AN APPRAISAL OF CONVERSION PROCESS OF BUILDINGSIN TERTIARY INSTITUTIONS IN GOMBE STATE

BY

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Declaration

I declare that the work in this dissertation entitled "An Appraisal of Conversion Process of Building in Tertiary Institutions in Gombe State" has been carried out by me in the Department of BuildingFaculty of Environmental Design. The information derived from the literature has been duly acknowledged in the text and a list of reference provided. No part of this dissertation was previously presented for another degree ordiploma at this or any other Institution.

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Certification

This is to certify that this dissertation entitledAN APPRAISAL OF CONVERSION PROCESS OF BUILDINGS IN TERTIARY INSTITUTIONS IN GOMBE STATE has been carried out by YUSUF ARDO meet all the required regulations governing the award of the degree of Master of Science in Construction Management of the Ahmadu Bello University, Zaria and is approved for its contribution to knowledge and literary presentation.

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Dedication

This work is dedicated to my parents, AlhajiMohammad ArdoBappah andHajiyaFatsuma Mohammed for their love caring and support during the period of this study.

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Abstract

Generally, alteration and conversion are parts of maintenance work undertaken in order torestore the performance of a building.The study focuses on identifying problems that arose on buildings as a result of conversion process on the buildings. The aim of this study was to examine theprocedures ofbuilding conversion in some identified tertiary institutions in Gombe State byarticulatinga standard procedure of carrying out conversion of buildings, establishingthe current procedure of conversion used by the institutions and also determining compliance ofclients' methods against the established standard.In order to achieve the objectives of the study eighteen (18) converted buildings fromthree selected tertiary institutions were investigated using achecklistto assess the outcome of the process with regards to converted building. The study adopted both quantitative and qualitative approach which made use of questionnaires, checklist and interview as means of data collection. Sixty six (66)setof questionnaires were administered toconstruction professionals across the three institutions. The questionnaires solicit for information relating to professionals perception on the importance of theidentified conversion process. In addition, interview was conducted withkey professionals whom were involved in the process of conversion to ascertain theprocedures of conversion used by each institution, while a checklist was used to identify the outcome of the process of conversion.Data collected was analyzed using statistical tools: means, percentages, and standard deviation, and also results were presented in tables and bar charts. The major findings showfourteen (14) procedures were indentified and found to beeffective in carrying outconversion, with each process recording a mean of at least 3.85 which translate to being effective. The study found that 57% of theprocess used in carrying out conversion of buildings in Gombe State University do notfollowed the identified standards while 50% of procedure used in

carrying out buildings conversion in Federal University Kashere were not followed the identified standards.The study also reveals that 55% of defects were found in converted buildings in both Gombe State University and Federal University Kasherererelated to the procedures used in carrying out conversion. The study concludes that the procedures used in carrying out conversion by the institutions have led to the problems found on the new buildings.The study recommends that the standardized procedure established and presented in the work should be adopted by the institutions in Gombe State when carrying out conversion of buildings.

CHAPTER ONE

1.0 INTRODUCTION

1.1 Background of the Study

Nowadays, conversion of buildings becomes rampant in our society or community due to some reason ranging from economic, social and political reasons. The term conversion is defined as a situation where the building is subjected to a change in use and change in form (Andrew, 2007). Alterations refer to works that are carried out on an existing building in order to meet the new requirements (Dennis, 2007). Also, alteration of buildings means the process of adjustment and adaptation of a building to meet new requirements (Ivor, 1996). However, for the purpose of this study, conversion refers to the change in the occupation or use of a building which involved alteration of the building elements. Alterations to an existing building are part of a conversion in terms of the Building Regulations Scotland (2004). Within the building regulations, the terms alteration and conversion must be clearly distinguished. There are basic ways that guide the process of building conversion which need to be followed in order for the overall objectives of the process to be achieved. When the procedure is not appropriately followed or complemented, some problems may arise.

Before one begins any conversion of a building with the aim of adding more space and value to it, it is worth finding out exactly what it will involve and how it will affect the design of house or office. Therefore, some policies provided that redundant buildings needs to be assessed before conversion (Paul, 2009). The built environment goes through a continuous cycle of renewal. Some old buildings are demolished to make way for new ones, whilst other buildings are retained and adapted for new uses (Tony, 2007).

Since the very beginning of architecture, people have adapted the buildings they have inherited so as to meet contemporary purposes. A new use could be a way of asserting

the primacy of a new religion or culture over the preceding one, or it could simply be a good way to utilize existing property without going through trouble of starting all again (Tony, 2007).

Izam (2011) stated that building can be defined as any physical enclosure of space that houses various forms of human activity such as a school, hospital or residential home and also, it is the process of erecting a physical structure. Furthermore, the discipline of the arts and science of building construction is also termed Building. Accordingly, the term building construction has been used interchangeably to describe a process or the end product of a process as well as a professional discipline or practice.

Building conversion and alteration are two different things, but they are inter-related, Andrew (2007) defines conversion of building as the change in function which involves change in components. In addition to this, conversion is a specified change of occupation or use of a building (Scotland Regulations, 2004). Anything other than a simple conversion, it is most likely that professional advice will be required, while alteration of buildings means the process of adjustment of a building to meet new requirements. Many older buildings require conversions to meet the changing needs of occupants. According to Ivor (1996) the process often involves temporary supporting works of the building forms. Dennis (2007) identified conversion to be one of the triggers for the application of building standards that seek to achieve a number of social benefits, ranging from better disabled access and egress to a reduced carbon footprint.Andrew (2007) asserts that people embark on the conversion of an existing building to have thorough understanding of its properties, both structural and building fabric or materials. With this knowledge correct diagnosis can be made, this is important in making well informed decision such as deciding on removal of wall.

However, one of the major obstacles is likely to be cost. As described by Ivor (1996), rebuilding work is shown to be more expensive than new work;another obstacle is the need for some of the materials and components to be purpose made. According to Bristol City Council (2005) strong case can be made on aesthetic and architectural grounds to alter some pleasant buildings from past years that are no longer required for their original intended use.Another factor that complicates the process of conversion as shown by (BRE, 2014) is the need for adequate fire, sound or water retaining capacity required especially where work is performed in a dwelling unit.

Remoy (2007) stated that building conversion is a well known, inner city buildings lose their functions and adapt to new uses. Despite the general knowledge of building conversion; there is a general lack of technical knowledge about conversion processes of buildings. However, there are some possibilities for building conversion through theory and practice (Theo-Vander, 2007). The processes and principles involved in successful conversion of buildings hence require skills from a brand range of subjects relevant to building studies as described by (Christine, 2008). Hence, it is important whatever conversion proposed that the building can be converted to a new use without a major change in external appearance. This is to avoid changing the overall character of the building while locality is maintained.Building requiring significant alteration, conversion, extension and rebuilding to achieve a satisfactory standard may thus not be considered suitable subjects for conversion to residential use (Eden, 1996).

Defect is one of the major components of building problems that significantly needs attention when a building fails to perform its functions.Ahzahar, Karim, Hassan andEman (2011). Stated that there are some defects caused as results of unstable foundation, building materials/components used, faulty design and lack of technical skills. Despite the existing knowledge of building conversion, the study focuses on

defects caused by the process of conversion. Also, examine the procedures of carrying out building conversion.

1.2 Statement of the Research Problem

Demographic changes and social needs of a growing people that require more space or new up to date facade have resulted in many building owners opting for conversion works on existing buildings (Isnin and Ali.,2012). According to Theo'Vander (2007) many reasons have been advanced for the inability of conversion process carried out not to stand the test of time. These include; lack of knowledge about building conversion, uncertainty about financial feasibility or implications and little knowledge about the chances and risk of building conversions.

Chendo and Obi (2015) were of the opinion that imposing additional floor and rooms beyond original design provision is a common practice in Nigeria. Creating additional rooms and changing the use of building (for example altering and converting classes to academic offices or administrative buildings)Thereby creating vibrations by breaking of slabs, beams, columns and walls may lead to structural failure.This in most cases is done against the process or procedure of conversion of a building.

Remoy(2007) identifies that lack of general knowledge about conversion process of buildings has been the major problem that leads to occurrence of several problems peculiar to converted buildings. Knowledge areas that influence success of conversion of buildings as identified by Remoy (2007) includes;knowledge of condition of the existing buildingrelating to its age, use, procedure of construction, nature of loadings etc., knowledge of structural stability of the building, thorough understanding of existing building materials, legal consideration and knowledge of budget for the projected work.

Furthermore, other problems or issues have been identified which require careful consideration during conversion process of building such as building construction, building condition, building suitability, legal issues and budge (Andrew, 2007).

Due to the downturn, clients have looked at that buildings as assets not liabilities, often requiring re-planning and sub-division or just restoration to make them more attractive from the initial appraisal survey and feasibilityassessment to detailed design, specification and tendering, can enhanced the work (Andrew, 2007).

In summary, the inability of converted buildings to stand the test of time due to occurrence of defects found on the new buildings. While sagging of structural members have been attributed to lack of proper knowledge on the right procedure of carrying out conversion.

Based on these facts, despite prevalence of conversion works, previous works of Douglas (2006) have indicated that damages do occur on converted buildings. The occurrence of these damages has been attributed to lack of proper knowledge of carrying out conversion. Therefore, it becomes necessary to undertake study which will identify the proper way of carrying out conversion as a means of avoiding future problems on converted buildings.

1.3 Justification of Study

Buildings that require alteration to their frontage in order to accommodate changes in use or form may require intervention that is significantly more than maintenance. This type of works that goesbeyond the level of maintenance will bring the building up to a whole new standard of performance which is significantly better than its existing form (Douglas, 2006). Typically, such works might be described as alterations, conversion, extension, improvement, modernization, restoration and so on (Douglas, 2006).

Conversion of buildings becomes necessary when building lose its performance declines significantly in relation to expected performance of the building,need to fulfill new requirements or satisfy changing needs of users or clients (Andrew, 2007).

In view of the above, converted buildings help to reduce cost from the institutions and making redundant buildings to be useful in the society, to meet the changing needs of occupants.

1.4 Aim and Objectives

1.4.1 Aim

The aim of the study is to the examine procedures of building conversion and alteration in tertiary institutions in Gombe State, with a view to improve on the current practice of building conversion.

1.4.2 Objectives

The objectives of this research are;

i. To articulate global procedure of carrying out conversion of buildings.

ii. To establish the current procedure of conversion used by institutions in Gombe State.

iii. To determine compliance of the conversion against the established standard in the study area.

iv. To assess the outcome of thebuilding conditionwith regard to conversion.

1.5 Scope and Limitations

1.5.1 Scope

The scope of this study is to examine procedure of building conversion (which involve alteration to the building element and change in the use of the building). The

studyconducted in Gombe State University (G.S.U), Federal University Kashere (F.U.K) and College of Nursing and Midwifery in Gombe State respectively. The study covers both Academic buildings and Administrative buildings.eg Classes, hostels and halls.

1.5.2 Limitations

The study was conducted after the process of conversion of buildings has been concluded which is limits the availability of data for the study. Furthermore,the study focused on defects caused by the process of conversion which includes cracks, leakages and sagging of structural members within Gombe State and the findings may not be applicable to other State of the federation.

CHAPTER TWO

2.0 LITERATURE REVIEW

2.1 Conversion of Building Structures

Hilde, Rem and Sara (2012) describe building conversion as a way of activating and reusing vacant buildings. Conversion is also defined by Scotland Regulation (2004) as a specified change in use and change in form of a building. Conversion refers to the change in theuse of a building which involves significant alterations of the element Dennis (2007). Andrew (2007) defines conversion of building to be a change in function which involves change in components.Building work of conversion projects is often more complex than an equivalent new building, this is because conversion involves a process of undertaking building operations which will maintain, strength and stability during and after the conversion of a building Dennis (2007). Conversion projects involve many activities such as preparation of basic design, demolition work, relocation and new installation of building structures and materials. The process and principle involved in successful conversion of buildings hence requires skills from a brand range of subjects relevant to building studies as described by (Christine *et al,* 2008). This can be achieved only through careful consideration and skillful planning of the conversion of a building so as to make the fullest use of its potential without adversely affecting the building character (Ivor, 1987).

Craig, Francis, Eddie and Hui (2007) maintain that buildings are major assets that form a significant part of facilities operation that are long lasting and they require continual maintenance and restoration. Eventually, buildings can become inappropriate for their original purpose due to obsolesce, or can become redundant due to change in demand for their service. It is at these times that change becomes a way for new construction, or some form of refurbishment. Conversion of traditional buildings as highlighted by

Craig *et al.* (2007) presents significant challenges for practitioners (that is architects, surveyors, engineers, project managers), developers, approved certifiers and local authorities who have to prepare or approve designs that will accommodate changes in the use and occupation of such buildings while respecting their cultural and historical significance.

Hilde *et al.* (2007) Indicated that by the year (2006) about six million square metres equaling 14% percent of the office space in the Netherlands was vacant, which was caused by change in values, change in user requirements and change or improvements on functionality of buildings which may not be available in the old original buildings, making the need for conversion and alteration of the buildings to fulfill the new requirements. Even though the construction activities are important to the existing building and house owners, they must not compromise health, safety, productive environment and its surroundings, but should contribute to sustainable development for the existing neighborhood, communities and future generation. Tony (2007) stated several studies have suggested that sustainable conversion projects, besides serving the purpose of preserving and reusing, the existing buildings and building areas, are intended to make owner and occupants more healthy, energy efficient and resource effective, that connects more to the inhabitants.

Although the process is not as complicated as in multiple or high-rise building constructions, the total work should be carried out without deteriorating the quality of life, living conditions and the environment. Unfortunately, several studies have shown that these requirements are not followed up thoroughly in related building regulations especially when concerning the public (Remoy*et al.*, 2007).

It is synonymous with alteration, adjustment, modification and improvement, as well as change, which is said to be constant in life at the end of the day, the outcome is adjudged by the generality of observation and good sense.

2.2 GlobalProcess of Carrying out Conversion of Building

The process involved in the successful conversion of buildings requires skills from a brand range of subjects relevant to building studies as described by (Christine, 2008). The process of selecting a suitable conversion should not be done in haste but proper selection is the cornerstone of the successful outcome (Dorothy, Woodson and Stephen 2004). The process has been shown by several authors include Bristol City Council (2005)Dennis (2007) andDorothy*et al.* (2004). Among which Dennis (2007) describes that the identified below are those processes involved in carrying out the conversion of buildings:

1. Assessment of construction, materials, elements and features,

2. Investigation of existing defects in the building and assessment of repair needs,

3. Assessment of structure on the basis of past use and likely future use, in some circumstances load tests may be required.

4. Assessment of thermal performance and fire risk assessment.

5. Sound insulation assessment (dwellings) sound testing is normally requires.

6. Risk assessment for harmful and dangerous substances.

Dorothy *et al.* (2004) describes for the client, the steps in the project conversion process these include the following:

1. Establish of the property use or uses sought

2. Establish what funds can be raised to execute the project

3. Choose a district that will support the use.

4. Contact the planning authority for approval.

5. Determine if there are financial or rehabilitating existing project.

6. Employ the services of professionals such as architects, builders and structural engineers

7. A person visit to each site for recording observations and impression.

8. Professionals to investigate existing conditions.

9. Contract design firm to prepare conceptual schematic design.

10. Assess the structure and their cost impact.

11. Demolition of excess or unstable structures to prepare site for new construction.

12. Stabilization and protection of existing structures that will remain.

13. Execution of enclosure and envelope conversions

14. Begin or continue the process of conversion and alteration work.

The Bristol City Council (2005) Guide for designing house alterations and extensions identified seven summary points that guide for conversion process of buildings commonly used. These are:

1. Seek guidance from development control as planning permission

2. Get skilled advice from an experienced architect to prepare a design drawing

3. Follow the design guide during construction activities

4. Look at your surroundings to investigate the existing defects

5. Detailing and use of materials.

6. Be a good neighbour

7. Submit full information to support design showing the existing building

Furthermore,from the above several studies have been identified processes of carrying out conversion of building projects as stated by Dorothy *et al.* (2004) and Dennis (2007). The study articulated both of them and established standard procedures of carrying out the work, in such a way that it would be suitable situation in Nigeria. The procedures include:

1. Establishing the need for conversion and alteration

2. Appointing professionals

3. Investigating the defects

4. Assessment of construction materials in place

5. Assessment of structural stability

6. Assessment of planning requirements

7. Risk assessment

8. Establish design based on clients' requirement and structural planning capability

9. Define budget can be raised

10. Prepare detailed proposal

11. Application and approval for the proposal

12. Appointing project team

13. Define extent of the work such as demolition, stabilization and construction

14. Execution begins

2.2.1 Considerations in conversion works

The right decisions can be taken when considering conversion and alteration process of building. Certain issues have to be carefully considered and evaluated (Andrew, 2007) and these are:

1. Building construction
2. Building Suitability
3. Building Condition
4. Statutory Compliance:
5. Project brief
6. Sustainability
7. Legal Issues

2.2.1.1 Building construction

Identifying the exact method of construction and the materials used has to be ascertained to understand the implications of conversion and alteration work. According to the Principles of Building Construction Combustible (2000) building construction is described is an important consideration that identifying buildings and understand the

classification system of buildings, along with common terminology used for building construction components.This will assist the construction information in making good, safe, and timely decisions. Construction manager and other professionals have the knowledge, skills, and abilities to evaluate a structure quickly and accurately to identify its class and method of construction. This process often is called reading a building. The initial decisions made about the building will affect the development of strategic goals and tactical objectives, as well as the overall action plan and safety.

2.2.1.2 Building suitability

This relates to the size and shape of the building and requires careful examination to ensure it will meet the client's requirements. Kendall (2002) defines a building suitability asbuildings usability, thisconcerns how buildings can help organizations achieve their goals and ensure the satisfactions of their users. In other words, how buildings contribute to efficient operations for the core business and for the support services.A building that prevents users from conducting their business in a good and effective manner can inflict greater costs than necessary on user organization for personnel and operations. Also, buildings that are not functional can restrict a business opportunities for development and adaptation, and can be therefore negatively impact on their competitiveness. In other words this is the extent to which a product can be used by specified user to achieve specified goals effectiveness, efficiency and satisfaction in specified context of use. In simple terms, suitability concerns how work can perform better by having a buildin**g**that supports the work done. Old buildings also express the continuity of human society and they are symbolic of its permanence. Historic buildings and areas provide a link between the past and the present. They are expressive of the deep roots of society.

2.2.1.3 Condition of Building

When the structure of the building has been considered, the next stage is to examine the building for defects. Are there defects that require rectification and will prevent the proposed works being feasible from a cost point of view? Building condition is a report that assessesbuildings results from a comprehensive review of general assessment buildings conducted by staff from administration and finance with assistance from sightlines facilities asset advisors, and a consultant firm that provides integrated facilities, planning services. Reviewed in the assessment is the current condition of our buildings with respect to deferred maintenance deficiencies, renewal of building systems, fire safety, and other needs UMass Amherst (2007).Building condition report o**n** the physical condition of a building can be maintained roughly at the designed standard through maintenance, and some improvements can even be achieved through repairs.

2.2.1.4 Statutory compliance

This is where a building undergoes a change of use. Planning consent may be required and the resulting building must comply with the current building regulations, with consideration requirements element such as thermal insulation, sound insulation, and meansof escape, fire protection and accessibility. It is important that, where external alterations or conversions are proposed, the changes are keeping with both the original house and the context of the local area. Poor house conversions and alterations can have a damaging effect on an area, the residential amenity of neighbours and may reduce the value of a particular property. Converting or altering the property to a high standard and in keeping with the original design may however, add value and enhance the character of the local area according to Bristol City Council (2005).

Information about the history and an understanding of the development of a building is essential when considering proposed alterations and conversions, this may be gained

from the physical evidence in the building itself such as ghosts of lost features in plaster, rough edges where features have been cut away, empty peg-holes and mortises which can elucidate the original form or construction. There may also be documentary information, such as early photographs, drawings, written descriptions, or other documents relating to its construction or use North Dorset (2007).

2.2.1.5 Project brief

It is critical that the client's requirements and expectations of time, cost and suitability are examined to ensure that there is a common understanding between what the client is expecting and what can be delivered within the set parameters. The project brief is the final stage in the process of defining the client's requirements for the development of a built asset, the project brief is the key document upon which the design will be based NIOB (2015). However, the project brief will evolve through the project brief stage and the concept design stage with the benefit of information gained from consultations with the client and other stakeholders and ongoing design development. Also, project brief is likely to be presented as a report, however, where possible, information and requirements should be scheduled in a database or spreadsheet format that will be easy to expand and use to test whether proposals satisfy requirements later in the project. This project brief is to be used to help formulate a project's concept, strategy, and means of direction and execution. The purpose is to determine the goals of a project and how to best formulate the methods of execution in a manner that will be understood clearly by the desired target audience. Project briefs are intended to define strategy, assist in planning, aid in design, and to structure communication (Peter, 2008). Furthermore,the project brief provides a way into the project and acts as a first step to producing a Project initiation document. This template can be used successfully as the basis of an initial brainstorming session with everyone involved or interested in the project. The Project brief sets an

agenda for the meeting and acts as a checklist to ensure that discussions cover all the major issues. It's helpful to issue everyone with a copy of the brief template and encourage them to think about the issues before the meeting. The outcome of the meeting as a completed brief should be written up by the project manager to form the basis of a more developed project.

2.2.1.6 Sustainability The term sustainability originated from the Latin word 'sustinere' meaning: the ability to sustain, maintain or support something (Modu, Audu, Kyari and Garba.,2014) cited in Dencsak (2010). The term sustainability is an empty concept, lacking firm substance and containing embedded ideological positions that are, under the best interpretation, condescending and paternalistic.The traditional driving forces of time and cost are usually the most influential; however, if both of these factors are to be maximized, then, due consideration needs to be given to a number of sustainable practices at a very early stage. Examples of this will be an appraisal of the condition of the existing materials that is roof covering, is it in a suitable condition so that it can all be reused or will other materials have to be found to match.

According to General Service AdministrationGSA (2014), sustainability is the conditions under which humans and nature can exist in productive harmony that permit fulfilling the social, economic, and other requirements of present and future generations. Sustainable design seeks to ensure that future generations are not disadvantaged by the depletion of natural or non-renewable resources by the current generation. Following sustainability, design principles improve building performance, promote the health and comfort of building occupants, minimize environmental impacts, and supports natural resource availability. The term sustainable building means the building that encompasses environmental, social and economic standards, together with technical aspects,

andmaintains that building. Sustainability covers a wide range of relationship between the built, natural and social systems and, therefore, there is a complex of varied priorities that need to be well thought out in every stage of the life cycle(Modu*et al.*, 2014). These principles must serve as the basis for planning, programming, design, budgeting, operation, construction, commissioning, maintenance, and disposal of all new facilities, major renovations, and existing building alterations.

2.2.1.8. Legal issues

It is quite likely that the adaptation of a building will involve work that requires a party wall notice. A benefit of a building adaptation is that there should be no change to the right to light of neighbours, unless an extension is planned as part of the refurbishment (David, 2006). Legal aspects can also reduce the financial feasibility of conversions, as the requirements for residential buildings and other buildings that accommodate overnight stay are stricter than for day use functions like offices. Adaptations of the buildings structure, stairways and facade are often needed. In these cases, the conversion costs might become too high compared to the expected benefits, and conversion may be financially unfeasible. Remoy*et al*, (2014) found an evident relationship between building costs and the alterations of specific building elements. The major cost generator for most office to housing conversions is frontage alteration (27% of the total building costs), followed by interior walls (17% of total building costs) and contractor costs. A group of costs in Dutch estimates combining site costs, general costs of the contractor and his profit (15% of total building costs). Whereas the costs for interior walls depend on the new function and can easily be predicted, the costs related to the facade depend on the building shape, technical state and quality of the existing building, and on the demand for external appearance, comfort and quality of the converted building. The

necessity for facade alterations should therefore be thoroughly assessed when studying office-to-housing conversion potential.

2.2.1.9. Change of use

Where a building undergoes a change of use, the resultingbuilding must comply with the current building regulations. This can cause significant problems and a study carried out by 'Building Magazine' found that the main areas, indicated by construction professionals (which included construction managers and building control officers), were exclusion of moisture, thermal insulation, sound insulation, means of escape, fire protection and accessibility. These can add significant costs to the projectAndrew (2007). There has been recognition of the environmental impact of buildings since at least the 1970s, but nowadays the issue of sustainability is very high on the agenda amongst politicians, organizations and indeed the general public.

Riley andCotgrave (2005) point out that building are believed to account for 50% of all energy used globally.The implication of this is fairly clear if existing buildings are re-used rather than being demolished and redeveloped, and then significant savings can be made in energy usage.

2.2.2 Practical Advice for Conversion Process

Practical advice given in this section aims to provide guidance to resolve some common problems that may be encountered in complying with the current building safety and health requirements.During the process of conversion it is almost certainly the case that repairs to the building, where necessary, will be carried out at the same time. As with alterations, the repairs must recognise good conservation practice (Bell, 1997).

2.2.2.1 Structural safety

Structural works involved in any change in use and structural strengthening in buildings will proceed in accordance with the requirements, there are modern methods and techniques for structural investigation and structural strengthening that can be formulated to minimize the effect on the aesthetic particular projects.

2.2.2.2 The lack of approved plans and structural records

Nowadays one of the common problems for heritage buildings is the lack of approved plans and structural records. The uncertainty in the load carrying capacity of the existing buildings makes it difficult to assess accurately the extent of structural strengthening required. For buildings without approved plans and structural records, a detailed structural appraisal will be conducted, such as full survey, structural assessment. Moreover, when the design data of an existing structure is not available, the structural system of the building will be determined by conducting full survey and structural assessment of the existing building in order to re-establish the structural framing data. Also, the construction details of the structural elements, the validity of the structure, the material strengths and the current condition of the existing structures including the foundations, and other destructive tests will be employed to obtain the construction detail and material strengths for the existing buildings.

According to Practice Guidebook for adaptive and alteration and addition work to Heritage building (2012). Information will include the sampling/test locations, reinstatement proposals after the sampling work and photographical record before and after the carrying out of the sampling/ test. Furthermore, they will understand the limitations of the existing building and their responsibility in proper management and maintenance of the building. An understanding of what will be retained, and what can be altered/converted as how the building will be used and managed in the future will

significantly help the plan before embarking on the conversion and alteration process of building projects.BS 7913:(1998).

2.2.2.3 Addition of new structural element

The addition of new structural elements such as lateral ties, shear walls, brace frames or concrete lining to the existing building is often found necessary to improve structural performance. However, the addition of these new structural elements will also identify at an early stage of the design.

2.2.2.4 Re-distribution of design loads

The re-distribution of design loads that may act on the existing building will be considered to reduce the extent of the required strengthen works and hence minimize the impact to the existing value of the building. The cracks will also be identified in the full survey that will reveal how the loads have been redistributing within the structure in the building.

2.2.2.5 Additional supports to reduce the Span

The deficiency of the load carrying capacity of floors or beams will be resolved by putting in additional supports in specific locations. Often, large rooms need to be subdivided through re-planning by constructing new partitions. These partition walls canbe designed as structure supports to reduce the floor span. It is also possibleto put in additional columns and beams with the construction of material that is distinguishable from the existing structure to reduce the stresses in the existing structures.

2.2.3 Structural Considerations for Conversion process Buildings construction before any new standards come into force are not required to be upgraded to the new standards, except for certain commercial, domestic or composite buildings

which only come into force after the buildings are constructed. However, when such buildings undergo change in use or conversion and alteration works, those parts of the buildings will be affected which will normally be require to be upgrade and comply withthe current standards, according to practice Guidebook for Adaptive of Alteration and addition works to heritage building (2012).

2.2.3.1 The structural design for conversion and alteration Process

An existing building will involve the design of new structural works and/or the checking of structural adequacy and structural strengthened of an existing building. All new structural elements in the conversion and alteration works will be designed in accordance with the current building regulations and relevant codes of practices. The building regulations and codes of practice obtained at the time of construction of the building will be used for checking the structural adequacy of the existing portion of the building which will affect the proposed conversion and alteration works.

2.2.3.2 Structural assessment for conversion Process

As existing buildings have been constructed long time ago, it is necessary to appraise their current conditions where one can identify the extent of defects, deterioration and any damage. They will re-assess the validity of the design parameters, when structural documentation record is not available. Site measurement, non-destructive investigation and, where appropriate, destructive tests such as taking samples materials from existing structure for strengthening tests and opening up for structural investigation are effective methods for assessing the design parameters English Heritage(2011).

2.3 Adopted Process against Established Process of Carrying out Conversion

The identified processes made by Dorothy *et al.* (2004) and Dennis (2007) and the procedures of carrying out conversion by each of the institutions were obtained through interviewed professionals that were involved in the process were articulated. A standardized procedure relevant to the study area was established too. The process is articulate as follows:

1. Establishing client needs and requirements with respect to the proposed conversion.

2. Appointment of project team

3. Taking inventory of the existing structure

4. Investigation of defects, through pictures and schedule of dilapidation

5.Structural and risk assessment

6. Assessment of planning requirement

7. Preparation of designs based on client and planning requirements

8. Application and approval for the proposal

9. Preparation of bill of quantities and approval of budget

10. Preparation of complete project/tender documents

11. Advertisement of project and sell of tender

12. Selection and appointment of contractor

13. Execution of work to completion based on the approved standard

14. Closing and submission of final reports.

Conversion is not a new phenomenon, but has taken place everywhere on different scales, as such, contributing to today's beloved historical cities and buildings (Douglas, 2006). Although converting of existing offices is a means of reducing the amount of new office developments, not all office buildings can be successfullyadapted. If a property is environmentally obsolete, converting the building to fit new office user demands will not offer any solace. According to Dennis (2007) conversion of a building to change its occupation or use is often the only means of ensuring its retention and future viability. In some cases, the existing office building is small and too technical outdated to be adapted.

2.3.1 Conversion or Conservation principles

Conversion has been identified as an action or activity related with repair and maintenance (Ahmad, 2006).This guide is concerned principally with works that affect the special interest and character of buildings. However, due to the wide range of building types and materials used for their construction, this guide cannot be comprehensive, but the sections do summarize the characteristics and features that make up the special interest of most buildings which will be given full weight in the process of judging conversions North Dorset (2007).

The conversion of an existing building will almost inevitably lead to its alteration to some extent, and the need to satisfy the requirements of the building regulations will present additional challenge. Such conversions will be carried out in a way that prevents loss of cultural significance and historic fabric without increasing the risk of users and occupants. Conservation should always apply with the right techniques and methods. Ahmad (2006)also suggests four (4) key principles that should always be practised in conservation work in Malaysia. They are:

1. Minimal Intervention: This Conservation is based on a respect for the existing fabric, use, associations and meanings. It requires a cautious approach of changing as much as necessary but as little as possible. 2. Conducting Scientific Research and Laboratories Testing: Conservation should be based on appropriate research and physical investigation which will be possible. A non destructiveintervention should always be proceeded by appropriate research, investigation and recording.

3. Documentation of Conservation Work: These entail that records should always be maintained, kept with the documentation of the building or site and deposited in an

appropriate condition.

4. Applying Effective Methods and Techniques: Conservation will make the use of all the knowledge, skills and disciplines which can contribute to the study and take care of the place. Traditional techniques and materials are preferred for the conservation of significant fabric. In some circumstances, modern techniques and materials which offer substantial conservation benefits may be appropriate. The guiding conservation principles when undertaking a conversion process of building (Dennis, 2007) are similar to those used for repairs. These principles are set out in the conservation charters and are also identified in BS 7913,1998. In addition, the following points represent good conservation practice in any conversion and alteration process of building projects:

2.3.1.1 Proper Assessment of the Site.

There is a need to understand the previous history of the building if there is a need of alteration and conversion of buildings to be achieved. This can be a complex task in somesituations and the time, effort and finance require will not be under estimated. The

analysis of the site may require specialist architectural and archaeological investigations, through both on-site and documentary research.

2.3.1.2 Understanding the causes of defects and decay

To proceed with alterations and conversion process without any investigation of existing defects in the building can lead to unsuccessful work and a recurrence of the problems, such as moisture penetration, cracks in wall, defective plaster, peeling paint and leakages.

2.3.1.3 Unnecessary Replacement and Minimum Intervention

A historic building will contain features that are original to it. There will almost certainly be later conversions and alterations representing different periods in the life of the building. These later alterations and conversions may be important features of the building and arepart of its history and character continuation provided they do not seriously disrupt the architectural design and aesthetic value of the building (BS 7913: 1998).

2.3.1.4 Appropriate techniques and materials

Conversions process will preserve the authenticity and historic integrity of the building. The techniques, skills and materials used should match or be compatible with existing construction methods and materials.

2.3.1.5 Hazardous materials

During conversions and alterations process of buildings, some of the hazardous materials encountered such as dust will generate from masonry work and other activities like cutting, breaking, drilling, building materials and even sweeping the workplace will produce a lot of dust that are potentially very hazardous. Dust inhalation is one of the most serious health risks in any alteration and conversion projects.

Based on the occupational, safety and health requirements, appropriate mouth masks, safety goggles and gloves are required for this work because of their carcinogenic properties that are hazardous (Isnin, 2010).

2.4 Effects of Conversion on Building Structures In any conversion, alteration works will overcome or prevent adverse psychological and physiological reactions to occupants and stakeholders of the property, a poor design and execution works could unwillingly cause problems.

Evidence shows that the design of low cost houses often neglects indoor environment quality, and fails to meet human satisfaction in terms of indoor air quality, thermal comfort and noise quality (Liang, 2009).

2.4.1 Conservation Plans

The conversion of an existing building will benefit from preparation of a conservation plan that identifies the cultural significance of the site and sets out policies that safeguard that significance. Conservation has been identified as an action or activity related with repair and maintenance (Ahmad, 2006). According to Building maintenance committee (1972) Maintenance can be defined as work undertaken in order to keep, restore or improve every facility, ie every part of a building, its services and surrounds, to a currently accepted standard and sustain the utility and value of the facility. It has been generally accepted from time immemorial in Nigeria that occupants or owners of buildings continually improve their accommodation both for space and quality, because of the changes in taste and accommodation levels is currently accepted standard today. Building maintenance is an expensive item requiring careful attention from building owners, occupiers, contractors, surveyors, architects and in fact every active member

inthe construction industry. The correct diagnosis of building defects associated with the correct remedial action is the only economic basis for a successful building maintenance by (NBA).National Building Agency (1979) stated that building defect is one of the major components of building problems that significantly needs attention when a building fails to function as it should, we must immediately seek for the determination.

Building defect occurs to either the new building or the old ones, defect within new buildings may be of non-compliance with building Code and published acceptable tolerances and standards Nurul and Azree (2013).Summary of some common defects in buildings are given:

1. Cracks of wall

2. Peeling paint

3. Dampness

4. Roof leakages

5. Timber decay

6. Defective plaster

7. Sagging/Deformation

8. Sealant and felt failures

9. Deflection/Buckling

Each conservation activity involves intervention which affects the value of a building (Ahmad, 2006). Generally conversion and alteration of buildings is part of maintenance

work in order to maintain the performance of the building at the designed standard and serves its users and fulfils the purpose for which it was built, Dennis (2007).

Furthermore, two methods were used in carryout conversion process of building projects. They are mechanical and manual tools.

2.4.1.1 Mechanical tools

This method utilize cutting and breaking of building structure such as columns, beams, slabs and reinforced concrete. This system of works directly improves quality control with high precision. Also, this method is much faster than the manual method that optimizes human resources at the project site.

However, mechanical means requires construction personnel who would handle on hacking places of concrete and plaster also this method provides the assurances of maintaining load integrity of the existing structures ISSA (2009). Also, mechanical/automation technique is the use of simple machines to reduce labour requirements and allow one person to do work of several people by hand. Furthermore, as many structural engineers, architects and others specifies have discovered very few advantages when compared to manual method from construction point of view, it allows for easy and simple workability.

2.4.1.2 Manual tools

ISSA (2009) Stated that this is a very labour intensive and time consuming part of any large construction project, with lack of skilled manpower in several areas of the construction work, this method is easily acquired with minimal training.eg using the following tools pickaxe, club hammer, digger and shovel etc

The conservation plan should be prepared before or at least in parallel with plans for the development of the site. For some plans, further specialist reports and detailed study may

be required (Vienn, 2004). This should be built into both the cost and time required for the project work.Conservation work will be successful if it complies with the basic conservation principles and techniques (Bell, 1997).

2.4.2 Criteria for conversion work

The criteria given extract from BS 7913, 1998 which makes practical guidance appropriate to works of alteration, including conversion are identified below:

1. Sufficient survey, investigation, recording, documentary research and analysis would be undertaken in advance of design work to ensure that the building is fully apprehended as reasonably possible and that the risks of accidental damage, destruction, unexpected discoveries are minimized.

2. Disturbance of significant existing material will be avoided for any unsound works retained and repaired in association with alteration work wherever possible. The need for alterations will not be used to justify avoidable damage or destruction.

3. Some buildings or parts of buildings are of such quality, importance or completeness that they will not be altered at all except in the most exceptional circumstances.

4. The need for alteration can sometimes justify the restoration of the layout or of missing parts of the building according to an original or earlier design.

5. Even materials now regarded as hazardous can be of historical significance, and if so may best be left undisturbed.

2.4.3 Risks on conversion works

Dust inhalation is one of the most serious health risks in any alteration and conversion projects. Based on the occupational safety and health requirements, such as appropriate

mouth masks, safety goggles and gloves are required for this work because of their carcinogenic properties that are hazardous to the health. Many of their activities involve dismantling activities that result in excessive levels of dust than comparable new building schemes; dust is generated from masonry work and facade renovations (Isnin, 2010). Lead-based paint is another common major source of lead poisoning for occupants and workers. Research studies on lead toxicity in humans indicate that the current Occupational Safety and Health Act (OSHA) standards should prevent the most severe symptoms of lead poisoning, but these standards do not protect workers, occupants, families and their developing children from all of the adverse effects of lead, lead can affect a person's humans brains Health and Safety Executive (2010).

3.0 CHAPTER THREE

3.1 Research Methodology

Research methodology is a systematic way to solve a problem (Uman, 2015). Basically, the method used from similar studies on the assessment method for buildings rehabilitation needs is based on a visual inspection of the buildings including where it is possible, visual inspection of all units and shared parts. During field survey all the data gathered were recorded in a checklist according to the criteria defined in the applicationinstructions developed for this purpose (Pedro, 2007). This study was carried out using both quantitative and qualitative methods of analysis, to obtain both primary and secondary data.

3.2 Research Method adopted for the study

Seth (2014) undertook a similar study on evaluation of the impact of defects in residential buildings;data was gathered using questionnaire, personal observation and interview.Mixed method of data collection was adopted for the study which includes questionnaire, interview and checklist. Questionnaire was administered to the construction professional staff of the works and physical planning unit departments in the selected tertiary institutions because they are likely to have good knowledge of conversion process of building projects. Interview was carried out with the professionals who were involved in the process of conversion, while checklist was used to identify the outcome of the process of conversion.

In the assessment of each functional element in the surveyed buildings to determine the existence and severity of the defects Pedro, Vilhenna and Paiva (2007) have classified defects on building based on the severity of the defects on a four scale.This classification is presented in Table 3.1 and was adopted for this study.

Table 3.1 Classification of defects based on severity

Very slight	Minor	Medium	Severe
Absence of defects ordefects with no Expression	Defects prejudicial to aesthetic	Defects prejudicial to use or comfort	Defects that endanger health or safety

Source: Pedro et al., (2007)

Table 3.1 provided classification of defects based on severity of the defects.The resultant impact ranking of defects found in public buildings were divided in a four points scale, are very slight, minor, medium and severe.

1.Very slight:As a result of no defects found will be neglected on the severity impact, this is due to the fact that the defect is insignificance.

2. Minor severity:Minor defects were found with average conditionaffecting the functional element, with a minor extension.

3. Medium severity: Buildings have deteriorated with major defects found, defects affecting limited areas of the functional element, and with major extension of the total area.

4. Severe or high severity: Buildings have failed. This is unfit for occupancy or normal use. Defects affect large areas or almost all of the functional element, and with extension beyond expectation of the total area.

3.3 Research Design

This aspect describes the study design and specific methodology adapted for the studyAbdul'Azeez (2012) on appraisal of conversion process of buildings in tertiary institutions in Gombe State.

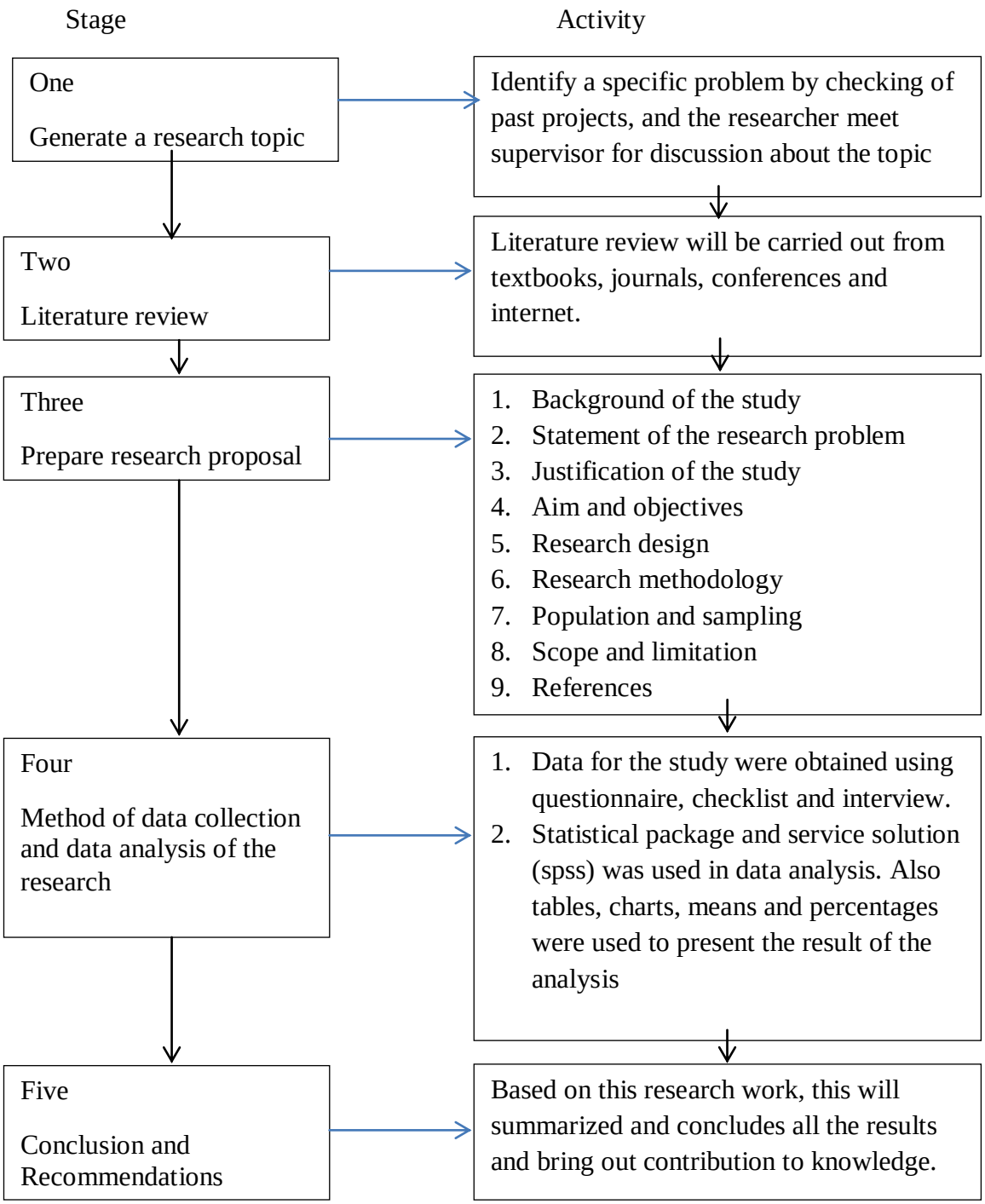


Figure 3.1: Research Design
Source:Ardo, 2016(Adapted byAbdul'Azeez (2012))

Therefore, in accordance with the aim and objectives, the research design was divided into five broad stages as shown in Figure 3.1

Stage 1 how the topic was selected. Stage 2 discussed literature review in detail, Stage 3 which guided to prepare the study. Stage 4 explained how the data for the study was collected and analyzed anddiscussion of the result. Stage 5 covered the summary of findings, conclusion and recommendations.

3.4 Population and Sample Size

The target populations for the study are three selected tertiary institutions in Gombe State comprising GombeState University, Federal University Kashere and College of Nursing and Midwifery. It was gathered that there are 20 professionals/constructionrelated staff in G.S.U, 33 in F.U.Kashere and 13 in College of Nursing and Midwifery thereby giving a total population of 66 used as the sample size.Interview question was carried out with 3 professionals one from each institutions who were involved in the process of conversion to ascertain the procedures of conversion used by each institution. Also, 18 altered and converted buildings from the same institutions were investigated using checklist to identify problems encountered after conversion respectively.Since the population size of the converted buildings is 18. The total population sampling is a type of purposive sampling technique where choose to examine the entire populations that have a particular set of characteristics.

3.5 Data Collection Techniques

The study adopted both quantitative and qualitativemethods of data collectionobtained respectively; Quantitative consistprimary data for the study was obtained through using a structured questionnaire.Qualitative method of collecting data was obtained through

interview with certain professionals that are involved in carrying out the process of conversion.Checklist was used to identifythe outcome of theprocess ofconversion of buildings from the selected institutions.

3.6 Questionnaire Design

Based on the study, the questionnaire design consists of four sections A to D as shown in the appendix.Section A was demographic information about the organization andrespondents who were construction professionals; Section B was used to examine the perception of respondent on the importance of identified processes of conversion.For section C, interview method was adopted in collecting qualitative data to solve objectives 2&3 which is to establish the procedure of conversion used by institutions, and to determine compliance of the conversion procedure against the established standard. For section D, checklist was used to obtain the identified problems encountered after conversion process of building projects by visiting selected tertiary institutions in Gombe State.

3.7Method of Data Analysis

Descriptive data analyses were used to analyses the data for the study. The data collected was analyzed using Statistical Package for Social Sciences (SPSS) and Microsoft Excel. Data presented inCharts, Tables, Means, Percentages andStandard deviation.

Relative Importance Index (RII) $= \frac{\sum fx}{\sum f} \times \frac{1}{k}$

Where,

∑fx = the total weight given to each attributes by the respondents.

∑f = the total number or respondents in the sample.

K = the highest weight on the likert type scale.

The rating of all the factors for degree of significance was based on the value of their respective relative importance index (RII). The item with the highest RII was ranked first followed by the next and so on.

Table 3.2: Guide to degree of significance

Degree of significance	Rating
Very significant	0.76 and above
Significant	0.67-0.75
Fairly significant	0.45-0.66
Not significant	0.44 and below

Source:Vanduhe (2012)

CHAPTER FOUR

4.0RESULTS PRESENTATION,ANALYSIS AND DISCUSSION

In order to achieve the objectives of this study data, obtained from the questionnaires, interview and checklist are presented, analyzed and discussed in this chapter.

4.1 Demographic Data of the Respondents

Questionnaires were distributed to works and physical planning departments in the three selected tertiary institutions in Gombe State. Table 4.1 presented the questionnaire response rate; thetable shows that all thesixty-six (66) questionnaires directed to the construction related professionals were returned making a hundred percent (100%) response rate.

Table 4.1: Breakdown of Administered Questionnaire

	No. distributed	No. properly filled and returned	Percentage response
Construction related professionals	66	66	100%

Source: Field survey (2016)

4.1.1 Profession of the respondents

Summary of data collected and presented in Figure 4.1 showsthat 30.3% of respondents are builders,28.8% are engineers, 25.8% are Architects,and 13.6% are quantity surveyors, while 1.5% respondents are classified as others. The result indicated that all the respondents are professionals in construction industry. This also shows that98.5% of the respondents are knowledgeable to be responsible in carrying out conversion of buildings. Those that participated in the study were qualified to make positive contribution in the study.

Due to the nature of conversion projects, Theo'Vender(2007) suggest that quantity surveyors should be tasked more with managing alteration and conversion projects, but

the result here indicated that only 13.6% of professionals involved are quantity surveyors. This finding shows that there is a need to engage more quantity surveyors whenever this type of project will take place.

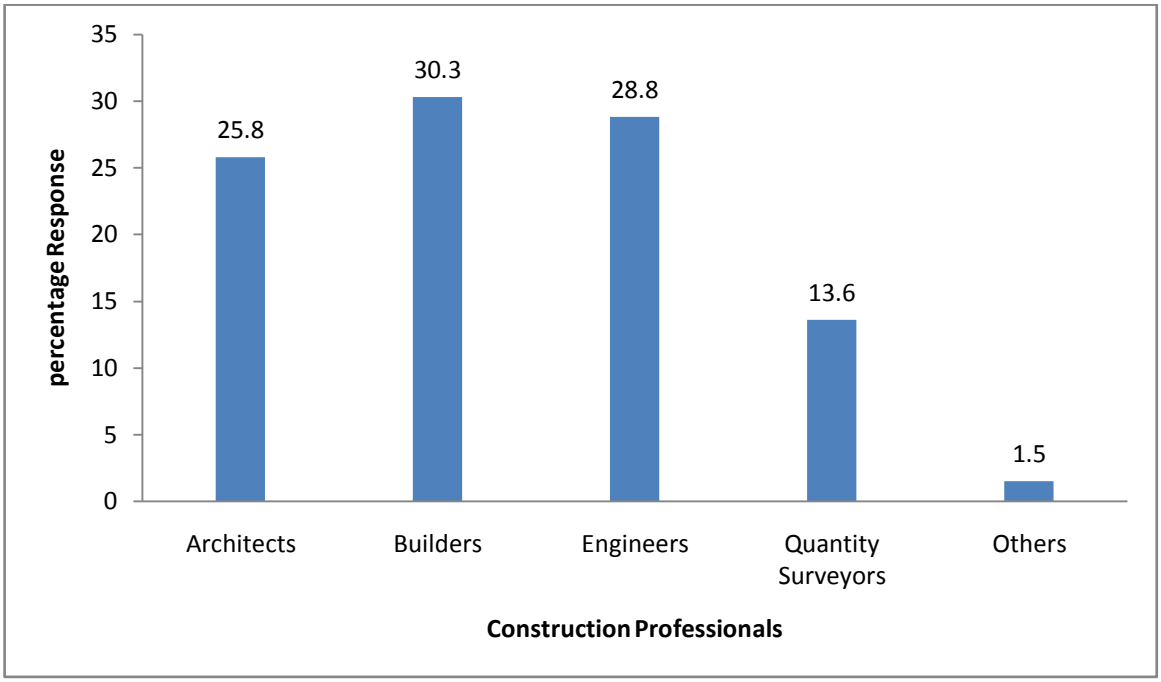


Figure 4.1: Profession of the Respondents
Source: Field Survey,(2016)

4.1.2 Working experiences of the respondent

The working experience of the respondents is presented in Figure 4.2. In the Figure, 21.2% of respondents reported to have working experience of 0-4 years, 54.5% has experience of 5-9 years, and 18.2% has 10-14 years of experience, while 6.1% has 15-19 years of working experience. The result indicated that 78.8% majority of respondents have at least five years of working experience. This also shows that the respondents are quite knowledgeable and experienced in the built environment.Philippe*et al.*, (2013) ascertained that working experience of the professionals is an important consideration in handling conversion of building projects.

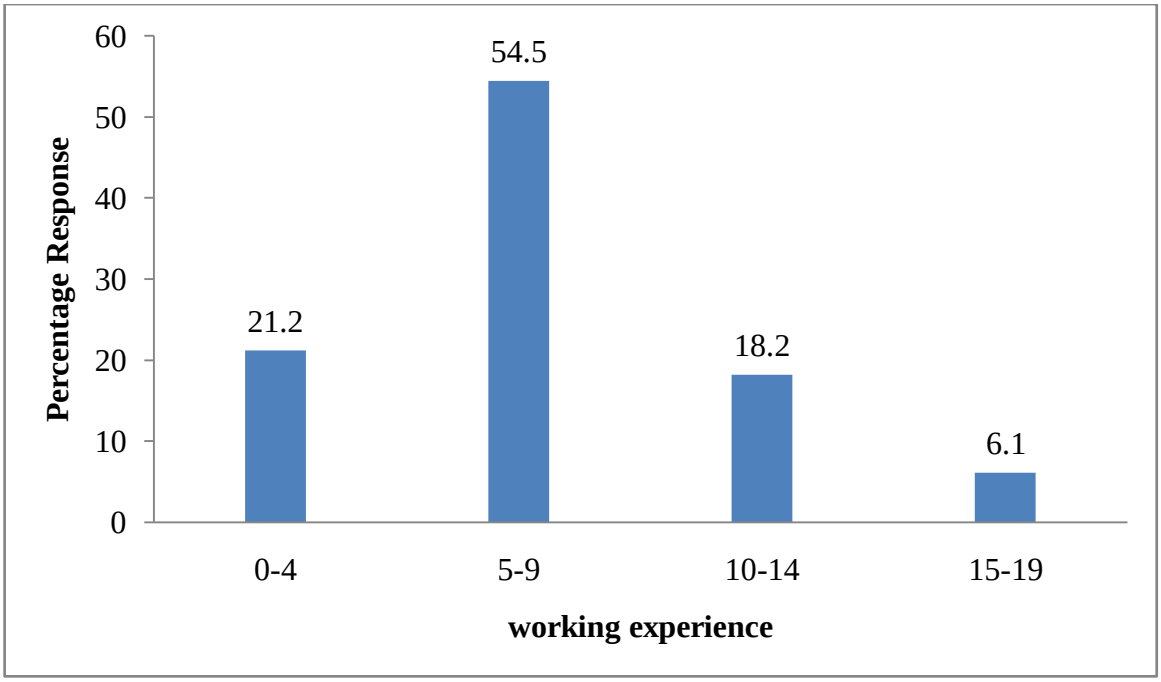


Figure 4.2: working experience

Source: Field Survey, (2016)

4.1.3 Professional registration status

Figure 4.3 shows the professional registration status of the respondents. The result indicated that 65.2% of the respondents are none registered, while only 34.8% of respondents are registered.The result contradicted NIOB (2015) requirement which advocated for only registered professionals in managing construction project. The failure to use only registered professionals could have aided in the recurrence of construction defects after buildings were converted.

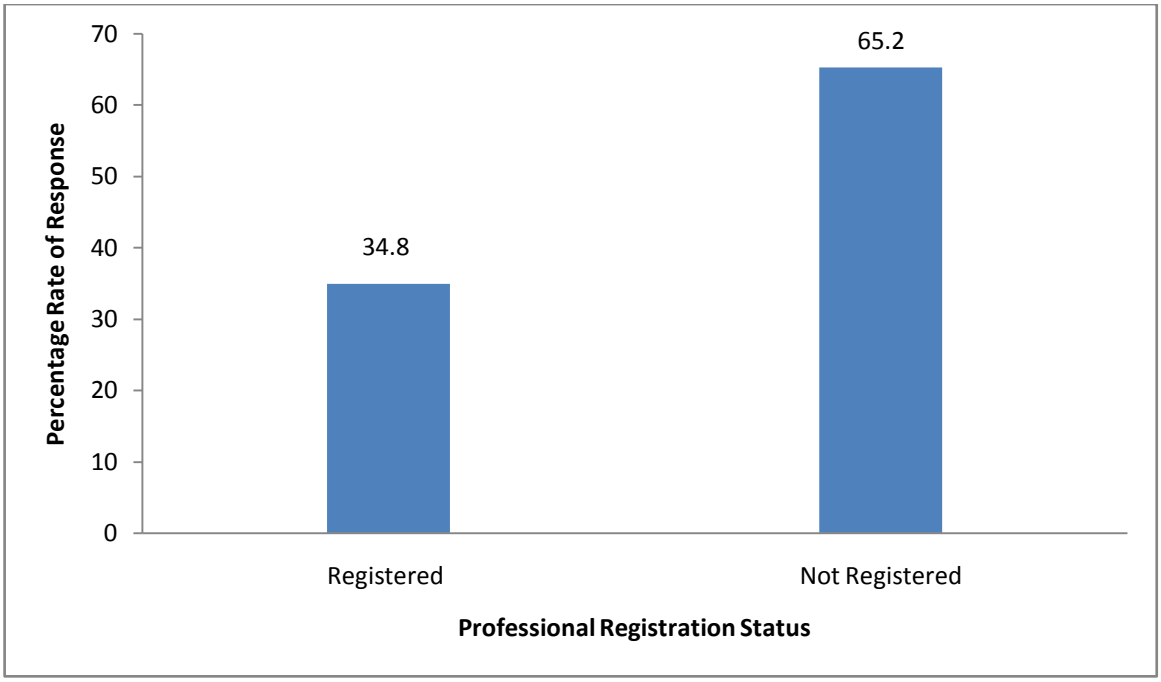


Figure 4.3: professional registration status

Source: Field Survey, (2016)

4.1.4 Educational qualification of respondent

The educational qualifications of the respondents are shown in Figure 4.4Degree holders have the highest percentage among the respondents with 62.1%, followed by a percentage of22.7% for respondents with H.N.D holders. 9.1% for respondents with National Diploma (ND) while 6.1% respondents are holders ofMasters Degree,which hasthe lowest percentage.Therefore, it can be inferred that the majority of the respondents have adequate educational qualification needed to respond to the questionnaire and interview for data collection.

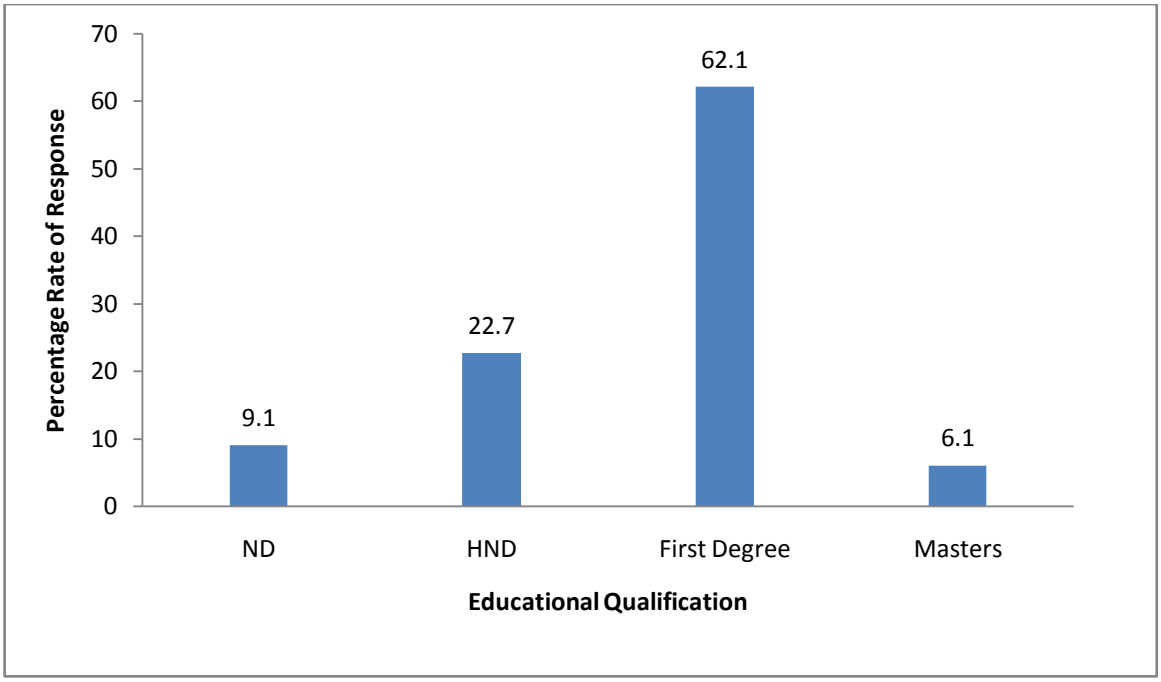


Figure 4.4: Educational Qualification

Source: Field Survey, (2016)

4.1.5 Responsibility of supervising conversion works

Figure 4.5 presents the result on who is responsible for supervising conversion works in the institutions.The result showsthat 48.5% of the respondents are in works and maintenance departments, followed by contracting firms with 40.9% of respondents while physical planning department has 10.6% of the respondents.It can be inferred that majority of conversion of building projects in the institutions were undertaken by works and maintenance department, supervised by the construction related professionals in the departments.

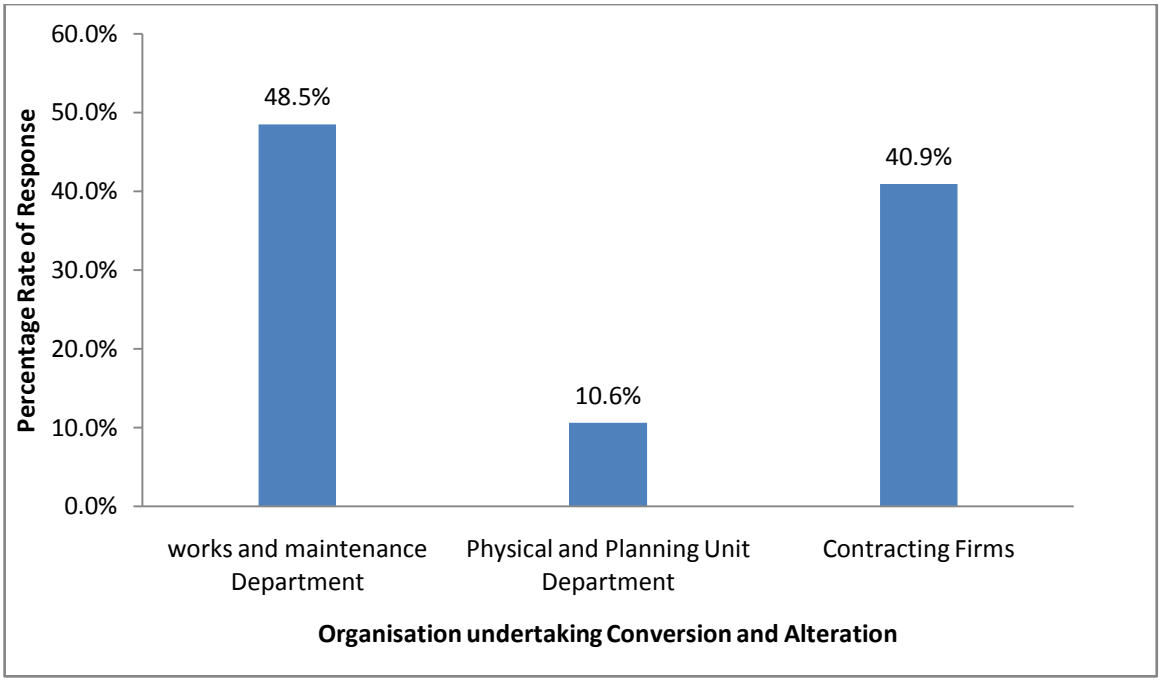


Figure 4.5: Organization undertaking Conversion

Source: Field Survey, (2016)

4.2Standard Process in Carrying out Conversion of Building

From the literature made by Dorothy *et al.*,(2004) and Dennis (2007) identified processes of carrying out conversion of building projects, therefore,the study articulated both of them and established standard procedure of carrying out the work. The following are the established standardprocedures of carrying out the conversion below are:

Table 4.2: Standard Processes for Conversion of Building Structures

S/N	Standard Processes	S/N	Standard Processes
1.	Establishing need for conversion	**8.**	Establish design based on client requirement and structural planning capability
2.	Appointing professionals	**9.**	Defined budget can be raised
3.	Investigation of defects	**10.**	Prepare detailed proposal
4.	Assessment of construction material in place	**11.**	Application and approval for the proposal
5.	Assessment of structural stability	**12.**	Appointing project team
6.	Assessment of planning requirements	**13.**	Define extent of the work such as demolition, stabilization and construction
7.	Risk assessment	**14.**	Execution begins

4.2.1 The Perception of respondents on the compliance of the identifiedprocess of carrying out conversion

This section examined the perception of respondent compliance on the process of carrying out conversion of buildings. Table 4.3 presents results on perception on the importance of the identified processes involved in conversion of buildings based on Dorothy *et al.,* (2004), and Dennis (2007). The Table 4.3 contains fourteen processes ranked from Strongly Disagree to Strongly Agree. The result indicated that respondents agree with all the identified processes to be important in carrying out conversion, this is evident with each process recording mean of at least 3.85 which translates to being effective, through degree of significance rating.

This result is in conformity with the statement made by Dorothy *et al.,* (2004), and Dennis (2007) assertion that the above mentioned processes are effective in carrying out conversion.With respect to the result in Table 4.3, since respondents agree that all the identified processes are important, the processes are then considered part of the standard

process of carrying out conversion. The result also confirms with the findings of Dorothy *et al.,* (2004), and Dennis (2007). In Table 4.3 ranking are based on mean therefore, when the two values of mean are corresponding the lowest value of standard deviation should rank next on the table.

Table 4.3: Perception of respondent on conversion process of Building Projects

`S/N	Process	Frequency of response					∑f	∑fx	Mean	SD	Rank
		1	2	3	4	5					
1.	Execution begins	0	0	1	37	28	66	291	4.41	0.526	1st
2.	Establish the need for conversion and alteration	0	0	2	40	24	66	286	4.33	0.536	2nd
3.	Define extent of the work such as demolition, stabilization and construction	0	0	1	44	21	66	284	4.30	0.495	3rd
4.	Investigate Defects	0	0	4	42	20	66	280	4.24	0.556	4th
5.	Appoint project team	0	0	10	31	25	66	279	4.23	0.697	5th
6.	Appoint professional	0	0	1	36	29	66	292	4.22	0.528	6th
7.	Assessment of construction material in place	0	0	5	42	19	66	278	4.21	0.569	7th
8.	Risk assessment	0	0	12	28	26	66	278	4.21	0.734	8th
9.	Establish design based on client requirement and structural planning	0	0	9	38	19	66	274	4.15	0.638	9th
10.	Assessment of structural stability	0	0	10	37	19	66	273	4.14	0.654	10th
11.	Define budget	0	1	10	33	22	66	274	4.15	0.728	11th
12.	Prepare detailed proposal	0	1	9	42	14	66	267	4.05	0.643	12th
13.	Application and approval for the proposal	0	0	17	30	19	66	266	4.03	0.744	13th
14.	Assessment of planning requirement	0	0	20	36	10	66	254	3.85	0.662	14th

(1 = Strongly Disagree, 2 = Disagree, 3 = Neutral, 4 = Agree, 5 = Strongly- agree)
Source: Field Survey, (2016)

4.2.2 Factors to be considered during conversion of buildings

Andrew (2007) identified in the literature factors to be considered when carrying out conversionof buildings, an interview was presented to respondents to indicate how much they agree or disagree with each of the factors.

Table 4.4 showsthe result on factors to be considered in carrying out conversion. The result indicated that respondents agree with all the identified factors and have high mean scoring as it is above 3.62.The respondents ranked "building construction" with a very high mean scoring of 4.26 which is very efficient, as one of the major factor that can be considered during process of conversion of building while "legal issue" was the least factor when ranked based on the respondents with a mean value of 3.62 considered as effective. It can therefore be inferred that all the highest mean value scoring of factors according to respondents are in line with the views of Andrew (2007) on efficient consideration process of conversion of building project.

Table 4.4: Factors considered in carrying out conversion

S/N	Factors	Frequency of response					∑f	∑fx	Mean	RANK
		1	2	3	4	5				
1	Building construction	0	0	5	39	22	66	285	4.26	1st
2	Building condition	0	0	4	44	18	66	278	4.21	2nd
3	Statutory compliance	0	1	17	33	15	66	260	3.94	3rd
4	Project brief	0	1	21	27	17	66	258	3.91	4th
5	Aesthetics	0	2	17	38	9	66	252	3.82	5th
6	Building suitability	0	0	25	33	8	66	247	3.74	6th
7	Legal issue	1	4	23	29	9	66	239	3.62	7th

(1 = Strongly-Disagree, 2 = Disagree, 3 = Not Sure, 4 = Agree, 5 =Strongly- Agree)
Source: Field Survey, (2016)

4.2.3 Buildings that were converted by the institutions

Table 4.5 presents therespondents' responses relating to the types of buildings that are often converted by the institutions.The Table 4.5shows that the building types that are converted most frequently are classes withmean value of (3.85), Hostels with mean scoresof (3.36) and Halls have a mean value of(3.30).Residential buildings are rarely converted considering that they have a mean value of (2.32). The result also indicated that Auditorium and lecture theatres are hardly converted considering that they have value of mean scoring (0.36) and (0.32) respectively. The result is contrary to the statement made by Andrew (2007) who observed that employ competent architects for design preparation is good for residential conversion of buildings.

Table 4.5: Frequency of conversion of Buildings by the institutions

S/N	Buildings	Frequency of response					∑f	∑fx	Mean	RANK
		1	2	3	4	5				
1	Classes	0	0	23	30	3	66	254	3.85	1st
2	Hostel	3	0	36	24	3	66	222	3.36	2
3	Hall	1	5	41	11	8	66	218	3.30	3rd
4	Residential	11	25	28	2	0	66	153	2.32	4th
5	Auditorium	21	37	8	0	0	66	119	1.80	5th
6	Lecture theatre	32	27	7	0	0	66	107	1.62	6th

(1 = Never, 2 = Rarely, 3 = Sometimes, 4 = Most of the times, 5 = Always)
Source: Field Survey, (2016)

4.2.4 Conversion ofbuilding components

Table 4.6 indicates the ranking of respondents' responses relating to the building components that are affected when carrying out conversion of building projects. It was observed that walls are considered as a very effective component based on its mean value of(4.00) was ranked first while ceilings with mean scores of (3.53) was ranked

second, roof with the value mean (3.52) was ranked third and floors with mean score (3.42) was ranked fourth. This was considered as significant and also foundationsscoring the mean value of (1.56) ranked the least and considered as not effective. This result is inconformity with the statement made by Ivor,(1996) who claimed that suitability of sound foundation should not be alter during conversion.

It can be inferred that walls have the highest values of mean score with(4.00) as one of the major components that are altered when carry out the process of conversion work.

Table 4.6: Building components often altered inthe process of conversion

S/N	Building Component	Frequency of response					∑f	∑fx	Mean	RANK
		1	2	3	4	5				
1.	Walls	0	0	19	28	19	66	264	4.00	1st
2.	Ceilings	0	3	37	14	12	66	233	3.53	2nd
3.	Roofs	2	3	32	17	12	66	232	3.52	3rd
4.	Floors	0	6	33	20	7	66	226	3.42	4th
5.	Foundations	34	28	3	1	0	66	105	1.56	5th

(1 = Never, 2 = Rarely, 3 = Sometimes, 4 = Very Often, 5 = Always)
Source: Field Survey, (2016)

4.3 Procedure of ConversionUsed by the Institutions in Study Area

The procedures of carrying out conversion of building projects adopted by each of the institutions were obtained through interview. A relevant construction professionalof works and maintenance departmentin each of thethree selected tertiary institutions that were involved in the conversionprocess was interviewed. Results from each institution were presented in the following Tables 4.7, 4.8 and 4.9.

Table 4.7 presented the procedure of conversion used in Gombe State University. The following mentioned above, were obtained through interview of professionals who were involved in the process of carrying out the conversion.

Table 4.7: Process of conversion used in Gombe State University (GSU)

S/N	**Conversion Processes Used in Gombe State University**
1.	Collection of client requirement of the building to be altered and converted
2.	Condition survey of the existing structure and defect assessment
3.	Preliminary sketches
4.	Development of complete drawings and schedules
5.	Detailed bill of quantities and schedules
6.	Actual work implementation
7.	Closing and submission of reports

Table 4.8 presented the process of conversion used in Federal University Kashere was gathered to involve the following:

Table 4.8: Process of conversion used in Federal University Kashere (FUK)

S/N	**Conversion process used in Federal University Kashere**
1.	Taken inventory of the existing building structures
2.	Assessment of dilapidation
3.	Schedule of pictures and dilapidated areas
4.	Preparation of bill of quantities
5.	Employed professionals
6.	Employed competence contractors
7.	Work begin and retiring of documents to the management

Table 4.9 presented the process of conversion used in College Of Nursing and MidwiferyGombe. The following are involved:

Table 4.9: Process of conversion used in College of Nursing and Midwifery (CMG)

S/N	Conversion process used in College of Nursing Gombe
1.	Identify the building structures that need conversion
2.	Assessment of dilapidation or condition survey
3.	Investigation of defects and structural assessment
4.	Extent of alteration and conversion of the existing buildings
5.	Preparation of bill of quantities based on assessment
6.	Preparation of tender documents
7.	Advertisement of contract
8.	Selection of competence contractors
9.	Alteration and conversion work continue
10.	Preparation of final account

4.3.1 Standardized procedure of carrying out conversion of buildings relevant to the study area

The identified processesmade by Dorothy *et al.*, (2004) and Dennis (2007) and the procedures of carrying out conversion by each of the institutions were obtained through interviewed with professionals that were involved in the conversion processwas examined and articulated. Fourteen (14) standardized procedures relevant to the study area were established, the procedures are articulated as follows:

1. Establishing client needs and requirements with respect to the proposed conversion.

2. Appointment of project team

3. Taking inventory of the existing structure

4. Investigation of defects, through pictures and schedule of dilapidation

5. Structural and risk assessment

6. Assessment of planning requirement

7. Preparation of designs based on client and planning requirements

8. Application and approval for the proposal

9. Preparation of bill of quantities and approval of budget

10. Preparation of complete project/tender documents

11. Advertisement of project and sell of tender

12. Selection and appointment of contractor

13. Execution of work to completion based on the approved standard

14. Closing and submission of final reports.

4.4 Level of compliance with the established standard process of carrying conversion

After establishing the standardized procedure in the previous section,the level of compliance of each institution was measured against the established standard in order to checktheir adequacy of compliances.

The results indicated that 57.1% of GSU procedures used in carrying out conversion of buildings were not followed with the established standard. It can therefore be inferred that lack of following with the identified standard may be responsible for the occurrence of some identified problems on converted buildings.

4.4.1 GombeState University (GSU)

The study observed that Gombe State University (GSU) processes of undertaking conversion of buildings differ from the established standard withthe following omissions:

1. Appointment of project team

2. Taking inventory of the existing structure

3. Structural and risk assessment

4. Assessment of planning requirement

5. Preparation of designs based on client and planning requirements

6. Application and approval for the proposal

7. Advertisement of project and sell of tender

8. Selection and appointment of contractor

From the result, it can be seen that the institution did not carry out structural, risk assessment and assessment of planning requirement too. Dorothy (2004) indicated that Lack of carrying out structural assessment on buildings to be converted can cause structural damage to the components of the new building.

4.4.2Federal University Kashere (FUK)

It was observed that FUK process of carrying out conversion differs from the establishedmethod due to absence of the following items:

1. Establishing client needs and requirements with respect to the proposal conversion

2. Structural and risk assessment

3. Assessment of planning requirement

4. Preparation of designs based on client and planning requirements

5. Application and approval for the proposal

6. Preparation of complete project/tender documents

7. Advertisement of project and sell of tender

The result indicates that 50% of FUK procedure of carrying out conversion of buildings were not in totalconformity with the established standard,hence it can be inferredthat the inability of the institution to use a standard process of carrying out conversion may lead to development of the identified defect on the converted buildings. Therefore,it can be seen that Federal University Kashere did not carry outstructural assessment and preparation of design based onclient's requirement. Dennis (2007) indicated that unavailability of design preparation on buildings that were converted can cause structural failures to the elementsof the new building.

4.4.3 Collage of Nursing and Midwifery (CNM)

The study observed that College of Nursing and Midwifery (CNM) 21.4% of the procedure carrying out conversion differs from the established procedure with the following items:

1. Appointment of project team

2. Assessment of planning requirement

3. Preparation of designs based on client and planning requirements

The results further indicated that 78.6% CNM procedure used in carrying out conversion of buildings are in conformitywith identified standard when compared with others

institutions. The results show it conforms moreto the established standard.It can beinferred thatpartial following the identified standard processes may be responsible to occurrence of some identified problems on converted buildings.Akande*et al.*, (2016) indicated that lack of proper supervision and preparation of design may lead to building failures.

4.5Problems Encountered After Conversion of Buildings

Problems encountered after conversion of buildings were assessed using a checklist and the result was presented in Table 4.10.Theoutcome of the results from each institution was presented in separate tables.

Table 4.10: Identified problems with regard to building condition encountered after conversion of buildings in (Gombe State University)

Title	Organization	Existing building	Present building	Component Altered	Defects Found	Severity defects (1-4)	Building defects
1	G.S.U	Hostel	Admin Building	Walls,roof, beams &ceiling	Crk,Lkg,Tbd,Sag, Ffl,	4	high
2	G.S.U	Classroom	Admin Building	Walls,roof&ceilings	Dtp, ppt, Tbd,	2	Low
3	G.S.U	Hall	Admin Building	Roof,walls,plasters & Floor	Crk, Sag, Lkg,	3	Medium
4	G.S.U	Office	Admin Building	Walls,Roofs&ceilings	PPt,Dtp, Tbd	2	Low
5	G.S.U	Hostel	Admin Building	Walls,plaster and Roof	Crk,Lkg,Sag,Tbd,	4	high
6	G.S.U	Classroom	Hostel	Walls,Roof,beams ceilings	Dpn,Sag,Crk,Lkg	4	high
7	G.S.U	Classroom	Admin Building	Walls,Roof,beams, ceilings	Ppt,Crk,Tbd,	2	low
8	G.S.U	Hostel	Academi Office	Walls,plaster and Ceilings	Crk,Lkg,Sag,Dtp, Ppt	4	high
9	G.S.U	Classroom	Admin Building	Walls,Roof,beams	FFL,Dpt,Tbd,Sag,	2	low

*Source: Tertiary Institutions in Gombe State 2016 (*Adapted by Chendo and Obi (2015))

Crk:Cracks,Lkg:Leakages,Ppt:Peeling paints,Tbd:Timber decay, Dtp:Defective plaster, Ffl:felt failure, Sag:Sagging,Dpn:Dampness,

Defects were found in nine (9) buildings inGombe State University. The result indicated that the inability to conform to the identified standard is responsible for the occurrence of the identified problems on the converted buildings.

The result in Table 4.10 indicates that GSU did not conform to the guidelines identified by Dennis (2007) and Dorothy *et al* (2004). Hence, Failure to adhere with the standardized processes has been the cause of defects in the new building.

Table 4.11 shows the outcome of the process indicated that five buildingswere found with defects in Federal University Kashere (FUK). The major defects that appear on the building elements after conversions arecracks,sagging andleakage. It can be seen that Federal University Kashere did not carry out structural assessment and preparation of design in carrying out the process of conversion which may lead to those identified problems of new buildings. This finding highlighted by organization that they did not followed the standard processes rightly or ideally. This result is not in conformity with the statement made byDorothy *et al.,* (2004) assertion that the above mentioned processes are standard in carrying out conversion of buildings.

Table 4.11: Identified problems with regard to building condition encountered after conversion of buildings in (Federal University Kashere)

Title	Organization	Existing building	Present building	Component Altered	Defects Found	Severity defects (1-4)	Building defects
1	F.U.K	Admin Building	Admin Building	Walls	Ppt,,Dpt,	2	Low
2	F.U.K	Classroom	Offices	Roof,wall&Ceilings	Sag,,Ppt,Crk,	3	medium
3	F.U.K	Classroom	Lecture Hall	Walls,Roof,Ceilings	Crk,sag,Tbd	4	High
4	F.U.K	Classroom	Store room	Walls,Roof,Floor	Sag,Lkg,FFL,ppt	3	Medium
5	F.U.K	Hall	Admin Building	Roof and walls	Tbd,Sag, Ppt,	2	Low

*Source: Tertiary Institutions in Gombe State 2016 (*Adapted by Chendo and Obi (2015))

Table 4.12 shows that the outcome of the process of conversionindicates thatfour buildings were found with defects in College of Nursing and Midwifery.The results indicated that there is partial conformity with the established standard in carrying out conversion of buildings when compared with others institutions.It can therefore be inferred that majority of defects found are leakage and sagging which were not affecting the building elements seriously.Therefore, looking at the general conditions of buildings as indicated 78.6% of the procedures are conformity with the following identifiedstandard process of carrying out conversion of buildings. Most of the building defects occurred as a result of improper supervision and assessment of planning requirements(Seth,E. A.,2014).

Table 4.12: Identified problems with regard to building condition encountered after conversion of buildings in (College of Nursing and MidwiferyGombe)

Title	Organization	Existing building	Present building	Component Altered	Defects Found	Severity defects (1-4)	Building defects
1	College of Nursing	Classroom	Hall	Roof,Walls,Ceiling	Lkg,Dtp,Ppt,	2	Low
2	College of Nursing	Classroom	Admin Building	Roof,Walls,Ceiling	Sag,Dtp,Ppt, Lkg	2	Low
3	College of Nursing	Classroom	Hall	Walls & Floors	Ppt,Dtp	1	Insignificant
4	College of Nursing	Classroom	Hall	Floors,Roof,walls	FFL,Dpt,Tbd, Sag,	2	Low

*Source: Tertiary Institutions in Gombe State 2016 (*Adapted by Chendo and Obi (2015))

Crk:Cracks,Lkg:Leakages,Ppt:Peeling paints,Tbd:Timber decay, Dtp:Defective plaster, Ffl:felt failure, Sag:Sagging,Dpn:Dampness,

In summary, the study observed that there are defects on building elements of the converted buildings in both Gombe State University (GSU) and Federal university Kashere (FUK).The identified defects were found to be related to the procedures used in carrying out the conversionof the buildings. The inability to conform with the established standards especially, lack of structural assessment and preparation of designs were found

to be the major factors responsiblefor occurrence of the identified problems on converted buildings.

The findings of this study support previous works ofDennis (2007) and Dorothy *et al* (2004) who identified a guide for carrying out conversion. However,in College of Nursing (CNM) buildings were found with minor problems due to 78.6% of the procedures is partial conformity with the established standards in carrying out conversion of buildings when compared with others institutions.

CHAPTER FIVE

5.0 SUMMARY, CONCLUSION AND RECOMMENDATIONS

5.1 Summary of Findings

The results of the major findings in this study are summarized as follows:

i. It is revealed that 65.2% of professionals involved in conversion of buildings in the study area were found not to be registered with their relevant statutory, professional or regulatory bodies.

ii. The study found that only 48.5% of the converted buildings were supervised by relevant professionals from department of works and maintenance.

iii. The results show that respondents agree with all the identified processes to be important in carrying out conversion, this is evident considering thateach process scores a mean of at least 3.85 which translates to being effective.

iv. The study also indicates that walls with highest mean values of (4.00) score are ranked first,also were the major components that are altered when carrying out conversion of buildings. Foundations with mean values scoring (1.56) werefound to be the least altered building components.

v. The study examined and articulates the identified processes and established standardized procedure in carry out conversion are relevant to the study areas.

vi. Conversion process used by the institutions were observed to differ from the standardized procedure with the following discrepancies:

1. In GSU, the client did not undertake structural and risk assessment and preparation of design. This inability causes structural defects on new buildings.

2. In FUK, the client did not undertake structural assessment and design preparation. This is attributed to cracks, sagging and leakages found on the new buildings.
3. In CNM, the study found that 78.6% of procedures used are in line with the identified standard process, whichis responsible for minor defects on the new building.

vii. The study revealed that defects were found on converted buildings in both GSU and FUK, and are related to the procedures used in carrying out the conversion.

viii. The studyfound that CNM buildings arewith minor problems,only 78.6% of processes used in carrying out conversion are inconformity with the established standard when compared with others institutions.

5.2 Conclusion

Based on the study findings, the following conclusions are made:

i. Unregistered professionals are tasked and involved with conversion of building projects in tertiary institutions of Gombe State.

ii. Majority of conversion of buildings were undertaken directly by the tertiary institutions in Gombe State.

iii. The identified processes are effective in carrying out conversion of buildings in the study areas.

iv. The Major building components that were often altered when carrying out conversion are walls, ceilings, roofs and floors without change in their foundation.

v. Four procedures of carrying out conversion of buildings were articulated to establish the standardized procedure relevant to the study areas.

vi. The processes used in carrying out conversion by the institutions led to these defects such as cracks, leakages and sagging.

vii. Lack of following the standardized process may also lead to future defects

5.3 Recommendations

i. Only registered professionals should be tasked with performing conversion of buildings in tertiary institutions in Gombe State.

ii. Conversion of buildings should be done under strict professionalguidance,this will avoid building failures and prolong the life span of the building.

iii. Institutions shouldadopt theidentified articulated processes presented in the study when carrying out future conversion activities.

iv. Organizations should ensure thatstructural assessments are examined when carrying out the process of conversion.

v. The standardized procedure established and presented in the work should be adopted by institutions when carrying out conversion of buildings.

5.4 Contribution to knowledge

i. The study has established fourteen (14)standardized procedures in carry out conversion relevant to the study areas.

ii. The study established that the level of compliance in carrying out conversion in the study area is partial in comparison with the standardized processes. This is demonstrated by 42.9% conformity level by GSU, 50% conformity level by FUK and 78.6% conformity level by CNM.

iii. The study established that inability to carry out structural assessment and design preparation is the major causeof structural failure on converted buildings.

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Appendix I (Questionnaire)

Department of Building,

Faculty of Environmental Design,

Ahmadu Bello University, Zaria

P.M.B. 2222,

Kaduna State.

Dear Respondent

LETTER OF INTRODUCTION

I am M.Sc. Student of the above named institution, conducting a research work on **"AN APPRAISAL OF CONVERSION PROCESS OF BUILDING IN TERTIARY INSTITUTIONS IN GOMBE STATE".** The information required here is purely for academic purposes, I am therefore requesting your kind cooperation in providing me with the needed and relevant information. You may therefore wish to respond to the attached questionnaire by writing or ticking in the appropriate places. All information provided shall be treated as confidential.

Thank you for your cooperation and assistance.

YUSUF ARDO

PHONE NO: 07039662646.

Email;yusufardo@gmail.com

SECTION A: Respondents Demographic Information

1. Name of Respondents organization.....

2. Respondents office address.....

3. Indicate the age of your Institution.....

4. Please indicate your profession, a) Architect ( ) b) Builder ( ) c) Engineers ( )

d) Quantity Surveyor ( ) e) Others (Specify).....

5. Respondent years of working experience, a) 0 – 4 ( ) b) 5 – 9 ( ) c) 10 – 14 ( )

d) 15- 19 ( ) e) 20 above ( )

6. Respondents professional Registration Status: a) Registered ( ) b) Not Registered ( )

7. Please indicate your Qualification: a) Ordinary National Diploma ( )

b) Higher National Diploma ( ) c) Degree ( ) d) Masters Degree ( ) e) Others.....

8. Please indicate which arm dept/section in your organization undertake conversion and alteration of its Buildings

a. School Estate department design and undertake

b. Works and maintenance department

c. Physical and planning unit department

d. Contracting firms

SECTION B: Examining the perception of respondents on the importanceprocess of conversion

9. Please indicate your perception on the importance of identified process in carrying out conversion

SN	Process of carrying out conversion and alteration	Strongly disagree	Dis agree	Not Sure	Agree	Strongly agree
1.	Establish need for conversion and alteration					
2.	Appoint professional					
3.	Investigate defects					
4.	Assessment of construction material in place					
5.	Assessment of structural stability					
6.	Assessment of planning requirement					
7.	Risk assessment					
8.	Establish design based on client requirement and structural planning capability					
9.	Define budget					
10	Prepare detailed proposal					
11	Application and approval for the proposal					
12	Appoint project team					
13	Define extent of the work such as demolition, stabilization and construction					
14	Execution and Completion					

10. Please indicate how much you agree with each of the following factors to be considered when carrying out conversion of buildings

S/N	Factors to be consider conversion and alteration	Strongly Disagree	Disagree	Not sure	Agree	Strongly Agree
1.	Building construction					
2.	Building condition					
3.	Building suitability					
4.	Statutory compliance					
5.	Aesthetics					
6.	Project brief					
7.	Legal issues					

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11. How often does your institution undertake conversion of the following Institutional

Buildings

S/N	Buildings	Never	Rarely	Some times	Most of the times	Always
1.	Lecture Theatre					
2.	Auditorium					
3.	Residential					
4.	Hostel					
5.	Classes					
6.	Hall					

12. How often do you carry out conversion and alteration on each of the following building component?

S/N	Building Component	Never	Rarely	Some times	Very Often	Always
1.	Walls					
2.	Roofs					
3.	Ceilings					
4.	Floors					
5.	Foundations					
6.	Other (please specify)					

SECTION C: An Interview Question of the Respondent on the Process of Conversion.

13. Please mention the current process in carrying out conversion of Buildings used by your institutions?

Appendix II (Checklist)

DEPARTMENT OF BUILDING
FACULTY OF ENVIRONMENTAL DESIGN
AHMADU BELLO UNIVERSITY, ZARIA

CHECKLIST TO IDENTIFY THE OUTCOME OF THE PROCESS OFCONVERSION OF BUILDINGS IN TERTIARY IN GOMBE STATE

SECTION A

1. Name of Organization……..

2. Location of Organization……

3. Type and nature of existing structure or Building that is to be altered or converted a. Hostel [ ] b. Administrative Building c. Hall/lecture theatre [ ] d. Classroom [ ] e. Office [ ]

4. Type and nature of present building a. Hostel [ ] b. Administrative Building c. Hall [ ] d. Classroom [ ] e. Office [ ]

5. General Condition of Building a. Poor [ ] b. Fair [ ] c. Good [ ] d. Excellent [ ]

6. Please indicate how often that end user satisfaction of new buildings

a. Very unsatisfied [ ] b. Unsatisfied [ ] c. Not sure [ ] d. Satisfied [ ] e. very satisfied

7. Please indicate how much you agree with each of the following problems that the end users are face in the converted buildings

S/N	Problems end users facing in the new building	Strongly Disagree	Disagree	Not sure	Agree	Strongly Agree
1.	Cross ventilation Problems					
2.	Poor lighting condition					
3.	Outdated used of facility					
4.	Other (Please specify)					

8. Defects are found on the building

1. Cracks Yes [ ] No [ ]

2. Peeling Paint Yes [ ] No [ ]

3. Dampness Yes [ ] No [ ]

4. Leakages Yes [ ] No [ ]

5. Timber decay Yes [ ] No [ ]

6. Sagging/Deformation Yes [ ] No [ ]

7. Defective Plaster Yes [ ] No [ ]

8. Buckling/Deflection Yes [ ] No [ ]

9. Sealant and Felt Failures Yes [ ] No [ ]