

CHAPTER ONE

INTRODUCTION

Background of the Study

Education is a veritable tool for societal development. Everywhere around the world, several people are appreciating its important role as mechanism to effect necessary changes in all sphere of human endeavour. Despite the fact that the Nigeria education system is being challenged by various socio-economic and political factors, Nigeria still place premium on the critical role that education can play in moving the country towards the attainment of its social and economic goals. The broad national development objectives on which the educational objectives are premised derive from the following national goals: a free and democratic society; a just and egalitarian society; a united strong and self-reliant nation; a great and dynamic economy and a land of bright and full opportunities for all citizens(FRN, 2013). In pursuance of these national goals, the Nigerian educational system is currently tagged a 9-3-4 system: nine years for basic education, three years of secondary education and four years of tertiary education.

University education, which is part of the tertiary education in Nigeria, is a new development compared to countries like Britain, the USA, India, the Philipines, and Sierra Leone. Before the establishment of the University College, Ibadan (UCI), in 1948, the practice was for Nigerians yearning for university education to attend British and American Universities and Fourah Bay College, Sierra Leone. The colonial administration felt the need for university education and by 1948, the first Nigerian University, the University College of Ibadan (UCI) came into being. It was the mission of the founding fathers to establish an institution, the products of which would eventually take over the responsibilities of administering an independent Nigeria.

The reason behind the establishment of university education in Nigeria, as often observed by Governments and others in the business of university education, is to coordinate and enhance the development and utilization of manpower in Nigeria. According to the Federal Republic of Nigeria (2013), university education has the objectives of contributing to national development through high level manpower training, developing and inculcating proper values for the survival of individual and the society, developing the intellectual capability of individuals to understand and appreciate their local and external environment, and promoting and encouraging scholarship and community services. These objectives shall be pursued through teaching, research and development, virile staff development programmes and dedicated services to the community through extra-mural and extension services. Thus, the mandate of universities is summed up to be teaching, research and community service. The extent to which these stated objectives are achieved through these three mandates is termed effectiveness. Hence, the effectiveness of universities was determined in this study using teaching, research and community service.

Recently in Nigerian, stakeholders in education have been clamouring for plausible solution to challenges bedeviling the sector. Some have traded words by blaming government, parents, teachers and even students, while others have dropped the blame on school plants and infrastructural decay within the school system. The current situation in many public Universities have unveiled many challenges but not limited to non-functional laboratory, inadequate books in laboratory, convenience, technical workshops, choky classrooms, parks, make-shift walkways, epileptic power supply. Adebayo (2009) support that the educational institutions' school plants are structurally ineffective and decay. It is a replica of non-spacious environment with inadequate ventilation and less lightening which have affected effective teaching-learning process in many parts of Nigeria.

In the same vein, teaching involves so many activities ranging from preparation for the lesson and class presentation to conducting examinations and grading students. All these have one end product which is the students' academic performance. Thus the effectiveness of universities in teaching will be measured in this study by students' academic performance. Research, on the other hand, involves publications in local, national and international outlets, attending conferences, workshops, seminars and collaborating with other universities within and outside the country as external examiners, resource persons or as participants in a programme. There are series of administrative, voluntary, humanitarian or community services that the universities are expected to perform. These may include counseling the students, providing resource persons to host communities, as well as financial, commercial, physical or religious assistance to people around and far away from the universities. Thus, the extent to which these universities achieve roles determines their effectiveness.

Today, many Nigeria Universities plants are structurally defective, choky and non-conducive for use (National Universities Commission, 2004). This has been part of the revitalization struggle of the Academic Staff Union of Universities (ASUU). For the universities to be effective there are so many factors that can make or mar this effectiveness. One of such factors is university plant planning. University plant planning is the process of organizing the classrooms, laboratories, library, corridors, flowers and footpaths systematically and logically to achieve university goals and objectives (Adeogun, 2007). The buildings to be built, the site of the different relevant arms of the institution, the location of the classrooms and the offices, the parks and recreation centres need to be systematically planned and implemented for theses school plants to be maximally utilized and effective.

University plants depict living laboratories with several land missions which includes research, service and education. Some scholars explained it as beautiful spaces, functional atmosphere, and features which symbolizes location, and history of an ivory tower as well as

honour diversities, strengthens and abilities in a sustainable manner. University plants are expected to enhance the beauty as well as promote sustainable landscape and students' optimal learning outcomes. It is believed that selecting native and non-native, modesty and low-maintenance plants is of paramount importance and needed for educational attainment. By implication, this promotes multicultural nature of the Nigeria society, climatic conditions, cultural as well as expands educational exploration for all students irrespective of their physical abilities to navigate. It is therefore measured in this study using location, aesthetic, lecture room size and safety of university plants.

As observed by Abdulkareem (2004), classroom buildings need to provide special stairs for the handicapped, need to have good ventilation and be well designed to portray their corporate image or public expectations. If an institution is located near a motor park or market; there is a tendency that disturbances will be coming from there. Locating students' classrooms close to lecturers' offices is likely to disturb the peace of the lecturers. Thus these school plants need to be planned systematically for the institution to be effective. It is against this background that this study investigates university plant planning and effectiveness in North central Nigeria.

It is no longer news that education at every level in Nigeria requires adequate quality resources both physical and human material resources for attaining stated educational objective. These are capable of positive achievement of educational system. Rao (2011) asserts that the availability of quality and quantity of school plants and resources is also capable of determining students' academic performance. Several factors that promote students' academic performance have drawn the attention, concern and interest of many stakeholders like teachers, parents, counselors, school administration, psychologists in Nigeria and several other African countries. There has also been public outcry on the state of the Nigeria public universities. The current reality has shown that quality has been sacrificed

on the altar of economic gains as well as aesthetics and functionalism, this has hampered the effectiveness of some public varsities.

Statement of the Problem

No education system can survive effectively without the provision of adequate physical structures such as school plants (school buildings, lecture rooms, facilities, equipments etc). Oyedeki (2012) observed that school plant planning gives the students the opportunity to make a meaningful choice about what is to be learned and be able to interact formally with their teachers and one another. He further stated that it helps to reflect the geographical background of the area and the purpose to be served to achieve educational objectives. However, in many universities in North central Nigeria, lecturers' offices are located too close to the lecture rooms, and this disturbs the intellectual activities of these lecturers. Many of the high structures do not make provisions for physically-challenged students. Some departments are located too close to the stadium, and academic activities are disrupted especially when matches are going on in such a stadium (an example is the location of the Department of Human Kinetics in the University of Ilorin).

Moreover, lecture room sizes were not well planned. At times lecture rooms were built instead of lecture theatres. These shortcomings are likely to have an adverse influence on the effectiveness of universities in North central Nigeria. Thus this study tends to fill a gap by investigating the relationship between university plants and the effectiveness of universities in North central Nigeria.

Iheonunekwu and Anyatonwu (2014) investigated resource utilization as a correlate of students' academic performance in the Ohafia Education Zone of Abia State, Nigeria; the findings showed that there was no significant relationship between utilization of laboratories and students' academic performance. There was also no significant relationship between the utilization of classrooms and students' academic performance. However, there was a

tendency towards inverse relationship, but the magnitude of the co-efficient (-0.17) was not strong enough to establish a relationship. Based on their findings, it was recommended that utilization of teachers should go along with the provision of quality instructional materials and that training and re-retraining of secondary school teachers should be urgently considered as teachers can only teach what they know even when they are made to work round the clock. Jimoh, Akinlosotu and Ojo-Maliki (2017) studied the influence of the school plant on secondary school students' academic performance in Economics in Ile-Oluji, Okeigbo Local Government Area of Ondo State, Nigeria. Results showed that educational equipment, buildings and playgrounds have individual significant influence on students' academic performance in Economics. It was recommended that the state government adequately inform and sensitize principals on the importance of school plants in schools' goals' achievement.

It is evident from the appraisal of the studies cited that most of the studies were limited to secondary schools in the eastern and western parts of Nigeria, while the present study was carried out in North-central public universities in Nigeria. It was also observed that most of the reviewed studies correlate school plants planning with students' academic performance whereas the present is an attempt to correlate university plants planning with effectiveness of the institution. These are the source of the gaps the present study is intended to fill in. It is against this backdrop that this study has been undertaken to examine the relationship between university plant planning and effectiveness in North-central public universities in Nigeria.

Purpose of the Study

The purpose of this study is to investigate the relationship between university plant planning and effectiveness in North-central Nigeria. Specific purposes are to:

1. investigate the adequacy of university plant planning in North-central Nigeria.
2. determine the level of the effectiveness of universities in North-central Nigeria.

3. investigate the relationship between university plant location and effectiveness in North-central Nigeria.
4. investigate the relationship between university aesthetic and effectiveness in North-central Nigeria.
5. investigate the relationship between university building design and effectiveness in North-central Nigeria.
6. investigate the relationship between university building size and effectiveness in North-central Nigeria.
7. investigate the relationship between university students and employees' safety and effectiveness in North-central Nigeria.

Research Questions

The following research questions were set to guide the study:

1. How adequate is the university plant planning in North-central Nigeria?
2. What is the level of the effectiveness of public universities in North-central Nigeria?

Research Hypotheses

The following hypotheses were designed to further guide the research using inferential statistics

Main Hypothesis

There is no significant relationship between university plant planning and effectiveness in North-central Nigeria.

Operational Hypotheses

1. There is no significant relationship between university plant location and effectiveness in North-central Nigeria.
2. There is no significant relationship between university aesthetic and effectiveness in North-central Nigeria.

3. There is no significant relationship between university building design and effectiveness in North-central Nigeria.
4. There is no significant relationship between university building size and effectiveness in North-central Nigeria.
5. There is no significant relationship between university students and employees' safety and effectiveness in North-central Nigeria.

Scope of the Study

This study was undertaken to examine the relationship between university plant planning and effectiveness of public universities in North-central Nigeria. In the study university plants location, lecture room size, students and employees' safety, building design, building aesthetic of these measures were used. Also the indicators of effectiveness include the university's effectiveness in terms of teaching, research and community services.

The study was carried out in the North-central part of Nigeria, with 14 public universities. The study was however limited to six of the public universities in the zone. The population of the study includes all the 6,462 lecturers of the six universities selected while the sample of the study was 794 lecturers selected using stratified random sampling technique with the aid of Research Advisor (2006) sample size table. Two adopted questionnaires titled "University Plant Planning Questionnaire", "Effectiveness Questionnaire" and the Students' Academic Performance Proforma were used. Descriptive statistics of percentage, mean, standard deviation and rank order were used to answer the research questions formulated while Pearson product moment correlation statistics was used to find out the significant relationship between university plant planning and effectiveness of public universities in North-central Nigeria.

Significance of the Study

This study is significant, in that it should grows the body of knowledge needed to achieve a high standard for tertiary education in terms of university plant planning and effectiveness. It will be of immense benefit to the government, university administrators, education helpers and private organizations.

Educational sociologist have noted the importance of the university environment in the cognitive development of a child, it is however the opinion of the researcher that this work would drive the imagination of all and sundry (students, parents, lecturers, government and its agencies to trace the need for university plant planning so to curb the inadequate planning of the university environment, poor students' learning outcomes and weak university effectiveness. Okoye (1981) describes the environment as “phenotypic”. To him, environment plays the role both physical and biological factors, which, while being outside the learner affect his performance. It is the researcher considered view that this research work will promote holistic learning to the possibility of manipulating the environment so as to bring about optimal conditions in learning.

This research would push aside the frontier of ignorance and advance to the frontier of knowledge about school plant planning. The findings and recommendations will help students, scholars, parents, authors, researchers to understand and appreciate the importance of university plant planning. It would afford curriculum planners, government agencies, ministries to see the need to formulate policies that will enhance University plant planning with a view to increase University effectiveness . Finally, it is noted that the implications of this research would serve as basic foundation for other researcher who are aspiring to carry out a research work on school plants planning, environmental education, environmental knowledge, awareness, curriculum, school environmental factors, societal aspects, roles and positioning factors, understanding of our relationship with the world in respect of the

dynamic environment, instructional method of teaching, environmental sustainability, conservation, skills, curriculum design and structure.

The study would provide information for sponsors, educators and university administrators to reflect upon university plant planning factors that help students in achieving their academic goals. The findings from the study will encourage policy makers to support reforms that will help to increase university effectiveness, in that policy makers will appreciate the relationship between learning and the school plant. In addition, this study should enable policy makers to see the need to consolidate on-going efforts in promoting university effectiveness by injecting more funds into university education.

This study should also provide a useful guide and template pertaining to the evaluation of universities' effectiveness, particularly in the Nigerian setting in which data base management in the higher education sub-sector is still fragile. Effectiveness is a critical determinant of the quality of education, thus analyzing university effectiveness would give some insight into the quality of higher education provision in Nigeria. The findings of this report would serve as a useful material for research students embarking on University plant planning and Effectiveness study.

Operational Definition of Terms

The following terms are operationally defined based on the context in which they were used in this study.

Benchmark is the scale point designed by the researcher which is used as point of reference against which research results are being compared.

Lecture Room Size refers to standard dimension of classroom length and breadth wise for effective teaching and learning.

School plant refers to everything within the school premises which includes the site, buildings, equipment and all essential structures, permanent and non-permanent as well as machines and laboratory equipment and others.

Students and Employees' Safety encompasses an environment that is physically and emotionally safe for students and members of staff, through adequate school plant planning.

University Aesthetic is about the beauty of the university environment so as to enhance teaching and learning.

University Effectiveness in Research involves publications in local, national and international outlets, conferences attendance, workshops, seminars and collaboration with other universities within and outside the country in research efforts.

University Effectiveness involves many activities ranging from preparation for each lesson and class presentation to conducting examinations and grading students. All these have one end product which is the students' academic performance. Thus, effectiveness of universities in teaching was measured in this study using students' academic performance (students' classifications e.g. first class, second class or third class).

University Plant Design is the arrangement of buildings, facilities and equipment within the school environment to form a pattern that will facilitate teaching and learning, achieve effectiveness in the universities.

University Plant Location is the positioning of the university plant in relation to adequacy towards the achievement of university effectiveness.

University Plant Planning is the process of positioning school facilities in organized positions where educational activities could be achieved.

CHAPTER TWO

REVIEW OF RELATED LITERATURE

This chapter presents a review of related studies by previous researchers pertaining to University plant planning and effectiveness. It was structured under the following major sub-headings:

Theoretical Framework

Conceptual Framework

Concept of University Plant Planning

Building Size

University Building Design

Principles Guiding University Plants Planning

University Aesthetics

Safety of Students and Employees

Concept of University Effectiveness

Parameter for Measuring University Effectiveness

Empirical Studies on University Plant Planning and Effectiveness

Appraisal of Literature Reviewed

Theoretical Framework

Universities are learning organizations where students are supposed to acquire requisite skills. Their effectiveness is therefore measured along the margin of how much teaching and learning they are able to produce. Since the learning of any subject matter is affected by the characteristics of the environment in which the learning takes place, and the extent to which necessary facilities and infrastructures have been planned, it is therefore expected that university effectiveness will be affected by variables that have to do with these

entities. These include class size, school climate, school site, instructional space-classroom, laboratories and parks.

The system theory will therefore provide the theoretical basis for this study. The system theory was first designed for labour market organizations but is now widely applied to other institutions including schools. A system can be defined as an entity which is a coherent whole (Ng, Maull & Yip, 2009), such that a boundary is perceived around it in order to distinguish between internal and external elements and to identify input and output relating to and emerging from the entity. A system theory is hence a theoretical perspective that analyzes a phenomenon seen as a whole and not as simply the sum of elementary parts. The focus is on the interactions and on the relationships between parts in order to understand an entity's organization, functioning and outcomes. This perspective implies a dialogue between holism and reductionism. Systems can be found in nature, in science, in society, in an economic context, and within information systems. A distinctive characteristic of system theories is that it developed simultaneously across various disciplines and that scholars working from a systems theory perspective build on the knowledge and concepts developed within other disciplines.

According to Nwankwo (2014), a system has been described as “a series of interrelated and interdependent parts, such that the interaction of any part (subsystem) affects the whole system”. A system can be likened to the human body which has various parts functioning together to ensure the existence and comfort of the organism. Thus, whatever happens to any part of the system has implications for the other parts and indeed the entire body.

Transposing this to education, the university is a system involving a number of members, namely students, academic staff, non-academic staff, school administrators, the society and the government. These different parts (or members) have different tasks to

perform, but in such a way that each element or part interacts with other elements or parts and with other systems (environment) around it. Thus, the understanding of the parts which form the whole and the interrelationships among them is essential. It is worthy to note that the effectiveness of universities is dependent on the extent to which the various stakeholders play their roles efficiently. If one member is defaulting in its function, the entire system suffers, with the student bearing the brunt of the problem. Parents suffer in the sense that their financial investments in the education of their children are wasted. On the part of the government and the society, poor institutional effectiveness would imply that there would be a shortage of human capital and skilled personnel needed to grow the society economically, politically and socially.

A system is either closed or open. Closed systems are completely self-supporting and they do not interact with their environment. Open systems on the other hand interact with their environment, on which they depend for obtaining essential inputs and for the discharge of their output. University education can be seen from the open system perspective. Thus, the system theory treats an organization as a system of mutually dependent variables. It should be noted, however, that although organizations should be administered on the basis of their interaction with the environment, the question that arises is how predictable is the environmental influence? This is a question which the system theory cannot resolve. The relevance of the systems theory in educational organizations has long been recognized. The system theory enables educational managers to see the school system as an extension of the larger society. Thus educational plans and policy implementation must consider the socio-economic, political and technological environment and harness them positively in meeting the objectives of university education which is appraised by the level of academic achievement of the students.

Relevance of the Theory to the Study: The provision of the system theory is applicable to the study of plant planning and effectiveness in universities in the North central geopolitical zone of Nigeria, in a number of ways. Firstly, the system theory enables us to appreciate universities as systems that consist of several elements synergizing efforts to achieve a definite goal. The goal of the universities in this (North central) geopolitical zone can be summarized into teaching, research and community service. The elements in this case refer to the various stakeholders that make input towards the realization of these goals of the university. These include the students, academic staff, non-academic staff, the management team and the government.

Secondly, the system theory enables inter-dependency of the elements that constitute the university as a system to be appreciated. Hence, we see, for instance, that the students cannot proceed with their studies in the university, without the academic staff. Besides the academic staff, the students also depend on the input of the non-academic staff, as a school cannot run effectively without them.

Conceptual Framework

To measure university effectiveness involves a lot of elaboration. Therefore, the development of a conceptual frame for this study required a close evaluation. The study used three mechanisms which are Input, Process/Activity and Output. The Input chosen for this study is university plant planning. The Process/Activity remains the activities involved in planning, organizing, directing and controlling. The Output consists of institutional effectiveness. The flow chart is summarized in figure 1.

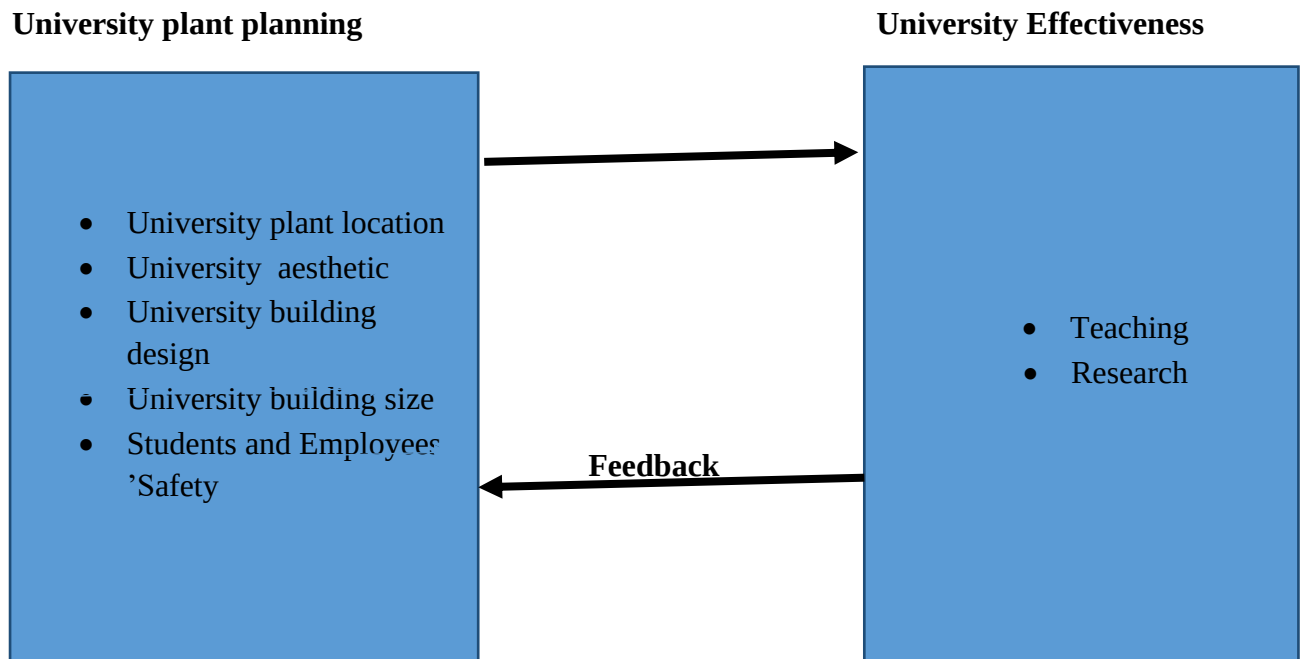


Fig. 1: A Flow Chart Showing the Interplay of University Plant Planning and Effectiveness

Source: Researcher's Design (2019)

Assumptions for the Conceptual Framework: The assumption for this conceptual framework of this study is a linear inter-relationship existing among the constructs -- university plant planning and effectiveness of universities. That is, the independent variable (university plant planning) is the factor within a university system that determines the outcome of the effectiveness of a university (the dependent variable). University's effectiveness, whether in the dimension of teaching, research production or community service, is hinged on the university plant planning.

In a university where the available school plant is appropriately planned, the needs of both the students and the teachers within the school are bound to be well met. This in turn would promote effectiveness, as more teaching and learning, research and community service would be easily achieved. In contrast, an imbalance in the planning of school plants and facilities will hamper the effectiveness of the universities.

It therefore becomes imperative for all the elements in the university system to harness efforts in promoting the school plant planning for improved effectiveness of the

school. The level of effectiveness would send feedback to the university's management on what to do about the in-putted school plant planning to improve its effectiveness. Thus the process starts from beginning again and continuing till the university effectiveness is achieved. Thus it is a continuous process.

Concept of University Plant Planning

It is believed that a well-educated populace is the best insurance for the preservation of our environment. School Plants are machineries, equipments, appliances, containers, implements and tools which include any component or anything fitted or connected to any of those things (Work Health & Safety Act 2011). It is also referred to as a wide range installations, tools, lifts, cranes, computers, conveyors, forklifts, vehicles, power tools, welding and amusement devices which need to be fit for purpose, maintained, inspected and used in accordance with safe systems of work (Amanchukwu & Ololube (2015). School plant used at the University ranges from complex installations to portable equipment and tools. These school plants may be purchased, created for, and employed in, any aspect of University business as. It include; school plant under pressure e.g. autoclaves, boilers, gas cylinders; School plant with moving and rotating parts e.g. presses, lathes, milling machine; powered mobile Plant e.g. electric vehicles; vehicle hoists; School plant designed to lift or move e.g. cranes, forklifts, hoists and elevating work platforms; earthmoving machinery; Industrial robots and other remotely or automatically energised equipment; Lasers and laser products; Non-powered hand tools e.g. screwdriver, chisel, hammer etc. small office equipment; and University vehicles e.g. forklifts, golf carts, off road vehicles, cars etc (Sidhu, 2007).

A planned or organised physical resources in the system is called University plants planning(Singh & Kumar, 2017). University plants planning is major concerns to university management as it is of great importance to the educational processes and programmes. It is

seen as the nerve centre of the educational process. It includes the school building, playground, furniture, class-room, library, hostel, apparatus and equipment's, school offices, chalk-board, smart-board, school record etc. Studies like Oladipo and Oladejo, (2016); Okoaloga, (2018), Muraina, Ijaduola and Oni (2011) have shown that well planned physical facilities and material resources contribute greatly to the overall achievement in teaching, learning, research and community service. Thus, the importance of the university plants planning cannot be over-emphasized to all members of the society as it is the most important factor in the whole educational process.

University plant planning is a veritable vehicle as it helps to improve teaching and learning (Austin, 2002). As there is too much emphasis on speeding up the learning process, so no less emphasis should be given to the good learning environment. A healthy, beautiful and refreshing environment and essential facilities provided by a good school plant, help in creating a congenial educative environment. As a result of which an environment can be established in which the academic staff members, students, workers and visitors can benefit in various capacity of facilities and environment created as a result of proper university plant planning. School plant planning is a bit of a unique one, in that it helps to have a mixture of both scientific and artistic skills in the practice of designing buildings, spaces and places as it involves the use managerial acumen in science, art, and technology to create the built environment (Sang, 2013). It is a programme or document written for each building and infrastructure project which establishes the link between the project, the strategic and master plans, describe the goals and visions for the project, and lay the foundation for the design of the project.

Thus, the management of school plants planning requires good leadership, effective monitoring, maintenance culture; corrective, preventive and predictive maintenance etc (Zais, 2011). Issues of maintenance of school plant has been raised due to overcrowding; non-

delegation of tasks by the heads of schools; vandalization of school property among others (2015). A long range plant planning begins with a master plan which is an outline for the physical development that is driven by the University's Strategic Plan. The building and infrastructure projects are undertaken or derived from both the master plan and the strategic plan. A campus plant planning articulates a shared vision for the University and defines a strategy and set of principles that guides the development of new built form; the laying out of streets and supporting infrastructure; the integration of mobility networks and the creation, enhancement and programming of new open spaces. It is also a master planning assists in avoiding the errors that could result from planning individual projects on a piecemeal basis (Ojedele, 2000).

Succinctly, short-term decisions often give little consideration to the ramification of those decisions. Master plans can address an institution's long-term as well as short-term needs (Yusuf, 2008). For instance, managing resources and higher education planning can be a two-way process. A university campus management has short-term goals and tasks, such as classroom allocation and academic scheduling for a given semester. Many universities across the globe is committed to a comprehensive and continuous land use planning process that results in a flexible framework to guide future decision making. Universities considers the use of resources from environmental, regulatory, operational, economic, historic, and cultural perspectives as support of its teaching/learning, research, and outreach mission (Singh & Kumar, 2017). Some of the principles that guide plants planning are organized in the following categories: general principles, land use and facilities, environmental sustainability, open space, parking, circulation, and utility infrastructure.

University plant planning envisioned as buildings near the academic core of campus (Torupere, 2016). It is usually to provide necessary classroom seats, faculty offices to meet existing capacity challenges and also enable the university to increase student enrollment

strategically. The academic focus of the plant planning is the interdisciplinary space which will house faculties, car space, lectures and other needed facilities. Plant planning envisioned that school infrastructures depict an interdisciplinary, collaborative learning environment drawing on the university's long-standing expertise in sustainability and sustainable solutions (Thomas & Wooster, 2008). This in turn helps in making a mark on the world of academic environment as plant planning is all about planning, designing and building things in strategic locations for ease of learning. University Planning maintains the university's space inventory and reference building floor plans (Stricherz, 2000). The database contains information about all rooms in the University, such as their areas, occupant departments, room uses, etc.

Hence, to ensure excellence in campus planning and design, directives that guide the University towards a systematic and comprehensive approach for evaluating design alternatives for buildings and grounds are necessary. The general planning principles relating to campus planning, building design, site planning and landscape open space to assist the University in various development proposals are loosely categorized (Sanoff & Walden, 2012). It has also been discovered that lots of factors that affect the character of plants planning in university environment. Some of these factors are social and economic factors, educational programme, population and school enrolment, cultural values, developments in the building industry, developments in educational practices among others. Thus, it is discovered that school plant helps improve students' performance in achievement tests, attendance, student's attitude to learning, increase teaches retention rate and reduces drop-out rates (Owoeye & Yara, 2010).

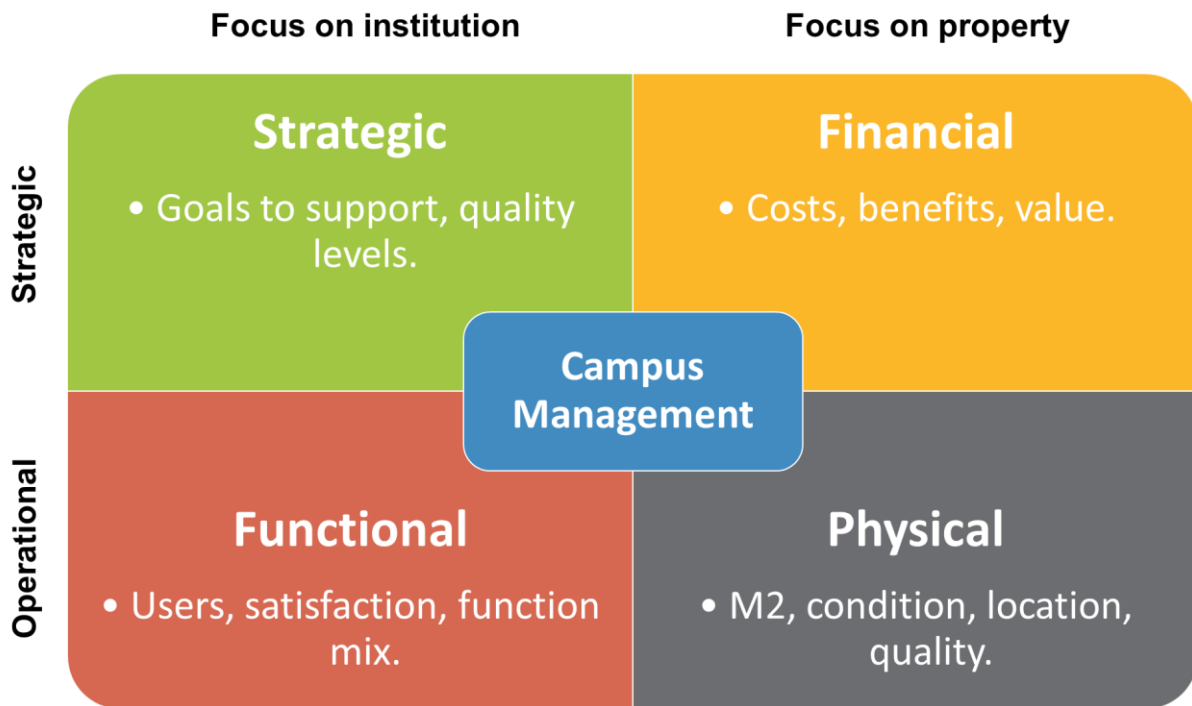


Fig 2: (Adopted) Model for School Plants

Source: Den Heijer, 2012

The above model for school plants was adopted from Heijer, (2012). It explained clearly the University management system. It revolves around attending to the physically features, functionalities of the system, cutting cost and accruing benefits to make the system achieve its stated objectives. This implies that school maintenance culture is of paramount importance. It is sacrosanct to smooth running of a university which aimed at competing at a global level. It is can expected to be positive while portraying a consistently caring behaviour by its members towards achieving stipulated goals and objective. Any form of negativity, non-caring attitude or non-challant attitude to university system either by students, teachers, management team, non-academic staff, portraying a non-caring attitude is likely to spell doom for its growth, development and outputs in manpower and research as well as community engagement (Çubukçu, 2012). All the four quadrants of university maintenance are strategic and functional.

Some focus on the growth and development of the institution while the other two focuses on property. All are symbiotic, that is they are dependent one another to achieve the overall goals. To corroborate, according to Thomas and Wooster (2008) a good and functional university system focuses on the following; a clear and shared vision for the school, a conducive learning environment, skilled and supportive teachers and administrators, focus on teaching and learning, reliable support staff, safe learning environment for students, state-of-the-art equipment and facilities, and teamwork. Stakeholders are also liable to join in the decision-making system of a university so that its goals can be achieved. Thus, students, lecturers, parents, alumni and community members are meant to serve as observers and advisers in decision-making of the ivory tower. They are also to function effectively in formulating policies that best suit the needs of the University system school as well as the overall interests of the students.

University is a social institution set up to serve its ends. It is the nucleus around which the society revolves. It is also the university system and its environment that plays a major role in moulding the ideas, habits and attitudes of the pupils with a view to producing physically strong, mentally alert, emotionally stable, culturally sound, socially efficient and well-balanced personalities (Singh & Kumar, 2017). University plant planning carries a wide meaning as all the material conditions should be conducive for the all-round development of the student- physical, emotional, social, cultural, aesthetic and moral. The physical, social and aesthetic facilities of a university system do have a great deal to contribute to its overall success (Shina, 2011).

School plant planning refers to a process in which a suitable site is selected and instructional space, administrative space, circulation space, and spaces of convenience are designed to facilitate the teaching and learning process in the school system (Isaac & Musibau, 2010). It involves mapping out school facilities and accessories as well as choosing

an ideal blueprint for then. Commenting on school plant planning, Oyedeji (2012) noted that it becomes necessary to plan school plants in order to provide for future expansion since there is the tendency for population growth. In essence, school plant planning is the planning of the facilities within a school. It involves conceiving the need for a facility, drawing up a design for it and stationing it to maximize teaching and learning activities within a school.

According to Odufowokan (2011), school plant planning refers to the following:

- (i) **Instructional Spaces:** These include classrooms, auditoriums, gymnasias, libraries, workshops, laboratories, art rooms, home economics rooms, multipurpose rooms/halls, music areas and any other space where students receive instruction.
- (ii) **Administrative Spaces:** These comprise principals' offices, clerks' offices, staffrooms, Guidance Counselors' offices and health clinics.
- (iii) **Circulation Spaces:** These include corridors, lobbies, staircases and other spaces where students recreate.
- (iv) **Spaces for conveniences:** These consist of toilets, cafeterias, kitchen dormitories, custodian sheds and stores.
- (v) **Accessories:** These include parks, gardens, fields, courts and lawns.

Odufowokan (2011) pointed out that it has been observed that adequate attention is now being paid to school plant planning throughout the world's educational systems including that of Nigeria. This is because it has been found to be critical to the development of an effective educational programme for the school system. School plants' planning, such as school site planning, instructional space planning, administrative space planning, space of convenience planning and circulation space planning, are essential in the teaching and learning process in the school system (Isaac & Musibau, 2010). Oyedeji (2012) outlined the following as steps necessary in school plant planning: Establish objectives or goals; Consider planning premises; Identify alternatives; Compare alternatives in the light of goals sought;

Choose the best alternative; Implement the program; Evaluate the plan and obtain feedback (Oyedeki, 2012).

Planning a functional school plant is a complex task. It involves putting up functional buildings and other structures that will be adequate for present and possible future use and which will provide a conducive setting for effective teaching and learning. It requires considering a number of political, social, economic and other environmental factors that are related to the educational programme, the school plant and students' behaviour. It is believed that a well-planned school plant will gear up expected outcomes of education that will facilitate good social, political and economic emancipation, effective teaching and learning process and academic performance of the students (Odufowokan, 2011). An effective school plant planning should provide a physical environment that is comfortable, safe, secure, accessible, well illuminated, well ventilated, and aesthetically pleasing. It should consist of not only the physical structure and the variety of building system such as mechanics, plumbing, electricity and power, telecommunications, security, and fire suppression systems. It should also include furnishings, materials and supplies, equipment and information technology, as well as various aspects of the building grounds, namely athletic fields, areas for outdoor learning, and vehicular access and parking.

Depending on the quality of its design and management, the facility can contribute to a sense of ownership, safety and security, personalization and control, privacy as well as sociality, and spaciousness or crowdedness. When planning, designing, or managing the school facility, these facets of place experience should, when possible, be taken into consideration. There are a number of conditions and procedures that are crucial for the success or otherwise of such a project. They include, but are not necessarily limited to, the following: effective leadership, nature of educational goals, team approach, and effective communication (NOUN, 2010).

Moreover, the school plants which refer to the physical facilities available in the school system should be well planned to enhance better learning outcomes for the students. Essentially, Oyedeji (2012) affirmed that the school plant includes the site, the building and the development. He further added that the school plant embraces permanent and semi-permanent structures which include items such as machines, laboratory equipment, the chalkboard and the office assistance tools. The school plant consists of the basic systems and structures which a viable school or institution needs in order to function effectively and to fulfill the purpose for which it is established. Better-planned school plants will enhance better school programmes and meeting the community's needs, by providing a place for psychological and physical safety for students and teachers and enhancing the good quality and quantity of instruction. The school plant is a major component of school facilities. Ihuoma (2008) opined that school facilities are the material resources provided for staff and students to enhance their efficiency in the teaching and learning process.

The school plant has also been described as “the spatial interpretation of the school curriculum”. In other words, the curriculum finds its physical expression in the construction and arrangement of the school plant, which is a controlled environment that facilitates the teaching and learning procedure and also protects the physical well-being of the occupants. Ihuoma (2008) opined that since teaching and learning does not take place in a vacuum, school facilities give meaning to the planned curricula and extra-curricular activities.

School plant planning involves planning school equipment which is needed in various forms; the equipment may be fixed or movable and serve various purposes in the educational system. The equipment can be used in classrooms, laboratories, offices, workshops, cafeterias, toilets, laundries and libraries for their specific purposes. The supplies are the accessories for operation the of various equipment. Furniture also available in the classrooms, offices, cafeteria, laboratories and workshops, outdoor, residential halls, common rooms, and

those designed for the physically challenged. Information and Communication Technology (ICT) facilities include, among others, software on classroom management, facility management, inventory control, maintenance management, on-line procurements, food services and general management.

Ihuoma (2008) noted that in the school system, there are multiplicity of facilities, which facilitate teaching and learning. They are used to illustrate concepts, provide opportunities for first-hand experience, for experimentation and demonstration, for scientific investigation and discovery, to provide diversity of thoughts, for observation and inquiry, for development of scientific attitudes and skills, to protect the individual and also to provide comfort. The indirect or teaching support facilities such as offices, cafeteria, acoustics, toilets, laundries, mowers, residential halls, common rooms, cleaning materials ground and similar items satisfy the individual's physical and emotional needs. They are used to: Increase instructional effectiveness; improve the cleanliness, orderliness and safety of facilities; reduce the operational cost and life cycle cost of a building; extend the useful life of a building; increase efficiency and effectiveness of the staff and students; improve building appearance; use data collection and analyses for decision making.

The beautiful surroundings are very important factor in generating a congenial atmosphere for work, studies and relaxation satisfaction (Okoaloga, 2018). This made many scholars referred human and material resources as the most important in the whole educational process. It is of paramount importance to state that in order to achieve optimal students' learning outcome, good learning environment is expected to be created by developing the university plants.

The university environment plays an important role in the whole teaching-learning process in school (Thomas & Wooster, 2008). It is also very helpful in the all-round development of the personality of the students; physical, emotional, social, cultural, aesthetic and moral. In the university, students spend a good deal of their time and a healthy school

plant is likely to take care of their physical growth and development. All aspects of personality of the students are developed due to good sanitation, proper ventilation and lighting, good canteen and hostel arrangements, provision of playgrounds etc in the school premises (Scarfone, 2007).

University plant planning helps in providing community centre which cannot be thought to exist without society. It is the nucleus round which the society revolves. A good school plant helps in bringing society and university closer for their mutual progress and development. In the same vein, plant planning is helpful in better school administration and organization. It has been discovered that beautiful university plant is helpful for the proper organisation and administration of school programmes (Pearce, 2014). Administration and organisation of university plant is one of the important responsibilities of the managements of the university. And so, all the facilities and equipments meant for the administration and organisation of the university system is of paramount important for learning outcomes.

Peter, (2012) asserts that school plant planning entails systematic and carefully designed and built administrative, circulation, instructional, conveniences, accessories spaces and places to enhance teaching-learning activities. It is described as the site, the buildings, the equipment and all the essential structures, permanent and semi-permanent, as well as such machines and laboratory equipment and the blackboard/chalkboard needed for effective teaching and learning. In the beginning there were no educational facilities; there were no classrooms and no desks for learners to sit or write on. Research shows that Plato and Aristotle met with students to exchange and discuss ideas in the open air and in any convenient location, perhaps in the shade of a temple or wall. Nowadays, these school plants are seen in the school compound for effective teaching and learning, but how they are being managed is a different ball game. This becomes a challenge to school managers as a whole to

ensure that they are well maintained. The school plant is the entire physical infrastructural facilities provided in the school for the purpose of educating the child.

It comprises the school site and all the structures that have been put in place to aid effective teaching and learning in the school system. Furthermore, Yusuf (2008) defines school plant as a spatial interpretation of the school curriculum. It would be impossible for the curriculum to be implemented if the physical facilities required for teaching and learning are not available. Absence of the school plant makes teaching ineffective and desired learning impossible to take place. It therefore becomes necessary to ensure that such a plant is properly planned and maintained to facilitate the effectiveness of the school system. The writer expresses that in some state secondary schools the classrooms are jam-packed with children and, as a result, poor teaching and learning manifests itself. Teachers cannot move around to give learners individual help where needed because there is hardly any space in between the benches in the classrooms (Teaching Practice supervision experience).

In a baseline study carried out, the researcher observed during her visit to some universities in the North-central zones of the country for supervision, the campus compounds were bushy, have some abandoned or even dilapidated buildings with leaking roofs, broken chairs and tables, rough floors and windows without louvers. In some of the schools, the buildings were dirty, no lightning while some are blown off roofs and indication of absence of or little planning. The roads leading to the sports field in some of the campuses were weedy. This could be due to the prolonged ASUU strike however, it appears adequate management and maintenance is not provided on the available school infrastructure. Location of schools seems not to have been a concern to the authorities running them. For instance, it is common to find schools located in the commercial hubs of the States which generate noise such as automobiles, neighbourhood human discussions, discotheques, and so on, to the extent that distract the concentration of learners.

The buildings on the other hand are another source of worry. Most school infrastructures are not regularly painted. They are dilapidated and often in shambles which make schools dull and unattractive; this is tantamount to creating a very hostile study infrastructure not congenial to Nigeria's children who must take their place as leaders of tomorrow with their counterparts in the developed world. During rains, it is common to see classrooms leaking, school infrastructures flooded with run-off and making the students very uncomfortable. Again, all these seem to be as a result of inadequate or poor planning.

In collaboration, Ajayi (2007) and Yusuf (2008) maintain that school plants comprise the machinery which in turn includes machines and tools used in the workshop, in addition to duplicating machines. They also point out that the school site, which is the landscape on which the school's permanent and non-permanent structures are built, are part of the school plant. They include buildings, equipment, furniture, vehicles of various types, electrical fittings, books, water supply infrastructure; accessories like playgrounds, lawns, parks and farms as part of the school plant. The writer is lending her opinion by saying that the school plant is all embracing as it comprises every single item starting from the gate of the school to the walls covering the school compound. This should be drummed into the ears of the school children who do not know that the school's grounds and everything in these grounds belong to them and that they should take good care of.

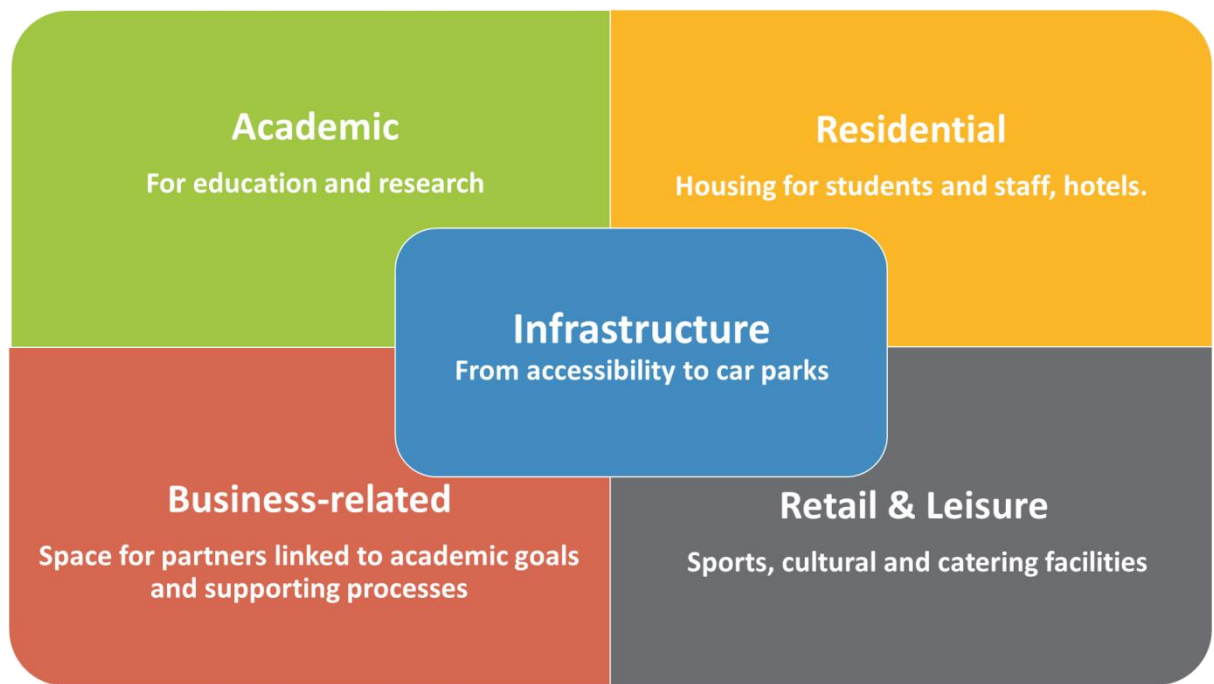


Fig.3: (Adapted) Model for functional University School Plants

Source: Den Heijer (2012)

The above model for school plants was also adopted from Heijer, (2012). The infrastructural facilities within University system are germane to its development. According to Heijer, (2012), a University infrastructure revolves around academic (education and research), residential (accommodation for both staff and students of the University community), business-related (space for partners linked to academic goals and supporting processes) and retail and leisure (sports, cultural and catering facilities). Herein, school plants referred to as infrastructural facilities. School plant refers to everything within the school premises which includes the site, buildings, equipment and all essential structures, permanent and non-permanent as well as machines and laboratory equipment, areas for sports and games, landscape, farms and gardens including trees, roads and paths among others. School plant management therefore involves a number of on-going and related activities determining the need for school plants, educational programme planning, school facility or building design, building construction, furnishing and equipping the school, school plant operation, utilization and maintenance and school.

University infrastructure such as school plants help improve students' performance, improves attendance, reduces dropout rate, improves student's attitude to learning as well as increase teaches retention rate (Lei, 2010). One very important objective of school plant planning that is directly related to the implementation of the educational programme is the provision of adequate and appropriately organised spaces to facilitate and support teaching and learning activities. A growing body of research has found that school facilities can have a profound impact on both teacher and student outcomes. With respect to teachers, school facilities affect teacher recruitment, retention, commitment, and effort. Also, the physical plant is so important in education that if it does not meet certain standards or if its quality or condition deteriorates, it may have some negative consequences on the teaching and learning process, as well as on the staff and students

More importantly, school facilities also affect the health, behaviour and engagement of the students, lecturers and other staff members (Biggs, 2003). Thus, adequate facilities make it easier for the school to deliver better education. Hence, planning for school facilities maintenance helps to ensure that school buildings are: clean, orderly, safe, cost-effective and instructionally supportive. Moreover, appropriate facilities maintenance extends the life span of older facilities and maximizes the useful life of newer facilities. Appropriate sanitation exercise, safe water supply, healthy air quality, good lighting, safe playgrounds, and emergency evacuation, among other issues that relate to the physical environment of schools are to be invested in as well as being properly maintained. Every lecturer knows that a safe, clean, comfortable and attractive classroom can stimulate learning and help build a classroom community.

Experts agree that curriculum development is a crucial aspect of school plant planning. It is advised therefore that considerable time be devoted to developing the curriculum of the school before actual planning or design of buildings by the architect. The

architect should not only know what subjects would be taught but should know the basic educational concepts and intended student experiences that underlie the design of the buildings. She/he should know what equipment is needed and how much space the teachers feel a student needs to pass through each type of educational experience. Planning a new school plant or modifying an existing one may be a new experience for some of the people involved in the exercise. Many decisions have to be made right from time that the idea of embarking on school plant development or modifying an existing one is conceived. In taking some of these decisions or in seeking solutions to some problems of school plant planning and design, the planning team may have to rely on some principles that have been found over time to result in successful projects.

According to Ajayi (2007), a well-planned school site with its places and spaces is likely to influence students' learning outcomes. Oluchukwu (2000) submits that school plant planning is sacrosanct to achieving stated objectives as well as students' academic performance. A neatly constructed, built mechanism to directions and salvages, effectively utilized and maintained equipment and facilities are potent factors to students' academic achievement. Oyesola (2007) affirmed that the main aim of school plants is to ensure that stated educational objectives are achieved within a time frame. By implication, this will promote the covering and achievement rate of school co-curricular activities and community yearnings. School plants are meant to help the psyche and physical safety of students while learning and relating in a serene environment. This is capable of promoting teacher-students relationship, quality and quantity instruction. Also, Ezeocha (2014) remarked that inadequate infrastructural facilities such as physical space and tools, is likely to lead to poor attitude to learning. There can never be smooth teaching-learning activities with occasion recreational conducts, group plays and large interactions in sports and games without neat, well arranged spacing and facilities.

Concept of University Building Size

University buildings are often much larger storey. They are built with the same construction methods as multi-storey office buildings. The main difference is that the space provision can be more complex with, for example, the need for large lecture theatres or laboratories with vehicle access at ground floor. The high design loads and strict control of vibrations that are required for these spaces means that the steel elements are often heavier than in office construction (Akinyemi, Momoh, Orunbon & Faduyile, 2017). University residential accommodation is also an important sector and generally consists of 6 to 12 storey blocks often with communal space at ground floor level. The design of student residences is such that bedrooms are arranged in a cluster of 5 or 6 together with a communal kitchen. The rooms are often arranged in a linear style and the acoustic separation and fire compartmentation functions are provided by the enclosed perimeter of the cluster of rooms, which includes the corridor wall and floor. This arrangement leads to the use of double corridors as shown so that independent access and means of escape is provided. Many student residences are constructed from similar sized modules that are manufactured off-site, so that they can be installed rapidly.

Concept of University Building Design

The building design project involves a small group of students working as a team to design a nominated chemical or biological manufacturing plant (Buckley, Schneider & Shang, 2004). The tasks include the study of the available processes, process selection, calculation of material and energy balances, preparation of flow sheets, design of selected plant items, an assessment of factors affecting plant safety, sustainability and environmental impact, estimation of plant cost and process economics, preparation of a design report and drawing of the plant layout (Bertauski, 2005). The design of instructional places at any level

of educational institutions, climatic factors, financial strength and level of Education should be taken into consideration (Oyedeki, 2012).

Principles Guiding University Plants Planning

A principle is a basic or widely accepted rule, norm, doctrine, or assumed truth that guides or influences thought, decisions, or actions on a matter. Some principles of school plant planning have been derived from various sources – practical experiences of practitioners, logic, theories, observations and research studies by environmental psychologists and educators. As in other disciplines and areas of human endeavour, these principles make it possible for the members of a team to channel their efforts towards the same direction. They also enable them to manage change with less effort. It is important to note, however, that principles are just guidelines to possible actions and not rules that must be obeyed under all circumstances. They are not absolutes even though they may apply predictably under normal circumstances.

Versions of Principles: There are as many sets or versions of principles of school plant development as there are authors. Some authors have formulated principles that span the whole process of school plant development from the planning stage to occupancy, maintenance and operation. Some have written only on the planning aspect while some have developed some principles that are applicable to specific educational institutions. There is, therefore, no agreement among them in regard to number or statement of principles. All the sets of principles have one purpose – to contribute to the body of knowledge on the setting up of attractive school plants having conducive learning environments and meeting the needs of the academic programmes, students, staff and members of the local community.

Most of these principles are subsumed under the set of six principles developed in 1998 by a group of stakeholders in education who were invited by the United States Department of Education to discuss ways of planning and designing schools to best meet the

needs of their students and communities. The principles were later endorsed by the American Institute of Architects, the American Association of School Administrators, the Council of Educational Facility Planners International and the Construction Managers Association of America. The principles are listed and discussed hereunder.

The Six Design Principles: According to the above-mentioned stakeholders, in order to meet the nation's needs for the 21st Century, school learning environments should: (1) enhance teaching and learning and accommodate the needs of all learners; (2) serve as a centre of the community; (3) result from a planning and design process that involves all community interests; (4) provide for health, safety, and security; (5) make effective use of available resources; and (6) be flexible and adaptable.

Principle 1: The learning environment should enhance teaching and learning and accommodate the needs of all learners. Like many of the others, this principle is based on research evidence that shows that school design can either enhance or hinder academic achievement. It is based on current research and practice that call for a departure from old rigid school designs, with all their restrictions on pupil and teacher activities, to modern ones that emphasize new education models characterized by active student participation. Modern approaches require that students move about, work in groups of various sizes and be active in class. They also recognize the use of different learning styles and the special needs of each student. Some of the learning needs of children recognized by research include indoor air quality, occupant comfort, lighting, and acoustics.

Principle 2: The learning environment should serve as a centre of the community. The rationale of this principle is that successful schools strengthen a community's sense of identity and coherence and that a school that serves as a community hub teaches its occupants about cooperation and common good. Unlike in the past when schools were seemingly isolated from the community, this principle stresses that schools of tomorrow must be

designed to be more open and serve a variety of community needs and encourage the involvement of the community members in school activities.

Principle 3: The learning environment should result from a planning and design process that involves all community interests. This principle is based on the democratic tenet which holds that people have a right to participate in making decisions that affect them and that such participation improves the outcome of the decision-making process. This implies that schools should be planned by many members of the community who will use them – educators, parents, students, and members of its civic and business organizations.

The rationale here is that community participation in the planning process creates a sense of shared purpose, increases their commitment to the school, and makes them see themselves as visionaries, creators, and owners. Such feelings and mindsets make them more willing to work together to set goals, solve problems, and provide their schools with ongoing support and financing necessary to make the schools succeed.

Principle 4: The learning environment should provide for health, safety, and security. This principle is emphasized by other writers on guidelines to school facility planning and design. In addition to the traditional concern for the safety and health of children, emphasis on this principle is buttressed by the current rise in youth violence, terrorism, crime and drug abuse, especially in the American society.

In order to ensure safety and health standards, schools should not only adhere to the building codes but should also incorporate the three concepts of natural surveillance, natural access, and territoriality in their designs. Safety and security can be enhanced by strategically locating windows, entry access and gathering places. Territoriality can be secured by using hedges and fences.

Principle 5: The learning environment should make effective use of available resources. This principle requires that schools be designed to take advantage of the fact that the physical

environment can have a positive effect on learning experience. One effective way of doing this is to make use of the available resources. To enable students understand the connection between the classroom and the workplace, for instance, schools can make use of outside resources like the community library, parks, hospitals and other public buildings for extended learning.

Principle 6: The learning environment should be flexible and adaptable. This principle is based on the fact that constant change is a fact of life. School facilities should therefore be designed to accommodate change. Changes in the needs of the community necessitate changes in the educational programme and delivery methods. Some of these changes can be accommodated by designing the school for spatial flexibility. This implies making provision for large rooms that can be used for anything or that can be easily repartitioned. The same end is accomplished by making use of flexible, open structural systems that can be reconfigured as the need arises. Flexibility and adaptability are enhanced by reviewing the master plan and educational specifications at least once every five years.

Concept of University Aesthetics

The concept of aesthetics is a philosophical study of nature and expression of beauty and taste as well as the philosophy and nature of arts with the creation and appreciation of beauty (White, Alcock, Wheeler & Depledge 2013). Aesthetics is not concerned with general experience of the everyday world, but with the rarefied moments of pleasure. As a means of analysis, aesthetics concerns the qualities that make an experience enjoyable or otherwise. Tenngart Ivarsson and Hagerhall (2008) defines aesthetics as “the area of philosophy that concerns our appreciation of things as they affect our senses, and especially as they affect them in a pleasing way”. Not all experiences will be aesthetically pleasing. Some experience will affect human being greatly by impressing, moving, inspiring, invigorating or captivating them. What actually counts as aesthetic experience and the varieties of sensory apprehension

are the core questions of philosophical aesthetics. As a branch of aesthetics, environmental aesthetics comprises natural and cultural experiences of pleasure.

The aesthetics of a building is one of the principal aspects considered in architecture and more importantly in a University (Stevens, 2014). The purpose of aesthetics is to enhance an individual's natural beauty as well as structural facilities. Hence, by appealing to people's emotions, beautiful architecture makes human beings feel better. The appeal of a building covers the combined effects of a building's shape, size, texture, colour, balance, unity, movement, emphasis, contrast, symmetry, proportion, space, alignment, pattern, decoration, culture and context. The unique properties and natural beauty of wood and other bio-based materials make them desired for various applications including construction, facades and interior design (Staats, Jahncke, Herzog & Hartig, 2016). A building should be designed in order to satisfy requirements regarding safety, serviceability, durability, but also, aesthetics, assuring proper structural performance through the entire service life. For that reason, it is essential to understand the overall deterioration mechanisms within the different levels of a building including elements, components, faces and for the entire building (Van den Berg., Koole & Van der Wulp, 2003). Beautifying traffic medians not only improves the aesthetics of the roadways, it also affects driver attitudes.

University aesthetics tends to be the most notable quality of a landscape. The success or failure of a landscape is often judged on the visual quality of the plants. Aesthetics start with the building type and the size of the designated building area (Alimi, Ehinola & Alabi, 2012). Buildings are likely to take up space, thus, to ensure the integrity of the location within the university system, the university planning teams are expected to plan accordingly and identify the amount of space for building beautification to cover. The aesthetics of university buildings is important in achieving an effective working atmosphere (Rufai, Umar, & Idris, 2013).

Safety of Students and Employees

Safety is a core value in several tertiary institutions. Physical safety refers to the protection of all stakeholders, including students, school staff, and the community, from violence, theft, and exposure to weapons and threats, in order to establish a secure learning environment (Steinberg, Allensworth & Johnson, 2011). Physical safety is essential for a safe and supportive learning environment in which students and staff can thrive. It is related to higher academic performance, fewer risky behaviours, and lower drop-out rates (Ripski & Gregory, 2009). Physical safety is important for students' feelings of connection to school and their educational experience. Students who are not fearful or worried about their safety feel more connected to their school and care more about their educational experience (Harper, 2010). Many Universities are committed to continued advancement of an institutional safety culture with strong programmes of personal safety, accident and injury prevention, wellness promotion, and compliance with applicable environmental and health and safety laws and regulations.

For instance, Universities are meant to promote occupational and personal safety, health and wellness; protect the health and safety of University faculty, staff and students; provide information to faculty, staff, and students about health and safety hazards; identify and correct health and safety hazards and encourage faculty, staff, and students to report potential hazards; conduct activities in a manner protective of the environment, inform the University community regarding environmental impacts associated with institutional operations; and maintain a risk-based emergency management program to reduce the impact of emergency events to University community (Osher & Kendziora, 2010). In summary, Universities' programmes are expected to provide a safe workplace for faculty, staff and students includes: facility design; hazard identification, workplace inspection and corrective action; shut-down of dangerous activities; medical surveillance; and emergency preparedness.

In addition to this general institutional health and safety policy, additional hazard specific policies and requirements are required to be applied to different work and learning environments. Providing a safe learning environment is of paramount importance to education providers. Deploying adequate solutions to ensure the safety of students and staff and maintaining the security of the school buildings when not in use must be key considerations in security planning (Neild, Furstenberg & Stoner-Eby, 2002). Many University safety policy states that faculty and staff are responsible for using required safety equipments, following safe work practices as well as the safety of other employees and students under their supervision (Osher & Kendziora, 2010). For students to learn, they need to feel safe. It is essential that all students have the opportunity to attend schools that provide a safe environment where they can thrive and fully engage in their studies without the distraction and worry about physical safety concerns. Students who feel safe are more likely to stay in school and achieve academically.

University has the primary duty to ensure buildings without risk to the health and safety of any person. Nearly all university members such as employees, students and visitors are users of buildings within the campus. Thus, all are charged with responsibilities of adequate use and are required to follow appropriate procedures to ensure that all buildings are safe, appropriately used, correctly maintained during its life-cycle (Austin, 2002). Adequately plant planning is capable of promoting safety and satisfaction within the university system. Beautifying road ways can have the dual effect of increasing driver satisfaction with the roadside landscape and creating a natural norm. Drivers are less likely to accidentally drive over a norm if there is a landscaped area between oncoming lanes of traffic. Studies show that drivers are more at ease on roadways with natural landscaping, and are much more inclined to think positively about the community that they are driving through if the roadways are beautiful (Alimi, Ehinola & Alabi, 2012). Furthermore, adding trees to roadways creates

a sort of natural obstruction which could reduce the likelihood of cars crossing into oncoming traffic lanes. This improves driver safety and makes the community a safer place for everyone to live in. Landscaped areas between oncoming lanes of traffic could decrease the number of accidents occurring due to drivers crossing the median and make the road a safer place.

Concept of University Effectiveness

University effectiveness is the degree to which programmes, events, or activities achieve their intended purposes. In education, effectiveness has been used to describe the performance or productivity of an educational process. It is a slippery concept like Quality Control. Effectiveness indicates how well the curriculum, programme, and even the university, achieves their purposes. It is the extent of success or achievement in implementing what was intended. Furthermore, a pervasive focus on instruction and learning is also central to school effectiveness, according to this research. Effective schools focus on academics by ensuring high curriculum coverage that offers rich learning opportunities for students, and they maximize learning time at both the school and classroom levels. University Effectiveness signifies processes that an institution uses to know how well it is accomplishing its mission and how it engages in continuous development. Similarly, Jennifer (2010) opined that Institutional effectiveness is when achievements and outcomes indicate how well the College's mission is being fulfilled. In many organizations, institutional effectiveness is somewhat difficult to track down by the administrators. However, it is better viewed through the eyes of outcomes assessment -- an approach for measuring academic success, student support success, and administrative unit success.

University effectiveness involves gathering information that enable an evaluator to measure the extent to which students achieve the outcome of their academic activities as already stipulated by the school's authorities. The institutional effectiveness process is

complete only when the results obtained from such measurements are used to make changes in the school's curricula and operations. For this reason, institutional effectiveness has been viewed as the systematic and ongoing process of collecting, analyzing and acting on data and information relating to the goals and outcomes developed to support the university's mission and purpose. Thus, university effectiveness is oriented towards measuring results and using those results to aid decision making to improve the performance of the university. Giving credence to this, Harry and Hall (2010) asserted that University effectiveness involves not only the assessment of learning outcomes but also objectives, collaborations, purposeful reviews, and engagement of constituent stakeholders. It is an important part of any healthy organization. It generates data which inform strategic plans for programme development and improvement.

Moreover, university effectiveness has been viewed as a cyclical process in which continuous improvements and refinements on goals and methods are undertaken on a continual basis. It is an ever-changing and evolving process. Thus, it needs to be revisited continuously to ensure that the needs, purpose, and mission of the University are being met. Therefore, university effectiveness is integral to the maintenance and development of high quality academic and service programs. The term 'university effectiveness' as it applies to higher education, is a holistic concept that covers, collectively, the effectiveness of the academic staff, non-academic staff (administrative staff), and hence the university as a single entity. It has been described as the result of operational processes, policies, duties and sites, and their success in working together to support the management of an academy (Allen, 2008).

While describing university effectiveness, Nichols and Nichols, (2010) pointed out that university effectiveness is characterized by the following:

- Describing expected results through construction of educational (student learning) outcomes and administrative objectives/outcomes
- Selecting the means of assessment that will best determine the accomplishment of those outcomes and objectives identified
- Actually conducting the assessment and recording of the data (results) of that assessment
- Describing how the data collected from the assessment activities were used to improve student learning and AES (administrative and educational support) services

Thus, university effectiveness involves students' academic performance, research and community services and using the result obtained to make necessary improvement (NUC, 2006). The exercise of evaluating university effectiveness is a robust one that requires setting up an University Effectiveness Committee (IEC), with rotating faculty, staff and student membership, appointed by the central school authority. The charges of such committee are to develop, review and recommend policies and procedures for institutional effectiveness. On a periodic basis, the committee reviews the university's policies and procedures to determine what revisions, additions, and clarifications are needed.

The concept of university effectiveness is better understood when it is defined to determine its boundaries from other educational terminologies such as efficiency, quality assurance and strategic planning. According to Jennifer (2010), another name for effectiveness is outcome assessment. While the former evaluates the output of an institution vis- a- vis her vision and mandate, the latter evaluates the output of an institution vis- a- vis the input made involved. University effectiveness is not concerned with the amount of resources supplied for running an institution. It only seeks to determine the performance of a system along the corridors of the mandate of the system and irrespective of whether or not; the necessary inputs needed to achieve such mandate are available. Additionally, the concept

of effectiveness in university education is not tantamount to quality control/assurance in that the former is an internal affair which a university uses to appraise itself without being subjected to external scrutiny as in the case of quality assurance.

Moreover, while effectiveness and strategic planning have a common inclination on the mission of the institution, the latter is distinct from the former. Strategic planning focuses on the actions that are taken to implement the Institutional Mission, while university effectiveness planning focuses on the end result to determine how well the University Mission is being fulfilled. Strategic planning is means/process oriented, meaning it focuses on actions to improve processes or make a unit operate more efficiently. It will be recalled that the NUC was set up partly to establish and monitor quality and standard in Nigeria universities. It was however noted that the 223 Impact of NUC Accreditation Exercise on University Administrative Structure accreditation of the university programmes and subsequent standardization nation-wide by the NUC remain substantively superficial especially in the absence of a mechanism to ascertain or ensure that the prescribed programmes are implemented by competent qualified personnel both in the administrative and academic sectors of the university according to laid down criteria. It is also believed that the process of accreditation is undertaken in order to evaluate an institution or programme against some (usually not clearly articulated) minimally acceptable standards which protect the institutions themselves, their students and the public. University effectiveness planning is outcomes oriented, meaning it focuses on measuring how well students are learning in the programmes and measuring how well administrative units are operating (Jennifer, 2010)

Other Parameters for measuring the University Effectiveness

According to Pruvot, Claeys-Kulik and Estermann (2015) publications in journals and participation in conferences do not totally reflect the quality of university effectiveness and overall performance. Though could be reflect the quality of research, but not education, the

parameter for measuring effectiveness of University could be assessed from the following satisfaction of students, employability of graduates in terms of jobs, salary, unemployment duration and job search duration. Also, University effectiveness could also be measured in terms of competition at enrollment stage (i.e., the ratio of the number of applications to the number of available places). The role of University effectiveness cannot be quantified. Various parameters are barometers to assess university effectiveness. University effectiveness can be measured through research publications size, collaboration with outside professional bodies, government agencies, world parastatals like The United Nations Educational Scientific and Cultural Organization (UNESCO), World Bank, and Organization of Economic Co-operation and Development (OECD), leaders and experts in various field of endeavour.

Reichert, (2009) remarked that there about 150 performance indicators to assess the educational activities including inputs, processes, products, outputs and outcomes of enrollment, teaching, learning, assessment methods, academic and non-academic staff, graduates and research among others. Salerno, (2011) researched into key areas to marshal if University effectiveness needs to be measured. The 5 broad sets comprise of Teacher-Learning Resources (since they are pointers to facilitation of the teaching learning process), Research and Extension Activities (This includes publications, citations, extra-mural funding, patents and technology transfers, etc.), Graduation Outcomes, Outreach and Inclusivity and finally, Perception of Pears and Employers (UK Universities, 2011). However, there following parameters may not be directly measured. There has been lots of discussion on the debate as it is difficult to converge on an objectively measurable set of parameters to measure Universities effectiveness in Nigeria and even beyond.

Melo, Sarrico and Radnor (2010) submits that employability and productivity of graduates are the ultimate measures of quality in higher education. If graduates are

employable and productive, it means that they are well-educated and possess the right skills needed by the labour market. These attributes can only be acquired in a quality university education. It is however advised that employability and productivity should include interpersonal skills, values, sustainability competences which many higher education institution struggle to address in their programmes. In his own view, the quality in higher education is a complex concept and has an overlap with other concepts such as efficiency and effectiveness.

Kayode, Nurahimah and Arsaythamby(2014) posits that goal and strategic constituency approach as key way towards examining the effectiveness of University education in Nigeria most especially in this era of globalization and economic crisis where all members of the society are looking up to the University system for solution.

Kupriyanova, Estermann and Sabic (2018) asserts that some indicators can be used directly or indirectly (proxy) to measure the quality of higher education effectiveness. The employment of graduates, the absorption of financial resources from industry and other sectors of society, the number of foreign students recruited from reputable universities, the amount of international scientific communications, the number of patents, the extent of higher education impacts on the society and culture and policy-making, student's satisfaction of various aspects of university life, liveliness and dynamics of learning environments (Kindsiko, 2014).

Of a fact, some of these indicators are context-based and there is not enough data in a comparable way (Allen, 2015). Apart from research some quality indicators could be delivery of curriculum in terms of logistics, innovation, and completeness. Quality of faculty with respect to content expertise, interpersonal dealings, delivery of explicit curriculum and value-addition is another important indicator. Students experience during and after University is an important source of information as it covers quality of most processes that form the core

functions of a University such as admission protocols, delivery of curriculum, suitability for employment, infrastructure and learning resources. However, depending on one stakeholder would be limiting and a mistake in research (Türk, 2008).

Empirical Studies on University Plant Planning

Adetule, Oluwakemi and Ayodele, Omowumi Victoria (2019) school plant planning as a determinant of teachers' productivity in secondary schools in Ondo state, Nigeria. The study investigated school plant planning as a determinant of teachers' productivity in secondary schools in Ondo State. Descriptive research design of the survey type was adopted. The population for the study comprised all secondary schools teachers in Ondo state, Nigeria. The sample for the study consisted of 120 teachers selected from secondary schools in Ondo State. Simple random sampling technique was used to select 20 secondary schools from Ondo west Local Government Areas. 6 teachers were selected from each of the schools using simple random sampling technique. The instrument used for the study was a questionnaire designed by the researchers to sort for school plant planning and teachers productivity. Validity of the instrument was ascertained through face and content validity. Test re-test method of reliability was obtained for the instrument. Reliability co-efficient of 0.85 was obtained. The data collected were analysed using percentage, mean and standard deviation. Findings from the study established that there are no adequate facilities available to facilitate teaching and learning processes in schools. Recommendations were made based on the findings that the government should assist the schools by making provision of adequate school plant planning. The NGOs as well as the interest members of the community should also ensure to meet the needs of the schools by donating school facilities that are good and qualitative.

Azever (2019) carried out a study on school plant and students' academic performance in Makurdi education zone of Benue State with emphasis on the influence of

recreational facilities on students' academic performance. One research question and one hypothesis guided the study. Descriptive survey design was adopted for the study. From the population of 1,191 secondary school teachers, 298 teachers were sampled from 24 schools using simple random sampling technique. School Plant and Students' Academic Performance Questionnaire (SPSAPQ). The data collected were analyzed using the mean and standard deviation to answer the research questions and chi-square to test the hypotheses at 05 level of significance. Findings from the study revealed that recreational facilities have significant influence on students' academic performance in Makurdi Education Zone of Benue State. It was therefore, recommended that recreational facilities should be provided and be maintained to enhance effective teaching and learning process in secondary schools.

Okoaloga (2018) studied school plant provision on students' academic performance in Federal Unity Colleges in the North-central States of Nigeria. The study adopted descriptive survey design and guided by six research questions and six hypotheses. The population of the study comprised two thousand seven hundred and seventy four (2774) from twenty four (24) Federal Unity Colleges in six states and the Federal Capital Territory (FCT) Abuja in North central States of Nigeria. The sample size was 350 teachers from Federal Unity Colleges. The instruments used for data collection were the structured 30-item four point rating scale type questionnaire and Checklist. The raw data from Checklist were analyzed using percentages where bar charts were used for mode of differences. Quantitative data were analyzed using the descriptive statistics of mean scores ($\bar{x}$) and standard deviations to answer the research questions. The results revealed that provision of classrooms, school libraries, school laboratories, school workshops, school playgrounds and school furniture have significant influence on students' academic performance in secondary schools. The study recommends that classrooms should be spacious and well-ventilated to serve the teachers and the students and by that teachers will be retained, government efforts and non-governmental organizations

should not relent in making provision for school libraries for they are the centre of learning and information to both teachers and students, Nigerian government should endeavour to provide adequate funds for provision and maintenance of school laboratories for effective teaching and learning among others.

Ekpoh (2019) carried out a study on school plant maintenance culture and utilization. It is generally acknowledged that school plant is a critical input that aids in the attainment of school goals. As a plant is put into use daily, the need for maintenance becomes imperative to sustain its continuous usage. However, it is evident in literature that there is lack of plant maintenance culture in the Nigerian school system. The author perused the need for school plant, its maintenance culture and utilization. Basic principles and approaches to plant maintenance were highlighted. Different types of plant maintenance and the role of school personnel in enhancing plant maintenance culture were discussed. The various challenges inhibiting maintenance culture in the school system were identified and explained. Finally, suggestions for instituting a positive maintenance culture were given.

Yakubu (2017) did a study on space for convenience planning and academic performance of secondary school students in Oyo State, Nigeria. The study adopted the descriptive survey research design of the ex-post facto type and made use of a sample of 1,440 selected through a multi-stage sampling procedure. The two validated instruments used for data collection were space for convenience planning scale ($r=0.81$) and student academic performance scale ($r=0.70$). Three hypotheses were tested at 0.05 level of significance. Data collected were analysed using Pearson Product Moment Correlation (PPMC) and Multiple Regression analysis. Two, out of the three independent variables, had significant relationship with the academic performance of students. These were toilet facility ($r = 0.336$; $P < 0.05$) and water facility ($r = 0.262$; $P < 0.05$). Also, the independent variables (i.e. the three spaces for convenience planning elements) accounted for 13.9% of the variance in the dependent

variable and the joint effect of space for convenience planning is significant on the academic performance of students ($F=78.597$; $df= (1,439)$; $P<0.05$). The study concluded that toilet and water facilities have been adjudged to have contributed immensely to the academic performance of students. Thus, based on the findings, some of the recommendations made include provision of adequate toilet and water facilities.

Yakubu and Sowunmi (2017) assessed school plant planning, a prerequisite for the attainment of educational goals and objectives. The author examined conceptual clarification of school plant planning, shows the need for school plant planning in an ideal school system, observes school plant planning process, considers challenges of school plant planning in Nigeria and concludes that the realisation of educational goals and objectives, no doubt, depends on the extent to which government and administrators of schools are able to give school plant planning adequate attention needed. The study recommended that considerable time be devoted in planning school plant for both intended and existing schools in order to achieve the educational goals and objectives.

Nweneka (2016) carried out a study on assessment of availability and maintenance of school plant in secondary schools in Zaria Education Zone, Kaduna State, Nigeria. Anomalies in the quality and adequacy of school plant facilities in most secondary schools in Zaria Education Zone have been observed. This is to include lack of teaching facilities, inadequate learning facilities, lack of games and recreational facilities, lack of welfare facilities, etc. The inadequacies of these facilities are believed to have effect not only on teaching and learning process but also students' performance. The study adopted the descriptive survey design. The population comprised 1436 Teachers, 46 Principals and 35 Staff of Ministry of Education in Zaria Education Zone. A sample size of 380 respondents, which represents 25% of the population was used to administer a self designed 80-item questionnaire. The instrument was validated through a pilot study that involved the

administration of Thirty Eight (38) copies of questionnaire on the respondents which were all teachers from four secondary schools and reliability coefficient computed at 0.729. Findings revealed that school facilities in the secondary schools in Zaria Education Zone are generally bad. The findings revealed that school plant facilities were provided and maintained. Conclusions drawn include that school plant facilities should be regularly provided and maintained to enhance effective teaching and learning process. The study recommends that teaching, learning, game, recreational and welfare facilities are needed for effective teaching and learning process to take place. Consequently, government should provide these facilities and the funds for maintenance while principals should maintain the school plant facilities provided.

Megbo and Saka (2015) investigated the role of academic planning unit in sustainability of University education. The study assessed the concept of planning, functions of the academic planning unit of the university and the importance of academic planning to university sustainability in Nigeria. It also examined the key roles played by the academic planning unit considered as the fulcrum of university sustainability. The author also provides possible solutions to intricate problems encountered during the planning process and implementation, since the major function of the Unit is to ensure that university realizes its aims and objectives. It would be wrong for any university not to have the academic planning unit as the unit is central to the university, especially in planning for what opportunity to seize and which to reject when situations arise.

Odufowokan (2011) carried out a study on school plant planning as correlate of students' academic performance in south west Nigeria secondary schools using descriptive survey research design. The sample consists of 1650 respondents comprising 150 school principals and 1500 students. Multi-stage, stratified and simple random sampling techniques were used to select the sample. Data collected were analyzed using frequency counts,

percentages, means and Pearson product moment correlation. Five null hypotheses were tested, the study revealed that the levels of school plant planning and students' academic performance were relatively close, and as such students' academic performance was significantly related to instructional space planning, Administrative space planning, circulation space planning, planning for accessories and space for convenience planning. Based on the findings, it was recommended that authorities concerned should implement architectural designs of buildings and spaces for education to ensure students' academic performance.

Briggs, Ubulom and Long John (2018) studied school plant and academic performance of secondary schools students in Tai/Elemo local government area of Rivers State. This study investigated school plant and academic performance of secondary school students' in Tai/Elemo local government areas of Rivers State. Four research question and four null hypotheses were formulated to guide the study. A sample size of 416 SS II students were drawn from 6 selected public secondary schools in Tai/Elemo local government areas of Rivers State for the study. A correlational design was used in this research. A developed checklist of school plant and academic performance of secondary school students' was the instrument used for collecting relevant data needed for the study. The data was analyzed using mean rating and standard deviation for the research questions while Pearson product moment correlation was used to analyzed the hypothesis at 0.05 alpha levels of significance. The results of the analysis showed that a significant relationship exist between school plant and academic performance of secondary school students'. Upon these findings a conclusion was reached that school plant are basic necessities in educational system and their provision improves teachers teaching skill and students' academic performance.

Singh and Kumar (2017) carried out a diagnostic study on the Impact of Institution's Infrastructural Facilities on Academic Attainments and Placements of Management

Graduates. The aim is to assess the impact of infrastructural facilities on the academic attainments and placements of management graduates of selected B-Schools of Bangalore metropolis. Findings of the number of research studies carried out by the Indian and foreign scholars about the impact of infrastructural facilities available in an institution on the academic attainments on its students present a mixed bag. While AICTE places added emphasis on availability of necessary physical infrastructural facilities in technical education institutions including the B Schools for effective delivery of teaching-learning processes, it is ample evident that due to certain obvious reasons, many B-Schools seriously lack even the bare minimum physical infrastructural facilities thus adversely impacting the educational attainments and subsequently the placements of their students. An analysis of the primary and secondary research data captured reveals that there is a positive correlation between these variables and thus the findings strongly supports the necessity of having all the prescribed physical infrastructural facilities on the campuses of the B-Schools in place for more effective and efficient delivery of knowledge, which is a pre-requisite in our knowledge-based economy.

Udosen (2015) researched into stakeholders' perceptions on the provision and maintenance of school plant in secondary schools in Kaduna metropolis, Nigeria. Ten research questions and ten null hypotheses were formulated to guide the study. Scholarly works of various scholars on provision and maintenance of physical facilities, infrastructural facilities, instructional facilities, welfare facilities and sports and recreational facilities were presented using description of data, frequency tables and simple percentages. The testing of the hypotheses was done using the analysis of variance (ANOVA) test. The results showed that school plants were inadequately provided and where they were provided they were not maintained. Some of the recommendations are that School administrators and government urgently need to upgrade school plants to meet up with modern demands of secondary school

education. Digital facilities should be provided in schools and regular school inspection and good maintenance programme are recommended to protect the existing school plant.

Agoha (2008) carried out a study to investigate the administrative strategies for school plant maintenance in Okigwe Education Zone. A descriptive survey with four research questions and two hypotheses were formulated. The population of the study consists of 149 principals which were made up of 75 Senior Secondary Principals and 74 Junior Secondary Principals. The research questions were answered using mean and standard deviation while t-test was used to test the hypotheses at 0.05 level of significance. The result of the analysis led to the following findings; The ways school facilities and equipment are maintained by principals in Okigwe Education Zone are; applying to the Parents Teachers Association and philanthropists for major repairs and replacement of school plant; adopting any suitable maintenance strategy, carrying out major and minor repairs using internally generated fund, encouraging teachers and students to treat school plant with respect. Also, it is discovered that the maintenance options adopted by principals in Okigwe Education Zone are; emergency maintenance, remedial maintenance, no-maintenance at all, Adhoc maintenance and preventive maintenance. It is also discovered that Inadequate, poor quality of facilities and equipment, lack of qualified maintenance personnel, extreme environmental conditions, lack of knowledge and interest of staff on school plant maintenance and negligence of administrative roles by the principals due to sheer apathy are the factors that militate against school plant maintenance in secondary schools in Okigwe Education Zone. It is also found that the effective strategies for school plant maintenance in secondary schools in Okigwe Education Zone are; students should pay for any equipment they damage in school, schools should have maintenance and store officers who are in-charge of school plant, equipment fee should be set aside for maintenance of school plant, repair inventory book and maintenance workshop should be instituted in schools, teachers should repair any school plant entrusted in

their care, Secondary Education Management Board should visit schools to inspect the condition of school plant while the Imo State Ministry of Education should be responsible for maintenance of school plant

An assessment of provision and maintenance of school plant in colleges of education in North-west geo-political zone, Nigeria within the year 2010 and 2014 was carried out. The study investigated on the Provision and Maintenance of Facilities, with particular reference to: Infrastructural facilities; Teaching facilities; Learning facilities; Welfare facilities; Recreation and Games facilities. 10 research questions were raised and ten (10) null hypotheses were formulated for the study. Descriptive survey design was adopted and used to cover all the seven states that constituted North-West Geo-Political Zone. A total population of 4,811 made of 72 management staff, 4,475 teaching staff, 120 senior non-teaching staff, union leaders and 144 students' representative were for the study. A sample of 24 management staff, 267 teaching staff, 36 senior non-teaching staff union leaders and 48 students' representatives was arrived at, using Roscoe making the total sample size to 375.

Sulaiman (2000) examined urban design method-theory and practice a case study in Malaysia. The primary concern is the design of exterior spaces with the assumption that the poor urban spaces found in Malaysian urban areas is due to the weaknesses in the design method adopted by designers. these objectives:- (1) To identify the reasons why the design of urban spaces is neglected by architects that produce poor continuity in the design of urban spaces, (2) To examine the process adopted and the information used by architects in the design of urban ensemble and (3) To investigate the ways in which the architects responded to the needs of the user and the public. The techniques used for data collection include literature review, discussions with experts, content analysis, author's experience in practice, recognisance, observation, survey and in-depth interview. The information gathered was analysed qualitatively and quantitatively. The weaknesses of the design process and limited

use of important information were due to: (1) poor recognition of urban design, (2) limited time allocated, (3) economic pressure, (4) quick commissioning of the project and (5) professionalism. There was also insufficient public involvement in the design process due to poor public awareness, client's attitude, financial constraints, professionalism and the attitudes of the designer. As such design was mostly related to marketing strategy. The main theory adopted in the organisation of the exterior spaces is mostly related to circulation (line) and centres (dots). At the same time, the traditional urban spaces and forms were influential element used in design. The recommendations that follow were geared towards improving the design methods adopted by architects in producing better design of urban spaces.

Succinctly, Elements of the school environment such as class size, staff-student interaction, teacher quality, air, water, and materials around a school including temperature, ventilation noise, light etc., have been found to have an input on students' educational outcome. A student's academic achievement is usually rated using a number of parameters. Oluwakemi (2008), identified eight rating parameters for evaluating students' academic performance namely inventories, punctuality, class work, assignments, dressing, practical, attendance and participation in class. Distinctions and Credits are often regarded as good grades while Passes and Fail are regarded as poor grades. The assessment of students' learning outcome is expected to be carried out in its totality that is, assessing the students in all activities in the cognitive, affective and psycho motor domains. Osunde (2008) posited that the cognitive outcome deals with the acquisition of knowledge. Acquisition of knowledge is demonstrated at six levels which include knowledge, comprehension, application, analysis, synthesis and evaluation. The writer further said the major instrument for assessing behaviour in the cognitive domain is the class tests/examinations.

It has however been observed that many undergraduate students in Nigeria's higher education institutions are not doing well in this domain of learning, and this is connected

with the nature of the environment in which staff and students find themselves. Poor lighting, noise, high levels of carbon dioxide in classrooms, and inconsistent temperatures within a school make teaching and learning difficult. These factors can adversely affect student behaviour and lead to higher levels of frustration among teachers and poor learning attitude among student. As a result, students' perform poorly when they are tested in examinations. This is a pointer to the fact that all is not well with students' attainment in the cognitive domain. Beyond the direct effects that poor facilities have on students' ability to learn, the combination of poor facilities, which create an uncomfortable and uninviting workplace for teachers, combined with frustrating behaviour by students including poor concentration and hyperactivity, lethargy, or apathy, creates a stressful set of working conditions for teachers.

Because stress and job dissatisfaction are common pre-cursors to lowered teacher enthusiasm, it is possible that the aforementioned characteristics of a school can have an effect upon the academic performance of students. These factors constitute a student's neighbourhood, and their impact on students' learning exists. A positive neighbourhood enhances learning as students are psychologically tuned to study. For this reason, significant numbers of Nigerians studying in Western countries often accomplish a high academic performance. Concerning the influence of the neighbourhood on learning outcomes, Dupere, Leventhal, Crosnoe, & Dion (2010) examined the influence of a child's neighbourhood context and found that for children in less economically-advantaged neighbourhoods, there was a strong link between the presence of educated and affluent professionals in the neighbourhood and academic achievement.

Staff-student interaction is another aspect of school environment that has an impact on educational outcome. It is an avenue through which educational information is exchanged and knowledge is acquired. For this reason, a high level of staff-student interaction implies that students are free to relate with their teachers, seek clarification on course contents that

are ambiguous, etc. This leads to more knowledge gained and may eventually reflect as high academic performance. Giving credence to this, Powell, Diamond, Burchinal, & Koehler (2010) explained that teacher-reported closeness with children whose parents reported less progressive parenting practices (characterized by teaching conformity to rules, respect for adults and limited focus on encouraging curiosity) resulted in positive gains in reading scores over time. Hence, Ajao (2001) opined that the quality of education does not only depend on the teachers as reflected in the performance of their duties, but also in the effective coordination of the school environment.

Empirical Studies on University Effectiveness

Ibara (2018) carried out a study on effective administration of universities in south-south states of Nigeria within the context of facility issues and challenges. A correlational research design was utilized in the study. Four research questions, three null hypotheses were formulated and tested at 0.05 level of significance while a validated questionnaire with reliability index 0.85, was administered on 1200 sample of university administrators purposively drawn across the six states of Rivers, Bayelsa, Akwa Ibom, Cross Rivers, Edo and Delta, making up the South-South geo-political zone of Nigeria. The findings indicated that students' accommodation, library facilities and instructional resources posed major challenges to administrative effectiveness of universities in the geopolitical zone. A further analysis indicated that the extent of relationship of these facilities with administrative effectiveness of universities varied. While the relationship between student accommodation and administrative effectiveness of universities was not significant that of instructional resources and library facilities tested significant at 0.05 level of significance. The study concluded that improved infrastructural resources in the areas of library facilities and instructional resources could facilitate the administrative effectiveness of universities. It recommended among others that university management should explore private sector

partnership initiatives to enhance the infrastructural base of universities in South-South Nigeria.

Atanda and Adeniran (2017) researched into towards the effective management of private university education in Nigeria. The birth, historical development, development of private university education, distribution of private universities, by geopolitical zone, ownership and location of private universities in Nigeria, 14 steps/processes in licensing of private universities, benefits accruable from a good university education management, reasons for the establishment, challenges confronting and solutions to the challenges and future of private universities in Nigeria. The study concluded that there is need for government collaboration with private universities in terms of tertiary education trust fund grant-in so as to enhance and promote effective performance of the private universities in Nigeria.

Etuk (nd) studied innovations in Nigerian Universities, assessing it from an insider perspective, a “Fourth Generation” University. The article explained innovations in universities in Nigeria, using a somewhat young university as a paradigm. The innovations discussed include private ownership of universities, innovative funding strategies and innovative quality assurance practices. These include innovative planning (strategic planning); innovative programme contents; innovations in human and material resources development; innovative admission procedures; innovative carrying-capacity regulations; and innovative programme appraisal procedures and standards. It is concluded that maintaining innovation augurs well by improving programme standards and quality of products.

Oladipo and Oladejo (2016) researched into students’ e-management variables and university administration effectiveness in Nigeria, policy orientations. It adopted a descriptive research design. Three null hypotheses were postulated and tested at the .05 level of significance. The population for the study comprised all 27,826 full time undergraduate

students out of which 1600 participants were selected through stratified random technique. A self-designed validated and reliable ($r = .87$) questionnaire was used for data collection. Findings from the study revealed a weak, positive and significant relationship between university administration effectiveness and automated admission ($r = .171$; $p < .05$). There is also strong, positive and significant relationship between university administration effectiveness and on-line course registration ($r = .891$; $p < .05$). Finally, strong, positive and significant relationship is also discovered between university administration effectiveness and computerised hostel allocation ($r = 0.721$; $p < .05$). Premised on the study findings, the article recommends among other things that the university authority should ensure that websites are being updated regularly, and are more user-friendly. Also, the university should re-consider the installation of free Wi-Fi on campus to enable better internet connectivity for students and staff.

Oseni (2015) carried out study on the effectiveness and desirability of private higher education in Nigeria. The influx of the establishment of private higher educational institutions in Nigeria since the inception of the present democratic dispensation in 1999 is unprecedented. Their effectiveness compared to public institutions is the focus of this paper. Content analysis method was used in this study and the focus was on private universities. Most of these private institutions were established purely for business motives as costs are beyond many Nigerians. The shortcomings in respect of dearth of qualified personnel and infrastructural facilities are more pronounced in these institutions. The unusual interferences of proprietors were common in academic affairs and academic freedom is non-existent. The fear of the public in respect of acceptability and performance of the outputs to the challenges of graduate unemployment is being allayed by the outstanding performances of some of these graduates in open competitive labour markets. The regulatory and supervisory organs for universities should properly monitor these institutions in order not to turn them to either

glorified secondary schools or intellectual prison yards. These private institutions should concentrate on courses that can address the challenges of the time as the liberalization of higher education will go a long way to ameliorate the social welfare of the citizens like what is being witnessed in the telecommunication industry.

Audu, Umar, and Idris (2013) studied facilities provision and maintenance as a necessity for effective teaching and learning in technical vocational education. The author explained the concept of technical vocational education and discussed extensively on issues on facilities in educational institutions in Nigeria. The study concludes that government and all the stakeholders in the society should be encouraged in the funding of technical vocational education institutions for smooth running of vocational institutions in terms of provision of infrastructural and workshop facilities such as tools, equipment and machines so that technical vocational education graduates will acquire skills, knowledge and attitude for gainful employment to contribute to the socio-economic development of the nation

Ekundayo and Ajayi (2009) carried out a study on effective management of university education in Nigeria. Higher education plays a crucial role in the supply of high level manpower for the socio-political and economic development of a nation. To this end, the effective management of this educational sector becomes necessary. This paper examines the myriads of problems militating against the effective management of the Nigeria university education system. These include: financial crisis, poor infrastructure, brain-drain, erosion of university autonomy, graduate unemployment, volatile and militant students' unionism, secret cults, examination malpractices and sexual harassment. Therefore, it is recommended that government should re-address the issue of funding of university, review upward the pay-package of academics, grant the university autonomy and make plans and projections on the nation's manpower needs in a bid to integrate this into the university programmes.

University effectiveness (from students' learning outcome) can therefore be improved if the environment surrounding a school is favourable. This will occur when a school environment becomes a place where students can feel safe, physically and emotionally. Such an environment must be a supportive community where students and teachers of all backgrounds can focus on learning. To create a climate of safety, halls and classrooms must be free of behaviour like fighting, bullying and harassment (Larry, 2013). In furtherance of this, Bly (2007), asserted that in order to protect the safety of our schools, educators need to create a healthy, nurturing and normal school environment, where students feel connected, safe, valued, and responsible for their behaviour and learning, while at the same time, are provided sufficient security. Uline and Tschannen-Moran (2005) stipulated that one unexamined link between school facilities and student achievement was school climate. School climate had an impact on the learning environment (Uline & Tschannen-Moran, 2005). It is possible that dilapidated, crowded, or uncomfortable school buildings lead to low morale and reduced effort even to less positive forms of school leadership. It may be that these dynamics are responsible for the drop in achievement when school facilities are inadequate. The United States Department of Education (2000) found that the environmental conditions in schools, which included the inoperative heating system, inadequate ventilation, and poor lighting, affected the health and learning as well as the morale of students and the staff. Physical surroundings and conditions impacted job satisfaction (Keller, 2003). When addressing teacher morale and job satisfaction, the work environment played an important role. Teacher morale, job satisfaction, and the work environment could not be separated (Keller, 2003). In addition, the study of O'Neill (2000) had indicated that teacher satisfaction with physical working conditions was positively correlated with student academic performance.

Working conditions improved teacher job satisfaction and directly impacted school effectiveness (O'Neill, 2000). According to Randall, Fedor and Longenecker (1990), teacher job satisfaction was a multifaceted construct that was critical to school effectiveness, teacher retention as well as teacher commitment. According to Ma and MacMillan (1999), professional teaching competency, administration control, and organizational culture were work place conditions that affected our school facilities and had an impact on students' learning and academic performance. Research productivity is one of the pivotal points on which university education rests (Bassey, Akuegu & Udey, 2007). It is the second member in the three cardinal responsibility of university education-teaching, research and community service. Research output from a university speaks volumes about the effectiveness of that university. This is because statements about academic research are often included in a university's vision/mission statement.

There seems to be a link between the academic environment within a school and the level of research output being turned out. This is because web metric results have shown that more research works are being produced from tertiary institutions abroad, where the academic environment is more conducive. The serenity of the academic environment, good ventilation system and school climate etc., in many tertiary institutions abroad, place academic staff and students in a good pedestal for logical thinking and creativity which are necessary to produce research works. Little wonder, many Nigerian academic staff desires to visit the diaspora where they can harness the opportunities afforded by the school environment there to receive more training and skills along their fields of specialization.

It could be realized that a well-organized school environment makes it easier for effective study to take place in the class room which will in turn increase the level of discoveries and hence, research output. As opined by Price Water House Coopers (PWHC) (2010), what happens in the classroom affects the success of the education system the most.

A suitable academic environment improves academic staff capability to successfully mentor and guide students in their research studies. Where the class size is small for instance, lecturers would be allotted few research students to mentor. This way, they become more effective in guiding their students throughout their research studies. As submitted by the University Of Cambridge Generic Report (2010), mentoring and guiding students in their research activities would involve investigating new areas of research within specialist subject areas, identifying research topics, determining appropriate research methodologies for research, adapting research methodologies, analyzing results to formulate new concepts and ideas and writing reports to relevant bodies about the progress of research. Enabling environmental factors would assist significantly in achieving these objectives.

Moreover, for an academic institution to be effective in research production, it will require that academic staff members are subjected to special training to build their skills so they will be able to turn out more research works in relatively shorter time. Olaniyan (2008) stated that education and training improve skills of workers and their levels of productivity. The possibility to institute such trainings and the success they would produce is largely affected by the social, cultural, and political tempo of the environment. For this reason, some universities in Nigeria have attracted less intervention projects from international agencies owing to the insecurity perceived as thriving within the school environment. For instance, some research studies that would have captured some northern communities like Maiduguri have been avoided due to the state of insecurity in the region. Where cultural and religious practices operating around a school are averse to innovation, it becomes more difficult for such a school to be effective in terms of research output.

According to Kalu (2011), one of the remarkable tailored training for higher education academic staff is the one sponsored by The Petroleum Technology Development Fund (PTDF). In consideration of the immediate problem of the effect of teaching and

research on the learning capabilities of students, the PTDF recently introduced the University Lecturer's Skills Enhancement Programme to add value to the teaching and learning of oil and gas-related courses in PTDF-upgraded departments in selected universities across the country. The programme was introduced for lecturers in training positions in these upgraded departments, to enrich and improve their practice of teaching and research in core oil and gas-related disciplines. Participating lecturers are exposed to modern techniques of teaching, research, supervision, assessment and marking procedure, presentation skills, leadership, strategic thinking, planning, change management, partnership, shadow learning, modern techniques of conducting research, research presentation, mentoring and general administration. They are expected to transfer this knowledge to their students who are in experienced in research studies.

This University Lecturers' Skills Enhancement Programme is conceived to be of six months' duration split into three months overseas training covering classroom teaching methods, shadow teaching and industry collaboration, while the three months in-country training covers teaching practice, supervision skills practice, undertaking reflective analysis, reporting and feedback. At the end of the six-month programme, participants will be awarded the Certificate in Advanced Studies in Academic Practice (CASAP). This is a train-the-trainer programme, and beneficiaries will be required to participate as facilitators/instructors in the University Lecturers' Skills Enhancement Training Programme in the subsequent in-country editions, to impart the knowledge acquired to junior colleagues.

The Petroleum Technology Development Fund is exploring new frontiers for the expansion of its tailored training programmes, particularly the University Lecturers' Skills Enhancement Training Programme and doctoral scholarship. To this end, the Fund has opened up discussions with officials of the Grenoble Graduate Business School (GGBS) France; in collaboration with the Grenoble School of Management, the Institute of

Technology, Grenoble, and the Institute of Petroleum, Paris, France (IFP); to set up a programme for the training of lecturers under the PTDF university lecturer's skills enhancement training programme.

According to Kalu (2011), officials of the Fund led by the Executive Secretary, visited France recently and signed a memorandum of understanding with Grenoble consortium to, amongst others, promote scientific and professional activities through education and training to Nigerian university lecturers, students or employees in academic capacity building, executive education programmes, applied research programme delivery and other related areas of interest. With a strong industry /academic collaboration, the training programme in Grenoble is expected to expose Nigerian university lecturers in training positions to new methods of teaching and imparting knowledge, supervision skills and collaboration with the industry to attract funding.

Under the arrangement, the Fund is planned to sponsor 40 university lecturers in batches of 20 for the programme in Grenoble. It will run for 12 weeks by the faculty and staff of Grenoble Graduate School of Business, International Institute of Technology, Grenoble and the Institute of Petroleum, France. It will be an intensive programme comprising lectures, workshops, industry visits, shadow learning, supervision, meetings, seminars and conferences and visits to industries and organizations. This is expected to improve the participants' knowledge of collaborative skills and make them gain more experience about the industry. At the end of the 12-week intensive programme in France, participants will return to Nigeria for a three months teaching practice.

Furthermore, a frequent turning out of research works requires utmost and unhindered social interaction. This is because researchers might need information from their colleagues, students, members of community etc., at any time of the day. Therefore a culture or religious tenet that does not permit interaction at certain hours of the day, prolonged conversation with

the opposite gender, etc. would limit the rate of data collection and this would eventually hamper research output. Therefore, the school climate (in terms of student–student interaction, staff-student interaction, staff–management interaction) should allow for free communication for the purpose of knowledge sharing. As submitted by Eric and Jens (2011), “knowledge sharing” is becoming a key phrase – those who have useful knowledge (e.g. good universities) must share it with those who need it (e.g. industry, the public sector, or the public in general). Giving credence to this, Julia Hassler (UNESCO, 2017) has stressed the importance of international organizations to be prime movers in the process of connecting educators in a global network to reach the final Millennium Development Goal, i.e. “Global Partnership for Development”. Such connections would be rarely achieved in societies where cultural and social practices are not supportive.

The research publication duties of a lecturer include writing papers on topics relevant to specialist subject areas in journals, books and other materials. Through collaboration and networking among university scholars (staff-staff interaction), research activities are enhanced. Supporting this, the then Rector of the National University of Science and Technology (NUST), Engineer Muhammad Asghar, stated that research and innovation are the need of the hour and that there is a crucial need to develop strong linkages between the industrial sector and universities (The Tribune, February 24th, 2012).

More interaction amongst academic scholars is needed to increase research output turning out from Nigerian universities. The National Universities Commission (NUC), in its 2005 rankings, assessed research output at the country’s universities as measured by the number of scholarly research articles published in prestigious international academic journals and the number of citations in scholarly indexes. It found that only 20 universities scored between 10 and 200 in their research output (World Education News and Review, 2006). For this reason, Usang et.al. (2007), have asserted that from the over 70 universities in the

country, only 20 are found to have performed better with regard to their research output. This could be reversed if school environments allows for more collaboration between universities and their academic staff.

At present, the country's low research output probably reflects the low priority accorded to research and development by government decision makers. For example, Nigeria's federal university system spends only 1.3 percent of its budget on research (Hartnett, 2000). For education, Nigeria spends an estimated 2.4 percent of its GNP while Sub-Saharan Africa as a whole spends 5.1 percent (UNESCO, 2000; Hinchliffe, 2002). The main criteria for ranking "world class universities" are not so much by the volume of teaching, student population, or community services, but research output. Knowledge accumulation places the advanced countries at the top, by their control of social and human capital formation, economic development, and improved living conditions (Sabo, 2005). In the same vein, Hartnett (2000) posits that one index for measuring research output is the number and quality of published works by Nigerians in international journals, and by the world distribution of active serial titles emanating from the universities, which contribute to the generation, dissemination, and application of scientific knowledge for development in Nigeria and beyond.

University plant planning has been linked to academic achievement in many literatures. Odufowokan (2011) pointed out that it is likely that well-planned school plants in terms of location, structure and facilities will facilitate effective teaching and learning processes and enhance better learning outcomes of the students. In furtherance of this, Ajayi and Yusuf (2009), maintained that "essentially, the main objective of school plant planning is to lay solid foundation for educational structure in order to achieve educational goals and satisfy the physical and emotional needs of the learners and to provide for future expansion of the school system. Supporting this assertion, Oyedeji (2012) pointed out that school plant

planning saves time; if the future execution decisions had already been set, the implementation would therefore not waste time.

Concerning educational goals for university education, Allen (2008) pointed out that the following are what students should know or be able to demonstrate by the time they graduate: (i) Civic engagement; (ii) Diversity appreciation; (iii) Communication skills; (iv) Professional responsibility; (v) Ethics; (vi) Critical thinking; (vii) Collaborative learning; (viii) Leadership; (ix) Mathematical or Quantitative competence; (x) Technological competence; (xi) Scientific competence; (xii) Research skills; (xiii) Cultural competence; (xiv) Interdisciplinary competence; (xv) Civic responsibility; (xvi) Global competence; (xvii) Economic/financial competence; and (xviii) Social justice (Allen 2008)

These educational goals cover not only the cognitive, but also the affective and the psychomotor domains of learning. The Affective Domain, under academic achievements includes objectives, which describe changes of interests, attitudes and values and the development of appreciation and adequate adjustment (Ekundayo, 2006). Under affective domain comes the students' attitudes, feelings, emotions, opinions, interest, values, beliefs, reactions, motivation, social relations habits (Osunde, 2008). Personal experience has however shown that personality traits like honesty, hard work, punctuality, self-denial and self-discipline which are necessary conditions for effective citizenship are lacking in the products of many higher education institutions. Students, these days, appear to be lazy, dishonest and always search for short-cuts to success. These factors have led to certain problems in higher education. Omoregie (2005) listed the problems manifested as examination malpractices, cultism, manifestation of juvenile delinquency, drug abuse and academic incompetence, among others.

The Psychomotor Domain on the other hand deals with motor activities. Some examples of psychomotor behaviour include writing smoothly and legibly, speaking fluently,

drawing maps accurately, producing models, and the ability to manipulate laboratory equipment and use them effectively (Osunde, 1997). It has also been observed that very few graduates can communicate effectively or exhibit evidence of good and solid education background (Ekundayo, 2006). It appears that students have a poor mastery of English language, lack requisite technical and oral and written communication skills. Osunde (1997) argued that the behaviour under the cognitive, affective and psychomotor domains should form the basis for the teaching and learning process and subsequent assessments. All these three areas should be taught, assessed and the results utilized in taking decisions on each learner. The basis for this is that education aims at moulding and developing the individual in his totality. Bandele (2002) also posited that the combination of the three domains of learning makes the recipient of education live a fulfilled life and contribute meaningfully to the society where he/she lives.

A better-planned school plant will enhance better school programmes and the meeting of community needs by providing a place for psychological and physical safety for students and teachers and enhancing the good, quality and quantity of instruction (Odufowokan, 2011). Similarly Ajayi (2007) and Mark (2002) maintained that high level of students' learning outcomes may not be guaranteed where school plants such as school site planning, instructional space planning, administrative space planning, space of convenience and circulation space planning are ill-sited and structurally defective. They also emphasized that structural effectiveness, proper ventilation and well-sited instructional space lead to a successful teaching and learning process.

Commenting on school plant planning, Oyedeki (2012) submitted that the following should be taken into consideration when planning for classroom buildings and other instructional places: (i) School Organization; (ii) Multiple use of laboratories, workshops and halls; (iii) Relation of the instructional places under construction to the possible future

development; and (iv) Uses of certain features of the building by immediate community members.

Moreover, Kennedy (1999) had earlier argued that school classroom design affect learning outcomes and advocates that planners should look at students developmental needs and the curriculum in order to make proper planning and re-designing and expanding classroom to fit those needs and requirements. In contrast, however, Bankole (2003) and Osiki (2004), in their different studies, found out that there was no significant relationship between school site and students' learning outcomes. Relating this study to international occurrences are the assertions of Williams, Persaud and Turner (2008), quoting Marsden (2005), which reported that safe and orderly classroom environment (aspect of instructional space) and School facilities (accessories) were significantly related to students' academic performance. Supporting these findings are Duncanson and Achilles (2008), who affirmed that teachers and the physical environment (plant space) are two major tools that can bring about new outcomes.

Educational facilities such as school plants have been repeatedly found to have positive relationship with standard and quality of educational system. (Ojedele, 2000). Lackney and Jacob (2002) stated that "it is difficult, if not impossible, to separate instructional activity from the physical environment setting within which it occurs." Buckley, et al. (2004) also noted that a good school facility supports the educational enterprise. A school facility is a school building that accommodates instructional activities. Therefore, the design of a school building needs to reflect the instructional needs of the school programme.

According to Holt and Smith (2002), school facilities had a relationship to student success. Research suggested that there was a linkage between school facilities and student achievement, teacher perceptions concerning the importance of an inviting learning

environment, and the attention that factories and retail planners placed on design related to student success (Holt & Smith, 2002). Deal and Peterson (1999) advocated that the school structure was a key element in influencing student success. The physical plant and the architecture “reflect important beliefs as to what schools are about and the meaning they hold for students and the community” (Deal & Peterson, 1999).

Additionally, research had also shown that there was an explicit relationship between the physical characteristics of school buildings and educational outcomes (Lyons, 2001). School facilities and the classroom must be flexible enough to accommodate changing learning patterns and methods. Educators and policy-makers should be concerned about the relationship between student learning and achievement and school facilities (TACR, 2003). They must also be concerned about the health, security, and psychological state of the students.

Research studies of Earthman (2002) and O’Neill (2000) had provided support for research that found that the condition of the school building has a sizeable and measurable influence upon the achievement of students. There was a growing research literature that had held the belief that there was a relationship between student achievements and the conditions of school buildings (Hunter, 2006). Other research studies and literature had focused on a lack of science labs, school safety, and class size (Hunter, 2006). Stricherz (2000) in his study showed that students’ achievement lags in shabby school buildings, those with poor or no science laboratories, libraries, technical workshops, alongside inadequate ventilation and faulty heating systems.

Appraisal of Literature Reviewed

Literatures have broadly described the concept of university effectiveness, school environment and school plant planning. In explaining these concepts, Harry and Hall (2010) asserted that institutional effectiveness involves not only the assessment of learning outcomes

but also objectives, collaborations, purposeful reviews and engagement of constituent stakeholders. It is an important part of any healthy organization. It generates data, which inform strategic plans for programme development and improvement. Reviewed literature also noted that institutional effectiveness is the result of operational processes, policies, duties and sites and their success in working together to support the management of an academy.

A body of existing literature viewed a school environment as the thread that connects the multitude of activities on a campus. In many respects this thread is almost invisible, yet everyone experiences its influence. The reviewed literature in this study held the same view about the concept of school plant planning. Several descriptions of the concept pointed out that school plant planning deals with instructional spaces comprising classrooms, auditoriums, gymnasias, libraries, workshops, laboratories, art rooms, multi-purpose rooms/halls, music areas and any other spaces where students receive instruction. It also includes administrative spaces and circulation spaces comprising corridors, lobbies, staircases and other spaces where students recreate.

Additionally, the guidepost in determining institutional effectiveness is outlined in literatures. For instance, Nichols and Nichols (2005) pointed out that institutional effectiveness is characterized by the following:

- Describing expected results through construction of educational (student learning) outcomes and administrative objectives/outcomes
- Selecting the means of assessment that will best determine the accomplishment of those outcomes and objectives identified
- Actually conducting the assessment and recording of the data (results) of that assessment
- Describing how the data collected from the assessment activities are used to improve student learning and AES (administrative and educational support) services.

Literature contains submissions on the separate relationship existing between environmental factors, school plant planning and students' academic achievements. These include those of Hale (2002), who found students in classrooms with large windows, natural lighting, and well-designed skylights performed 19 to 26% better than their peers in classrooms without these features. Hunter (2006) found that the environmental conditions in schools, which included the inoperative heating system, inadequate ventilation, and poor lighting, affected the health and learning as well as the morale of students and the staff. Some literature found that sustainable schooling and the good qualities of lighting, site planning, indoor air quality, acoustics, healthy building materials and the use of renewable energy benefited student achievement. The overall building condition, the age of the building, and the windows in the instructional areas were positively related to student achievement (Bullock, 2007).

Commenting on plant planning-academic achievement relationship, Ihuoma (2008) noted that school facilities are the material/resources provided for staff and students to optimize their productivity in the teaching and learning process. The physical plant and the architecture "reflect important beliefs as to what schools are about and the meaning they hold for students and the community". A good school facility always supported the educational enterprise (Buckley, et. al., 2004).

However it is worthy to note that several literature have failed to enumerate the variables that could affect university effectiveness. Moreover, the link between plant planning and university effectiveness has not been adequately deliberated in existing literatures. This study therefore grow the body of literature by investigating the relationship between these critical variables in the education industry. This way, remedy is provided to some deficiencies associated with previous studies.

CHAPTER THREE

RESEARCH METHODOLOGY

Introduction

This chapter focuses on the description of the procedures that were used in gathering relevant data for the study as discussed under the following sub heading:

Research Design

Population, Sample and Sampling Technique

Instrumentation

Procedure for data collection

Method of data analysis

Research Design

This study adopted the descriptive survey research design of the correctional type which was considered appropriate for this type of research because the variables have already existed and no attempt is made in this study to control or manipulate them. The method was adopted because it employs useful scientific and statistical tools to determine the relationship that exists between the identified variables of this study. The major aim of the researcher was to observe the various manifestations of the dependent variable with a view of determining the relationship that exist between it and the independent variable. With this design, quantitative data which involves systematic and objective collection and analysis of data was adopted to elicit responses from the participants in order to find solution to the problem identified in form of recommendations. This design enables the researcher to seek the opinions of the lecturers in North central public universities in Nigeria. Besides, the design allows the researcher to gather information from a sample of a large population in their natural setting without manipulating them. This view was supported by Alli (2000) who

asserted that descriptive survey is useful for gathering information that requires respondent's opinion. It also saves time and is cost effective.

Population, Sample and Sampling Techniques

The entire set of cases from which researcher sample is drawn is called the population. Since, researchers neither have time nor the resources to analyse the entire population so they apply sampling technique to reduce the number of cases. (Hamed Taherdoost, 2016)

Thus, the population of the study entails all Public Universities lecturers and universities in the North-central Region of Nigeria. The target population of the study was therefore all the 6,462 lecturers of the six universities selected. (See Appendix IV).

There were 14 public Universities in North-central, Nigeria that spread across six states including FCT-Abuja. Six Universities were stratified based on the existing states in the zone using stratified random sampling technique which represents 42.9%. This is in support of Akuezilo (2002) when he said that a fair representative of a study population should be between 33% and 60% of the entire population. Stratified sampling is where the population is divided into strata (or subgroups) and a random sample is taken from each subgroup. A subgroup is a natural set of items. Subgroups might be based on company size, gender or occupation (to name but a few). Stratified sampling is often used where there is a great deal of variation within a population. Its purpose is to ensure that every stratum is adequately represented (Hamed Taherdoost, 2016).

In order to obtain a sample that is representative of the lecturer population in the public Universities in North-central, Nigeria, a quota sampling technique was used with the aid of Research Advisor (2006) sample size table. This involves a chosen appropriate correspondent sample of the population of the study as advised from the Research Advisor (2006) sample size table (see appendix V). to select 794 determined sample size. According to Sekaran and

Bougie (2010) “Quota sampling can be considered as a form of proportionate stratified sampling, in which a predetermined proportion of people are sampled from different groups, but on a convenience basis”. Quota sampling technique was used for at least three main reasons. Firstly, because sampling frame could not be access, quota sampling (i.e., a non-probability sampling technique) is considered appropriate for the present study despite the fact that findings cannot be generalized (Cooper & Schindler, 2011; Sekaran & Bougie, 2010)

Secondly, given the large population of 6,462 lecturers, quota sampling technique ensures that sampling error is minimized (Wilson, 2010; Gill, J., Johnson, P. & Clark, M., 2010). It also ensures homogeneity within a group (i.e.academic staff in Nigeria universities) and heterogeneity across groups (i.e.different universities with different departments, under either Federal or State Government)(Cooper & Schindler, 2011; Hair, Money, Samouel & Page, 2007). Thirdly, quota sampling technique was also been used because of the resource constraints of the researchers in terms of time and money (Hair et al.,2007; Sekaran & Bougie, 2010) as well as unavailability of a practical sampling frame (Cooper & Schindler, 2011; Sekaran & Bougie, 2010).

Instrumentation

The research instruments used for data collection were questionnaires and a proforma. Items on the instruments used for this study were randomly adapted from previous empirical and conceptual literature. The instruments were modified to suit the current study and mostly adapted from African past studies of like manner. This decision was done based on Korb (2012) who stated that instrument can be adapted based on the relevant localized, cultural condition and be done from different discipline or organisation which helps to build on an existing knowledge. This was done to enable the researcher to gives greater fairness in the evaluation.

According to Borsa, Damasio, and Bandeira (2012), an adaptation of instrument gives a greater ability to generalize and also promotes investigation of differences within an increasingly diverse population. Adapted questionnaire tagged, “University Plant Planning Questionnaire” (UPPQ) from Takwate K. T.(2018) was used to gather information on University Plant Planning from the respondents (Lecturers). It contained section A and B. Section A contained items on demographic data of the respondents and responses to the research questions, namely, the gender, and qualifications. Section B contained information on sub-variables (dimensions) of University Plant Planning such as location, aesthetics, design, size and safety with 15 items. Also, “Effectiveness Questionnaire” (EQ) adapted from Hassan (2011); Nabunya, (2012); Dawo, Smatwa, and Okwatch, (2013) was used to gather information on research publications from the respondents (Lecturers). This consisted of 6 items to answer the effectiveness of respondents as the indicators of lecturers’ job performance. A researcher self-designed proforma tagged “Students’ Academic Performance Proforma” (SAPP) was equally used to collect relevant secondary data from the Registry/Academic Planning/Human Resources office of the sampled universities. The SDPP was to obtain data on students’ who had first class(4.50-5.00), second class upper (3.50-4.49), second class lower (2.40-3.49) third class (1.50-2.39) and fail (below 1.50) from 2010 to 2014 academic sessions.

The researchers’ home supervisor, lecturers in the Department of Educational Management and expert in the area of Measurement and Evaluation in the University of Ilorin, and Obafemi Awolowo University validated the questionnaires adapted and the proforma designed for this research. These experts were requested to examine the questionnaires to see whether they are suitable for the desired information. They also assisted to assess the face, construct and content validity of the instruments by ensuring that irrelevant and ambiguous items were eliminated.

After this, a test-re-test was carried out due to the nature of the study, this helps to prepare the ground for the main administration of the questionnaires. Forty (40) copies of the instruments were administered in order to ensure the reliability co-efficient of the instrument to those who were not part of the sample and then the analysis of data collected was done using Cronbach Alpha(α) to ensure internal consistency and quality of the scale. There is no absolute standard on the acceptable level of Cronbach alpha. Nunnally and Bernstein (1994) suggested a reliability of 0.5 – 0.6 for basic research while Gerbing, Anderson, Green, and Carmines (1988) suggested an alpha value of 0.70 and above to adjudge an instrument as reliable. The value arrived at was 0.71 and 0.89 for UPPQ & EQ, because Cronbach's Alpha values were above 0.70. Therefore, it could be said that the scales have a good internal consistency (DeVellis, 2003; Pallant, 2011).

Procedure for Data Collection

A letter of introduction was collected from the Head of Department, Educational Management, University of Ilorin, to universities where the research will be carried out. With this letter, the researcher sought and obtained the consent of the management, lecturers, and other respondents of the participating universities for both primary and secondary data. They were informed of the objectives of the study with the administration of the various questionnaire and test items. Adequate training was given to the six research assistants. These preliminary activities took about two weeks. The researcher and her trained research assistants administered the questionnaires, UPPQ, EQ and the proforma which lasted about ten weeks. The content of the questionnaire was carefully explained. The questionnaires and proforma administered were retrieved from the respondents after supplying the required information; seven hundred and ninety four out of eight hundred and twenty questionnaires were validly returned as usable constituting 96.8% which was adjudged good returns.

Method of Data Analysis

Data gathered from the respondents on university plant planning and effectiveness were compiled and screened. First, descriptive statistics (frequency and percentage) were used to show profile of respondents in terms of gender and qualifications. After that, the data obtained on the research questions were analyzed using mean rating and rank ordering for the adequacy of University plant planning in the terms of location, aesthetic, building design, building size, students and employees safety and the level of effectiveness in the public Universities in North-central, Nigeria.

Differences were statistically analyzed using inferential statistic of Pearson's Product Moment Correlation Co-efficient (PPMCC) to test the main and operational hypotheses formulated at 0.05 level of significance as these showed the relationship between the variables. According to Schober, P. , Boer , Schwarte & Lothar A. (2018) Pearson's Product Moment Correlation Co-efficient (PPMCC) determines the degree to which a relationship is linear. Put another way, it determines whether there is a linear component of association between two continuous variables.

Five-point Likert-type scale was used in analyzing the responses of the questionnaire as follows: VA = Very Adequate, A = Adequate, I = In Adequate and VI = Very In adequate

CHAPTER FOUR

DATA ANALYSIS AND DISCUSSION OF FINDINGS

The results obtained from the statistical analysis of data are presented in this chapter. All the hypotheses formulated for the study were analysed using inferential statistics of t-test and Pearson Moment Correlation Statistics (PPMC) at 0.05 level of significance. The Statistical Package for Service Solution (SPSS version 22.0) was used to run the data analysis.

Table 1

Demographic Description of the Respondents

Variable	Frequency	Percentage(%)
Sex		
Male	321	40.0
Female	473	60.0
Total	794	100.0
Educational Qualification		
Bachelor certificate	91	12.0
Postgraduate certificate	89	11.0
Masters' certificate	166	21.0
Doctorate certificate	321	40.0
Other certificate	127	16.0
Total	794	100.0

Source: Field Survey, 2018

Table 1 revealed that out of the 794 respondent that participated in the study, 321 representing (40.0%) of the respondents were males, while 473 representing (60.0%) of the respondents were females. This implies that there were more female respondents than male respondents in this study. With respect to the qualification, 91 representing (12.0%) of the respondents had Bachelor certificate, 89 representing (11.0%) of the respondents had Postgraduate certificate, 166 representing (21.0%) of the respondents had Masters' certificate, 321 representing (40.0%) of the respondents had Doctorate certificate, while 127

representing (16.0%) of the respondents had other certificate. This implies that there were more respondents who had doctorate certificate than respondents who had masters, others certificate, bachelor and postgraduate certificates in this study.

Answering of Research Questions

Research Question 1: How adequate is the university plant planning in North-central public universities?

In order to answer this research question, participants' responses on the plant planning questionnaire were collated. The data collected from the sampled staff were analyzed. The summary of the results is as shown in Table 2.

Table 2

Adequacy of University Plant Planning in North-central Public Universities

	Item	Mean	Ranking
1.	Adequacy of university location	1.83	3rd
2.	Adequacy of university' aesthetic	1.59	5th
3.	Adequacy of university building design	1.70	4th
4.	Adequacy of university building size	1.84	2nd
5.	Adequacy of university students and employees safety	1.85	1st
	TOTAL	1.76	

Source: Field Survey, 2018

Decision(Based on mean value): Lowly Adequate = 1.00 – 1.99,

Moderately Adequate = 2.00 – 2.99, Highly Adequate = 3.00 – 4.00.

Table 2 indicates that the mean score of the respondents on adequacy of university location is 1.83; adequacy of university plant aesthetic is 1.59, adequacy of university plant design is 1.70; adequacy of university building size is 1.84; and adequacy of university plant safety is

1.85. Thus, adequacy of university plant safety was ranked first, adequacy of university building size which was ranked second, and adequacy of university location was ranked third, followed by adequacy of university plant design which was ranked fourth with adequacy of university plant aesthetic ranked last (fifth). Therefore, given the total average mean score of 1.76, the adequacy of university plant planning in North-central Public universities is low (1.00 – 1.99).

**Research Question 2: What is the level of public universities’ effectiveness
in North-central ?**

In order to answer this research question, participants’ responses on the University effectiveness in teaching and research were merged (see appendix III for the raw scores). The summary of the responses is shown in Table 3.

Table 3:

Average Mean Score of Level of Effectiveness in North-central Public Universities

S/N	Level of Effectiveness	Mean (%)	Decision
1	Teaching Effectiveness	1.92 (38.42)	Low
2	Research output	1.43 (35.75)	Low
	Weighted Mean Score	1.68 (37.09)	Low

Source: Field Survey, 2018

Decision (Based on Mean value): Lowly Effective = 1.00 – 1.99,

Moderately Effective = 2.00 – 2.99, Highly Effective = 3.00 – 4.00.

Table 3 indicates responses to items that sought information on level of effectiveness in North-central public universities revealed that their weighted mean score was 1.68; it therefore means that the lecturers’ effectiveness of public universities in North-central, Nigeria is low (1.00 – 1.99). Furthermore, the teaching effectiveness (1.92) and research output (1.43) of the lecturers are below average.

Hypotheses Testing

Having considered the demographic data of the respondents and answering research questions, in testing the hypotheses formulated to guide this work, Pearson Product Moment Correlation (PPMC) statistics was adopted to test the main hypothesis and the null hypotheses generated in the study. All hypotheses were tested at 0.05 level of significance.

Main Hypothesis

Ho: There is no significant relationship between University plant planning and effectiveness in North-central public universities, Nigeria.

In order to test this research hypothesis, participants' responses to the plant planning and effectiveness questionnaire were collated. The data collected from the study was analysed as shown in Table 4.

Table 4

Summary of Pearson Product Moment Correlation University Plant Planning and Effectiveness in Public Universities in North-central Nigeria

Variables	N	Mean	SD.	Cal.r	p-value	Decision
University Plant Planning	794	1.76	0.11			H₀
				0.66	0.00	Rejected
University Effectiveness	794	1.68	0.07			

$\rho < 0.05$ Source: Field Survey, 2018

As shown on Table 4, University plant planning had a mean score of 1.76 with standard deviation 0.11, while effectiveness had a mean score of 1.68 with standard deviation of 0.07. The calculated r-value was 0.66, which is strong and positive; while its p-value is 0.00 at alpha level of 0.05. On this basis, the null hypothesis was therefore rejected. This means that there was a positive significant relationship between University plant planning and effectiveness of public universities in North-central Nigeria. The r value of 0.66 implies

that a 100% improvement in university plant planning will bring about 66% improvement in the effectiveness of public universities in Nigeria.

Testing Operational Hypotheses

H₀₁: There is no significant relationship between University plant location and effectiveness in public universities in North-central Nigeria.

In order to answer this research question, participants' responses were collated. The data collected were analyzed as shown in Table 5.

Table 5

Summary of Pearson Product Moment Correlation University Plant Location and Effectiveness in Public Universities in North-central Nigeria

Variables	N	Mean	SD.	Cal.r	p-value	Decision
University plant location	794	1.83	0.20			H₀₁
				0.81	0.00	Rejected
University Effectiveness	794	1.68	0.07			

p < 0.05 Source: Field Survey, 2018

As shown on Table 5, university plant location had a mean score of 1.83 with standard deviation 0.20, while effectiveness had a mean score of 1.68 with a standard deviation of 0.07. The calculated r-value was 0.81 which is very strong and positive; while its p-value is 0.00 at alpha level of 0.05. On this basis, the null hypothesis was therefore rejected. This means that there was a significant relationship between university plant location and effectiveness in public universities in North-central Nigeria. By implication, University plant location is capable of promoting University outputs in terms of research, staff development, quality graduates, and collaboration among others.

H₀₂: There is no significant relationship between University plant aesthetic and effectiveness in public universities in North-central Nigeria.

In order to answer this research question, participants' responses were collated. The data collected were analyzed as shown in Table 6.

Table 6

Summary of Pearson Product Moment Correlation University Aesthetic and Effectiveness in Public Universities in North-central Nigeria

Variables	N	Mean	SD	Cal.r	p-value	Decision
University Aesthetic	794	1.59	0.28			H₀₂
				0.50	0.03	Rejected
University Effectiveness	794	1.68	0.07			

$\rho < 0.05$ Source: Field Survey, 2018

As shown on Table 6, University aesthetic had a mean score of 1.59 with standard deviation 0.28, while effectiveness had a mean score of 1.68 with a standard deviation of 0.07. The calculated r-value was 0.50 which is moderate and positive while its p-value is 0.03 at alpha level of 0.05. Thus, when the calculated value is higher than the table value, hence the statistical interpretation states that the hypothesis should be rejected. On this basis, null hypothesis ii was therefore rejected. This means that there was a significant relationship between University aesthetic and effectiveness in public universities in North-central Nigeria. By implication, the beauty of a University environment is likely to promote sound teaching and learning process. Many students are attracted to secure, safe and beautiful environment, this could be yardstick to measure the students' level of seriousness and concentration in school activities.

H₀₃: There is no significant relationship between University plant design and effectiveness in public universities in North-central Nigeria.

In order to answer this research question, participants' responses were collated. The data collected were analyzed as shown in Table 7.

Table 7

Summary of Pearson Product Moment Correlation University Building Design and Effectiveness in Public Universities in North-central Nigeria

Variables	N	Mean	SD.	Cal.r	p-value	Decision
University building design	794	1.70	0.31			H₀₃
				0.51	0.03	Rejected
University Effectiveness	794	1.68	0.07			

$p < 0.05$; Source: Field Survey, 2018

As shown on Table 7, University building design had a mean score of 1.70 with standard deviation 0.31, while University effectiveness had a mean score of 1.68 with standard deviation of 0.07. The calculated r-value was 0.51 which is moderate and positive while its p-value is 0.03 at alpha level of 0.05. On this basis, the null hypothesis was therefore rejected. This means that there was a significant relationship between University building design and effectiveness in public universities in North-central Nigeria. By implication, the finding denotes that a well designed, clearly stationed university plants at appropriate environment may likely increase the University effectiveness.

H₀₄: There is no significant relationship between University building size and effectiveness in public universities in North-central Nigeria.

In order to answer this research question, participants' responses were collated. The data collected were analyzed as shown in Table 8

Table 8

Summary of Pearson Product Moment Correlation University Building Size and Effectiveness in Public Universities in North-central of Nigeria

Variables	N	Mean	SD.	Cal.r	p-value	Decision
University building size	794	1.84	0.21			H₀₄
				0.68	0.01	Rejected
University Effectiveness	794	1.68	0.07			

Source: Field Survey, 2018

As shown on Table 8, University building size had a mean score of 1.84 with standard deviation 0.21, while University effectiveness had a mean score of 1.68 with a standard deviation of 0.07, the calculated r-value was 0.68 which is strong and positive while its p-value is 0.01 at alpha level of 0.05. Thus, when the calculated value is higher than the table value, hence the statistical interpretation states that the hypothesis should be rejected. On this basis, the null hypothesis was therefore rejected. This means that there was a significant relationship between University building size and University effectiveness in public Universities in North-central Nigeria. A well-designed infrastructural facilities or buildings provides conducive atmosphere for learning, hence, University building is likely to increase the chance of high and positive University effectiveness.

H₀₅: There is no significant relationship between University Students and Employees safety and effectiveness in public universities in North-central Nigeria.

In order to answer this research question, participants' responses were collated. The data collected were analyzed as shown in Table 9

Table 9

**Summary of Pearson Product Moment Correlation University Students
and Employees Safety and Effectiveness in Public Universities in North
central Nigeria**

Variables	N	Mean	SD.	Cal.r	p-value	Decision
University students & employees safety	794	1.85	2.08			H₀₅
				0.47	0.00	Rejected
University Effectiveness	794	1.68	0.07			

Source: Field Survey, 2018

As shown on Table 9, university students and employees safety had a mean score of 1.85 with standard deviation 2.08, while University effectiveness had a mean score of 1.68 with standard deviation of 0.07. When the calculated value is higher than the table value, hence the statistical interpretation states that the hypothesis should be rejected. The calculated r-value was 0.47 moderate and positive while its p-value is 0.00 at alpha level of 0.05. On this basis, null hypothesis was therefore rejected. This means that there was a significant relationship between University students and employees safety and effectiveness in public Universities in North-central Nigeria. By implication, students and employees safety is a potential factor to promote University effectiveness.

Discussion of the Findings

Finding from research question one revealed that the most adequate school plant planning, which ranked first, is university students and employees safety followed by adequacy of university building size which was ranked second, and adequacy of university location was ranked third. Adequacy of university building design which was ranked fourth, while adequacy of university aesthetic ranked last (fifth). This shows that the three identified variables were not given much attention while the first three were topmost among university plant variables examined. It reflected in their inter-personal relationships in the structure of

the school building, which is not different from the way they build their local houses, location of mosques close to lecture rooms; their dressing modes, and belief system. It can be said that there was a heavy presence of the people's culture in the university environment. However, the five variables are likely to affect University effectiveness in terms students' academic performance and research outputs. The frequencies of these variables are due to the fact that most Universities in the North-central zones cherished safety of the staff and students in the University community. They also appreciate the value of having large buildings which is signals higher institution of learning, the Ivory Tower. Also, the thorough supervision, control, direction and monitoring of school plants by the Ministry of Education has also increased the chances of having these set of variables taken care off in the University community across the zones. It is glaring that that the availability of school plants with proper planning will likley enhance better teaching and learning process and facilitates better academic performance. The relevant literature reviewed Yakubu, 2017; Shamaki, 2015; Sang, 2013 and Ojedele, (2000) for this study revealed that many of the Nigeria's secondary schools face the combined challenges of poor school plant planning, deteriorating conditions, out-of-date design and capacity utilization pressures. These combined deficiencies impair the quality of teaching and learning and also create health and safety problems for staff and students. The effects of poor school plant planning and poor maintenance of school infrastructure are threats to school management, curriculum delivery and students' academic performance.

Simply put, Ajayi and Yusuf (2009) observed that the main objective of school plant planning is to lay a solid foundation for educational structure in order to achieve educational goals and satisfy the physical and emotional needs of the learners and to provide for future expansion of the school system. The study agrees with that of Akinyemi, Momoh, Orunbin and Faduyile (2017) which revealed that a significant relationship exists between teaching

space planning, classroom planning, laboratory planning and students' academic performance in Lagos State senior secondary schools. The findings of the study also buttress that of Amanchukwu and Ololube (2015) which stated that management of school plant requires good leadership, effective monitoring, maintenance culture; corrective, preventive and predictive maintenance etc.

Adetule and Ayodele (nd) finding agreed with the fact that there is need for adequate facilities available to facilitate teaching and learning processes in schools. Also Singh and Kumar (2016) agreed with that finding of the study that the necessity of having all the prescribed physical infrastructural facilities on the campuses of the B-Schools in place for more effective and efficient delivery of knowledge, which is a pre-requisite in our knowledge-based economy. The finding of the study agrees with Azever (2019) which states that recreational facilities have significant influence on students' academic performance in Makurdi Education Zone of Benue State. While the result from Essien (2017) is at variance with the study of this research that school location has no significant influence on students' academic achievement in Social Studies.

Answer to research question two (RQ2) revealed that the level of effectiveness in North-central public universities was low. By effectiveness, it is meant the degree to which public universities in the North-central region achieve their goals in terms of their research outputs and academic performance. This low level of effectiveness, which is not exclusive to the universities covered by this study, may not be unconnected with the level of adequacy of university plant available. This finding is in consonance with that of Halidu, (2015) which reported that the low level of funding by the federal government has affected the primary mandates of the university system.

The testing of the main hypothesis led to its rejection, thus there was a significant relationship between University plant planning and effectiveness in public universities in

North-Central Nigeria. It is crystal clear that there is significant relationship between University plant planning and effectiveness in public Universities in the North-Central, Nigeria. This implies that properly planned school plants are likely to increase the productivity, effectiveness and efficiency of University apparatus in achieving state goals. This finding supports that of Odufowokan, (2011) who reported that there was a significant relationship between instructional spaces like classrooms, which was significantly related to students' academic performance. In addition, Ajayi and Yusuf (2009) reported that there was significant relationship between instructional space planning and students' academic performance in South-west Nigerian secondary schools. In addition, Ajayi (2009) reported that structural effectiveness, proper ventilation and well-sited instructional space lead to a successful teaching and learning process in Nigerian secondary schools. Also, Ajayi and Yusuf (2010) reported that instructional space planning and circulation space planning were significantly related to students' learning outcomes. This is in disagreement with Bankole (2003) and Osiki (2004) who agreed that there was no significant relationship between school site and students' learning outcomes.

The findings from the testing of operational hypothesis one (HO₁) revealed there was a significant relationship between university plant location and effectiveness in public universities in North-central Nigeria. This implies that the location of University plants has influence on the effectiveness of any Universities. The strategic sitting of University plants is likely to promote productivity, actualisation of University aims, goals and objectives, but if they not properly sited, it is likely to hinder the growth, development and actualisation of University core mandate of teaching, research and community services. This finding is in consonance with that of Odufowokan (2011) who reported that there was a significant relationship between administrative and circulatory space planning and students' academic performance. The study is in congruence with that of Owoeye and Yara (2010) who found

that there is a significant difference between students' academic achievement of rural and urban secondary schools in senior school certificate examinations ($t=2.73$, $p<0.05$). The study has proven that students in urban areas had better academic achievement than their rural counterpart. This is likely due to school plants in the urban settings unlike what is obtainable in the rural areas.

It was also found that there was a significant relationship between the aesthetic of University buildings and effectiveness in actualizing the Public University mandates in North-central Nigeria. The beauty of structure, proper sitting in strategic location is capable of promoting University effectiveness. Many 21st century students are driven by beautiful structure, modern architectural design, land economy and spacing among others, This solely could attract them to a public University, endear them to stud hard and avoid truancy in school thereby helping the University system peacefully carry out her tasks as well as helping them to attain their stated objectives. This finding is also in consonance with that of Odufowokan (2011) who reported that students' academic performance was significantly related to instructional space aesthetic, administrative space planning, circulation space planning, planning for accessories and space for convenience planning.

Operational Hypothesis three was also rejected. Thus, there was a significant relationship between university building design and effectiveness in public universities in North-central Nigeria. That is, the architectural design has a lot to do with how the public Universities actualise their stated objectives within the North-central region. This is in conformity with the findings of Ajayi and Yusuf, (2010) who reported that instructional plant design and circulation space planning were significantly related to students' learning outcomes. Kennedy (1999) had earlier argued that school classroom design affect learning outcomes and advocates that planners should look at students' developmental needs and

curriculum in order to make proper planning and re-designing and expanding classrooms fit those needs and requirements.

The rejection of operational Hypothesis showed that there was a significant relationship between university building size and effectiveness in public universities in North-central of Nigeria. This conforms with the findings of Oyedeji (2012), who submitted that the following should be taken into consideration when planning for classroom buildings and other instructional places: (i) School Organization; (ii) Multiple use of laboratories, workshops and halls; (iii) Relation of the instructional places under construction to the possible future development; and (iv) Uses of certain features of the building by immediate community members (Oyedeji, 2012). It is believed that all these have positive relationship with the effectiveness of universities in the North-central Nigeria.

Operational Hypothesis 5 was also tested and resulted in the findings that there was significant relationship between university students and employees safety and effectiveness of North-central public universities. The safety of the users of school plants is taken into consideration when planning as this is likely to affect the effectiveness of public University in North-central. This conforms to the findings of Williams, Persaud, and Turner (2008), quoting Marsden (2005), which reported that safe and orderly classroom environments are significantly related to effectiveness of institutions.

CHAPTER FIVE

SUMMARY OF FINDINGS, CONCLUSIONS AND RECOMMENDATIONS

This chapter presents the summary of findings and conclusions based on the data analyzed and results presented in chapter four. Based on the findings and conclusions of this study, recommendations were made towards improvement in school plant planning and University effectiveness.

Summary of Findings

The study investigated University Plant Planning and Effectiveness in North-central Public Universities, Nigeria. Specifically, the study was carried out to examine: the adequacy of university plant planning, the level of the effectiveness of universities, the relationships between university plant planning and effectiveness, plant location and effectiveness; university aesthetic and effectiveness; university plant location and effectiveness; university plant design and effectiveness, university plant design and effectiveness; building size and effectiveness plant safety and effectiveness in North-central, Nigeria. The study adopted a descriptive survey research design of the correctional type with a population of 6,462 lecturers in all the six public universities in North-central geo-political zone of Nigeria. Simple random and stratified sampling techniques were used to select universities while proportional sampling technique was used to select 794 lecturers out of the number of lecturers within the geo-political zones with the aid of research Advisor sample size table.

Six research questions were raised and answered using frequency counts, percentage, mean standard deviation and inferential statistics of multiple regression and Pearson product moment were used to analyzed the research questions. One main hypothesis and five operational hypotheses were formulated to guide the study.

The following were the findings after the two research questions were answered using mean and standard deviation, and the hypotheses were tested using Pearson Moment Correlation statistics.

1. Adequacy of University plant safety was ranked first, followed by adequacy of university building size which was ranked second and adequacy of University plant location was ranked third; followed by adequacy of university building design which was ranked fourth with adequacy of University aesthetic ranked last (fifth).
2. Effectiveness in North-central public universities is low.
3. There is a significant relationship between University plant planning and effectiveness in North-central Nigeria.
4. There is a significant relationship between University plant location and effectiveness in North-central Nigeria.
5. There is a significant relationship between University aesthetic and effectiveness in North-central Nigeria.
6. There is a significant relationship between University building design and effectiveness in North-central Nigeria.
7. There is a significant relationship between University building size and effectiveness in North-central Nigeria.
8. There is a significant relationship between University students and employees safety and effectiveness in North-central Nigeria.

Conclusions

The study looked into the identified gap in university plant planning with a view to determining its effectiveness. It can be concluded that the level of effectiveness in North-central public universities was low and this may not be unconnected with the inadequacy of the university plant planning in terms of location, aesthetic, building design, building size,

students and employees safety. Thus, the more adequate the university plant planning, the more the universities in North-central Nigeria are effective. The study also concluded that there is a greater task ahead for government and other stakeholders on University plant planning issues, in meeting the challenges of unattractive consciousness toward the universities effectiveness. The fractional support given to the aesthetic surroundings has not contributed good measure to the condition of the environment. Many Universities in the North-central are inadequately University plant planning. Hence, there is need for proper planning of the public universities, not only in the North-central region but across the six geopolitical zones in Nigeria.

Recommendations

Based on the findings of the study and the conclusions, the following recommendations are made in order to bring about improvement in university plant planning in order to make the Universities effective .

That government at all levels (be it Federal, State and Local) should continue to lay more emphasis on school plants planning, in order to enhance the effectiveness of the Universities.

There is need to improve on the accessibility to the Universities in terms of distance to town. The faculties and units need to be well distributed to accommodate future expansion.

Architects, Building designers should make effort to ensure that university plants aesthetic is adequately done. This can be ensured by giving the construction to appropriate school plants agents.

Designing school plants is a multi-task and is necessary to aid effective teaching and learning that all accommodating in terms of taking care of the physically challenged, as well as old and young stakeholders. Efforts must therefore be made to ensure professionals

and experts in University design are recruited in carrying school plants which can be compared with global best practices.

There are recommended building sizes for different roles or objectives. Lecture rooms, offices, administrative areas, corridors, parking spaces and other parts of school plants must have adequate recommended sizes to aid effectiveness of universities.

Safety can be in different dimensions like safety from external forces, from natural and artificial hazards. University plants must be built in such a way that they are absolutely free from anticipated danger to lives and property. High walls, surveillance cameras and solid materials usage during construction are some of the safety precautions that must be improved upon in order to enhance effectiveness of universities in North-central Nigeria.

Limitations to the Study

Certain factors served as limitations to this study. For instance, extraneous variables such as learning environment, nature of studentship (on and off campus) of the participants, age, gender, socio-economic backgrounds, availability, adequacy and utilization of internet facilities and others that could influence the findings of this study were outside the scope of the study. Also, the study involved only a limited number of dependent variables- University effectiveness in terms of research output and students' academic performance which found to influence Universities' effectiveness. Other studies could make use of other dependent variables such as performance, academic advancement etc. The research adopted questionnaires and proforma for data collection. The generalisation of the findings of this research is limited as a result of the sample and sampling techniques used, which did not accommodate private-owned universities in the two countries. The time frame of data used for study is 2010-2014.

Another limitation experienced is that the study was carried out in only one zone in Nigeria, thereby limiting its geographical scope. Apart from this, due to the present economic

quagmire and the break out of the Covid_19 pandemic the whole country is plunged into, as well as the strike action which the entire Nigeria University were plunged into for about nine months. The effects of these stated challenges affected the attendance of lecturers and students on campus due to Covid_19 non-pharmaceutical protocol. Even, some lecturers were sceptical about the terms of references the Government had given in paying them their salaries and arrears so larger percentage did not resume immediately. The few lecturers found were unwilling to take the questionnaire. The researcher had to wait for another two weeks so to have high school attendance rate before the administration of the instruments. However, despite these limitations, the findings from this study would provide a good reference point when referring to the university plant planning and effectiveness in North-central zone of Nigeria.

Suggestions for Further Studies

In view of the above limitations, the following suggestions are made for further research:

The study covered only one geo-political zone in Nigeria, further research could cover the entire country or be carried out using a larger population and sample so as to make for wider generalization as well as make work more robust.

It would also be suggested that the questionnaire administered to lecturers be extended to stakeholders such as parents, students, Ministries of education, planning, and environment and government officials so that they can contribute their quota to the development of modern public Universities that will be cynosure of all eyes. In the same vein, vital information will be assessed on the school plants and its impacts on students' learning outcomes.

Also, more qualitative research needs to be done. About 90% of educational researches seen in the field are quantitative. Although statistical methods provide good

quantitative results, it is also very good to conduct oral interviews, field observations and on-the-spot assessments. Such qualitative data will help to provide more insights into areas that are impossible to explain with the use of questionnaires and others instruments.

Contribution to knowledge

The findings of the study have revealed that there is a significant relationship between University plant planning and effectiveness in Nigerian universities. It has contributed to knowledge in the areas University plant planning and effectiveness.

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APPENDIX I
UNIVERSITY OF ILORIN
FACULTY OF EDUCATION
DEPARTMENT OF EDUCATIONAL MANAGEMENT
UNIVERSITY PLANT PLANNING AND EFFECTIVENESS IN RESEARCH
QUESTIONNAIRE
(LECTURERS)

Dear Respondent,

This questionnaire is designed to collect data or information on university Plant Planning and Effectiveness in universities in the North Central geo political zone of Nigeria. It is not a test and has nothing to do with taking decisions about your professionalism. Your responses will be confidentially treated, so please try to answer the questions as honestly as you can.

Thank you

Adeleke, F.O

SECTION A

Instruction:

Kindly fill in or tick as appropriate.

Personal Data

1. What is your Gender? (a) Male (b) Female

(Please tick “√” as appropriate)

2. What is your highest academic qualification?

(a) Bachelor (b) Post Graduate (c) Masters (d) Doctorate (e) Others.

SECTION B: adequacy of university plant planning

Instruction: Please tick appropriately in the column provided as it applies to you, where

VA=Very Adequate, A= Adequate, I = Inadequate, and VI =Very Inadequate

S/N	Item	VA	A	I	VI
	In terms of location how adequate is the planning of:				
1	Lecture rooms				
2	Library				
3	Laboratory				
4	Lecture theatre				
5.	Multipurpose hall				
6	HOD's office				
7	Lecturer's office				
8	Administrative office				
9	Guidance Counsellors' office				
10	Health clinic				
11	Corridors				
12	Lobby				
13	Staircase				
14	Footpaths				
15	Parks				
	in terms of aesthetic how adequate is the planning of:				
16	Lecture rooms				
17	Library				

18	Laboratory				
S/N	Item	VA	A	I	VI
19	Lecture theatre				
20	Multipurpose hall				
21	HOD's office				
22	Lecturer's office				
23	Administrative office				
24	Guidance/counsellors' office				
25	Health clinic				
26	Corridors				
27	Lobby				
28	Staircase				
29	Footpaths				
30	Parks				
	In terms of Aesthetics how adequate is the planning of:				
31	Lecture rooms				
32	Library				
33	Laboratory				
34	Lecture theatre				
35	Multipurpose hall				
36	HOD's office				
37	Lecturer's office				

38	Administrative office				
39	Guidance Counsellor's office				
40	Health clinic				
S/N	Item	VA	A	I	VI
41	Corridors				
42	Lobby				
43	Staircase				
44	Footpaths				
45	Parks				
	in terms of size how adequate is the planning of:				
46	Lecture rooms				
47	Library				
48	Laboratory				
48	Lecture theatre				
50	Multipurpose hall				
51	HOD's office				
52	Lecturer's office				
53	Administrative office				
54	Guidance Counsellor's office				
55	Health clinic				
56	Corridors				
57	Lobby				
58	Staircase				

59	Footpaths				
60	Parks				
	in terms of safety how adequate is the planning of:				
61	Lecture rooms				
S/N	Item	VA	A	I	VI
62	Library				
63	Laboratory				
64	Lecture theatre				
65	Multipurpose hall				
66	HOD's office				
57	Lecturer's office				
58	Administrative office				
69	Guidance/counsellors' office				
70	Health clinic				
71	Corridors				
72	Lobby				
73	Staircase				
74	Footpaths				
75	Parks				

SECTION C: Effectiveness in research

Instruction: Please you are required to tick (✓) in the appropriate column the numbers as applicable to you between 2010 and 2014 on Research Output.

SN	ITEMS	31 - 40	21 - 30	11 – 20	0 – 10
1	The number of conferences attended where papers were presented by you				
2	The number of conference proceeding papers				
3	Articles in published journals				
4	Workshops/Exhibitions Attended				
5	Chapter contribution in a textbook/textbooks				
6	Textbooks authored / Co- authored				

FACULTY OF EDUCATION
DEPARTMENT OF EDUCATIONAL MANAGEMENT
EFFECTIVENESS IN TEACHING
(Students' academic performance pro-forma)

Dear Respondent,

This questionnaire is designed to collect data or information on the effectiveness of teaching in universities in the North Central geo political zone of Nigeria. It is not a test and has nothing to do with taking decisions about your professionalism. Your responses will be confidentially treated, so please try to answer the questions as honestly as you can.

Thank you

Adeleke, F. O.

STUDENTS' ACADEMIC PERFORM Please supply the following information on students' results from 2010 to 2014.

YEARS	FIRST CLASS 4.50-5.00	SECOND CLASS UPPER 3.50-4.49	SECOND CLASS LOWER 2.40-3.49	THIRD CLASS 1.50-2.39	FAIL Below1.50	TOTAL
2010						
2011						
2012						
2013						
2014						

Effectiveness in Research

S/N	ITEMS	31 - 40	21 -30	11 - 20	1 - 10
1	Number of conferences attended where papers were presented by you	Nil	16	342	436
2	Number of conference proceeding	2	72	302	418
3	Articles in published journals	100	43	215	436
4	Workshops /Exhibitions attended	32	131	234	397
5	Chapter(s) contribution in book(s)	1	14	22	757
6	Textbooks authored / co-authored	Nil	Nil	Nil	794

Source: field survey (2018)

APPENDIX IV

Sample Distribution across Schools and Faculties

Sampled Schools		Sampled Lectures across Faculties (40%)			Total
University of Ilorin, Kwara State;	Social Science (29)	Education (37)	Technology (24)	Management Sciences (38)	128
Federal University of Technology, Minna.	Social Science (25)	Education (33)	Technology (38)	Management Sciences (26)	122
Federal University of Agriculture, Makurdi	Social Science (23)	Education (24)	Technology (27)	Agricultural Sciences (42)	116
Kogi state University, Kogi State	Social Science (32)	Education (36)	Technology (29)	Management Sciences (32)	129
University of Abuja, Gwagwalada	Social Science (36)	Education (44)	Technology(36)	Management Sciences(42)	158
University of Jos, Plateau State	Social Science (37)	Education (36)	Technology(29)	Management Sciences(39)	141
Total	182	210	183	219	794

Required Sample Size[†]

Population Size	Confidence = 95%				Confidence = 99%			
	Margin of Error				Margin of Error			
	5.0%	3.5%	2.5%	1.0%	5.0%	3.5%	2.5%	1.0%
10	10	10	10	10	10	10	10	10
20	19	20	20	20	19	20	20	20
30	28	29	29	30	29	29	30	30
50	44	47	48	50	47	48	49	50
75	63	69	72	74	67	71	73	75
100	80	89	94	99	87	93	96	99
150	108	126	137	148	122	135	142	149
200	132	160	177	196	154	174	186	198
250	152	190	215	244	182	211	229	246
300	169	217	251	291	207	246	270	295
400	196	265	318	384	250	309	348	391
500	217	306	377	475	285	365	421	485
600	234	340	432	565	315	416	490	579
700	248	370	481	653	341	462	554	672
800	260	396	526	739	363	503	615	763
1,000	278	440	606	906	399	575	727	943
1,200	291	474	674	1067	427	636	827	1119
1,500	306	515	759	1297	460	712	959	1376
2,000	322	563	869	1655	498	808	1141	1785
2,500	333	597	952	1984	524	879	1288	2173
3,500	346	641	1068	2565	558	977	1510	2890
5,000	357	678	1176	3288	586	1066	1734	3842
7,500	365	710	1275	4211	610	1147	1960	5165
10,000	370	727	1332	4899	622	1193	2098	6239
25,000	378	760	1448	6939	646	1285	2399	9972
50,000	381	772	1491	8056	655	1318	2520	12455
75,000	382	776	1506	8514	658	1330	2563	13583
100,000	383	778	1513	8762	659	1336	2585	14227
250,000	384	782	1527	9248	662	1347	2626	15555
500,000	384	783	1532	9423	663	1350	2640	16055
1,000,000	384	783	1534	9512	663	1352	2647	16317
2,500,000	384	784	1536	9567	663	1353	2651	16478
10,000,000	384	784	1536	9594	663	1354	2653	16560
100,000,000	384	784	1537	9603	663	1354	2654	16584
300,000,000	384	784	1537	9603	663	1354	2654	16586

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