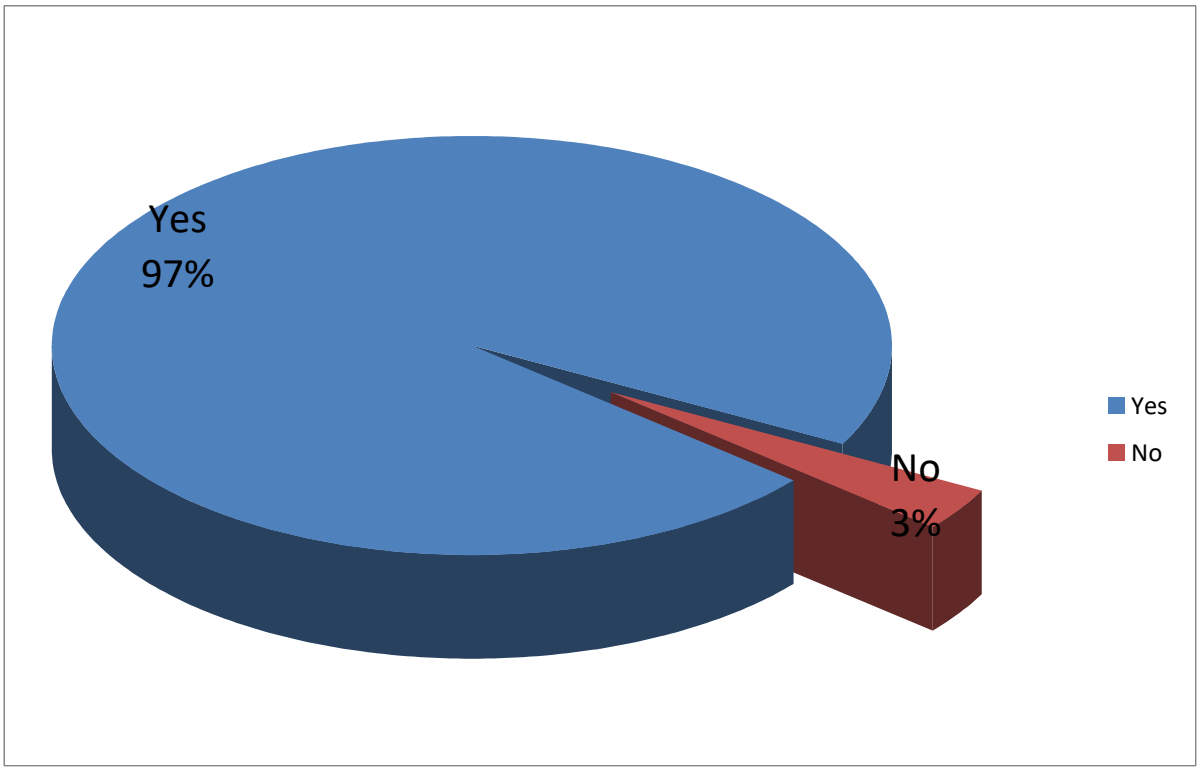


Figure 47: Pie Chart Showing Alteration Carried Out by Self

Table 41: The Building Effectively Served the Purpose for which it was intended

	Frequency	Percent	Valid Percent	Cumulative Percent
Disagree	120	100	100	100
Neutral	0	0	0	0
Agreed	0	0	0	0
Strongly Agreed	0	0	0	0
Total	**120**	**100**	**100**	**100**

Source: Author's Field Work, 2014

From Table 41, one hundred and twenty of the respondents totally disagree, that the building effectively served the purpose for which it was intended. This result is equally presented in pie chart in Figure 48 below for clarity. This also confirms the response of the occupants during physical survey of the areas.

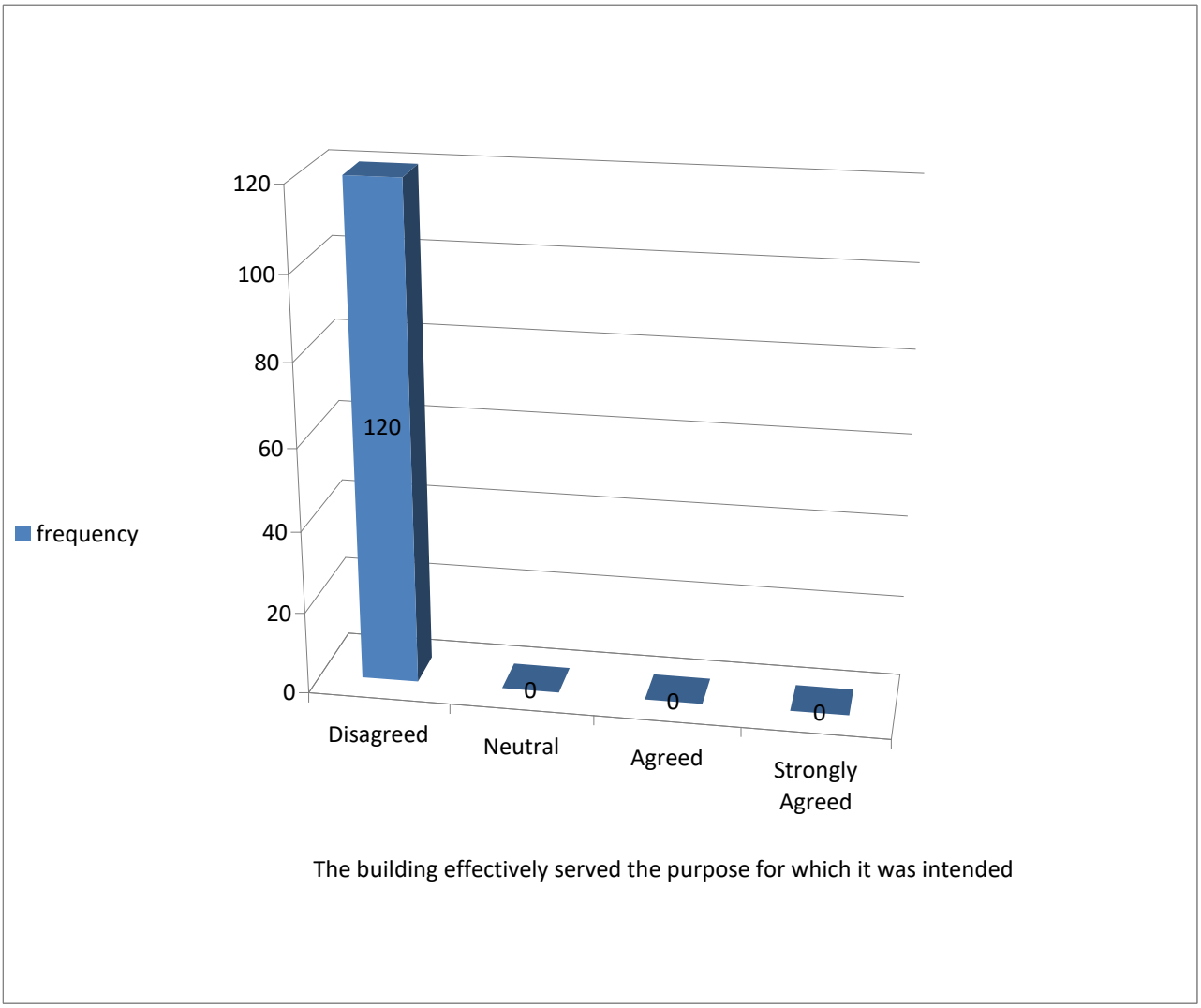


Figure 48: Bar Chart showing Whether the Building Serve the Purpose of its Design

Table 42: The Design of the House provided Optimum Support for Desire Activities

	Frequency	Percent	Valid Percent	Cumulative Percent
Disagreed	40	33.3	33.3	33.3
Neutral	8	6.7	6.7	40
Agreed	56	46.7	46.7	86.7
Strongly Agreed	16	13.3	13.3	100
Total	**120**	**100**	**100**	

Source: Author's Field Work, 2014

The responds on whether the design provides optimum support for desire activities, from Table 42, thirty three percent (33%) of the respondents disagreed, seven percent (7%) of the respondents were neutral. Forty seven percent (47%) of the respondents agreed, while thirteen percent (13%) strongly agreed.

A bar chart in Figure 49 below was drawn to represent the number of respondents to whether the design provides optimum support for desire activities. From the bar chart, forty (40) of the respondents disagree; eight (8) of the respondents were neutral on whether the design provides optimum support for desire activities. Fifty six (56) of the respondents agreed that the design provide optimum support for activities, while sixteen of the respondents strongly agreed.

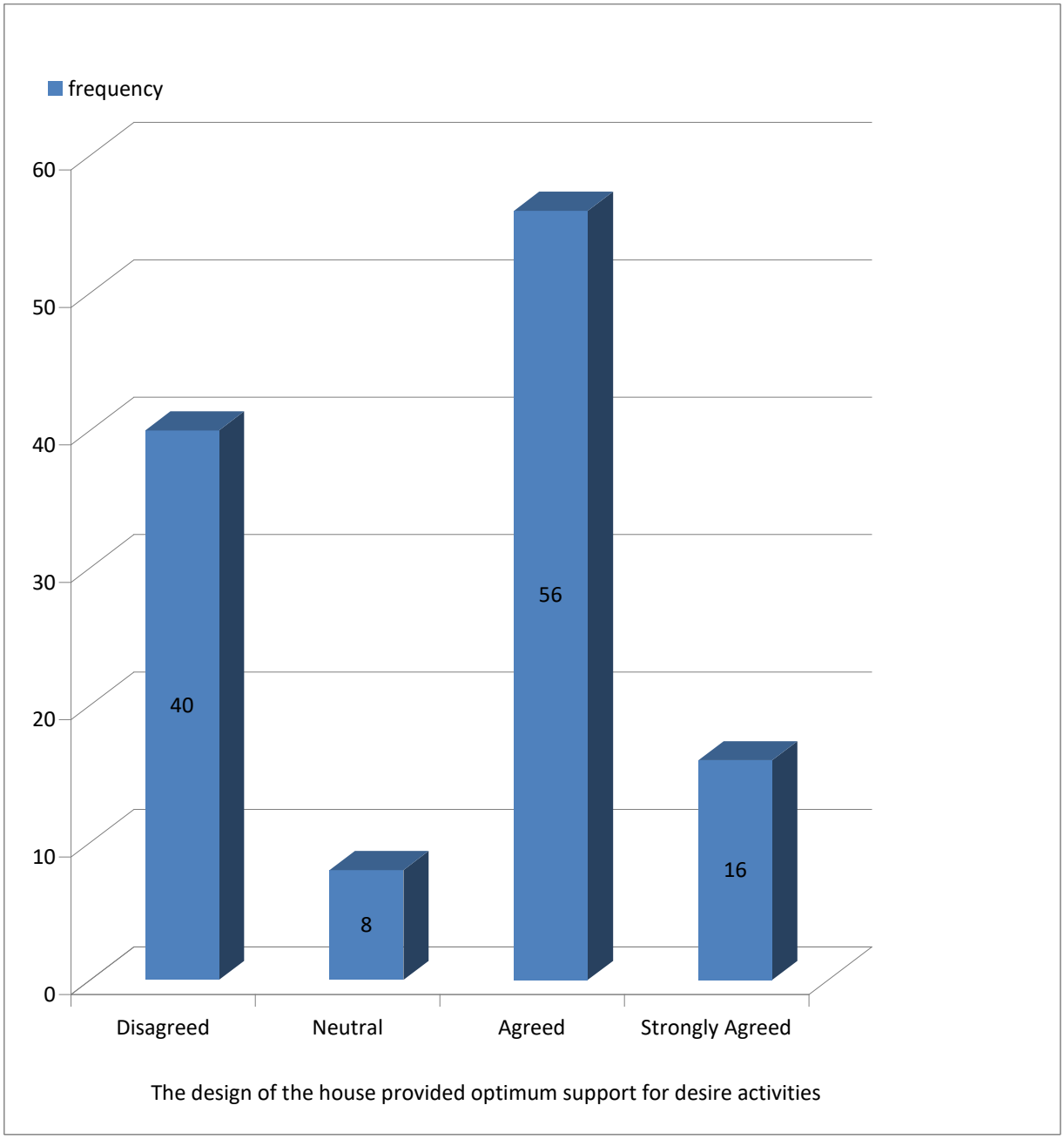


Figure 49: Bar Chart showing whether the Design provides Optimum Support for Desire Activities

Table 43: Design of Building was Flexible enough to meet Change Needs

	Frequency	Percent	Valid Percent	Cumulative Percent
Disagreed	52	43.3	43.3	43.3
Neutral	4	3.3	3.3	46.7
Agreed	56	46.7	46.7	93.3
Strongly Agreed	8	6.7	6.7	100
Total	**120**	**100**	**100**	

Source: Author's Field Work, 2014

From Table 43, on whether the design of building they occupied was flexible enough to meet any change needs; forty three percent (43%) of the respondents disagreed; three percent (3%) of the respondents were neutral; forty seven percent (47) of the respondents' agreed, while seven percent (7%) strongly agreed.

The result in Table 43 was presented in bar chart to show the respondents responds to how flexible the initial design was, in order to meet the change need. From the bar chart (Figure 50), fifty two (52) of the respondents disagreed; four (4) of the respondents were neutral; fifty six of the respondents agreed; while eight of the respondents strongly agreed.

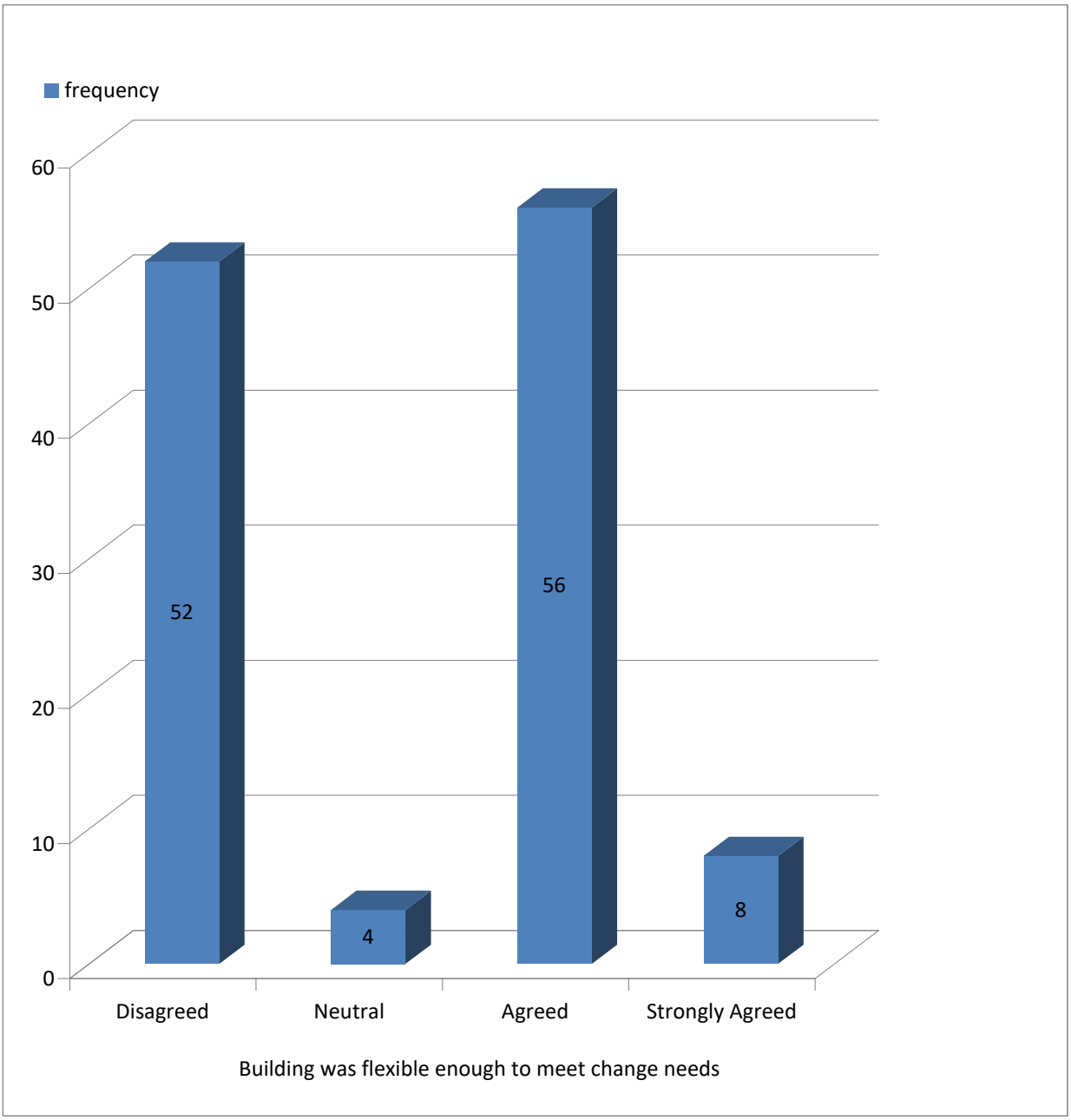


Figure 50: Bar Chart Showing Whether the Building Design Is Flexible Enough To Change Needs

Table 44: Kitchen was Well Suited to Our Needs

	Frequency	Percent	Valid Percent	Cumulative Percent
Disagreed	24	20	20	20
Neutral	8	6.7	6.7	26.7
Agreed	68	56.7	56.7	83.3
Strongly Agreed	20	16.7	16.7	100
Total	**120**	**100**	**100**	

Source: Author's Field Work, 2014

In Table 44, twenty percent (20%) of the respondents disagree that the kitchen was well suited to their needs, seven percent (7%) of the respondents are neutral. Fifty seven percent (57%) agreed that the kitchen suit their needs, while seventeen percent (17%) strongly agreed.

A bar chart was plotted in Figure 51. From the bar chart, twenty four (24) of the respondents disagreed; eight (8) of the respondents were neutral; sixty eight respondents agreed; while twenty of the respondents strongly agreed.

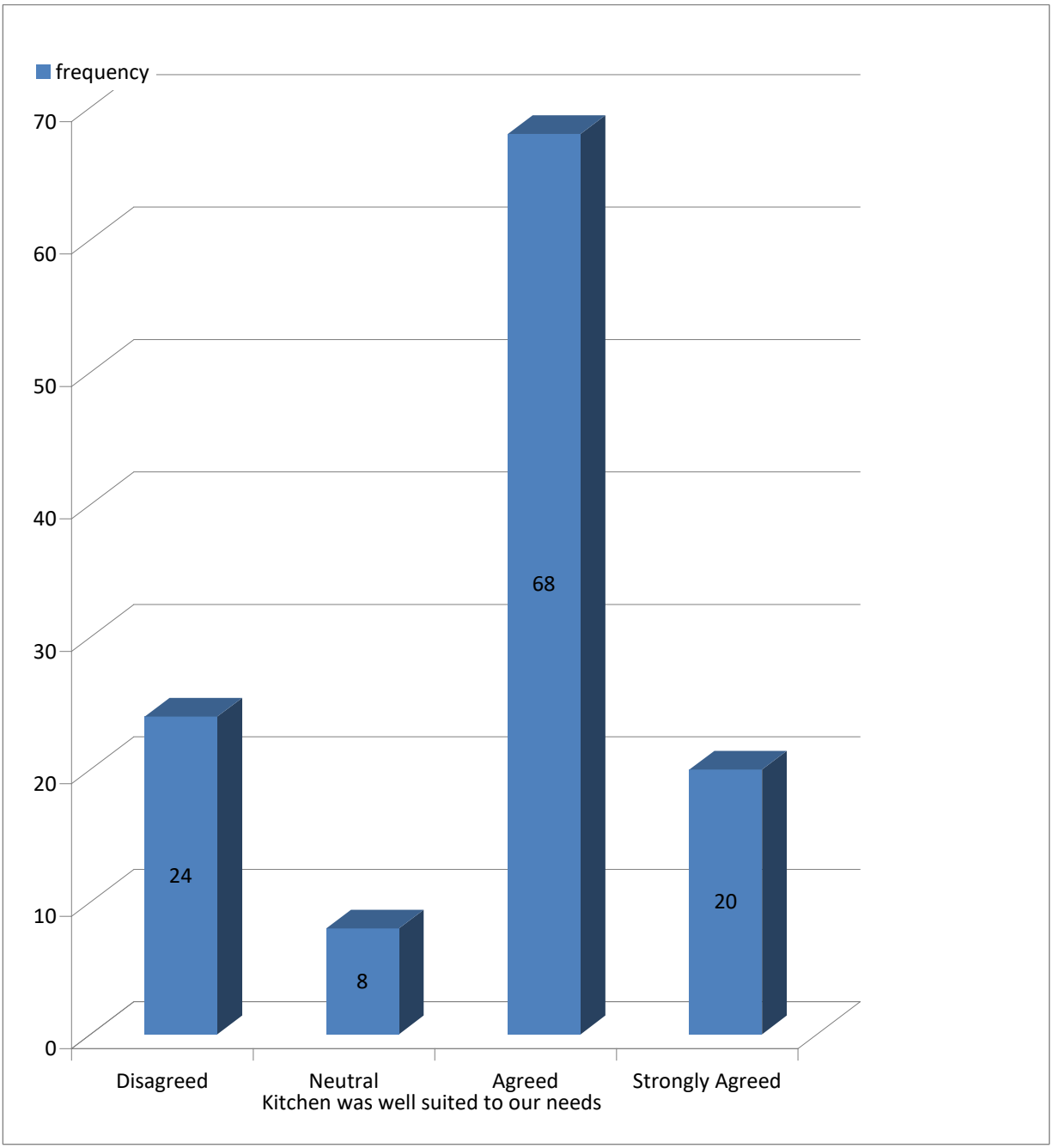


Figure 51: Bar Chart Showing Whether Kitchen was Well Suited for User Needs

Table 45: Living Room was Large enough to Suit Our Needs

	Frequency	Percent	Valid Percent	Cumulative Percent
Disagreed	4	3.3	3.3	3.3
Neutral	20	16.7	16.7	50
Agreed	56	46.7	46.7	66.7
Strongly Agreed	32	26.7	26.7	93.3
Total	**120**	**100**	**100**	

Source: Author's Field Work, 2014

The respondents in Table 45, in response to whether their living room was large enough to suit their needs, three percent (3%) of the respondents disagreed, seventeen (17%) of the respondents are neutral over it. Forty seven percent (47%) of the respondents agreed, while twenty seven percent (27%) strongly agreed. This signifies that the users are satisfied that their living rooms are large enough to suit their needs. This also confirms the response of the respondents on the sizes of their living room in table 19 above.

From Table 45, a bar chart was plotted (Figure 52). From the chart, four (4) of the respondents disagreed; twenty (20) of the respondents were neutral; fifty six (56) of the respondents agreed; while thirty two (32) of the respondents strongly agreed.

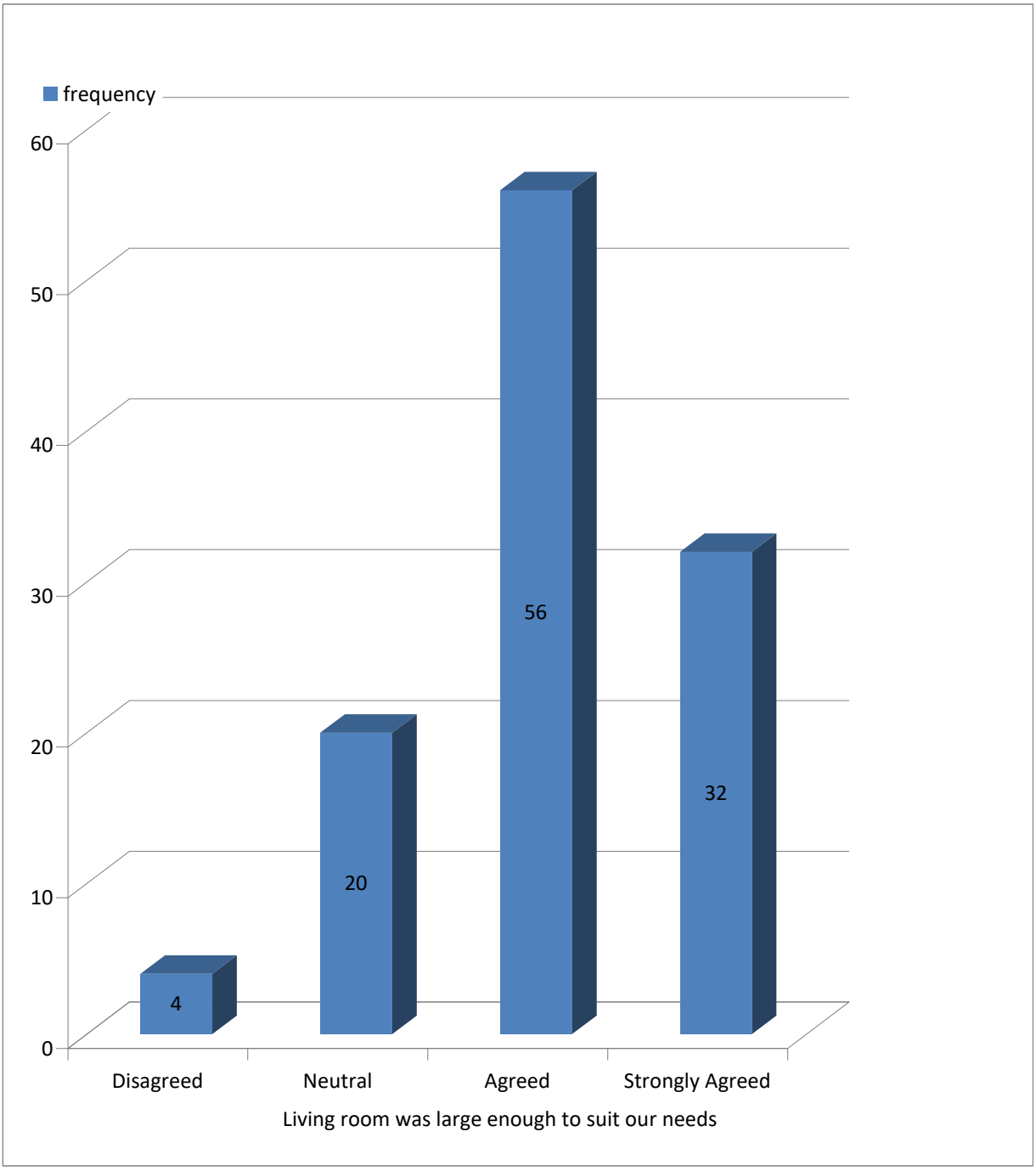


Figure 52: Bar Chart Showing Whether the Living Room Was Large Enough to Suit User Needs

Table 46: Number of Bed Rooms was Sufficient to Suit Our Needs

	Frequency	Percent	Valid Percent	Cumulative Percent
Disagreed	52	43.3	43.3	43.3
Neutral	12	10	10	53.3
Agreed	44	36.7	36.7	90
Strongly Agreed	12	10	10	100
Total	**120**	**100**	**100**	

Source: Author's Fieldwork, 2014

Table 46 on whether the numbers of bedrooms are sufficient to suit user needs, forty three percent (43%) of the respondents disagreed, thirty seven percent (37%) of the respondents agreed; while ten percent (10%) of the respondents strongly agreed and ten percent (10%) were neutral.

This Table was plotted to a bar chart in Figure 53, from the bar chart, fifty two (52) of the respondents disagreed; twelve (12) of the respondents were neutral; forty four (440) of the respondents agreed; while twelve (12) strongly disagreed.

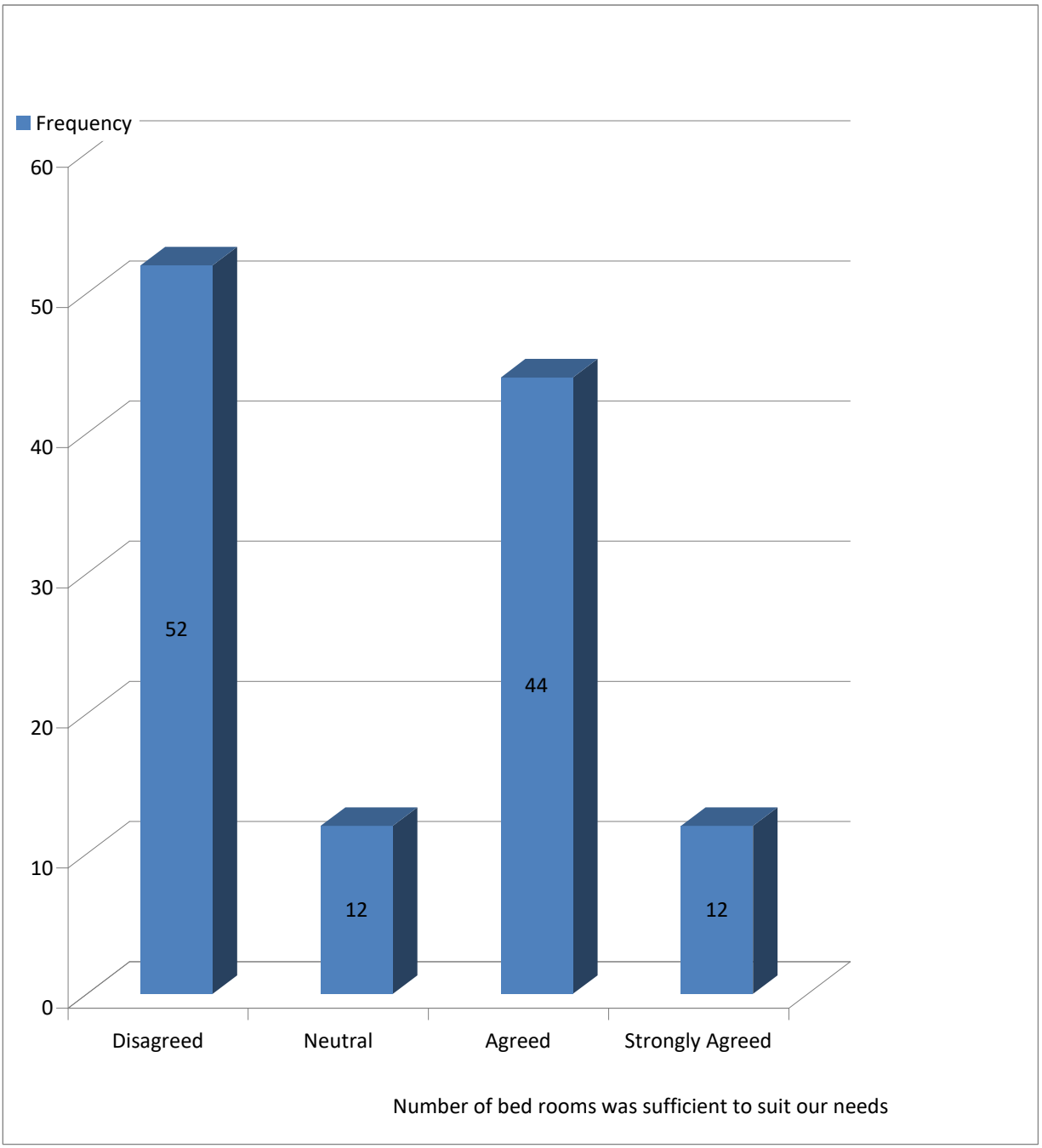


Figure 53: Bar Chart Showing Whether Number of Bedrooms were Sufficient to Meet User Need

Table 47: Quality of Low-cost Houses

S/No		Yes				No			
		Freq.	Perc. %	Valid %	Comu. %	Freq.	Perc. %	Valid %	Comu. %
1.	Is the structure free from wear?	108	90	90	90	12	10	10	100
2.	Is the structure of your dwelling free from tear?	104	86.7	86.7	86.7	16	13.3	13.3	100
3.	Is the roof free from leakage?	68	56.7	56.7	56.7	52	43.3	43.3	100
4.	Is the structure free from peeling off of surface finish?	68	56.7	58.6	58.6	48	40	41.4	100
5.	Is the structure free from cracks?	88	73.3	73.3	73.3	32	26.7	26.7	100
6.	Is the structure free from moisture seepage?	100	83.3	83.3	83.3	20	16.7	16.7	100
7.	Is the structure free from dilapidation?	108	90	90	90	12	10	10	100
8.	Do you notice any damage in your roof?	88	73.3	73.3	73.3	32	26.7	26.7	100
9.	Do you notice any damage on wall?	56	46.7	46.7	46.7	64	53.3	53.3	100
10.	Do you notice any damage on the floor?	24	20	20.7	20.7	92	76.7	79.3	100
11.	Do you notice any damage in your foundation?	20	16.7	16.7	16.7	100	83.3	83.3	100

Source: Author's Field Work (2014)

Table 47 is basically on the quality of the respondent's homes. 90% of the respondent's structure is free from wear, while 10% indicated that their structure is not free. On tear, 86.7% indicated that their apartments are free from tear, while 13.3% indicated not free. 56.7% agreed that their dwellings are free from peeling off surface finish. On the other hand 40% disagree that their structure are free from peeling off surface finish.

On cracks, 73.3% of the respondents indicated that there are no cracks on their buildings, while 26.7% noticed cracks on their buildings. On moisture seepage, 83.3 indicate that their apartments are free from moisture seepage. On the other hand, 16.7% noticed moisture seepage in their apartments. Buildings noticing moisture seepage may be as a result of the absent of drainages in most of the locations.

Whether the buildings are free from dilapidation, 90% of the respondents indicate that their apartments are free from dilapidation, while 10% are not free. Most buildings under dilapidation are as a result of house owner's inability to renovate these buildings. The buildings are old and the materials are gradually deteriorating. On damaged roofs, 73.3% did not notice any damage on roofs, while 26.7% noticed damages on roofs. General damage on wall, 46.7% noticed damaged walls, while 53.3% did not notice any damage on walls. Damage on floors was not noticed by 76.7% of the respondents, while 20% noticed damages on floors. Damage on foundation, 16.7% noticed damages on foundations, while 83.3% did not notice any damage.

The above responses tallies with the physical observations and the findings from focus group discussions. From the physical observations carried out, most residents of the low-cost houses where no renovation/ alteration were made to buildings suffered from the following: roof linkages, cracks, moisture seepage, foundation damage, floor damage, peeling of painted surfaces, and poor drainage system. Where renovations or alterations were made, they are free from the above.

Table 48: Availability of Social Facilities within the Low-cost Houses

S/No.		Available but malfunction				Not available				Available			
	Services/Facilities	Freq.	%	Valid %	Cumul. %	Freq.	%	Valid %	Cumul. %	Freq.	%	Valid %	Cumul. %
1.	Pipe born water	52	43.3	43.3	43.3	56	46.7	46.7	90	30	10	10	100
2.	Electricity	20	16.7	16.7	16.7	–	–	–	–	100	83.3	83.3	100
3.	Sewage disposal	–	–	–	–	12	10	10	10	108	90	90	100
4.	Drainage system	–	–	–	–	120	100	100	100	–	–	–	–
5.	Tarred road	–	–	–	–	120	100	100	100	–	–	–	–
6.	Education	4	3.3	3.3	3.3	104	86.7	86.7	90	12	10	10	100
7.	Health	–	–	–	–	116	96.7	96.7	96.7	4	3.3	3.3	100
8.	Recreational	–	–	–	–	120	100	100	100	–	–	–	–
9.	Commercial	–	–	–	–	120	100	100	100	–	–	–	–

Source: Author's Field Work (2014)

Table 48 shows that on pipe borne water, 43.3% indicated the availability of pipe borne water but malfunctioning, while 46.7% indicated that the facility is not available. 10% of the respondents indicate that the facility is available. On electricity supply, 16.7% indicate the availability of electricity, but malfunctioning. 83.3% indicated that electricity is available. 90% of respondents indicate that there is sewage disposal, while 10% indicate that there is no sewage disposal system in their apartments. Drainage system is not available in all the locations. On educational facilities, 86.7% indicated that the facility is not within the Low-cost houses. 10% indicate that educational facility is within the low-cost buildings. 3.3% indicated the availability of the facility but not functioning.

On health facility, 96.7 indicated that there is no health facility within the low-cost houses. 3.3% indicate the availability of health facility within the low-cost houses. Recreational facility is not available in all the location of the low-cost houses, likewise there is no commercial centre within the low-cost houses.

4.1 HYPOTHESIS TESTING

Hypothesis 1: Specific demographic characteristics, such as ethnicity, age, education, occupation and income of the respondents do not affect overall housing satisfaction with the interior and outdoor spaces. Data obtained in Appendix A4 was used for the multiple regression in Table 49 below.

Table 49: Multiple Regression for Hypothesis 1

Model Summary

Model	R	R Square	Adjusted R Square	Std. Error of the Estimate
1	.665[a]	0.442	0.416	4.34578
Not Available	4	3.3	3.3	100

a. Predictors: (Constant), Income level, Age, Tribes, Educational level, Occupation

ANOVA[a]

Model		Sum of Squares	Df	Mean Square	F	Sig
1	Regression	1584.817	5	316.963	16.8	.000[b]
	Residual	2001.897	106	18.886		
	Total	**3586.714**	**11**			

a. Dependent Variable: Users satisfaction score

b. Predictors: (Constant), Income level, Age, Tribes, Educational level, Occupation

Coefficients[a]

Model		Unstandardized Coefficients		Standardized Coefficients		
		B	Std. Error	Beta	t	Sig.
1	(Constant)	25.826	4.862		5.32	0
	Tribes	-0.038	0.132	-0.022	-0.29	0.774
	Age	0.005	0.047	0.008	0.11	0.915
	Educational Level	-5.647	1.048	-0.408	-5.39	0
	Occupation	7.928	1.425	0.433	5.56	0
	Income level	2.988	0.616	0.375	4.85	0

a. Dependent Variable: Users satisfaction score

Multiple regression was employed and the output clearly revealed that there is a significant relationship between personal characteristic of the respondents and the overall housing satisfaction. There is adequate evidence to reject the null hypothesis since the p-value of (0.018) is less than the level of significant (0.05) and we conclude base on the evidence that the demographic characteristics, such as ethnicity, age, education, occupation and income significantly affect the overall housing satisfaction with the interior and outdoor spaces of their house. The result (Table 49) further indicates that age and ethnicity of the respondents does not significantly contribute significantly.

In hypothesis 2 which sought to evaluate the relationship between size of room and location of room as against respondents' satisfaction with housing. The data used for this analysis was correlation in Table 50 below.

Table 50: Correlations for Hypothesis 2

Correlations

		Size of the rooms	Number of bed rooms
Size of the rooms	Pearson Correlation	1	.464**
	Sig. (2-tailed)		0
	N	120	120
Number of bed rooms	Pearson Correlation	.464**	1
	Sig. (2-tailed)	0	
	N	120	120

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

The output of correlation (Table 50) clearly indicate that there is significant relationship between size of the rooms and no of bed rooms, as the number of size of the rooms increases the number of bed rooms also increases in a positive direction. This is because the p-value of about 0.001 is less than the level of significant 0.05.

Hypothesis 3 sought to examine modification made to low- cost houses and how it affects users' satisfaction. Data obtained in Appendix A4 was used for correlation in Table 51 below.

Table 51: Correlations for Hypothesis 3

Correlations			
		User satisfaction score	Alteration made score
User satisfaction score	Pearson Correlation	1	0.061
	Sig. (2-tailed)		0.508
	N	120	120
Alteration made score	Pearson Correlation	0.061	1
	Sig. (2-tailed)	0.508	
	N	120	120

The output of correlation in Table 51 above clearly indicates that there is no significant relationship between users' satisfaction and alterations made to the low-cost houses. This clearly indicates that users' satisfaction has nothing to do with the alteration made to the low-cost houses. This is because the p-value of 0.508 is greater than the level of significant 0.05.

In hypothesis 4 which sought to evaluate the functionality of the spaces provided and how it affects users' satisfaction. Data obtained in Appendix A4 was used for correlation in Table 52 below.

Table 52: Correlations for Hypothesis 4

Correlations			
		Functionality of space score	Users satisfaction score
Functionality of space score	Pearson Correlation	1	.670*
	Sig. (2-tailed)		0
	N	120	120
Users satisfaction score	Pearson Correlation	.670*	1
	Sig. (2-tailed)	0	
	N	120	120

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

The result of correlation in Table 52 above clearly indicates that there is a significant relationship between the functionality of the spaces provided and users' satisfaction. This mean the more the space available the more satisfaction acquired by the users. This is because the p-value of 0.002 is less than the level of significant 0.05.

Hypothesis 5 sought to evaluate housing quality and performance of buildings such as basic services and social services as it affects users' satisfaction. Data obtained in Appendix A4 was used for correlation in Table 53 below.

Table 53: Correlations for Hypothesis 5

Correlations

		Housing Quality	Users satisfaction score
Housing Quality	Pearson Correlation	1	.270*
	Sig. (2-tailed)		0.003
	N	120	120
Users satisfaction score	Pearson Correlation	.270*	1
	Sig. (2-tailed)	.0030	
	N	120	120

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

The output above in Table 53 indicates that there is strong significant connection between the respondent Housing quality and users' satisfaction. This is simply because the p-value of 0.003 is less than the level of significant 0.05.Therefore the null hypothesis is not accepted.

CHAPTER FIVE
DISCUSSION

5.1 DISCUSSION OF FINDINGS

This section presents the discussions of findings obtained from the survey in selected Low-cost housing in Plateau State with the aim of investigating users' satisfaction with Architectural design of spaces in residential buildings of Plateau State Low-cost housing. The discussion outlines user satisfaction with architectural design of low-cost housing spaces in the three low-cost housing in each geopolitical zone of Plateau State. The study areas are Miango low-cost housing, Pankshin low-cost housing and Shendam low-cost housing.

5.1.1 Location and Conditions of the Low-Cost Houses

Prior to getting on the actual field survey of this study, a preliminary survey of all the low-cost houses was carried out between the months of February and March 2014. The reason for the survey was to identify locations, coverage and extent of the study area; location of Low-cost houses and to identify the state of the low-cost houses and also to identify any alteration made to the original plan as shown in Plates 2, 3 and 4. The locations of the Lowcost houses in the three geopolitical zone of Plateau State are: Miango low-cost housing, Pankshin low-cost housing and Shendam low-cost housing. During the physical study and observation of the study areas, the following general observations were made for all the studied low-cost houses:

Roofs/Ceilings: leakages were identified in most roofs and ceiling of houses not renovated, the roofs need replacement. It was observed that few of the houses were renovated with the roofs changed from their original corrugated iron roofing sheet to long span aluminum roofing sheets. Most ceilings were affected by the leakages from the roof. In most of the renovations carried out, the original ceilings sheets were replaced with PVC ceiling or POP ceiling (See Plates 2, 3 and 4).

Doors and Windows: It was observed that houses that have not been renovated still have the original wooden flush doors. On the other hand, renovated houses had the original wooden flush doors replaced by steel doors for external doors while steel frame flush doors were introduced for internal doors. The original crittal hope glass windows are broken and in dilapidated stage (see Plate 2). Where renovations were carried out, windows were replaced with aluminum sliding/projected windows. In some cases the sizes of windows were made wider for living rooms (see Plate 7).

Floor plan: It was observed that the original floor plans still exist for most houses. See Figure 10. Houses that had undergone alteration or modifications, introduced additional rooms to the existing rooms. Such additions were mostly bedrooms and toilets.

Walls: Most of the walls of the Low-cost buildings are still in good shape (see Plate 2), only few had minor cracks which can be mended as a result of renovation (see Plate 6). In the renovated buildings, some walls were collapsed and new ones introduced for additional rooms.

Car Porch/Entrance Porch: The original plans of the low-cost houses do not have car porch or entrance porch (see Plate 2). Most houses modified their existing entrances by introducing a car porch and entrance porch (see Plate 7)

Floor Finishing: The original floor finishing for all the low-cost houses was cement sand- screed floor. All renovated and modified houses change their floor finishing to modern floor tiles.

External Fence and gate: The original low-cost houses do not have fence and gates to the apartments, but most occupants introduced a fence/gate house for security purposes (see Plate 4).

Drainage System: It was observed that the original plan has no or poor drainage system; therefore, the modifications made to these buildings now have new drainage system introduced. The physical conditions of all the low-cost houses within the study

areas are classified under excellent, good, average, poor and very poor using the following assessment criteria; such as leakages in roofs, peeling off of plaster, cracks on walls, decay of fascia board and ceiling, moisture seepage and condition of floors, doors, windows, electrical fittings, plumbing pipes and sanitary fittings. See Table 6.

It was observed that the low-cost houses in Miango are of average condition, those in Pankshin and Shendam are in poor condition considering the assessment criteria. The reason is because more renovation work has been carried out on Maingo low-cost compared to other locations of low-cost houses.

5.1.2 User Satisfaction with Sizes of Rooms

From the results obtained, majority of the respondents are satisfied with the size of their living room. This signifies that, the size of the living room is spacious enough to accommodate all the activities carried out in this space. According to the users, the living room is used for family devotion, relaxation, visitor's reception and family meeting. The majority of the users are very dissatisfied with the dining space, with few of them satisfied with the space. During the oral interview majority are not satisfied with the dinning space because the space is too small. Many of the user indicated that the space can only accommodate small dining table which is not large enough to meet the need of the family. This confirms what was observed during the physical survey of the low-cost houses. Most users converted the dining space to store. According to them they use their living room equally as dining space. Most of them indicated that they don't need dinning space, because their food is served and ate in the living room.

From the result obtained on satisfaction with sizes of kitchen, majority of the users are satisfied with the size of their kitchen. Some indicated that they are very dissatisfied. These two scenarios were established during the field survey, some indicated that they prefer to cook inside the temporary structure they constructed as kitchen than to use the designed kitchen because the size is small. On the other hand majority are comfortable

with the size of the kitchen. It was discovered that users not satisfied with the size of kitchen are using fire wood or charcoal for cooking; hence the space to keep the fire wood or bags of charcoal was their challenge. Considering the result obtained on satisfaction with size of store, majority of the users are very dissatisfied with the size of their store. From the physical survey of the buildings, the size of the store is small. This may be the reason why some of the users altered the original design of the low-cost houses to incorporate their desired space need.

The result obtained also signifies that majority of the users are dissatisfied with the size of bedrooms. It was also gathered during the physical observation of the spaces that some altered design were done to increase the size of the bedrooms and also the number of bedrooms. Few of the users of low-cost houses indicated during the oral interview that, they use their bedrooms for resting and relaxation. In this case additional furniture are required, which eventually will lead to additional size of space. Majority of users of the low-cost houses are very dissatisfied with the size of the toilets and bathroom. Though others indicated they are satisfied, but during the physical survey and oral interview users are more concerned with the number of toilets not the size. According to them one toilet for the entire household is not adequate. Results on the size of external spaces, such as parking space and surrounding spaces, the users are satisfied. During the physical survey adequate external space was seen in most of the low-cost houses. This may be one of the reasons why most users have altered the original plan of the low-cost houses.

5.1.3 Functionality of Low-Cost Houses and how it supported the Activities of Users

Results obtained from questionnaires on how functional are the designed spaces of low-cost houses and how the spaces effectively support the activities of the users, majority of the users disagreed that the buildings are functional and support the activities of users. This confirms the statement made by most users of the low-cost houses, “if not for financial constraints, I will alter the original plan of my apartment to suit my needs”.

Many of users' are satisfied with the design, if it was designed for low income earners, but majority of the users are not low income earners. See figure 21. Probably that could be the reason why a lot of alterations are going on within the low-cost housing in all the locations.

On the flexibility of the design, whether it is flexible enough to meet alteration needs, respondents agreed that the design of the low-cost houses is flexible enough. The functionality of all the spaces, the users agreed that the spaces are functional only that the number of bedrooms and toilets are limited compared to number of each household. Also most users converted the dining space to different functions such as reading room and store, since the store is small and no provision for any study space. From this result, majority are of the opinion that dining space is not necessary, since most families carried out the serving and eating of food in the living room and they are comfortable with it.

5.1.4 Alteration and Modification Made to Low-Cost Housing

Results obtained on user alteration and modification made to low-cost houses, some of the users indicated that alteration have been made to the following spaces: Living room, dining, kitchen, store, bedrooms, bathroom and toilets. From the result only few altered their living room. Majority of the users have not altered their living room. This tallies with result obtained on satisfaction with sizes of living room in section 5.1.2. Majority of users were satisfied with the sizes of their living room, which may be the reason why little alteration was recorded in the living room. Those that made alteration to the living room may not be as a result of the size of space, but likely because of their taste and status in society. Users that made alteration to their dining spaces are few. Majority did not make any alterations to their dining rooms. This could likely be as a result of users not using dining spaces for the purpose it was designed for. During the oral interview on functionality of the dining space, majority of the users don't use dining space for serving of food and eating. This could likely be the reason why few alterations were made. Those

that made the alteration might have done that because, majority of the users were not satisfied with the size of the dining as seen in section 5.1.2.

Results on alteration made to kitchen space signify that only few alterations were made to the kitchen space. This confirms the result on users' satisfaction with size of kitchen in section 5.1.2 because it reveals that majority are satisfied with the size of their kitchen. Therefore any alteration made in this case may likely be as a result of individual status and taste but not based on size. It was confirmed from the result that few alterations were made to store, toilet and bathroom spaces. This alteration confirms users' dissatisfaction with the sizes of the spaces as discussed in section 5.1.2.

Generally, based on the results obtained on alterations made to original designed spaces of low-cost houses, only few users carried out such alterations. Most of these alterations were seen in Maingo State Low-cost, with few seen in Pankshin and Shendam low-cost Housing. Most of the users introduced fence and Gate with Gate house. Also little landscape work and car park were introduced. During the oral interview with some inhabitants of the Low-cost houses, many indicated that if not for financial constraint, they would have carried out alteration in their apartments to serve their present need, because the number of bedrooms and toilets in the low-cost houses are not enough compared to the number of households. It was also discovered from the results obtained that majority of the users who carried out alteration or modification did not consult professionals like Architects, Engineers, Builders etc. in carrying out the alterations and modifications of their apartments. It was revealed from the result that the alterations were carried out by self, blocks layers and other artisans in the building industry.

5.2 DISCUSSION OF ANALYSIS OF HYPOTHESIS

In hypothesis 1, the result of the analysis showed the null hypothesis was rejected because the p-value of 0.018 is less than the level of significant of 0.05. The alternative hypothesis (H1) which states that demographic characteristic of inhabitants such as

ethnicity, age, education, occupation and income of users have a significant relationship with users' satisfaction with architectural design spaces of low-cost houses. Ethnic group of users, contribute to their level of satisfaction, because every ethnic group has its cultural values which are usually built in a person's life. These values go with the perception of space and satisfaction. Activities within a space also vary from one person to the other. The age range influence users' satisfaction level, the level of satisfaction of young single person with a space cannot be the same with the satisfaction level of a married man with family. This also reveals that social class factor such as level of education, occupation and income of users' have great significance on their satisfaction level. These factors play an important role when it comes to satisfaction. That is why in any given design the demographic characteristics of the client are of great importance to the architect, because it helps in creating appropriate space. The study reveals that architectural design of spaces are more appreciated among the educated inhabitants than the illiterates and this also goes with their income level.

In Hypothesis 2, the hypothesis was to determine whether the sizes of rooms, number of rooms and the location of the rooms have any significant relationship with users' satisfaction with architectural design of spaces. From the analysis, the null hypothesis was rejected because the output of correlation clearly indicates that there is significant relationship between the size of room, number of rooms and the location of rooms with users' satisfaction with architectural design of spaces. The study explores users' satisfaction with architectural design of spaces in residential buildings. Here space is the point of focus, you cannot talk of space without considering size, because any space is define by its size. This test of hypothesis confirms the result in Tables 49-53. Here, the questionnaire examines user satisfaction with the sizes of rooms in low-cost houses. From the results obtained, it is obvious that the sizes of rooms influence user satisfaction.

In Hypothesis 3, correlation was utilised to determine significant relationship between users' satisfaction and alteration made to the low-cost houses. The output of the analysis indicates that there is no significant relationship between users' satisfaction and alterations made to the low-cost houses. The result of analysis showed that the null hypothesis was accepted, because the p-value of 0.508 is greater than the level of significance of 0.05. This indicates that users' satisfaction has nothing to do with the alteration made to the low-cost houses. This confirms the fact that most alteration made to the low-cost houses was based on individual status and preference. Based on the physical observations carried out, the alterations were basically on addition of rooms not only on sizes of rooms.

Hypothesis 4 was to determine the relationship between the functions of the spaces and the satisfaction level of users with architectural design of spaces. In this hypothesis, correlation was used for the test and the result indicates that there is significant relationship between the functionality of the spaces provided with users' satisfaction. Here, the null hypothesis was rejected, because the p-value of 0.002 is less than the level of significance of 0.05. The functionality of any given space has great influence on user satisfaction. Architects design must be functional in order to meet the need and aspiration of the user. Designs that are not functional are usually regarded as faulty designs. Therefore, the result of this hypothesis confirms that any design that is not functional will definitely have effect on the user.

In hypothesis 5 correlation was utilized to determine significant relationship between housing quality, performance of building and basic services. The output of the analysis indicates that there is significant relationship between user's satisfaction and the quality, performance of buildings and basic services. Here the null hypothesis was rejected which clearly confirmed that the quality and performance of buildings such as basic services and social services has significant relationship.

5.3 FOCUS GROUP DISCUSSION

Focus Group Discussion according to Uji (2009) is an instrument of data collection using a small, carefully selected, group of fairly more knowledgeable individuals (say about 6-8) representing a larger group, in order to discuss the subject matter of interest in a free and unlimited manner and guided by the researcher (called the facilitator of the FGD). The reason for using this instrument is because the information collected is more reliable than that from one-to-one oral interview, and provides a cross-section of well-informed opinions on the issue (Uji, 2009). During my preliminary field survey, I came across a number of professionals in the building industry that reside within the Low cost houses. Also most residents of the Low-Cost houses are knowledgeable, which necessitate the use of this instrument.

The focus group discussion was also zoned into the three Geopolitical zones of the State, using random sampling technique as obtained in the sample size of study. The northern zone is having Miango Low-cost Housing, for the Central Zone is Pankshin Low-cost Housing. The southern zone is Shendam State Low-cost Housing. A total of three focus group discussion was adopted for this research work. The home owners in these locations are homogenous groups who share common characteristics income, house plan design, and majority have spent more than ten years in the locations. A random number table was used to determine which household to contact. A research assistant who is fluent in both English and Hausa language was employed to contact homeowners. The research assistant explained who he was and the purpose of the Focus Group to each house owner contacted. He informed them about time commitment, tape recording, location, value of their contribution and their contribution and their confidentiality would be maintained. He responded to all questions or concerns about their participation.

5.3.1 Focus Group 1: Miango State Low-Cost Housing

Focus Group 1 met on Saturday morning at 10am, November 30th, 2013. Five households contacted to participate arrived on time. In addition to the five participants, two spouses and one household that heard about the Focus Group from a neighbor joined the meeting. This brings the number of participants to eight. Introduction of participants was made. The researcher welcomed the participants and reminded them of the purpose for the meeting and went further to inform them that it will be recorded and will be used purely for this research work all the twelve agreed to continue. The participants were asked the following questions as to aid in the discussion:

i. How long have you stayed in the Low-cost house?

ii. How do you acquire the house?

iii. Are you satisfied with the location of the Low-cost housing?

iv. What are your reasons for choosing to stay in Low cost Housing?

v. What do you like about the design of interior and exterior spaces of your house?

vi. What are the things you dislike about the design of the interior and the exterior of your house?

vii. What alterations or modification have you made to your house since it was sold out to you?

viii. If you have not made any alterations, why?

ix. If you have made changes or alterations, why?

x. Do you have any social amenities such as, clinics, schools, police out---post and recreational facility within your neighbourhood?

xi. If yes or no, can these facilities contribute to your satisfaction with the low-cost houses?

xii. Do you have the following basic facilities within your neighbourhood?

   a. Electricity supply

b. Pipe borne water supply

c. Drainage

d. Good road network

xiii. If yes or no, can these facilities form part of your satisfaction with the low-cost houses?

Findings from Focus Group 1

Discussion on the first and second questions went on with four of the participants stating that they have lived in the neighbourhood for the past twenty years and the houses were allocated to them by the state government. According to the majority of the participants, initially, the monthly house rent was deducted directly from their salaries. They indicated that they are satisfied with the location of the Low-cost houses, because it is close to their working place. Another common response was that there was no down payment needed to purchase the houses.

Response on other questions, almost all the participants were of the view that it was their external spaces that they like best, because enough space was provided. When asked on what they did not like about the design of their house, almost all the participants complained of inadequate bathroom and toilet facilities. All the houses have only one bathroom and one toilet facility, which the household members found to be very inconvenient. All the participants agreed that with the two bedrooms, they needed two WCs because of convenience of the household. The second most common response to what they dislike about the design of their homes was the size of bedrooms, the living room, dining room and kitchen. The participants considered the number of persons per room and their furniture overcrowded.

Many responded that the external spaces of their houses are adequate for them to park their cars and enough space for their children to play around the house. Questions seven, eight and nine were on changes and alterations made to the interior of their homes.

Participants were asked to provide specific changes or alterations they had made and why they had done so. The most common response was to provide additional space that can accommodate them. Two of the participants mentioned that the alteration was done to give facelift to the buildings. On why alterations were not made in some houses, the participants are of the view that it has to do with financial constraint of the occupiers.

On social amenities, the participants indicated that there are schools and police outpost within their neighbourhood. There is erratic electricity and water supply in the neighbourhood. No drainage system. According to them these facilities form the basis of their satisfaction with the low-cost houses. The major complaint from the participants is the poor road network within the area. The overall response of the participants was that they are proud to be homeowners despite some challenges they faced.

5.3.2 Focus Group 2: Pankshin State Low-Cost Housing

Focus Group 4 met on Saturday, 25th January, 2014 with seven households in attendance. The scheduled time for the meeting was 4pm. All the participants turned up for the meeting. The meeting lasted for one and a half hours. Pankshin low-cost housing has 80 housing units.

The meeting started with introduction of participants and the purpose of meeting was outlined to members. Participants were urged to be free to discuss issues that pertain to their houses. The same questions drawn up for the focus discussion in this research work were followed and the discussions were centered basically on these questions. Below are the findings from the focus group.

Findings from Focus Group 2

Discussion on the first and second question went on with seven of the participants stating that they have lived in the neighbourhood for the past twenty years and above. The houses were allocated to them by the state government. According to the majority of the participants, initially, the monthly house rent was deducted directly from their salaries

before the government later sold the buildings to them. They indicated that they are satisfied with the location of the Low-cost houses, because it is close to their working place. Another common response was that there was no down payment needed to purchase the houses.

Response on other questions, almost all the participants were of the view that it was their external spaces that they like best, because enough space was provided. When asked on what they did not like about the design of their house, almost all the participants complained of inadequate bathroom and toilet facilities. All the houses have only one bathroom and one toilet facility, which the household members found to be very inconvenient. All the participants agreed that with the two bedrooms, they needed two WCs for the convenience of the household. The second most common response to what they dislike about the design of their homes was the size of bedrooms, the living room, dining room and kitchen. The participants considered the number of persons per room to be high compared to the one toilet and bathroom provided.

Many responded that the external spaces of their houses are adequate for them to park their cars and enough space for their children to play around the house. Questions seven, eight and nine were on changes and alterations made to the interior of their homes. Participants were asked to provide specific changes or alterations they had made and why they had done so. The most common respond was to provide additional space that can accommodate them. Four of the participants mentioned that the alteration was done to give face lift to the buildings. On why alterations were not made in some houses, the participants are of the view that it has to do with financial constraint of the occupiers. On social amenities, the participants indicated that there are no schools, police out post clinic, and recreational facilities within their neighbourhood. There is erratic electricity and water supply in the neighbourhood. No tarred access road and drainage system. According to them these facilities form the basis of their satisfaction with the low-cost houses. The

overall response of the participants was that they are proud to be home owners despite some challenges they faced.

5.3.3 Focus Group 3: Shendam State Low-Cost Housing

A random number table was used to determine which household to contact. A research a research assistant who is fluent in both English and Hausa language was employed to contact home owners. The research assistant explained who he was and the purpose of the Focus Group to each house owner contacted. He informed them about time commitment, tape recording, location, value of their contribution and their contribution and their confidentiality would be maintain.

Shendam State low-cost housing has 80 housing units, out of this number eight household were invited for the focus group discussion. The following were the outcome of the focus group discussion in Shendam State Low-cost.

Findings from Focus Group 3

Discussion on the first and second questions went on with all the eight participants stating that they have lived in the neighbourhood for over twenty years and the houses were allocated to them by the state government. According to the participants, initially, the monthly house rent was usually deducted directly from their salaries until the houses were sold to them. They indicated that they are satisfied with the location of the Low-cost houses, because it is close to their working place.

Response on other questions, almost all the participants were of the view that it was their external spaces that they like best, because enough space was provided. When asked on what they did not like about the design of their house, almost all the participants complained of inadequate bathroom and toilet facilities. All the houses have only one bathroom and one toilet facility, which the household members found to be very inconvenient. All the participants agreed that with the two bedrooms, they needed two WCs because of their convenience. The second most common response to what they

dislike about the design of their homes was the number of bedrooms, the living room, dining room and kitchen. The participants considered the number of persons per room to be more than the number of bed rooms in most cases.

Many responded that the external spaces of their houses are adequate for them to park their cars and enough space for their children to play around the house. Questions seven, eight and nine were on changes and alterations made to the interior of their homes. Participants were asked to provide specific changes or alterations they had made and why they had done so. The most common respond was to provide additional space that can accommodate them. Five of the participants mentioned that the alteration was done to give face lift to the buildings. On why alterations were not made in some houses, the participants are of the view that it has to do with financial constraint of the occupiers

On social amenities, the participants indicated that there are schools and police out post within their neighbourhood. There is erratic electricity and water supply in the neighbourhood. No drainage system. According to them these facilities form the basis of their satisfaction with the low-cost houses. The major complain from the participants is the poor road network within the area. The overall response of the participants was that they are proud to be home owners despite some challenges they faced.

The summary from the focus group discussion above is that majority of the participants in the focus group discussion have stayed in the locations for twenty years and above. All the occupants acquired the houses through allocation from the government which was later sold to them. Majority are satisfied with the location of the Low-cost houses. From the findings in most of the focus group discussion, users are not satisfied with the spaces provided in their bedrooms, kitchen, stores, dinning, toilets/bathrooms and living room. They considered their external spaces to be adequate. Many participants have modified or altered their spaces for their convenience. Those that have not made any alteration or modification did not do so on the basis of finance. The participants indicated

that if their financial status change, they are ready to make such modifications or alterations.

Social amenities such as schools, clinics/hospitals, police out post and recreational facilities are absent in all the locations. Other facilities like pipe borne water, good tarred road, and drainages are absent too. Electricity is available in all the location with erratic supply. The general opinion of the participants in this focus group discussion is that, they are strongly not satisfied with their apartments particularly the interior spaces.

The output of regression analysis revealed that there is no significant linkage between the Housing quality/performance of buildings such as service and social services and user satisfaction. Since the p-value of (0.149) is greater than the level of significant (0.05) it implies that housing quality and performance of buildings such as basic services and social service does not affect user satisfaction. Hence there is sufficient evidence to retain the null hypothesis.

5.4. PHYSICAL AND GENERAL OBSERVATIONS OF THE LOW-COST HOUSES

Physical observation was carried out in all the study areas. The floor plan, roof plan elevations of the original low-cost houses was reproduced by the researcher in order to assist the researcher in carrying out the study on existing spaces (See Figures 54-58). During the physical study and observation of the study areas, the following general observations were made for all the studied low-cost houses:

i. **Roofs/Ceilings**: leakages were identified in most roofs and ceiling of houses not renovated, the roofs need replacement. It was observed that few of the houses were renovated with the roofs changed from their original corrugated iron roofing sheet to long span aluminum roofing sheets. Most ceilings were affected by the leakages from the roof. In most of the renovations carried out, the original ceilings sheets were replaced with PVC ceiling or POP ceiling.(See Appendix A4)

ii. **Doors and Windows**: It was observed that houses that have not been renovated still have the original wooden flush doors. On the other hand, renovated houses had the original wooden flush doors replaced by steel doors for external doors while steel frame flush doors were introduced for internal doors. The original critical hope glass windows are broken and in dilapidated stage (See Appendix A4). Where renovations were carried out, windows were replaced with aluminum sliding/projected windows. In some cases the sizes of windows were made wider for living rooms.

iii. **Floor plan**: It was observed that the original floor plans still exist for most houses. (See Figure 54). Houses that had undergone alteration or modifications, introduced additional rooms to the existing rooms. Such additions were mostly bedrooms and toilets.

iv. **Walls:** Most of the walls of the Low-cost buildings are still in good shape (See Plate 2), only few had minor cracks which can be mended as a result of renovation (See Plate 6). In the renovated buildings, some walls were collapsed and new ones introduced for additional rooms.

v. **Car Porch/Entrance Porch**: The original plans of the low-cost houses do not have car porch or entrance porch (see Plate 2). Most houses modified their existing entrances by introducing a car porch and entrance porch (see Plate 7)

vi. **Floor Finishing**: The original floor finishing for all the low-cost houses was cement sand- screed floor. All renovated and modified houses change their floor finishing to modern floor tiles.

vii. **External Fence and gate**: The original low-cost houses do not have fence and gates to the apartments, but most occupants introduced a fence/gate house for security purposes (see Plate 4)

viii. **Drainage System**: It was observed that the original plan has no or poor a drainage system; therefore, the modifications made to these buildings now have new drainage system introduced.

5.4.1 Miango State Low-Cost

The Miango state low-cost is located within the Jos Metropolis. It is located along the Jos Wildlife Park road, after Solomon Lar Amusement park (See Plate 1). During the field study, the following were the findings:

i. There are 250 housing units at the Miango state low-cost..
ii. Majority of the occupants are civil servants and retirees from the state civil service.
iii. 50 % of the houses have been renovated by the owners, without altering the initial design.
iv. Houses not renovated are old, and the building materials used are deteriorating.
v. 40 % of the houses have undergone total alteration from the original plan.
vi. Good tarred road network with few potholes along the roads were observed.
vii. There is steady water supply from the Water Board, also erratic electricity supply within the location.

Plate 1: Google Image of Miango State Low-Cost, Jos.
Source: Google Image from Google Earth (2013)

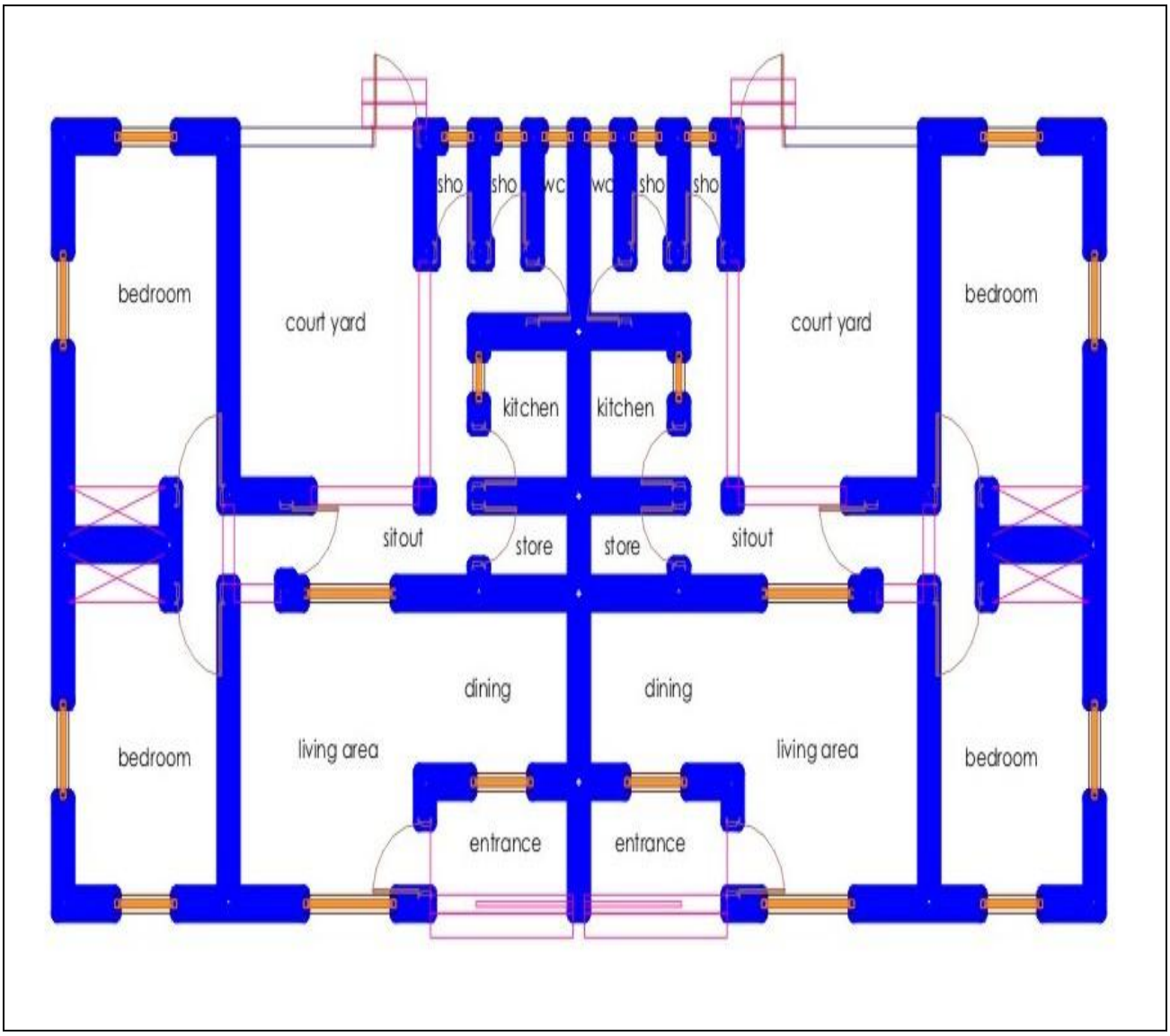


Figure 54: Typical Floor Plan of the Semi-Detached Low-cost House
Source: Field Survey (2014)

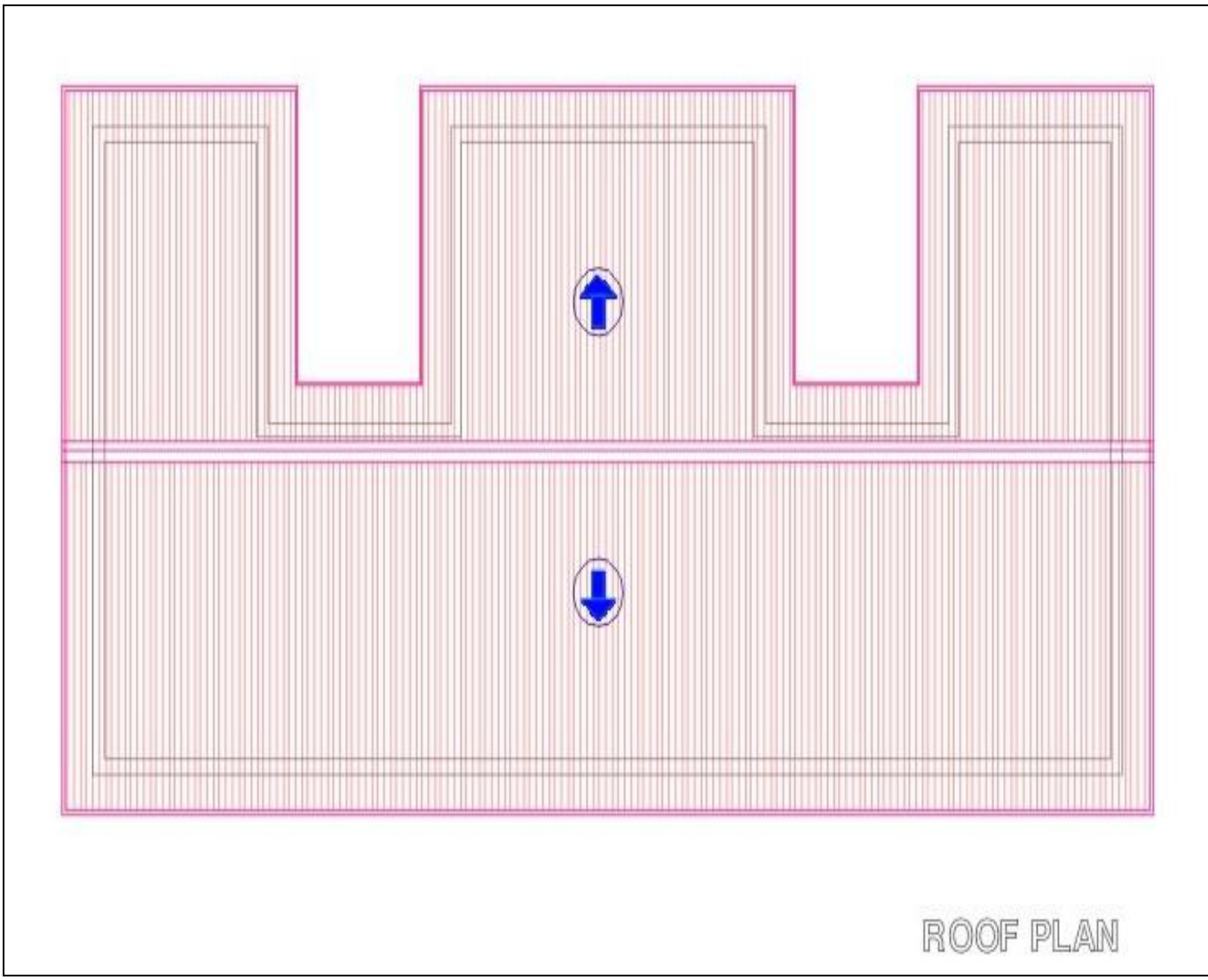


Figure 55: Typical Roof Plan of Low-Cost Houses
Source: Field Survey (2014)

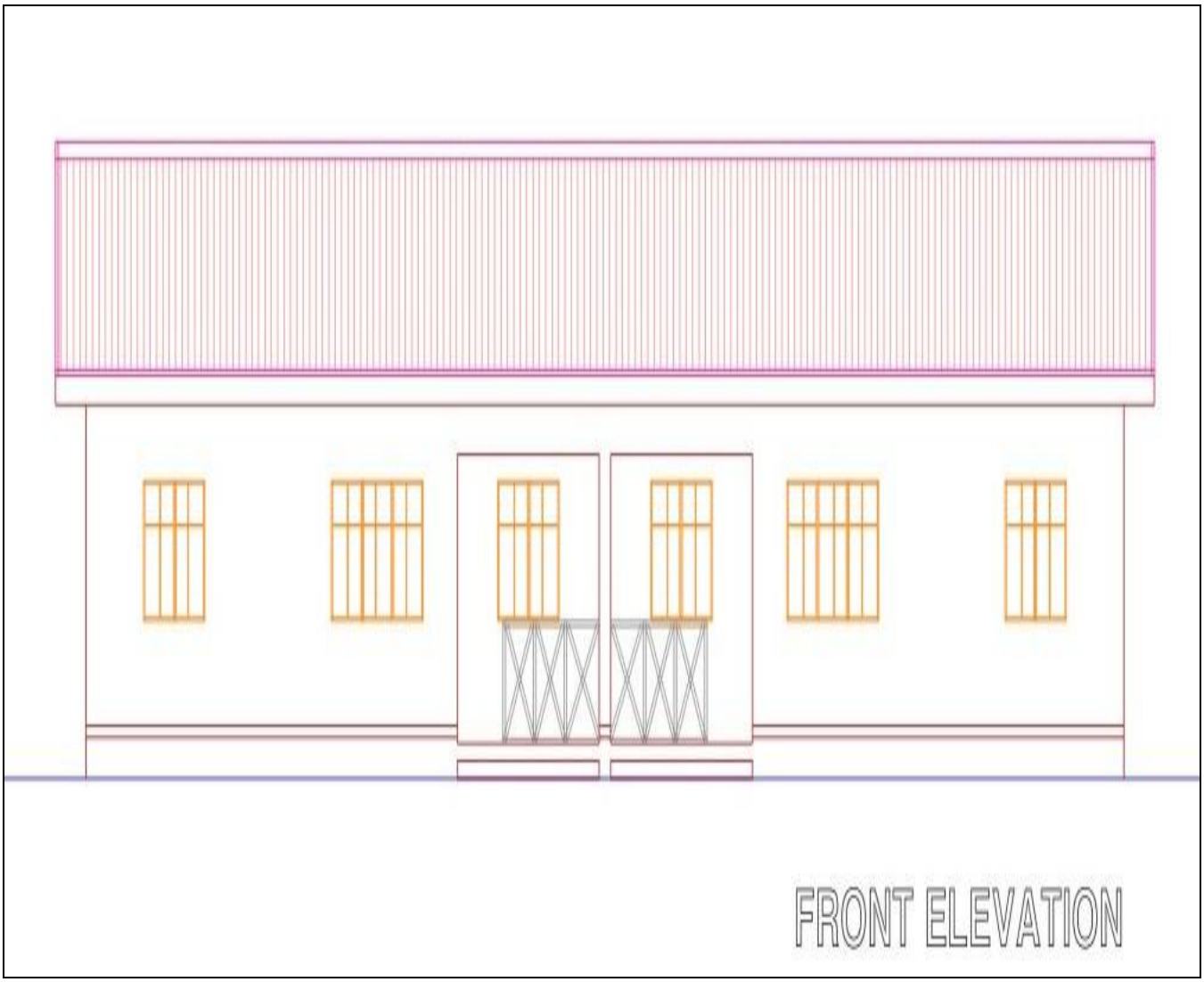


Figure 56: Typical Front Elevation of Low-Cost Houses
Source: Field Survey (2014)

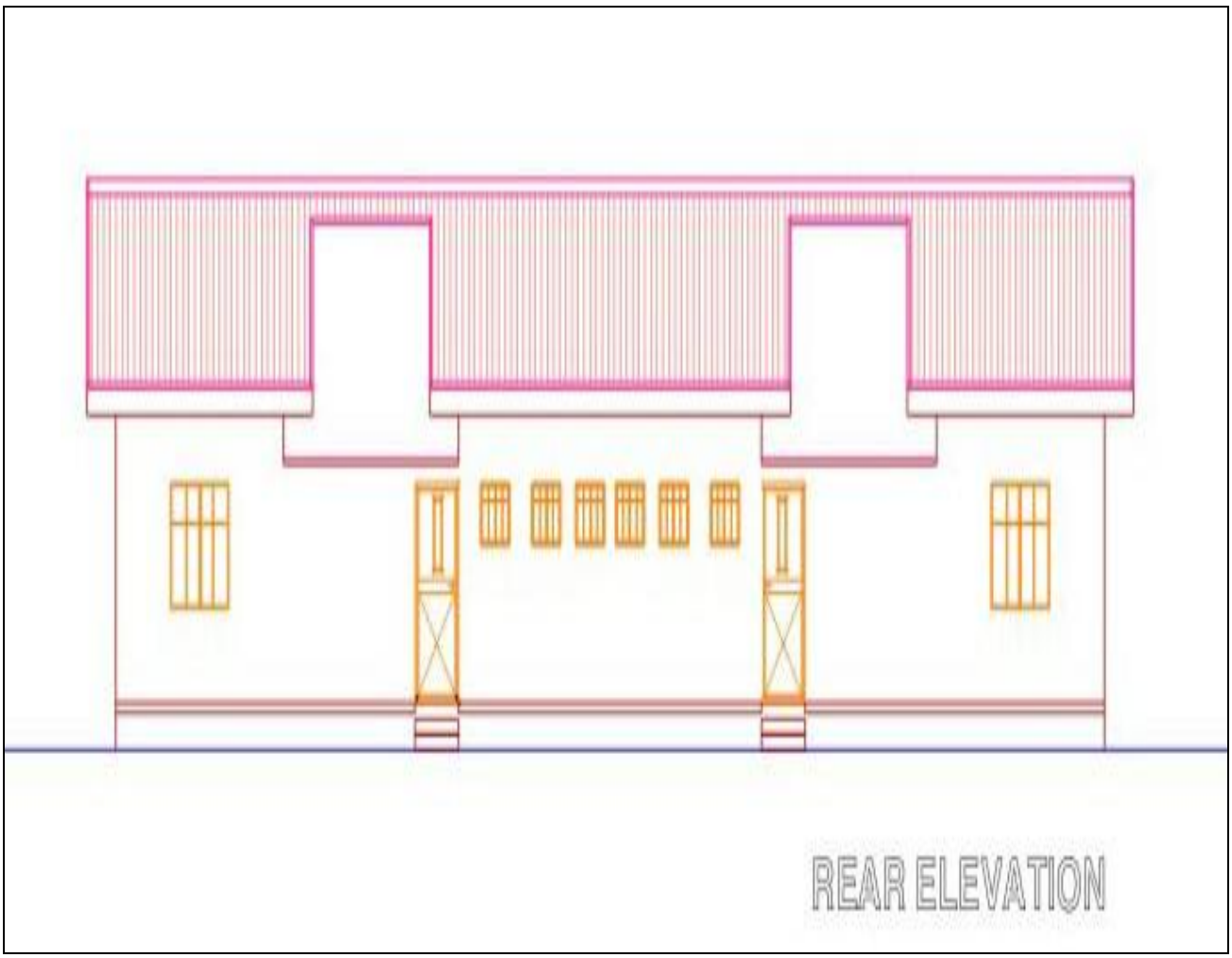


Figure 57: Typical Rear Elevation of Low-Cost Houses
Source: Field Survey (2014)

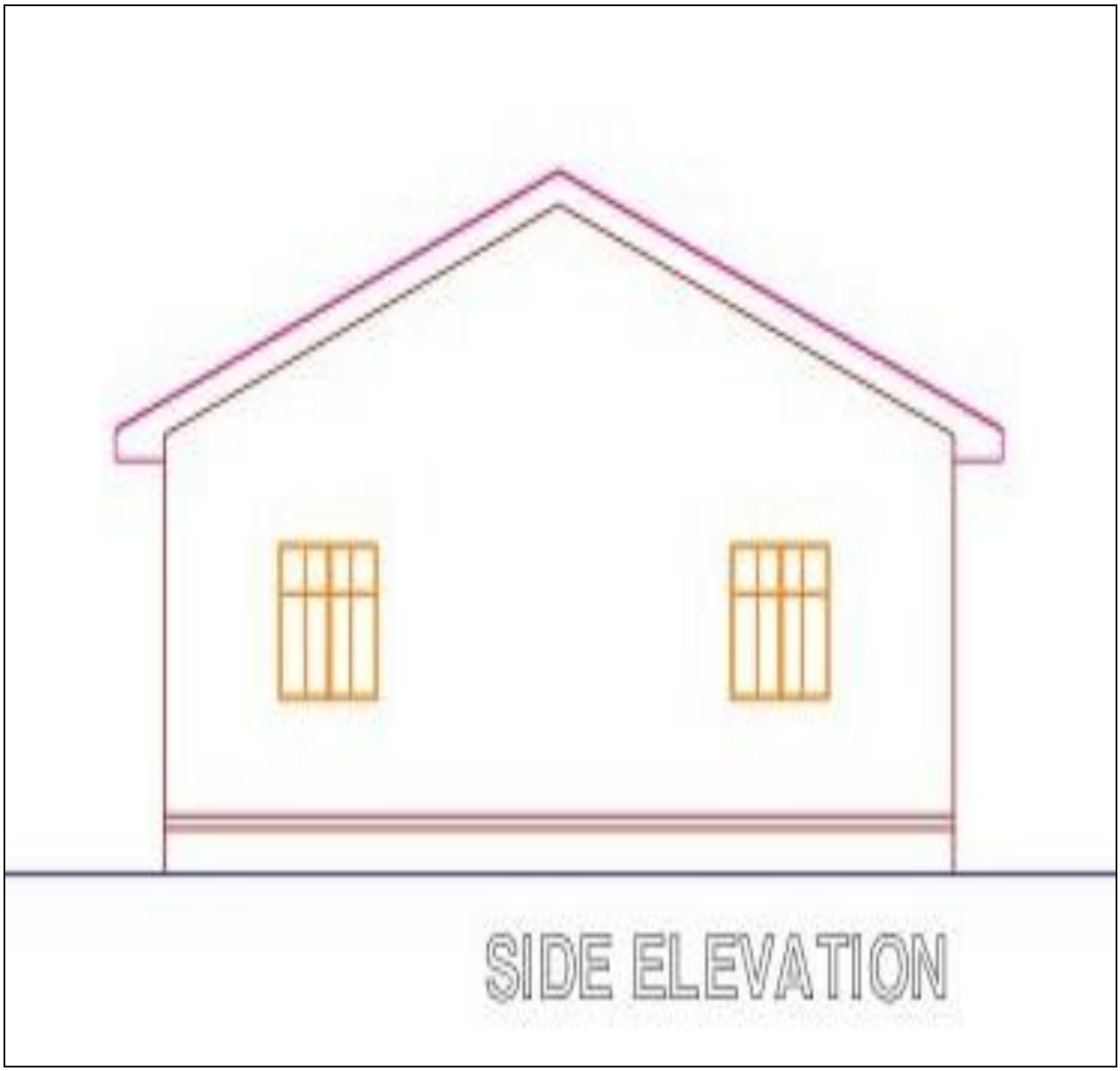


Figure 58: Typical Right and the Left Side Elevation
Source: Field Survey (2014)

Plate 2: Typical existing Block of Semi-Detached House at Miango State Low Cost without Alteration or Renovation
Source: Field Survey 2014.

Plate 3: Street with Altered Buildings at Miango State Low-Cost
Source: Field Survey 2014.

Plate 4: Fence/Altered Apartment of One of the Units at Miango State Low-Cost Housing
Source: Field Survey (2014)

5. 4.2 Pankshin State Low-Cost Housing

Pankshin is one of the oldest local governments in the state. It is 120km from Jos the Plateau State Capital. It is situated in the west of Mangu local government. The local government headquarter has the following socioeconomic infrastructure which include banks, standard Post Office, General Hospital and clinics, ultra Modern Nenpin Night Club, Electricity supply, Federal College of Education, School of Health Technology and numerous Post Primary Schools, the Nefur Arena, an impressive architectural Square carved out of solid rock, modern standard hotel situated on a top of a beautiful landscape hill with government guest house. See the location map in Figure 59.

During the preliminary study, the following were the findings:

a. There are 80 housing units in Pankshin Low-Cost Housing.
b. Most of the occupants of the low-cost houses are civil servants and retirees.
c. Most of the low-cost houses are old and require renovation.
d. About 10% of the houses have been renovated by the owners without any alteration from the original plan.
e. About 40% of the low-cost houses have been altered from the original plan.
f. No tarred roads and drainages
g. The social facilities located within the town are far from the low-cost housing.

Figure 59: Pankshin Low-Cost housing Layout
Source: Field Survey (2014)

Plate 5: Street with Modified Apartments at Pankshin Low-Cost Housing
Source: Field Survey (2014)

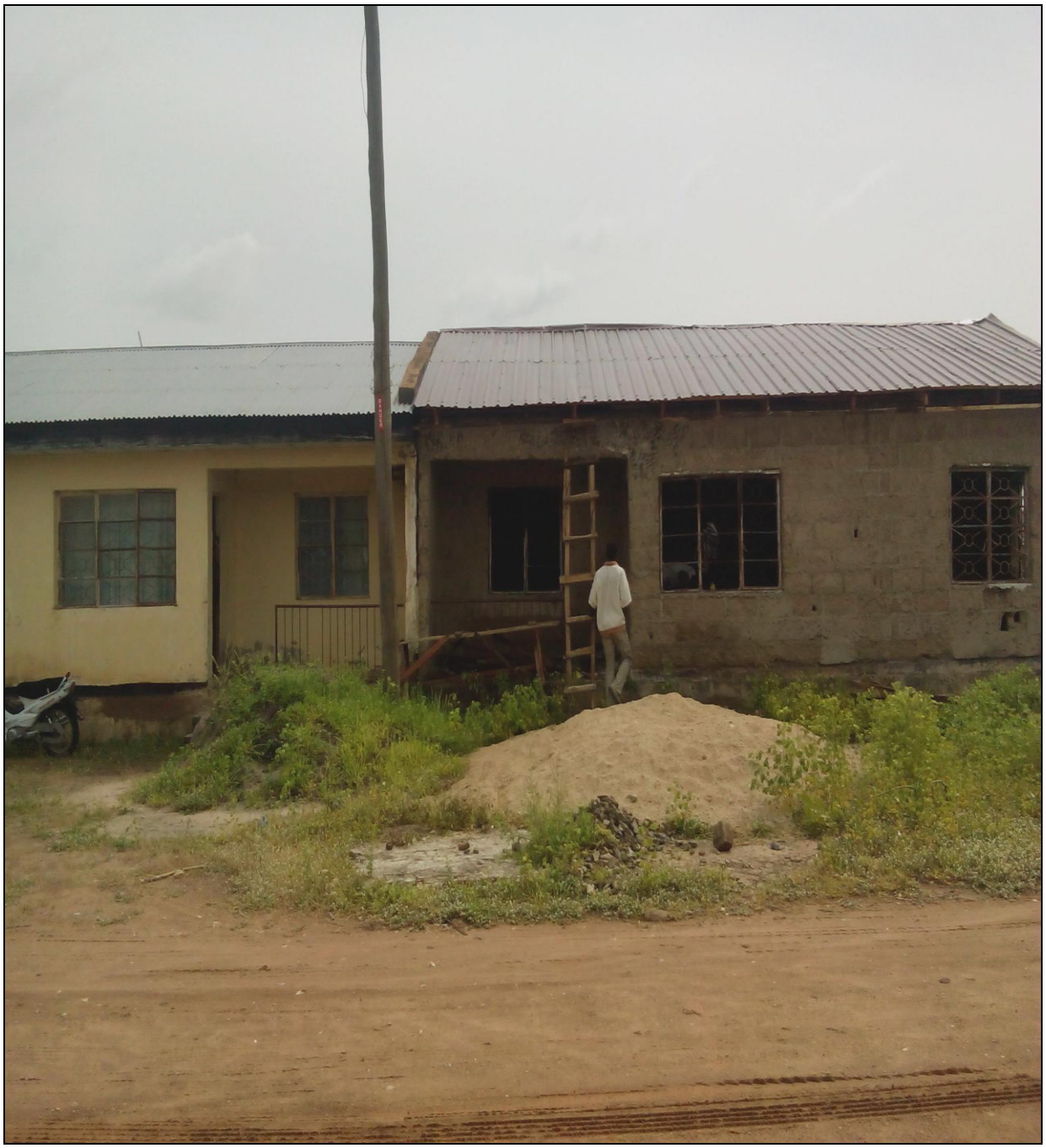


Plate 6: An Apartment under Renovation at Pankshin State Low-Cost
Source**:** Field Survey (2014)

5.4.3 Shendam State Low-Cost Housing

Shendam Local Government Area is located about 254km south of Jos, the Plateau State Capital. It covers a land mass of about 2,437.15 square kilometers and is regarded as the third most populated local government in the state, after Jos and Bukuru. Other social amenities and services enjoyed by the Local Government include standard Post Office, Pipe borne water, and nine standard Health establishments, one of which is a General Hospital. Also, there are numerous primary and secondary schools within the Local Government Headquarters.

During the field study, the following were the observations by the researcher:

a. There are 80 housing units at the Shendam State Low-Cost.
b. The houses are occupied mostly by civil servants and retirees.
c. Most of the houses are in deteriorating state, with some few being renovated without alteration from the original plan.
d. About 35% of the houses have undergone alteration.
e. There are erratic electricity and pipe borne water supply within the location.
f. No tarred road network/ drainages within the location.
g. No police outpost, clinic, schools and recreational facilities within the Low-cost housing.

Plate 7: An Apartment being altered from the original plan at Shendam Low-Cost Housing
Source: Field Survey (2014)

5.5 PHYSICAL OBSERVATIONS ON MODIFICATION MADE TO LOW-COST HOUSES

During the physical observations, it was observed that most houses have undergone alterations/modifications. These alterations/modifications are as follow:

i. **Roofs/ceilings**: Most roofs were changed from the original iron roofing sheet to longspan aluminum roofing sheets. The original ceilings sheets were replaced in most cases with PVC ceiling and POP ceiling

ii. **Doors and Windows**: It was observed that the original wooden flush doors were replaced by steel doors for external doors while steel flush doors were introduced for internal doors. The original louver windows were replaced with aluminum sliding/projected windows. In some cases, the sizes of windows were made wider for living rooms.

iii. **Introduction of Additional Rooms**: It was observed that most houses introduced additional rooms to the existing rooms. Such additions were mostly bedrooms and toilets.

iv. **Increase in Sizes of Rooms**: It was also observed that most occupants increase the sizes of their existing rooms such as kitchen, store, dinning, bedroom, living room and toilet.

v. **Introduction of Car Porch/Entrance Porch**: Most houses modified their existing entrances by introducing car porch at the frontage.

vi. **Floor Finishing**: Most floor finishing were changed from cement sand-screed floor finish to modern floor tiles.

vii. **External Fence**: The original low-cost houses do not have fence but most occupants introduced fence/gate house to their houses.

viii. **Drainage System**: It was observed that the original plan has poor drainage system; therefore, the modifications made to these buildings have new drainage system introduced.

All these alterations/modifications are common to all the low-cost houses in Plateau State.

CHAPTER SIX
SUMMARY OF FINDINGS, CONCLUSION AND RECOMMENDATIONS

6.1 SUMMARY OF FINDINGS

The summary of findings from the study are as follows:

1. The study revealed that there are eight hundred and sixty eight housing units in the low-cost housing in Plateau State. The inhabitants of the low-cost houses are of different tribes and religion.
2. Based on direct observation during reconnaissance survey the composition of architectural spaces in low-cost housing are two-bedroom, living room, kitchen, dinning, store, toilet, services and external spaces. The locations of the low-cost houses spread out to ten local government areas in Plateau State.
3. It was established in the study that users are not satisfied with the architectural design of sizes of space provided in low-cost houses.
4. The study revealed that users are not satisfied with the functionality of architectural designed spaces provided in low-cost houses.
5. It was revealed from the study that alterations made to the low-cost houses were in the following architectural designed spaces; living room, dinning, bedroom, kitchen, store, and toilet.
6. Physical observations carried out during the study revealed that alterations were made to roofs, floors, windows, doors, ceiling, walls, fence, security house and entrance porch.
7. The study established that most of the alterations were not carried out by professionals in the building industry such as Architects, Builders, Quantity Surveyors etcetera.
8. The hypotheses test confirmed that there was significant relationship between the demographic characteristics of inhabitants such as ethnicity, age, education, occupation, income of users and user satisfaction.
9. It was established from the hypotheses also that there was significant relationship between the size of rooms, number of rooms, location of rooms and user satisfaction.

10. The result from the hypotheses revealed that there was no significant relationship between alterations made to buildings and user satisfaction.
11. It was revealed from the hypotheses that there was significant relationship between the functionality of spaces in low-cost houses and user satisfaction.
12. Hypotheses test also revealed that there was significant relationship between the housing quality, basic services and user satisfaction.

6.2 CONCLUSION

In design process, architects in their imaginary journey, conceived the space in relation to function. It was established from the literature that architectural spaces are viewed in terms of the structural dimension, experimental dimension, functional dimension and architectural element dimension. All these provide the architect with the basis in order to arrive at an acceptable design. When these design basis for the space are followed, a satisfied space design will be achieved. The size of space created is base on human size, furniture size and allowable space for human movement. A building's success in part depends on its designer's understanding of human needs including comfort, safety, way-finding friendship formation, privacy and personality of space etc. In addition, building's success depends not only on how effectively the building provides the setting for activities of daily living but may depend on the perception of its resident concerning the space provided.

Residential satisfaction studies within the context of housing research have become paramount due to their significant role in providing evaluative feedback. Such feedback from residents increases the likelihood of improved design features in buildings and the planning of residential developments as a whole, and has been identified by Canter and Rees (2009) as being an integral part of the design process. Therefore a proper understanding of human nature as it relates to human needs is of critical importance in the formulation of houses and space standards. Most residential designs lack study and

understanding of human nature, particularly the clients input in the design process. In most cases no study on the site and the client's needs and aspirations is being carried out. From this study, It was observed that insufficient housing has mounted pressure on available housing and the growing housing demand in the urban centres has also paved the track for improper and faulty designs and construction which does not give regard to space and user satisfaction.

Based on this research, housing design can be regarded as the most difficult task in the field of architecture, because a proper understanding of the nature of human needs is of crucial importance in the formulation of houses and space standards. It was also established that designers are not always fully aware of the consequences of their design solution, only through post-occupancy survey will the designer usually realize what mistakes or bad decisions have been taken during the design process.

Therefore, the findings obtained will help planners, architects and contractors consider the factors that are influential in increasing individuals' quality of life and satisfaction levels. The current factors that guide the preferences of users about satisfaction with architectural design of their houses and environmental quality should provide basis for design works. Thus, the planning process will be more participatory and pluralistic, which will prevent recurrence of problems in the process of using.

6.3 RECOMMENDATIONS

Based on this study the following recommendations are made:

1. There is need for the professionals in the building industry, the Government, Non-governmental organizations and private individuals to make use of research outcome like this to bring out comprehensive planning, design and upgrading or redevelopment of residential buildings for the populace. Also to make housing policies that can stand the test of time.

2. In any given design, the architect should be mindful of the spaces he or she is designing in relation to the user need and aspiration.
3. The input of users is very vital in any mass housing proposals, therefore the professionals; government; Nongovernmental organization and private individuals should involve users at the planning stage.
4. With recent technological advancement residential spaces are changing in size, therefore in order to accommodate the new electronic gadgets, equipment, furniture and other services, Architects must bear all these in mind when designing.
5. The current preferences of users about satisfaction with architectural design of spaces should provide basis for design works making the planning process to be more participatory and pluralistic, which will prevent reoccurrence of problems in the process of using.
6. Detailed design/working drawing should be strictly adhered to by contractors during construction process and proper supervision, finance, labour and materials should be given priority during the construction process.

6.4 LIMITATIONS OF THE STUDY

1. The architectural design of the Low-cost houses were not available, therefore physical measurement of the spaces were taken in order to bring out the plan. This exercise was so tasking and time consuming.
2. Some users of low-cost houses denied research assistants entrance into their houses because of privacy. These areas of restrictions were basically their bedrooms.
3. As a result of time frame for the field work, taking the whole of low-cost houses in Plateau State would have been too tasking, therefore the research sample size was obtained by random sampling within the three geopolitical zone of Plateau State.

6.5 SUGGESTIONS FOR FURTHER STUDY

1. Further researchers can replicate the present study by examining quality of building materials used in residential buildings.
2. The need for further study on landscaping, drainages and green spaces in residential buildings is of great importance when it comes to users' satisfaction.
3. Researchers can carry further study on availability of neighborhood services and infrastructural facilities in residential buildings.

6.6 CONTRIBUTION TO KNOWLEDGE

1. This study has brought out more succinctly the fact that user satisfaction with architectural design of spaces requires user participation right from the design stage.
2. The research has established that flexibility in space distribution and users' participation which have been often ignored by Architects and Planners are very paramount in the design and construction of low-cost housing.
3. The research established that hierarchy in housing delivery, weather, culture and values play a great role in user satisfaction with architectural design of spaces in residential buildings.

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APPENDICES
APPENDIX A1

LETTER OF INTRODUCTION

Department of Architecture,
Faculty of Environmental Studies
University of Jos, Nigeria

Dear Respondent,

We are from the department of Architecture, University of Jos. We are carrying out this survey as part of an ongoing research work leading to the award of Degree of Doctor of Philosophy (PhD) in Architecture.

This research work is on **User Satisfaction with Architectural Design of Spaces in Residential Buildings: Insights from Plateau State Low-cost Housing**.

The aim of this research work is to investigate user satisfaction with designed spaces of their residential buildings and housing quality, considering both indoor and outdoor spaces. Your response to this questionnaire would be crucial to our timely completion of the research work. Therefore answer the questions on the questionnaire correctly reflecting your true feelings. The questionnaire is not a test, so do not spent time thinking what the correct answer might be.

All information you provided about yourself and any other matter will be treated as confidential and for the purpose of the research only.

We are most grateful for your help and contribution in this research work.

Yours faithfully,

RIPNUNG SHEM LEKJEP

APPENDIX A2

QUESTIONNAIRES

QUESTIONNAIRE SCHEDULE ON USER SATISFACTION WITH ARCHITECTURAL DESIGN OF SPACES IN RESIDENTIAL BUILDINGS: INSIGHTS FROM PLATEAU STATE LOW-COST HOUSING

.

INSTRUCTION: Please write in spaces provided or tick in the appropriate space provided.

SCHEDULE 1

A. PERSONAL DATA

1. Name of Household…….
2. Address (location of Low-cost housing)……..
3. Ethnic group/tribe of respondent……..
4. Religion of respondent……
5. Age of respondent
   - Below 18 years [ ]
   - 18 – 25 years [ ]
   - 25 – 30 years [ ]
   - 50 – 50years [ ]
   - 50 years and above [ ]
6. Number of children……..
7. What is your level of educational attainment?
   - i. No education at all [ ]
   - ii. Primary Education or its equivalent [ ]
   - iii. Secondary Education or its equivalent [ ]
   - iv. Tertiary Education or its equivalent [ ]
   - v. Trade and Craftsmanship training [ ]
8. What is your occupation?
   - i. Civil Servant [ ]
   - ii. Retired Civil Servant [ ]
   - iii. Trader/ Businessman [ ]
   - iv. Artisan/ Skilled workman [ ]
   - v. Non skilled labourer [ ]
   - vi. Student [ ]
   - vii. Applicant [ ]
9. What is your income level?
   - i. Low (below N50,000.00 per month) [ ]
   - ii. Medium (N50,000.00 – N100,000.00 per month) [ ]
   - iii. High (above N100,000.00 per month) [ ]

10. How long have you lived in this Low-cost Housing?
    i. Below 5 years [ ]
    ii. Between 5-10 years [ ]
    iii. Between 10-15 years [ ]
    iv. Between 15-20 years [ ]
    v. Above 20years [ ]

11. Residential building type occupied by respondent
    i. One bedroom [ ]
    ii. Two bedrooms [ ]
    iii. Three bedrooms [ ]
    iv. Four bedrooms [ ]

12. How did you get the place where you are living now
    i. I rented it from the owner [ ]
    ii. I bought it from the government [ ]
    iii. By other means (specify)……..

SCHEDULE 2: The following questions are on Residential Spaces. Tick appropriately the one that truly address your opinion.

13. How satisfied are you with the following spaces in and within your house?

	Spaces	Very Satisfied	Satisfied	Very Dissatisfied	Dissatisfied
I	Living Room				
Ii	Dinning				
Iii	Kitchen				
Iv	Store				
V	Bed Rooms				
Vi	Toilet				
Vii	Overall opinion on size of rooms				
Viii	Parking Space				
Ix	Overall opinion of external spaces				

SCHEDULE 3: The following questions are on modification and alteration.

14. Have you made alteration or modification to your house?
    Yes [ ] No [ ]

15. If 'yes' specify the area(s) the alteration was made
    i. Bed rooms [ ]
    ii. Dinning [ ]
    iii. Kitchen [ ]

iv. Store [ ]
v. Toilet [ ]
vi. Living room [ ]
vii. Roof and ceiling only [ ]
viii. Doors/windows [ ]
ix. Fence/Gate [ ]
x. Landscape [ ]

16. If modification or alteration were made as indicated above, who carried out the modification or alteration for you?
    i. Architect [ ]
    ii. Builder [ ]
    iii. Engineer [ ]
    iv. Self [ ]
    v. Block layer [ ]
    vi. Carpenter [ ]
    vii. Others (specify)……..

17. If you did not carry out any alteration or modification on your house, do you have any intention of doing it in future? Yes [ ] No [ ]

18. If you intent to carry out such modification or alteration in future, which areas or spaces do you intent to carry out such modification?
    i. Bed rooms [ ]
    ii. Dinning [ ]
    iii. Kitchen [ ]
    iv. Store [ ]
    v. Toilet [ ]
    vi. Living room [ ]
    vii. Fence/Gate [ ]
    viii. Landscape [ ]
    ix. Roof and ceiling only [ ]
    x. Doors/windows [ ]

SCHEDULE 4: Question on User Participation in Original plan of building by Housing Corporation. Tick as applicable.

19. What was your involvement in the original construction of your building unit
    i. I had no part in the planning/programming, design and construction of this building unit [ ]
    ii. I participated in the planning/programming, design and construction of this building unit [ ]
    iii. I participated in design phase only [ ]
    iv. I participated in construction phase only [ ]
    v. Specify if any other ……

20. If you are not involved in any level of the original construction, do you wish to have been involved? Yes [ ] No [ ]

21. If yes, which level of involvement do you desire to have participated
    i. Planning/ programming [ ]
    ii. Design stage [ ]
    iii. Construction stage [ ]
    iv. All the stages [ ]

SCHEDULE 5: The questions are on Functionality

22. How well the building supported your activity.

		Strongly agree	Agree	Neutral	Disagree	strongly disagree
i.	The building effectively served the purpose for which it was intended					
Ii	The design of the house provided optimum support for desire activities					
Iii	Building was flexible enough to meet change needs					
Iv	Kitchen was well suited to our needs					
V	Living room was large enough to suit our needs					
Vi	Number of bed rooms was sufficient to suit our needs					
Vii	The no of toilets are adequate for our family size.					
Viii	The store is large enough to suit our needs					

SCHEDULE 6: The Following questions are on quality of your house and performance of your dwelling unit. Tick appropriately.

23. Is the structure of your dwelling free from any of the following
    i. Leakage Yes [ ] No [ ]
    ii. Peeling off of plaster/paint surface finish Yes [ ] No [ ]
    iii. Cracks Yes [ ] No [ ]
    iv. Decay of fascia board Yes [ ] No [ ]
    v. Moisture seepage Yes [ ] No [ ]

24. Do you notice any general damage likely to cause any form of deterioration or dilapidation in the following areas in your house?
    i. Roof Yes [ ] No [ ]
    ii. Wall Yes [ ] No [ ]
    iii. Floor Yes [ ] No [ ]
    iv. Foundation Yes [ ] No [ ]

25. Which of these services are available within your Low-cost housing?

		Available (A)	Not Available (NA)	Available but malfunctioning (AM)
I	Pipe borne water			
Ii	Electricity			
Iii	Sewage disposal system			
Iv	Drainage Scheme			
V	Tarred roads and accesses			
Vi	Education			
vii	Health			
viii	Recreational			
Ix	commercial			
X	Police station/police out post			

26. If the above services or facilities are not available within your low-cost housing, what is the approximate distance to the services or facilities from your house?
    i. Less than 1km [ ]
    ii. 1-5 km [ ]
    iii. 5-10 km [ ]
    iv. Above 10 km [ ]

APPENDIX A3
FOCUS GROUP DISCUSSION QUESTIONS

i. How long have you stayed in the Low-cost house?

ii. How do you acquire the house?

iii. Are you satisfied with the location of the Low-cost housing?

iv. What are your reasons for choosing to stay in Low cost Housing?

v. What do you like about the design of interior and exterior spaces of your house?

vi. What are the things you dislike about the design of the interior and the exterior of your house?

vii. What alterations or modification have you made to your house since it was sold out to you?

viii. f you have not made any alterations, why?

ix. If you have made changes or alterations, why?

x. Do you have any social amenities such as, clinics, schools, police out---post and recreational facility within your neighbourhood?

xi. If yes or no, can these facilities contribute to your satisfaction with the low-cost houses?

xii. Do you have the following basic facilities within your neighbourhood?

a. Electricity supply

b. Pipe borne water supply

c. Drainage

d. Good road network

xiii. If yes or no, can these facilities form part of your satisfaction with the low-cost houses?

APPENDIX A4
LOCATION AND CONDITIONS OF THE LOW-COST HOUSES

S/N	Location of Low-Cost Houses	Spaces	Condition of the Low-cost Houses				
			Excellent	Good	Average	Poor	Very Poor
1.	MAINGO STATE LOW-COST	Court yard		✓			
		Roof			✓		
		Ceiling			✓		
		Paint				✓	
		Foundation		✓			
		Walls			✓		
		Floor				✓	
		Windows				✓	
		Doors				✓	
		Plumbing				✓	
		Electrical fittings			✓		
		Sanitary fittings				✓	
2.	PANKSHIN STATE LOW-COST	Court yard		✓			
		Roof				✓	
		Ceiling				✓	
		Paint				✓	
		Foundation		✓			
		Walls			✓		
		Floor				✓	
		Windows				✓	
		Doors				✓	
		Plumbing				✓	
		Electrical fittings				✓	
		Sanitary fittings				✓	

S/N	Location of Low-Cost Houses	Spaces	Condition of the Low-cost Houses				
			Excellent	Good	Average	Poor	Very Poor
3.	**SHEDAM STATE LOW-COST**	Court yard			✓		
		Roof				✓	
		Ceiling				✓	
		Paint				✓	
		Foundation		✓			
		Walls			✓		
		Floor				✓	
		Windows				✓	
		Doors				✓	
		Plumbing				✓	
		Electrical fittings			✓		
		Sanitary fittings				✓	

APPENDIX B1
SAMPLE SIZE CHART

Sample Size Chart for the Determination of the Required Sample Size
Source: The Research Advisors. www.research – advisors.com (2006)

Population Size	Confidence = 95% Margin of Error				Confidence = 95% Margin of Error			
	5%	3.50%	2.50%	1.00%	5.00%	3.50%	2.50%	1.00%
10	10	10	10	10	10	10	10	10
20	19	20	20	20	19	20	20	20
30	28	29	29	30	29	29	30	30
50	44	47	48	50	47	48	49	50
75	63	69	72	74	67	71	73	75
100	80	89	94	99	87	93	96	99
150	108	`126	137	148	122	135	142	149
200	132	160	177	196	154	174	186	198
250	152	190	215	244	182	211	229	246
300	159	217	251	291	207	246	270	295
400	196	265	318	384	250	309	348	391
500	217	306	377	475	385	365	421	481
600	234	340	432	565	315	416	490	579
700	246	370	481	653	341	462	554	672
800	260	396	526	739	363	503	515	763
1,000	278	440	606	906	399	575	727	943
1,200	291	474	674	1067	427	636	827	1119
1,500	306	515	759	1297	460	712	959	1376
2,000	322	563	869	1655	498	808	1142	1785
2,500	333	597	952	1984	524	879	1288	2173
3,500	346	641	1068	2565	558	977	1510	2890
5,000	357	678	1176	3288	586	1066	1734	3842
7,500	365	710	1275	4211	610	1147	1950	5165
10,000	370	727	1332	4899	622	1198	2098	5239
25,000	378	760	1448	6939	646	1285	2399	9972
50,000	381	772	1491	8056	655	1318	2520	12455
75,000	382	776	1506	8514	658	1330	2563	13583
100,000	383	778	1513	8762	650	1336	2585	14227
250,000	384	782	1527	9248	662	1340	2626	15555
500,000	384	783	1532	9423	663	1350	2640	16755
1,000,000	384	783	1534	9512	663	1352	2647	16317
2,500,000	384	784	1536	9567	663	1353	2651	16478
10,000,000	384	784	1536	9594	663	1354	2653	16560
100,000,000	384	784	1537	9603	663	1354	2654	166584
300,000,000	384	784	1537	9603	663	1354	2654	16586

APPENDIX B2

RAW DATA

Ethnic Group of Respondents

	Frequency	Percent	Valid Percent	Cumulative Percent
Mwanguul	20	16.7	16.7	16.7
Taroh	16	13.3	13.3	30
Bogom	4	3.3	3.3	33.3
Jhar	12	10	10	43.3
Ngas	20	16.7	16.7	60
Goemai	16	13.3	13.3	73.3
Berom	8	6.7	6.7	80
Idoma	4	3.3	3.3	83.3
Ron	4	3.3	3.3	86.7
Miryang	4	3.3	3.3	90
Chip	4	3.3	3.3	93.3
Yong	4	3.3	3.3	96.7
Piapung	4	3.3	3.3	100
Total	**120**	**100**	**100**	

Religion of Respondent

Religion	**Frequency**	**Percent**	**Valid Percent**	**Cumulative Percent**
Christian	111	92.5	92.5	92.5
Islam	9	7.5	7.5	100
Total	**120**	**100**	**100**	

Educational Attainment Level

Educational Level

	Frequency	Percent	Valid Percent	Cumulative Percent
Primary educator its equivalent	4	3.3	3.3	3.3
Secondary educator its equivalent	4	3.3	3.3	6.7
Tertiary education its equivalent	112	93.3	93.3	100
Total	**120**	**100**	**100**	

Occupation of respondents

Occupants	Frequency	Percent	Valid Percent	Cumulative Percent
Civil servant	100	83.3	83.3	83.3
Trader/Businessman	12	10	10	93.3
Student	4	3.3	3.3	96.7
Applicant	4	3.3	3.3	100
Total	**120**	**100**	**100**	

Income Level of Respondents

Income Level	Frequency	Percent	Valid Percent	Cumulative Percent
Low (<50,000.00 per month	16	13.3	14.3	14.3
Medium (between N50,000.00 – N100,000.00 per month)	44	36.7	39.3	53.6
High (>100,000.00 per month)	52	43.3	46.4	100
Missing System	8	6.7		
Total	**120**	**100**	**100**	

How long have you lived in this house or neighbourhood?

	Frequency	Percent	Valid Percent	Cumulative Percent
< 5 yrs	24	20	20	20
5 – 10yrs	12	10	10	30
15 – 20yrs	12	10	10	76.7
> 20yrs	28	23.3	23.3	100
Total	**120**	**100**	**100**	

Type of Residential Building occupied by Respondent

	Frequency	Percent	Valid Percent	Cumulative Percent
Two bedrooms	108	90	90	90
Three bedrooms	12	10	10	10
Total	**120**	**100**	**100**	

How did you get the place where you are living now

	Frequency	Percent	Valid Percent	Cumulative Percent
I rented it from the owner	32	26.7	26.7	26.7
I bought it from the owner	84	70	70	96.7
Other means (specify)	4	3.3	3.3	100
Total	**120**	**100**	**100**	

How satisfied are you with the size of living room?

	Frequency	Percent	Valid Percent	Cumulative Percent
Very dissatisfied	44	36.7	36.7	36.7
Neutral	0	0	0	0
Dissatisfied	4	3.3	3.3	36.7
Satisfied	68	56.7	56.7	96.7
Very satisfied	4	3.3	3.3	100
Total	**120**	**100**	**100**	

How satisfied are you with the size of dinning?

	Frequency	Percent	Valid Percent	Cumulative Percent
Very dissatisfied	60	50	50	50
Neutral	0	0	0	0
Dissatisfied	4	3.3	3.3	53.3
Satisfied	52	43.3	43.3	96.7
Very satisfied	4	3.3	3.3	100
Total	**120**	**100**	**100**	

How satisfied are you with the size of kitchen?

	Frequency	**Percent**	**Valid Percent**	**Cumulative Percent**
Very dissatisfied	52	43.3	43.3	43.3
Neutral	0	0	0	0
Dissatisfied	4	3.3	3.3	46.7
Satisfied	56	46.7	46.7	93.3
Very satisfied	8	6.7	6.7	100
Total	**120**	**100**	**100**	

How satisfied are you with the size of store?

	Frequency	Percent	Valid Percent	Cumulative Percent
Very dissatisfied	72	60	60	60
Neutral	0	0	0	0
Dissatisfied	4	3.3	3.3	63.3
Satisfied	40	33.3	33.3	96.7
Very satisfied	4	3.3	3.3	100
Total	**120**	**100**	**100**	

How satisfied are you with the size of bedrooms?

	Frequency	Percent	Valid Percent	Cumulative Percent
Very dissatisfied	32	26.7	26.7	26.7
Neutral	0	0	0	0
Dissatisfied	84	70	70	96.7
Satisfied	4	3.3	43.3	96.7
Very satisfied	4	3.3	3.3	100
Total	**120**	**100**	**100**	

How satisfied are you with the size of toilet/bathroom

	Frequency	Percent	Valid Percent	Cumulative Percent
Very dissatisfied	60	50	50	50
Neutral	0	0	0	0
Satisfied	56	44.7	46.7	96.7
Very satisfied	4	3.3	3.3	100
Total	**120**	**100**	**100**	

How satisfied are you with the size of parking space?

	Frequency	Percent	Valid Percent	Cumulative Percent
Very dissatisfied	32	26.7	26.7	26.7
Neutral	0	0	0	0
Dissatisfied	16	13.3	13.3	40
Satisfied	68	56.7	56.7	96.7
Very satisfied	4	3.3	3.3	100
Total	**120**	**100**	**100**	

How satisfied are you with the external space?

	Frequency	Percent	Valid Percent	Cumulative Percent
Very dissatisfied	36	30	30	30
Neutral	0	0	0	0
Dissatisfied	4	3.3	3.3	3.3
Satisfied	76	63.3	63.3	96.7
Very satisfied	4	3.3	3.3	100
Total	**120**	**100**	**100**	

How satisfied are you with the overall opinion of external spaces?

	Frequency	Percent	Valid Percent	Cumulative Percent
Very dissatisfied	40	33.3	33.3	33.3
Neutral	0	0	0	0
Dissatisfied	4	3.3	3.3	3.3
Satisfied	76	63.3	63.3	100
Very satisfied	0	0	0	0
Total	**120**	**100**	**100**	

Was there any alternation or modification was made to bed rooms?

	Frequency	Percent	Valid Percent	Cumulative Percent
Yes	52	43.3	43.3	43.3
No	68	56.7	56.7	100
Total	**120**	**100**	**100**	

Any alternation or modification was made to dining?

	Frequency	Percent	Valid Percent	Cumulative Percent
Yes	24	20	20	20
No	96	80	80	100
Total	**120**	**100**	**100**	

Any alternation or modification was made to kitchen

	Frequency	Percent	Valid Percent	Cumulative Percent
Yes	32	26.7	26.7	26.7
No	88	73.3	73.3	100
Total	**120**	**100**	**100**	

Any alternation or modification was made to store?

	Frequency	Percent	Valid Percent	Cumulative Percent
Yes	16	13.3	13.3	13.3
No	104	86.7	86.7	100
Total	**120**	**100**	**100**	

Any alternation or modification was made on living room?

	Frequency	Percent	Valid Percent	Cumulative Percent
Yes	8	6.7	6.7	6.7
No	112	93.3	93.3	100
Total	**120**	**100**	**100**	

Any alternation or modification was made on fence/gate?

	Frequency	Percent	Valid Percent	Cumulative Percent
Yes	20	16.7	16.7	16.7
No	100	83.3	83.3	100
Total	**120**	**100**	**100**	

Any alternation or modification was made on landscape?

	Frequency	Percent	Valid Percent	Cumulative Percent
Yes	16	13.3	13.3	13.3
No	104	86.7	86.7	100
Total	**120**	**100**	**100**	

The modification/alteration carried by an Architect

	Frequency	Percent	Valid Percent	Cumulative Percent
Yes	16	13.3	13.3	13.3
No	104	86.7	86.7	100
Total	**120**	**100**	**100**	

The modification/alteration carried by out by builder

	Frequency	Percent	Valid Percent	Cumulative Percent
Yes	12	10	10	10
No	108	90	90	100
Total	**120**	**100**	**100**	

The modification/alteration carried out by an Engineer

	Frequency	Percent	Valid Percent	Cumulative Percent
Yes	16	13.3	13.3	13.3
No	104	86.7	86.7	100
Total	**120**	**100**	**100**	

The modification/alteration was carried by oneself

	Frequency	Percent	Valid Percent	Cumulative Percent
Yes	4	96.7	96.7	100
No	116	3.3	3.3	3.3
Total	**120**	**100**	**100**	

The building effectively served the purpose for which it was intended

	Frequency	Percent	Valid Percent	Cumulative Percent
D	120	100	100	100
N	0	0	0	0
A	0	0	0	0
SA	0	0	0	0
Total	120	100	100	100

The design of the house provided optimum support for desire activities

	Frequency	Percent	Valid Percent	Cumulative Percent
D	40	33.3	33.3	33.3
N	8	6.7	6.7	40
A	56	46.7	46.7	86.7
SA	16	13.3	13.3	100
Total	**120**	**100**	**100**	

Building was flexible enough to meet change needs

	Frequency	Percent	Valid Percent	Cumulative Percent
D	52	43.3	43.3	43.3
N	4	3.3	3.3	46.7
A	56	46.7	46.7	93.3
SA	8	6.7	6.7	100
Total	**120**	**100**	**100**	

Kitchen was well suited to our needs

	Frequency	Percent	Valid Percent	Cumulative Percent
Disagreed	24	20	20	20
Neutral	8	6.7	6.7	26.7
Agreed	68	56.7	56.7	83.3
Strongly Agreed	20	16.7	16.7	100
Total	**120**	**100**	**100**	

Living room was large enough to suit our needs

	Frequency	Percent	Valid Percent	Cumulative Percent
D	4	3.3	3.3	3.3
N	20	16.7	16.7	50
A	56	46.7	46.7	66.7
SA	32	26.7	26.7	93.3
Total	**120**	**100**	**100**	

Number of bed rooms was sufficient to suit our needs

	Frequency	Percent	Valid Percent	Cumulative Percent
D	52	43.3	43.3	43.3
N	12	10	10	53.3
A	44	36.7	36.7	90
SA	12	10	10	100
Total	**120**	**100**	**100**	