USERS' ASSESSMENT OF CONDUCIVENESS OF CAMPUS INFRASTRUCTURE AT FEDERAL UNIVERSITY OF TECHNOLOGY, MINNA

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ABSTRACT

Higher educational institutions, particularly government owned institutions, in developing countries are described as unconducive, unhealthy and unattractive. They are being constantly challenged to improve on the state of their campus infrastructural facilities which is necessitated by the need to ensure quality teaching and learning. This study, therefore, examines the conduciveness of infrastructural facilities in Gidan-Kwano campus of Federal University of Technology Minna, Niger State, Nigeria. This study uses a descriptive research design. Three hundred and eighty questionnaires were distributed while three hundred and fifteen were returned and valid for further processing. Descriptive analyses with the overall mean score of 2.72 reveals that the condition of infrastructural facilities and services in Gidan-Kwano campus of Federal University of Technology Minna is classified as fair. Findings reveal that health, with Relative Importance Index of 4.91 is the most considered factor for conduciveness of campus infrastructure. Findings reveal that quality internet network with Relative Importance Index 4.879 is the highest rated element for conduciveness of campus infrastructure on this campus. Exploratory factor analysis and Swisco classification of factors revealed that the Laboratory & library and recreational facilities are moderately conducive but internet facility is not conducive. The need to improve on the quality of internet and its coverage and also provision of power socket at corridors and recreational space are some of the ways to improve the conduciveness of the campus infrastructure. This study concludes that the infrastructural facilities and services provided at Gidan-Kwano campus of Federal University of Technology, Minna is less conducive for teaching and learning. Based on the findings of the study, the improvement of all campus infrastructural facilities and services to a level that is conducive is urgently required. The study recommends that the university management should pay attention to the improvement of the condition of the infrastructural facilities and services. Also, the effects of unconducive infrastructural facilities and services on quality teaching and learning is recommended for further study.

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CHAPTER ONE

1.0 INTRODUUCTION

1.1 Background to the Study

The standard of learning, the learners, the teachers, and culture as a whole are all influenced by the learning environment, both directly and indirectly (Ojogwu and Alutu, 2009). To achieve complete growth in the areas of cognition, emotion, and movement of students, as indicated by Ayeni and Adelabu (2012), an educational institution must have a conducive learning environment. As a result, effective management of school physical facilities is essential in order to make the school a pleasant, safe, and comfortable environment. This will increase students' enthusiasm to attend classes and their willingness to participate fully in both academic and extracurricular activities (Adeboyeje, 2000).

That a learning environment is conducive means an atmosphere free of both physical and mental constraint that allows for an uninhibited sharing of opinions (Ekeh & Venketsamy, 2020). In Khalid (2008), a conducive learning environment is described as one that meets the needs of its participants not just in terms of numeracy and literacy acquisition, but also in terms of linking the group's economic and occupational demands to literacy learning activities. The creation of a conducive learning environment enhances student’s abilities to learn to their potential (Banditvilai, 2016). According to McLaughlin and Talbert (2006), school environment has a great impact in the wellbeing of students and communities. An atmosphere that is conducive for learning consists of suitable amenities that facilitate and increase quality learning outcomes while also preventing dropouts. (Ogedi & Obiano, 2017). University as a place to provide services

to fulfil the needs of student's is measured not only by the quality of teaching but also to the state of facilities (Muhamad-shah *et al.*, 2016).

The role of higher education is primarily aimed at human and social development realized by identifying, training and providing the skilled and innovative students wherever required, based on continuously changing demand environments (Umar *et al.*, 2019). Consequently, quality of academic delivery serves as a prime significant factor in realizing effective roles of higher education necessitating continuous monitoring and enhancement of academic delivery. One of the goals of a university's mission is to maintain a learning society capable of understanding and dealing responsibly with itself and the entire world (McGowen, 2007). In attaining the goal, being efficient and effective in the provision of the services is required from the University is of utmost importance. Most Universities make efforts to achieve the efficiency and effectiveness in their educational services by prudently investing in things like facilities, human resources, education system and student according to Vidalakis *et al.* (2013). Infrastructural facilities have for long been thought of as a crucial element of university campuses (Mbazor *et al*., 2018).

Campus Infrastructure is a set of fundamental facilities, services and systems that support the academic activities (http://dictionary.reference.com). This include buildings, landscaping, campus lighting, electrical and data distribution, vehicular and pedestrian circulation, potable water, sewage and so on. Universities invest in facilities not only to improve the quality of the academic services provided, but also to suit the academic expectations of the students and make their experience in the University meaningful (Mirahmi *et al*., 2011). Facilities, like people, technology, finance, and time, are an organizational resource (Isa &Yusoff, 2015). Facilities support the organization's

success by providing all of the essential assistance so that it may run its operations smoothly. Improving the quality of work life is one of these strategic tasks and contributions. Facilities are productivity instruments; as a result, this greater integration of facilities opens up significant prospects for gaining a competitive edge (Hallosten, 2016).

Mbazor *et al*. (2018) stated that infrastructural facilities are important to the overall organisational performance of universities. Besides the fact that such facilities provide a healthy learning environment for students, they are also expected to engender a safe and conducive working environment for the employees of the Universities. One of the most key elements that must be present in order to ensure that the students, who are the main reason of these higher education institutions, are satisfied and get excellent academic assistance for a nice time on campus, is facilities (Gruber *et al.*, 2010). Thus, academic facilities and student satisfaction are strongly intertwined and cannot be easily separated or ignored.

Ilias *et al*. (2008), maintained that students' perceptions of teaching and learning, teaching and learning support facilities like library, computer and lab facilities, and also the learning environment (lecture rooms, laboratories, social space and University buildings) are the major factors that could affect satisfaction level. Others are external factors of being a student, such as transportation, as well as support facilities (health facilities, student housing, and student services). The ability an institution has to provide and manage these would enable it to meet student expectations and gain competitive advantage. to provide students with high-quality services, the university must handle all aspects of the student's interaction with all of the services available (Banwet and Datta, 2003). Thus, a strategy of continuous improvement with regard to service quality is very important (Muhamad-shah *et al.*, 2016).

1.2 Statement of the Research Problem

In Nigeria, universities campuses have been regarded as uninviting, unproductive, unappealing, and unhygienic, with deteriorated and decaying infrastructure (Mbazor *et al*., 2018). The decayed and dilapidated infrastructural facilities will have significant impact on teaching and learning quality. As a result, the goals and objectives outlined in the National Policy on Education are significantly jeopardized (Ojogwu and Alutu, 2009).

Sabiu (2018) reported that the National Association of Nigerian Students (NANS) Kaduna Polytechnic chapter declared the school as no longer conducive for learning due to the rate of dilapidation of the school hostels. Also, another report of students' protests at Yaba College of Technology by Sahara reporters (2019), where the students declared the school facilities no longer conducive for learning and demanding improved learning environment. By implication, these reports of students' protests, whereby they engage the school management on the state of campus facilities and their request on the need of facilities conducive to learning, show the students are more aware of their right to quality education.

An anecdotal report that students and staff at the Federal University of Technology Minna, Gidan-Kwano campus are seen around stair case areas, around Information Technology Services (ITS) building and along walk ways with smart phone and laptops searching for internet access. Also, students at the University complain of inadequacy and inefficiency of sanitary provisions, some students and staffs request for free lift instead of using the bus park. These observations raised concerns about the effectiveness and efficiency of the infrastructural facilities in supporting the activities of its users. Hence, this study focuses on assessing campus infrastructure performance

using conduciveness as a tool. To guide the study, the following research questions were posed:

1. What is the condition of infrastructural facilities and services available on campus?
2. What makes campus infrastructural facilities and services conducive?
3. How conducive are the available infrastructure for the users?
4. How can the infrastructural facilities and services be improved?

1.3 Aim and Objective

This study aims at assessing the conduciveness of campus infrastructure using user's perception at Gidan-Kwano campus of the Federal University of Technology, Minna with a view to improve on the quality of teaching and learning. The study is set to achieve this by using the objectives to:

1. Investigate the condition of infrastructural facilities and services provided at Federal University of Technology, Minna Gidan Kwano campus
2. Identify the measures for conduciveness of campus infrastructural facilities
3. Investigate the extent of conduciveness of campus infrastructural facilities and services at the Federal University of Technology, Minna Gidan-Kwano.
4. Suggest ways to improve the infrastructural facilities and services for quality teaching and learning.

1.4 Justification for the Study

The provision of a conducive environment for teaching and learning is part of the educational sector's long-term development strategy for high-quality sustainable practices (Zen *et al*., 2014). It is mentioned in the work of Mirahmi *et al*. (2011) that to improve the quality of learning outcome, the environment in which the students are educated must be conducive to the organization and correctly operating. The importance of core competences for the facilities manager in maintaining and assist the learning process was stressed to support that outcome.

More local study on user experiences with facilities is needed due to a deficiency of knowledge of the state of the physical surroundings that have an indirect impact on student performance (Zen *et al.,* 2014). In Nigeria, the growing number of students, may have negative consequences on the condition of facilities, which may influence students' patronage if they are dissatisfied with the facilities and services. (Oluwunmi *et al*., 2017). Furthermore, there is need to assess how the facilities perform in order to assess their condition and increase their effectiveness and efficacy (Yusoff *et al*., 2017). The need for learning environment evaluation stems from a desire to collect evidence that can influence future decisions.

Research works on infrastructural facilities and services and quality of teaching and learning have gathered attention (Schneider, 2002; Price, 2003; Riley *et al.* 2010; Akhihiero, 2011; Khurshid and Arshad, 2012; Vidalakis *et al*., 2013; Afework and Asfaw, 2014; Chonjo, 2018). The attention tends toward users' satisfaction with the facilities but conduciveness of the facilities is rarely measured. Therefore, the assessment of the learning environment's conduciveness based on user perceptions would aid in determining the entire performance of the campus society, which would

include not only the institution's functions but also the students' quality of life and leisure activities, as well as the whole campus environment (Zen *et al.*, 2014).

This study shall help improve infrastructural facilities and services, and its management. This research, if implemented, shall also aid University facilities managers to plan ahead of time and set goals to improve the standard of the infrastructural facilities and services available and encourage the top management on the translation of sustainable efforts into the operational activities of the University's facilities, services, and infrastructures, which indirectly contribute to the quality of teaching provided by lecturers and learning to students.

1.5 Scope and Limitation of the Study

The scope of this research covers user's perspective in assessing the performance of campus infrastructural facilities and services by using conduciveness as a tool. The research covers the infrastructural facilities and services such as educational buildings, building connectivity, library, laboratory, accommodation, health care facilities, lavatories, recreational facilities, campus transportation and internet facilities provided at Gidan Kwano campus of Federal University ofTechnology Minna.

This study is limited to Gidan Kwano, the main campus of Federal University of Technology Minna, because it is the main campus of the university and it currently comprises six out of Ten schools. Construction is ongoing for the other four schools on the same campus. This indicates the intention of the university management to site all ten schools on Gidan kwano campus. The ongoing construction is been sponsored by Tetfund.

1.6 Definition of Terms

Campus: It is a term for a building that is used for college students' education and living quarters (Isiaka and Siong, 2008).

Infrastructure: Any physical structure or support service that is designed to develop and support the learning environment's correct functioning (Anand *et al*., 2020).

Conduciveness: The state, quality, or condition of being conducive. (Reinink, 2004)

Assessment: the process of thinking about or inspecting anything in order to measure its value, quality, significance, scope, or condition (Atkin and Brookes, 2003).

User Perspective: This represents the opinion or observation of a client or a customer (Staff and Students) to whom the facility is delivering its services (Tucker and Smith, 2008).

CHAPTER TWO

2.0 LITERATURE REVEIW

2.1 University Campus Environment

A university campus is an environment that supports the essential operations of universities, and a university is a single society created as an intellectual community (Jiwoo and Mikyoung, 2015). The word "university campus" refers to an institutional place created for the purpose of educating and housing college students. (Isiaka and Siong, 2008). It is a location where a variety of activities, such as education, research, recreation, residential living, and cultural activities, take place in one's daily life. It also comprises the linked area's building and other physical aspects such as courtyards and spaces in between buildings (Shuhana *et al*., 2007). Therefore, a campus environment can be said to be an intellectual community for learning and living created to support the core business activities of the higher institution.

The physical as well as psychological traits of schools that are highly sensitive to changes are reflected in the school environment, which provides the required conditions for passing and receiving of knowledge. (Junggle, 2003). Olutola (2008) proposed that a school learning environment that comprises lecture theatre, administrative block, circulation, and convenience areas, as well as accessories, is critical for enabling teaching and learning. In the opinion of some Cohen (2006), how qualitative and school life experience is defined by the learning environment. It reflects social conventions, objectives, values, and interpersonal interactions, leadership methods, teaching, learning as well as organizational structures, and is built on patterns of school life experiences. A healthy, long-term educational atmosphere encourages youth development and learning, which is essential for a productive, contributing, and fulfilling life.

2.2 Campus Infrastructure

Fagbohunka (2017) defined infrastructure as the basic amenities and systems that serve a country, city, or region, as well as all services and all facilities that are required for the economic activities to function. Several concepts have been used to explain infrastructure, according to the literature. Among such concepts are the 'school plant', 'learning resources', 'physical resources' and 'educational resources' to mention a few (Akhihiero, 2011). In specific terms, Akhihiero (2011) described infrastructure as every instructional policy's operational input and contains essential elements for teaching and learning. Any physical structure and support service made available to establish and support the appropriate functioning of the learning environment is referred to as infrastructure (Chakacha *et al*, 2014). The aim is to create support for students' learning and teachers' teaching environment, and visitors alike. Insufficient school facilities may make it difficult for students to perceive a clear emphasis on academic goals, and the learning atmosphere is less likely to be considered organized and competent (Uline and Moran, 2008). Infrastructure plays a critical part in an economy's growth process, as it increases productiveness and so resulting in a higher production potential in the future (Fagbohunka, 2017).

As a campus town or community, the University provides essential amenities and services such as residential, medical, commuting, recreational opportunities, and security to its members, that is, faculties, students and staffs (Aldosary and Nahiduzzaman, 2011). Universities require a wide range of facilities, which will differ from one institution to the next depending on the requirements of the courses offered. Administrative structures, lecture theatre, student and staff housing, offices, libraries, research laboratories, workshops, refectories, playgrounds, and other support facilities are all examples of what a university's facilities may have (Gruber *et al.,* 2010). Sapri *et*

al., 2009 listed the infrastructure for higher learning institutions include administrative and academic buildings, residential halls, food facilities, sports facilities, and relaxation centres. Specifically, lecture halls, libraries, and laboratories are examples of the main facilities needed to support curricular learning outcomes. According to Zen et al., (2014) sports centres and the natural social interaction spaces are two of the most important facilities for supporting extracurricular social contact; health centres and hostels are the most important facilities for providing basic living amenities (Zen *et al.,* 2014).

University facilities, as well as the manner at which they are managed, play a significant part in attaining the goals of the university by providing students and employees a conducive environment to learn and work (Kärnä *et al.,* 2013). Furthermore, university amenities have a significant impact on students' decision-making when a university is to be selected (Price *et al.,* 2003) because quality facilities have been discovered to have a significant influence on studying (Lewis, 2000; Tanner, 2009). The campus facilities are another important aspect that influences students' perceptions of a university's reputation (Nguyen and LeBlanc, 2001) while unsuitable facilities, on the other hand, have been confirmed may pose a risk and lower motivation in students (Hassanbeigi and Askari, 2010).

2.2.1 Campus infrastructure and quality of teaching and learning

The location, structure, furnishing, and equipment that contribute to a conducive learning environment and high-quality education for learners are referred to as campus infrastructure. Quality of education is determined not only by the performance of instructors in their duties, but also by the proper coordination of the school environment (Chuma, 2012). A well-designed school setting is thought to aid in achieving intended

educational outcomes through effective teaching and learning processes. The learning facilities quality at a school has a positive correlation with the quality of teaching and learning activities, which leads to the accomplishment of set goals. Comfortable classrooms and making available of instructional resources promote teachers' performance of instructional duty and students' learning outcomes, while students' longevity is determined by the building and furnishing quality.

Only in a campus environment conducive to teaching and learning setting can learners' whole growth in the mental, psychological and emotional areas of learning take place (Ayeni and Adelabu, 2012)**.** The provision of suitable and appropriate school physical facilities is essential in the educational process, and the location of a school defines its academic standard to a great extent. The campus environment should encourage, motivate, and reinforce students' attendance. Teachers' efficacy and students' academic achievement benefit from a comfortable classroom temperature and low noise level.

2.2.2 The influence of infrastructural facilities in promoting quality education in universities

Qualitative University education constitutes the pivot on which the development of any nation is based (Subair *et al*., 2012). Therefore, proper and correct acquisition of knowledge by the citizens of any nation is fundamental to its growth and development. The need for infrastructural support was highlighted by Benya (2001) and Subair (2008) who said, high quality University education and training requires that required infrastructure be provided by the institution. The availability or lack of physical facilities, as well as the entire environment in which learning occur, have a direct impact on the quality of education obtained by students (Asiabaka, 2008).

All students deserve safe, technology-ready facilities designed for learning and adequate decent facilities, structured around their learning needs. More importantly, completion rate and satisfaction with the University programmes are closely related to the infrastructure that can be provided. Students' success depends on school physical structures that can sufficiently provide a suitable learning environment. The bridge between good infrastructure and student learning that effective is of vital necessity. Looking closely at a university system, there is no doubt that infrastructure play a great role in the welfare of students and the result is motivation to learning (Subair *et al*.2012).

A vital factor affecting the quality of teaching and learning is conducive environment (Farid *et al*, 2020). According to Daigneau (2006), infrastructural facilities have the following effects on the promotion of quality education in higher education:

1. Availability of a physical environment that is conducive to learning. The development and structuring of the infrastructural facilities have been established as an avenue where the complete academic process can be provided. The higher the infrastructural facilities, the higher the quality of the educational process.
2. Creates a visual representation of the institution's quality and capacity. When visiting a campus, the first point of notice and utilize as a criterion for the institution's quality and competency is the facilities. As a result, infrastructural facilities are necessary since they improve the visual quality of education at institutions of higher learning.
3. Establishment of an "academic" community. The main stakeholders in an institution of higher learning, namely students, academic and non-academic staff, congregate around and within the infrastructural facilities, constituting a

campus. As a result, infrastructural facilities enable the formation of an academic community, which is critical in enhancing the quality of higher education.

4. Facilities are an important part of any educational organization. This is because facilities make a significant contribution to crucial factors such as the development of comprehensive curricula/scholarly materials, the recruitment of outstanding teachers, and the development of exceptional and motivated students, all of which have a direct impact on the promotion of high-quality education in universities.
5. The physical environment of a college or university reflects the institution's goals and ideals. The way infrastructural facilities have been prioritized and valued reflects how much a particular higher education institution prioritizes excellence in its curriculum. “Form follows function,” as the saying goes, means that the facilities influence and impact how the university functions.
6. Educational outcomes are directly influenced by the state of the buildings and grounds. Infrastructural facilities help the learning process, and depending on the administration's priorities, they can create a safe, secure, and comfortable environment, ensuring the University's supply of high-quality education.
7. Assists teachers in providing high-quality instruction.
8. The availability of efficient infrastructural facilities such as theatrical speakers, modern projectors, and conference room supporting materials, among other things, allows lecturers to focus their efforts more effectively and not waste time explaining things awkwardly since those tools are otherwise unavailable.

As a result, it is possible to agree that infrastructural facilities have high influence in promoting high-quality education in universities.

2.3 Conducive Learning Environment

The conceptualization and design of a university campus is usually well taught out in a manner to create an attractive, appealing, conducive ambiance that is both serene and beautiful in order to foster the ideal setting for learning (Uduma-Olugu, *et al*., 2019). It has been discovered that a conducive learning environment is important for effective passage of knowledge. Khalid (2008) defines conducive learning environment as one that meets the needs of its participants not just in terms of numeracy and literacy acquisition, but also in terms of linking the group's economic and occupational demands to literacy learning activities. A conducive learning environment is an environment immune from mental and emotional intimidations by so doing, making way for free flow of information. It is critical to create an atmosphere that stimulates and encourages teaching, learning, and research innovation (Olanrewaju *et al.* 2010). Therefore, a conducive teaching and learning environment, in the researcher's view, can be said to be a physical and emotional surrounding and conditions that is favourable to teaching and learning.

The creation of a conducive learning environment enhances student's abilities to learn to their potential (Banditvilai, 2016). Also, Mbazor *et al*. (2018) stated that creating comfortable facilities in the University environment and maintaining them to ensure efficient performance will provide a supportive setting for a high-quality education. According to McLaughlin and Talbert (2010), school environment has a great impact in the wellbeing of students and communities. Over the last decade, research studies from a variety of historically underserved sectors (such as risk reduction, health promotion, character education, marital health, and social-emotional learning) have established research-based school improvement principles that consistently generate safe, caring, responsive, and participative schools (Sanoff, 2009). If the learning environment is not

conducive to learning for students, then it breeds drop outs or affects the students' success.

2.4 Facilities Considerations for Conducive Learning Environment

Educational facilities allow teachers to complete their duties while also assisting students in learning and succeeding. Physical factors such as human comfort (visual, thermal, and auditory), spatial design, furniture and finishing quality, and safety elements are all significant factors to consider when creating a conducive learning environment (Ahmad *et al.*, 2015). Heating, ventilation, artificial lighting, and cooling are all energy-intensive processes that are necessary for health and comfort (Castaldi, 1982). The building design, the site planning, floor material selection, and the placement of impediment such as water fountains, protruding pipes, fire extinguishers, and electrical floor stubs, can all pose safety risks in schools (Castaldi, 1982). It can be concluded that critical facilities consideration for conducive campus environment include; health, comfort and safety.

A conducive learning environment includes the availability of appropriate facilities that facilitate and enhance quality learning outcomes (Ogedi & Obiano, 2017). Castaldi (1982) opined that when planning school buildings, adequacy, efficiency, and economy should all be considered. According to Ogedi & Obiano (2017), the size, form, operation, and kind of space, as well as environmental control, maintenance and operation, atmosphere, storage, and design, are all important considerations. The Accreditation Board for Engineering and Technology (ABET) mentions that, facilities must be made available, accessible, and upgraded to enable students to achieve student outcomes and to meet program demands in order to provide a conducive learning environment (ABET, 2017).

Kilei (2012) mentioned that Some factors in the school environment that have been proven to have an impact on the teaching-learning process include the provision of sufficient learning facilities and instructional materials, as well as an appropriate classroom climate and an appropriate school location. Therefore, availability, adequacy, efficiency and economy are critical facilities consideration for conducive learning environment.

2.5 Facilities Elements Conducive to Teaching and Learning

The most key elements in terms of health and safety, as mentioned by Earthman (2004) are: Fire safety, portable water, security systems, sufficient lavatories, and a solid emergency system of communication. It is necessary to keep the classroom tidy, well ventilated and spacious enough to allow for unrestricted mobility. Duarte *et al*. (2011) presented absence of basic utilities in schools, such as drinkable water, electricity, sanitary drainage, telephones, or efficient garbage and waste disposal, is closely linked to limited learning opportunities, discrimination, and violence. The study concluded that improvements in school infrastructure and learning environments are not a luxury but a need. The school environmental conditions (indoor and outdoor) play crucial roles in health, performance, and behaviour of students (Vilcekova *et al*., 2017). The elements of facilities conducive to teaching and learning are described below.

2.5.1 Indoor environmental quality (IEQ) in an educational facility

Indoor Environmental Quality (IEQ) is a critical factor in determining how effective learning is (Nasir *et al.* 2011). Lighting, humidity, and temperature, as well as seating, colours, ventilation, and acoustics, are all essential factors in enhancing learning outcome and facility performance (Castaldi, 1982; Lackney, 1999). Weather has a significant impact on the indoor environment's comfort. They become one of the factors that contribute to a building's overall discomfort. Increased temperature and humidity,

for example, will result in an increase in body temperature as well as a feeling of stickiness and unease. A comfortable indoor climate is essential for the productivity of the learners (Reinink, 2004).

Many building-related elements have an impact on the inhabitants' well-being. Water and humidity have a significant impact on public health. Poor air quality has been identified by many experts as a source of health issues, with moisture being the leading cause of school absences (Issa *et al.*, 2011 and Kielb *et al.*, 2015). According to major international standards (ASHREA 55-2010, EN 15251:2007, ISO 7730:2005) building IEQ is determined by three comfort factors (Thermal, Visual, Acoustic) and the Indoor Air Quality (IAQ).

2.5.1.1 Thermal comfort in an educational facility

The purpose of thermal comfort is to create a "comfort zone," or a range of thermal sensations that the majority (80%) of normal healthy people can tolerate, which is accomplished when the inhabitants have a good feeling (Aghniaey, *et al.*, 2019). Thermal comfort can be defined as a mental condition that is agreeable with the conditions of the environment (NUC, 2004). Air temperature, relative humidity, average radiant temperature, and air speed are climatic comfort elements, whereas activity and clothes are personal comfort elements.

The temperature within a structure is marginally greater than the outside temperature. The following are three of the factors that contribute to a building's indoor temperature rise:

i. The heat emitted by electrical and appliances lights;

ii. Heat admitted from the outside environment through the building's roofs, windows, and walls;

iii. The air from the building surrounding which is hot.

Mechanical or natural ventilation was adopted to combat the problem of rising temperatures.

Humidity refers to the amount of water vapour present in a given space (Kim *et al.*, 2017). Absolute humidity is defined as the density of water vapour per unit volume. The amount of moisture in the air has an impact on the temperature. The more moisture is trapped in the air, the hotter it is. Gender, body shape (fat, Dubois area), and race are among the other elements that influence comfort.

Measuring thermal comfort can be accomplished in a variety of ways. The Humphreys and Nicol scale, seven-point ASHRAE scale and the Bedford scale, and are among these. The scale is used to get records of human inclinations (subjects) in terms of their surroundings. Thermal comfort study continually expands, involving kind of structures such as classrooms, industries, and the room environment, each of which has its own unique nature of comfort (Nasir *et al*. 2011). Generally, the acceptable upper and lower limit of thermal comfort suggest that the comfort zone lies somewhere between 22^{o}C - 27^{o}C corrected effective temperature with air velocity of 0.15m/s to 1.5m/s (NUC, 2004). The corrected effective temperature scale is the most widely used since it handles the four independent variables simultaneously: these are temperature, humidity, air movement and radiation.

2.5.1.2 Noise in an educational facility

Noise can be a serious problem on a campus (NUC, 2004). A scientific definition of noise pollution is a signal that provides no information and whose strength varies substantially over time, but a generally accepted definition is a sound that is disliked and that cause pain. Excessive noise can be startling. According to the definition of noise pollution, noise is described as unwelcome sound psychologically (Nasir et al. 2011). This is when sound is reproduced in situations where it is not suitable with more than 80 decibels (dB). Acceptable internal noise level in decibels (dB) across locations by NUC (2004), include: Lecture room (35-40); Classrooms (45-50); Library (35-40) Conference (40-45) and Student Bedroom (35-40). Furthermore, noise pollution has an influence on the ears (auditory effect) as well as the outer ear (non-auditory effect). Excessively loud noise in excess of 120 decibels (dB) can cause irreversibly impair hearing and destroy the delicate hearing bones. It also can lead to nausea and vomit, personal pain, speech disturbances and dizziness, and behaviour that can devaluate the quality and efficiency of their activity. They also feel anxious, often easily tired, and irritable.

Providing sound-absorbing materials that can be transferred by air or activity is one way to achieve a pleasant sound level. By appropriate materials usage and good design during construction, noise can be reduced. Ensure that rooms are remote from sources of notice, also by installing two layers of windows, and choose wall and floor material with a high sound attenuation index, among other suggestions for reducing noise during the design process.

2.5.1.3 Lighting in an educational facility

Students must have appropriate lighting in order to learn and thrive in their learning environment (Douglas, 2006). Most activities carried out in interior spaces require good

level of natural illumination (NUC, 2004). Excessive brightness of a light source in the field of vision causes glare and thus is a source of discomfort. Humans are affected by lighting in remarkable ways. Visual acuity, glandular and metabolic activity, and biological rhythms are among the physiological processes affected by poor lighting. Lighting can influence depression and mood changes on an emotional level (Gilavand, 2016). Eye strain, impaired vision, and headaches can all be caused by poor illumination. These distractions have a natural effect on a student's capacity to concentrate cognitively on learning tasks (Lackney and James, 1999). The way we light our learning environments is an important factor in learning. It has an impact on one's mental attitude, attendance, and performance (Lyons, 2002).

2.5.1.4 Indoor air quality (IAQ) in an educational facility

Respiratory issues appear to be the leading cause of absenteeism in indoor environments. According to the US Environmental Protection Agency, asthma attacks in students cause more than 10 million days of missed school per year in the United States (Gessner, 2021). Also, Simons *et al*. (2010), a study sponsored by the Centres for Disease Control in New York found that Mould growth and the development of dust mites are both caused by moisture and dampness, which can induce allergic respiratory symptoms and infection. Particulates, pollutants, and allergens can gather within school buildings due to poor ventilation, and insufficient circulation of air can enhance the spread of respiratory illnesses. For example, a survey in Idaho and Washington of 409 classrooms (Shendell *et al*. 2004) discovered that the increase of 10-20 percent absentee is observed from students in rooms with poor ventilation.

2.5.2 Campus natural open spaces

Social interaction, accessibility, safety, security and campus entertainment are all provided by the physical shape of a university's open spaces (Uduma-Olugu *et al*., 2019). University students need a supportive physical atmosphere when conducting their activities in the campus area, in particular in the open space or outdoor area (Mahendra & Octarino, 2018). According to recent studies on campus learning environments, students are seeking alternate study venues on campus more than ever before (Peker & Ataöv, 2020). Duarte *et al.* 2011 and Sharif, 2014 emphasize the importance of recreational and physical education programs in schools to help students balance their academic work. Bell and Dyment (2008) suggest natural outdoor learning to encourage health and wellbeing and to be an important impact on the factor of multifaceted, school- based strategies of health promotion.

One of the main factors that decide the quality of life is leisure and recreation (Luo, 2018). There are several common leisure and recreational facilities where people can spend time while also developing skills and competences. These facilities include community space for social interaction, public space, parks, green spaces, playground and sport facilities, and so on, are a vital aspect of the residents' daily lives on campus (Pavlova *et al*., 2017). Nature and green environment create a conducive learning and teaching environment for campuses while integration among the building interior, the walkways, and the exterior landscape should be improved for a more positive visual impact (Kasim and Ujang, 2014). Vertical gardens and eco-friendly trees in courtyards could be constructed in urban places where there is no enough land and green areas are sparse to give shade, natural cooling, and nice vistas.

CHAPTER THREE

3.0 RESEARCH METHODOLOGY

3.1 Research Design

The purpose of a research design is to create a framework for a study. In research design Process, the research design choice is a crucial decision since it defines how relevant data for a study will be gathered, and the process comprises several interconnected decisions (Sileyew, 2019). The research design for this study is descriptive.

Descriptive study tries to characterize a population, circumstance, or phenomenon in an exact and systematic way (scribbr.com). It can answer the questions of what, where, when, and how, but not why. A case study or surveys are two options for conducting descriptive research. A case study is a deep and in-depth research of a few cases, whereas a survey is the collecting of data on a large number of cases, each of which is researched exclusively on the specific element under examination (Harrison *et al*, 2017). This research adopted a survey because surveys are used to gather or gain knowledge in fields such as social research and demography. Survey research is often used to assess thoughts, opinions and feelings.

3.2 Area of the Study

The study was carried out at Federal University of Technology, Minna, Niger State of Nigeria. The geo-reference of the area is on coordinate lines of 6.4492^0E, 9.5336^0N. Federal University of Technology, Minna is a federal government funded university situated in the North central Zone. The institution is a specialized University with a vision to be a world-class university and Nigeria's foremost provider of capacity-building and service delivery. The University is dedicated to developing a competent and innovative workforce capable of converting the country's natural resources into

goods and services through entrepreneurship and information and communication technologies (ICT), with the goal of improving the economy and consequently the quality of life of the citizens. The University has 10 schools and 45 departments.

Plate I: Aerial view of Gidan-Kwano campus of Federal University of Technology, Minna

The University currently has two campuses (Gidan-Kwano and Bosso campuses). Gidan-kwano campus which is the main campus is sited on a 10,650 hectares of land situated along Minna - Kataeregi - Bida road. The campus contains six schools; School of Agriculture and Agricultural Technology (SAAT), School of Engineering and Engineering Technology (SEET), School of Entrepreneur and Management Technology (SEMT), School of Environmental Technology (SET), School of Information and Communication Technology (SICT), and School of Infrastructure, Process Engineering and Technology (SIPET). While Bosso campus houses Schools of Life Science (SLS), School of Physical science (SPS), School of Science and Technology Education (SSTE) and School of Postgraduate Studies (SPS).

Federal University of Technology, Minna is adopted for this research because of the anecdotal report from the university coupled with the restrictions to movement caused by the pandemic. The Gidan-Kwano campus is selected because it is where the seat of the school management is situated and contains six out of ten schools which the University is made up of.

3.3 Research Population

According to Mohajan (2018), population is a group of people, subjects or events, with similar qualities in which the researcher is interested. The exact number of individuals in a population is known as population size. For the purposes of this study, the research population is 13,501 comprising the Staffs (Academic and Non-academic) and registered students of the six schools at the Gidan-Kwano campus, Federal University of Technology, Minna for the academic year 2019/2020.

Table 3.1: Research Population

SCHOOL	STUDENTS	STAFF	TOTAL
SAAT	2801	113	2914
SET	3770	143	3913
SEET	1634	86	1720
SEMT	729	52	781
SICT	1134	46	1180
SIPET	2853	140	2993
Total	12921	580	13501

Source: University Establishment Office, 2020.

The researcher obtained the archival data of the population from the Establishment Office of the University.

3.4 Sampling Technique and Size

As Gorard (2003) points out, the goal of sampling is to learn about and draw conclusions about a considerably greater number of cases (population). In this study, stratified random sampling technique was adopted to reach the target population who were students and staff on campus. In sample surveys, stratified sampling is a probability sampling approach that is used. The elements of the target population are separated into various groups or strata, with the elements within each stratum being similar in terms of key survey parameters (Parson, 2017). The strata considered in this research are (1) Students and (2) Staffs.

The sample size for the study is calculated using Slovin's Formula (Mathebula, 2020);

$$n = \frac{N}{1+N\,(e)^2} \tag{3.1}$$

Where

n = the required sample size;

N = the finite population size; and

e = the level of significance in this case 0.05 was used

$$\frac{13501}{1+13501\,(0.05)^2} = 388$$

Therefore, a total of 388 respondents were adopted as the sample size for the study and same number of questionnaires was distributed among staff and students in the University. 315 of the questionnaires were retrieved which forms a response rate of81.19 % of the distributed questionnaires. This response rate is acceptable according to response rate of 50% or more in a survey is considered excellent (Fox, 2020). The number of respondent based on each stratification are 377from the students while that of the Staffs are 16 respondents.

3.5 Data Collection Method and Instruments

The study used a structured questionnaire as the instrument of data collection. The questionnaire was self-administered to the respondents in person. A letter of request of students' data was submitted to the office of the Registrar through the Head, Department of Building, Federal University of Technology, Minna to aid the researcher in accessing the archival information from the Establishment Office of the University.

Literatures obtained from journals, past projects, theses and internet materials relevant to conduciveness of campus infrastructural facilities and services for teaching and learning were reviewed. Appropriate referencing was done to acknowledge the authors of all the literature works.

3.6 Design Questionnaire

The structured questionnaire was developed based on the identified performance criteria obtained from review of the literature and an interview with staff of university works Department. The questionnaire contains ranges of infrastructural facilities consisting of; building structures, building access and connections, lecture theatre and halls, building external landscapes, the hostels, health centre and its services. Also, transportation and bus services, sports facilities and internet connectivity that are converted into item variables (Zen *et al.*, 2014). The variables were used for the five Likert Scale for the items consisting of variables on the conduciveness the infrastructure on the campus. The five units of the Likert Scale that is used are: 1. Strongly Disagree, 2. Disagree, 3. No Opinion, 4. Agree, 5. Strongly Agree. Also, open ended questions were made for more suggestions.

3.7 Validity of the Instrument

Copies of the questionnaire were submitted to three academic staffs from the Department of Building, Federal University of Technology, Minna who were requested to comment and make corrections on the instrument. The final copies of the instrument were produced by including the corrections suggested by the experts.

3.8 Reliability of the Instrument

Reliability of the instrument used was established using the split half method. The split-half approach is used to assess a test internal consistency, such as psychometric tests and questionnaires. It assesses the extent to which all parts of the test have an equal effect on the results. This is accomplished by contrasting the result of one half of a test with the result of the other half (McLeod, 2007). The results of the test were correlated using Cronbach's Alpha statistics (Cronbach and Shavelson 2004). Cluster A of the instrument which elicited information on condition of infrastructural facilities and services had a reliability coefficient of .81, cluster B which elicited information on measures of conducive campus infrastructural facilities has reliability coefficient of .85 while cluster C which was on extent of conduciveness of infrastructural facilities and services has reliability co-efficient of .83. Typically, reliability coefficients are considered to be acceptable if they are above 0.80 (Mohajan, 2017).

3.9 Data Analysis

Objective 1 data was analysed using Descriptive analysis. This includes Mean score, Standard Deviation and Ranking.

Table 3.2: Benchmark for the Interpretation of the Mean Score Index

S/N	Score Range	Interpretation
1	1.0 – 1.49	Very Poor
2	1.50 – 2.49	Poor
3	2.50 – 3.49	Fair
4	3.50 – 4.49	Good
5	4.50 – 5.00	Very Good

ASCE Facilities Condition Grade

Objective 2 data was analysed using Relative Importance Index (RII), the formula is given as:

$$RII = (5n_5+4n_4+3n_3+2n_2+1n_1) /5N \quad (3.2)$$

n1 is the number of criteria with Strongly Disagree
n2 is the number of criteria with Disagree
n3 is the number with No Opinion
n4 is the number with Agree
n5 is the number of criteria with Strongly Agree

N is the total number of questionnaires filled and collected in the area.

Table 3.3: **Benchmark for the Interpretation of the Relative Importance Index**

S/N	**Score Range**	**Interpretation**
1	0.00 – 0.29	Strongly disagree
2	0.30 – 0.49	Disagree
3	0.50 – 0.69	Undecided
4	0.70 – 0.89	Agree
5	0.90 – 1.00	Strong Agree

Field Survey, 2020.

Objective 3 data was analysed using Exploratory Factor analysis. The correlation of each score to the total scale score ('item-total correlation') was measured through Pearson's correlation coefficients. The inferential statistics of Factor Analysis is used as a technique to simplify complex sets of data by analysing the correlations between item variables (Foster, 2001; Tabachnik and Fidel, 2001; Zen *et al.*, 2014). Principle

component analysis of factor analysis was used as an exploratory factor analysis that could yield as many components as there are variables to cover the issues in the study areas, in this case facilities, services and infrastructures' of the Federal University of Technology, Minna campus. The result of the survey was coded and analysed using the SPSS (Statistical Software of Social Science).

The conduciveness level was based on the four-level conduciveness scale developed by Zen *et al.* (2014). The mean item total correlation coefficient of each element was used to generate the four level conduciveness measurements of the Conducive Campus Environment: Not Conducive, Less Conducive, Moderate Conducive, and Conducive.

This was based on the Pearson correlation coefficient (ρ), which was inspired by Swiscow's (1997) study, which used the Pearson correlation coefficient to establish the Swisco criteria (Table 3.4).

Table 3.4: The Level of Conduciveness

Pearson correlation coefficient (ρ)	Pearson Category	Swiscow criteria (1997)	Level of Conduciveness
0.00 – 0.39	Weak	Weak correlation	Not Conducive
0.40 – 0.59	Moderate	Moderate correlation	Less Conducive
0.60 – 0.79	Strong	Strong correlation	Moderate Conducive
0.80 – 1.0	Very Strong	Very Strong correlation	Conducive

Zen *et al.*, 2014.

The application of the developed scale measurement which uses Pearson correlation coefficient is widely used in health measurement and psychiatric investigations research (Deon, 2011) and also applied in facilities research (Zen *et al*, 2014). Objective 4 was achieved by analysing the open-ended question using content analysis.

3.10 Summary of Data Analysis for Specific Objectives

The summary of the Data analysis for specific objective is shown in Table 3.5.

Table 3.5: Summary of Data Analysis for Specific Objectives

S/N	Objectives	Instrument for data collection	Data analysis
1	To evaluate the condition of infrastructural facilities provided at Federal University of Technology, Minna Gidan-Kwano campus.	Structured questionnaire	Descriptive Analysis (Mean Items Score)
2	To identify the measures for conducive campus infrastructural facilities.	Structured questionnaire	Relative Importance Index and Content Analysis
3	To investigate the extent of conduciveness of campus infrastructural facilities at Federal University of Technology, Minna Gidan-Kwano.	Structured questionnaire only	Factor Analysis and Mean Score
4	To suggest ways to improve the infrastructural facilities and services for quality teaching and learning	Open ended question	Content Analysis

Field Survey, 2020.

CHAPTER FOUR

4.0 RESULTS AND DISCUSSION

4.1 Characteristics of the Respondents

In order to accomplish the aim and the stated research objectives, characteristics of the respondent were put into consideration, to determine the status of the respondents.

Table 4.1: **Characteristics of the Respondents**

Characteristics of Respondents	Frequency	Percentage
Respondent		
Students	273	86.67
Staff	42	13.33
Total	**315**	**100**
Department / School		
SAAT	61	19.37
SET	90	28.57
SEET	48	15.24
SIPET	63	20
SICT	30	9.52
SEMT	23	7.3
Total	**315**	**100**
Age		
61-20	80	25.4
21-30	193	61.27
30-40	37	11.75
41 Above	5	1.59
Total	**315**	**100**
Gender		
Male	205	65.08
Female	110	34.92
Total	**315**	**100**
Qualification		
Undergraduate	241	76.51
Graduate	42	13.33
Masters	29	9.21
PhD	3	0.95
Total	**315**	**100**
Years spent		
Less than 3years	25	7.94
3-5 years	225	71.43
5-10 years	45	14.29
More than 10 years	20	6.35
Total	**315**	**100**

Table 4.1 shows that majority of the respondents with 86.67% were student and 13.33% of the respondents were staff of Federal University of Technology, Minna. It was also observed that the respondents were from various school/department. 19.37% of the respondents were from SAAT, 28.57% were from SET, 15.24% of the respondents were from SEET, 20.0% of the respondents were from SIPET, 9.52% of the respondents were from SICT and 7.30% of the respondents were from SEMT. It was further observed that 25.40% of the respondents were between 16-20 years, 61.27% of the respondents were between 21-30 years, 11.75% of the respondents were between the ages of 31-40 years while 1.59% of the respondents were above 40 years. This signifies that majority of the respondent were within 21-30 which is an active age of students of tertiary institution in Nigeria. The Table shows further that 65.08% of the respondents were male and 34.92% were female.

It is also observed from Table 4.1 that majority of the respondents with 76.51% are undergraduate students, 13.33% are graduates, 9.21% are postgraduates while 0.95% are PhD holders. It was also seen that 7.94% of the respondents have spent 3 years in the campus, 71.43% have spent between 3-5 years, 14.29% have spent between 5-10 years while 6.35% of the respondents have spent more than 10 years in the campus.

The above illustrates that all the respondents have experienced the infrastructural facilities and services provided at the campus over a time and they qualify to be referred to as users, therefore their opinion could be asked about their experience with the infrastructural facilities and services in the campus.

4.2 Condition of Infrastructural Facilities and Services provided at Federal University of Technology, Minna Gidan-Kwano Campus

Presented in Table 4.2 is the mean scores, standard deviation, ranking and rating of the perspective of users on the infrastructural facilities and services in Gidan-Kwano campus, Federal University of Technology, Minna. The table revealed that respondents ranked 'Pedestrian Routes' highest with mean value of 3.78.

Table 4.2: Condition of Infrastructural Facilities and Services

S/N	Facilities and Infrastructural Services	Mean	Std. Deviation	Ranking	Rating
1	Pedestrian route	3.78	1.29	1	Good
2	Lecture hall lightning	3.37	1.34	2	Fair
3	Number of recreation centres	3.34	1.22	3	Fair
4	Library services (Books, Internet, Power, Toilets etc.)	3.27	1.15	4	Poor
5	Landscape design	3.20	0.99	5	Poor
6	Library indoor environmental quality	3.16	1.28	6	Poor
7	Health centre environment	3.14	1.04	7	Poor
8	Size of lecture hall	3.09	1.14	8	Poor
9	Health centre service	3.01	1.14	9	Poor
10	Quality of recreation space	3.01	1.19	10	Poor
11	Lecture hall cleanliness	2.98	0.99	10	Poor
12	Hostel service (Power supply Water, internet etc.)	2.92	1.00	12	Poor
13	Clean water supply	2.91	1.08	13	Poor
14	Environment planting coverage	2.90	0.96	14	Poor
15	Laboratory indoor environment quality	2.88	1.12	15	Poor
16	Availability of equipment in the Laboratory	2.83	0.94	16	Poor
17	Indoor space allocation	2.81	1.09	17	Poor
18	Location of health centre	2.79	1.04	18	Poor
19	Lavatory cleanliness	2.77	1.07	19	Poor
20	Sanitation of the open environment	2.75	1.01	20	Poor
21	Hostel indoor environmental quality	2.70	0.84	21	Poor
22	Number of lecture hall	2.42	1.12	22	Very poor
23	Available furniture	2.41	1.09	23	Very poor
24	Bus park environment	2.39	1.06	24	Very poor
25	Indoor noise protection	2.33	1.03	25	Very poor
26	Condition of equipment in the laboratory	2.25	1.09	26	Very poor
27	Availability of equipment in the Laboratory	2.23	0.92	27	Very poor
28	Number of school buses	2.20	1.04	28	Very poor
29	Condition of furniture in the library	2.18	0.96	29	Very poor
30	Access to toilet	2.18	1.00	29	Very poor
31	Condition of hostel toilet	2.10	0.95	31	Very poor
32	Quality of internet service	2.10	1.17	31	Very poor
33	Coverage of internet service	2.04	1.00	33	Very poor
34	Quality of school buses	1.98	1.00	34	Very poor
	Overall	2.72	CV<1		

This is followed by ‘Lecture Hall lightning’ with the mean score of 3.37 and ‘Number of recreation centre’ with the mean value of 3.34 is ranked third. The fourth ranked infrastructural facility is Library Services with mean score of 3.27 while ‘Landscape Design’ is ranked fifth with mean score of 3.20. It is observed that three (3) out of the first five ranked infrastructural facilities and services are outdoor facilities. These are; Pedestrian route, Number of recreation centres and Landscape design. Indoor facility and Service delivery both have one each; these are Lecture Hall Lighting and Library services respectively. At the lower end of the table, ‘Access to Toilet’ and ‘Condition of Furniture in the Library’ both have mean score of 2.18 and are ranked 29th. The Internet facility quality and coverage is ranked 31st. This shows that internet on the campus is not in a favourable condition. The condition of hostel toilet has the mean score of 2.04 which implies that the condition of the Hostel toilet is poor which can pose the students to infection through the usage. Quality of school buses has the lowest mean value of 1.98 which implies that the condition of school buses in Federal University of technology is very poor, which will bring about a very poor service delivery of the buses to the users.

The overall mean score shown in Table 4.2 is 2.72. This shows that the condition of infrastructural facilities and services in Gidan-Kwano campus, Federal University of Technology Minna is classified as ‘FAIR’. This grading is CIRC (Canadian Infrastructure Report Card) and ASCE (American Society of Civil Engineers) developed condition grades to express degrees of physical condition. The difference in standard deviation between the highest and lowest values is less than one, indicating that the data is accurate.

4.3 Measures for Conduciveness of Campus Infrastructural Facilities and Services

This study classifies the measures for conduciveness of campus Infrastructural facilities based on two criteria; consideration and elements.

4.3.1 Considerations for conduciveness of campus infrastructural facilities and services

The considerations for Conduciveness of Campus infrastructural facilities and services at Federal University of Technology, Minna Gidan-Kwano campus as perceived by respondents, that is, the users is presented on Table 4.3. From the table, 'Health' has the highest weighted score of 1548 and RII 0.982 which is ranked 1st and remarked strongly agreed. This means that health is considered mostly among other considerations by the respondents for conduciveness of campus infrastructure. Health is followed by 'Adequacy of facilities' with the weighted score 1541 and RII 0.978 which also signifies strongly agreed and ranked 2nd among the variables. 'Availability' has a weighted score of 1537, RII. 0.976 and also signifies strongly agreed is ranked 3rd. It is observed from the Table 4.3 that 'Quality of Furnishing and Finishing' has the weighted score of 1438 and RII. 0.917 and ranked 12th and 'Economy' which is the least factor with the weighted score of 1437 and RII 0.912 also ranked 13th are the two variables the table.

The analysis shows that all thirteen (13) which is 100% of the tested variables remarked strongly agree. This shows that all of the tested variables are important considerations for conduciveness of campus infrastructural facilities and services on Gidan-Kwano campus, Federal University of Technology Minna.

The open-ended question was responded to by 189 respondents which represent 60% of response rate. All 189 respondents listed sustainability; 163 respondent listed communication.

Table 4.3: **Considerations for Conduciveness of Campus Infrastructural Facilities and Services**

FACILITIES	Weighed Score	RII	Ranking	Remarks
Health	1548	0.982	1st	Strongly Agree
Adequacy of facilities	1541	0.978	2nd	Strongly Agree
Availability	1537	0.976	3rd	Strongly Agree
Safety	1528	0.970	4th	Strongly Agree
Efficiency	1526	0.968	5th	Strongly Agree
Sufficiency	1526	0.968	5th	Strongly Agree
Accessibility	1514	0.962	7th	Strongly Agree
Human Comfort	1510	0.958	8th	Strongly Agree
Spatial planning	1503	0.954	9th	Strongly Agree
Energy	1468	0.932	10th	Strongly Agree
Cleanliness	1465	0.930	11th	Strongly Agree
Quality of furnishing and finishing	1438	0.914	12th	Strongly Agree
Economy	1437	0.912	13th	Strongly Agree

Field Survey, 2020.

4.3.2 Elements of conduciveness of campus infrastructural facilities and services

Table 4.4 showing the elements of conduciveness of campus infrastructure reveal that 'Quality internet network' has the highest weighty score of 1537 with RII 0.975 which ranks 1st and remarked Strongly Agreed, followed by 'Comfortable indoor environment' with the weighty score of 1526, RII 0.969 and ranked 2nd also remarked strongly agreed. Adequate Lavatories with the weighty score of 1525, RII of 0.968 and ranked 3rd which also signify strongly agreed. It is also observed from Table 4.4 that Good communication system with the weighty score of 1360, RII 0.868 is ranked 17th which

signify agreed, it is also seen that Good communication system with the weighty score of 1360, RII 0.855 was ranked 18th among the tested variables.

The outcome of the analysis showed that all the respondents agreed that conducive campus infrastructure is influenced by all the elements indicated in the questionnaire. However, the analysis indicated that the top Five (5) ranked factors which are; Quality Internet Network, Comfortable Indoor Environment, Adequate Laboratory, Comfortable Lighting and Energy (Electricity) respectively, which have direct impact on learning, showed how important these elements are to the respondents for a Conducive Campus Environment.

Table 4.4: Elements of Conduciveness of Campus Infrastructural Facilities and Services

FACILITIES	Weighed Score	RII	Ranking	Remarks
Quality internet network	1537	.975	1st	Strongly Agree
Comfortable indoor environment	1526	.969	2nd	Strongly Agree
Adequate Lavatories	1525	.968	3rd	Strongly Agree
Comfortable lighting	1502	.954	4th	Strongly Agree
Energy(Electricity)	1502	.954	4th	Strongly Agree
Comfortable air movement	1487	.944	6th	Strongly Agree
Cleanliness	1457	.925	7th	Strongly Agree
Beautiful green areas	1457	.925	7th	Strongly Agree
Playground	1457	.925	7th	Strongly Agree
Security system	1446	.918	10th	Strongly Agree
Conducive public space	1435	.911	11th	Strongly Agree
Portable water	1431	.909	12th	Strongly Agree
Fire safety	1427	.906	13th	Strongly Agree
Conducive park	1423	.903	14th	Strongly Agree
Controlled environment	1396	.886	15th	Agree
Comfortable sound	1367	.868	16th	Agree
Good communication system	1360	.863	17th	Agree
Good roads	1346	.855	18th	Agree

Field survey, 2020.

4.4 Conduciveness of Campus Infrastructural Facilities and Services at Federal University of Technology, Minna Gidan-Kwano Campus

A principal component analysis of factor analysis conducted on 65 variables was carried out. According to lever *et al*, 2017, an eigenvalue larger than zero is required for a factor to be retained. The results show that all of the constructs have an eigenvalue larger than 0 and are thus retained. The KMO (Keiser-Meyer-Olkin) Measure of Sampling Adequacy (MSA) value given is 0.86, this is considered to be a distribution value of very good adequacy (Glen, 2016). The result is presented in Appendix 3. There are ten factors identified, these are: Indoor Environment, Natural/Outdoor Environment, Inter-Building Connectivity, Library & Laboratory, Housing facilities, Health facilities, Lavatories, Sport & leisure Facilities, Campus Transportation and Internet connectivity. The ten are retained with total cumulative variance explained of 76.75 %.

4.4.1 Indoor environment

The Indoor Environment is the first component identified in the study, as shown in Table4.4. The Indoor Environment, having a high percentage of variance of 24.21 percent, an Eigenvalue of 14.77 (> 1), and a Cronbach alpha of 0.93. The mean item-total correlation coefficient was 0.59 and it is categorized as Less Conducive. From Table 4.5, the Indoor 'classroom' environment consisting of facilities such as lighting in the lecture room, chairs and table, cleanliness and size of the class room are classified as moderately conducive. Students' comfort, control, attention, access and enjoyment are all directly affected by an Indoor Environment that is moderately conducive and in turn affect students' motivations, concentration and performance (Al Horr, *et al*, 2016). Also, Nviro (2004) reports that the tidier a building is, the more it will be conducive for

study and work**.** Air movement equipment and noise control from outside the lecture room are classified as less conducive.

Table 4.5: Indoor Environment

INDOOR ENVIRONMENT	FACTOR LOADING VALUE
Lecture room are always clean and comfortable	0.74
Lecture rooms sizes are sufficient	0.76
Chair and tables are always comfortable	0.69
Teaching equipment is available and functioning well	0.44
Ceiling fan is available and functioning well	0.58
There is no odour in the duration of the learning process	0.37
There is no outside noise disturbance during teaching and learning	0.48
Windows can be opened to allow sufficient air circulation	0.49
Lighting encourages teaching and learning activities	0.78
Total Correlation	5.33
Mean Item-Total Correlation Coefficient	**0.59**
Eigenvalues	14.77
Percentages of Variance	24.21
Cronbach's Alpha	0.92

Field Survey, 2020.

As the highest degree of indoor environments, the factor must be elevated to Conducive levels. It is observed from the table that there is odour during the lecture time which will have a great consequence on concentration of the student. These interior amenities must be comfortable for students and lecturers to interact in a direct teaching and learning setting (Zen, *et al*, 2014).

4.4.2 Natural open space environment

The natural open space environment is the second factor identified in this study. This factor has an internal consistency of Cronbach Alpha 0.90, Eigenvalues of 7.3 (>1), and a percentage of variances explained of 12.16 percent, as shown in Table 4.5. It is classified as Less Conducive because the mean item-total correlation coefficient 0.43. This result is in agreement with the observation made by Emmanuel and Olufemi (2017) about Nigerian Universities that outdoor places that support conducive teaching and learning have received little attention.

Table 4.6: Natural Open Space Environment

NATURAL OPEN SPACE ENVIRONMENT	FACTOR LOADING VALUE
Natural environment is safe and contributes to a healthy social environment	0.43
Outdoor temperature is conducive	0.40
Existing landscape are well taken care of	0.52
Parking area are sufficient and convenient to accommodate staff and campus visitors	0.42
Outdoor seat are conducive	0.38
Total Correlation	2.55
Mean Item-Total Correlation Coefficient	**0.43**
Eigenvalues	7.30
Percentages of Variance	12.16
Cronbach's Alpha	0.90

Field Survey, 2020.

It was also observed from Table 4.6 that four out of five variables in this factor; Natural environment is safe and contributes to a healthy social environment, Outdoor temperature is conducive, Existing landscape are well taken care of and Parking area are sufficient and convenient to accommodate staff and campus visitors, have a classification of less conducive while the variable Outdoor seats are conducive is classified as not conducive. The result is in agreement with the findings of Emmanuel and Olufemi (2017) where it was mentioned that the outdoor furniture is inexcusably poor and learning and social connectedness are not supported in outdoor environments. There is critical need to improve on the natural open environment as it ensures the society's comfort, security, safety and comfort of campus infrastructures (Ghavampour *et al.*, 2015) and exposure to nature enhances social ability for attention, physical well-being, mental health, stress reduction and positive mood. The impact of natural environment on student's ability benefits the student both in terms of psychological and physical health (McCurdy *et al.*, 2010).

4.4.3 Inter-building connectivity

Inter-Building Connectivity is the third factor identified in this study. This factor covers the campus's physical environment, including building access and connections, pedestrian pathway directions connecting buildings, and walkway shelter. As shown in Table 4.7, the factor Inter-Building Connectivity has Cronbach Alpha coefficient of 0.86 with Eigenvalues 6.02 (>1) as its internal consistency and percentage of variances explained 9.86 %. It is classified as Less Conducive because the average item-total correlation coefficient was 0.57.

Variables Faculty and other building possess good accessibility with factor loading value of 0.67 and Entrance and walk ways are sheltered from sun and inclement weather with factor loading value of 0.65 are classified as Moderate Conducive.

Table 4.7: Inter-Building Connectivity

INTER-BUILDINGS CONNECTIVITY	FACTOR LOADING VALUE
Linkage between building are comfortable for pedestrian	0.53
Entrance and walkways are sheltered from sun and inclement weather	0.65
Faculty and other building possess good accessibility	0.67
Building arrangement encourages learning process	0.55
Direction around Faculty administrations, commercial and pedestrian are clear	0.41
Total Correlation	2.81
Mean Item-Total Correlation Coefficient	**0.57**
Eigenvalues	6.02
Percentages of Variance	9.86
Cronbach's Alpha	0.86

Field Survey, 2020.

This indicates that the users are fairly conducive with these facilities as they express satisfaction and comfortability towards them. Covered pedestrian walkways constructed naturally - through the use of trees- or artificially, and the encouragement of cycling will aid in encouraging green transportation initiatives and developing greenway on

campus to connect with the central zone's open space (Zen et al, 2014). The other three variables are classified as Less Conducive as they have factor loading values 0.53, 0.55 and 0.41 respectively. To achieve a campus conducive for teaching and learning there are needs to improve all aspects of Inter - Building Connectivity because Ghavampour *et al.* (2015) stated that inter-building interconnection is critical for creating a versatile campus that accommodates teaching and learning and also the live-and-learn concept.

4.4.4 Library and laboratory

Fourth factor identified 'Library and Laboratory' has an eigenvalue of 4.33, percentage of variance of 7.10 and Cronbach alpha of 0.90 (Table 4.8).

Table 4.8: Library and Laboratory

Library & Laboratory	**FACTOR LOADING VALUE**
Lightning at the library is adequate	0.69
Lightning at the laboratory is adequate	0.71
Chairs and tables at the library are comfortable	0.58
Chairs and tables in the laboratories are comfortable	0.74
The interior environment of the library is clean and comfortable	0.63
Library facilities (e.g. book ,journals and computer) are quality	0.61
Existing laboratory facilities are well equipped and updated	0.66
Total Correlation	4.63
Mean Item-Total Correlation Coefficient	**0.66**
Eigenvalues	4.33
Percentages of Variance	7.10
Cronbach's Alpha	0.91

Field Survey, 2020.

With mean item-total correlation coefficient of 0.66, this factor is classified as Moderately Conducive. Six item variables out of seven in this factor are classified as Moderately Conducive. These variables cover adequacy of lighting at the library and Laboratory, comfortability of Chairs and Tables in the Laboratory, Library facilities quality and cleanliness and quantity of Laboratory equipment. This means users are

moderately conducive with the quality, quantity, adequacy ad cleanliness of facilities and services of the library and laboratory.

Comfortability of library Chairs and Tables is classified as Less Conducive. This indicates that the users are less conducive using the furniture in the library. In order to maximize the advantage of students, an examination of the library and laboratory is vitally necessary in an institution (Ezeala & Yusuff, 2011). Hence, there is an urgent need on the part of the University administrators to improve the libraries and Laboratories to be fit for their benefits for the students.

4.4.5 Housing facilities

Housing Facilities, the fifth factor, with a mean item-total correlation coefficient of 0.51, an Eigenvalue of 3.95, a percentage of variance of 6.48, and a Cronbach alpha of 0.85. (Table 4.9). The mean Item-Total Correlation Coefficient (0.51) classifies this factor as Less conducive based on the Swissco criteria. Item variable 'Electricity supply support conducive living' has factor loading value of 0.62 which is classified as Moderate Conducive implies that the frequency of electricity on campus is fairly high and it is made available as at when needed.

The result is in tandem with the finding of Simpeh and Shakantu (2018) in which students commended the stable supply of electricity.

Table 4.9: Housing Facilities

HOUSING FACILITIES	FACTOR LOADING VALUE
The accommodation is always clean and conducive	0.54
The accommodation is always safe and secured	0.46
Number of available accommodation is adequate	0.40
Space allocation per occupants is sufficient	0.42
Electricity supply support conducive living	0.62
Toilet in the accommodation is adequate and clean	0.58
Water supply is sufficient	0.58
The hostel environment is conducive	0.48
Total Correlation	4.08
Mean Item-Total Correlation Coefficient	**0.51**
Eigenvalues	3.95
Percentages of Variance	6.48
Cronbach's Alpha	0.85

Field Survey, 2020.

Other item variables in this factor, that is; clean water availability, number, size and cleanliness of toilet, space allocation and building environment are classified as Less Conducive which implies that these facilities and the services are not satisfactory to the users. This corresponds to the challenges reported in the study of Shakantu and Simpeh (2018). There is a need for a prompt attention for improvement in the facilities and services as these are very important for student as they have health implications as well as affect the well-being of the students.

4.4.6 Health facilities

Conduciveness of health facilities is the sixth factor identified and is shown on Table 4.10. This factor has a mean item-total correlation coefficient of 0.57, eigenvalue of 3.11, percentage of variance 5.19 and Cronbach alpha of 0.93.

Table 4.10: Health Facilities

HEALTH FACILITIES	FACTOR LOADING VALUE
There are adequate hospital bed	0.59
Healthcare facilities is clean and safe	0.61
Healthcare service delivery is acceptable	0.59
Number of healthcare giver is sufficient	0.60
Indoor air quality (Humidity Control) is good	0.54
Clean water supply is available	0.50
Waste is properly disposed	0.58
Total Correlation	4.02
Mean Item-Total Correlation Coefficient	**0.57**
Eigenvalues	3.11
Percentages of Variance	5.19
Cronbach's Alpha	0.93

Field Survey, 2020.

Mean Item-Total correlation coefficient of 0.57 classifies this factor as Less Conducive based on the Swissco criteria. From the seven-item variable of this factor, healthcare facilities cleanliness and safety and the number of healthcare service giver sufficiency are classified as moderately conducive. This implies that the students, who are the primary users of the health facilities and services, are moderately satisfied and comfortable with the two variables. Other variables have factor loading values classified as less conducive. By implication, water availability and disposal is not satisfactory, the indoor air quality requires attention and also the hospital bed is not adequate.

4.4.7 Lavatories

Lavatory is the seventh factor identified in the analysis of this study. From Table 4.11, this factor haspercentage of variance of 4.47 %, the Eigenvalue of 2.73 (> 1) and Cronbach alpha 0.91**.** This factor is classified as Less Conducive because it has a Mean item- Total Correlation of 0.47. This classification is as a result of the factor loading value of variable items in this factor which six out of seven variables has a factor loading value within the range of the classification, that is 0.40 – 0.59. The number of lavatories is less adequate, the location and the cleanliness of the toilets are also less

satisfactory. The users are less comfortable with urination and defecation facilities, while water and wash hand basin equipped with soap is less available.

Table 4.11: Lavatories

LAVATORIES	FACTOR LOADING VALUE
Number of available toilet is adequate	0.44
Toilets are clean and safe	0.56
Location of available toilet is conducive	0.51
Access to toilet is always easy	0.30
Water is always available in toilet	0.48
Urination and defecation facilities are comfortable	0.50
Wash hand basin is available and equipped with soap	0.50
Total Correlation	3.29
Mean Item-Total Correlation Coefficient	**0.47**
Eigenvalues	2.73
Percentages of Variance	4.47
Cronbach's Alpha	0.91

Field Survey, 2020.

The variable 'Access to toilet is always easy' has a factor loading value of 0.30 which is classified as Not Conducive. This implies that accesses to the toilets are not always easy as most of them are not opened for use mostly for students during school hours. This was observed during the physical observation by the researcher.

4.4.8 Recreational facilities

Recreational facilities, presented in Table 4.12, is the eighth factor identified. The factor has a Cronbach alpha of 0.87, an Eigenvalue of 1.84, a percentage of variance of 3.02, and an Eigenvalue of 1.84. This factor is classified as Moderately Conducive because of its mean item-total correlation coefficient of 0.66.

Table 4.12: Recreational Facilities

RECREATION FACILITIES	FACTOR LOADING VALUE
Leisure facilities are adequate	0.69
Sport facilities are sufficient	0.68
Sport facilities provided help increase fitness	0.79
Leisure spaces are conducive	0.49
Total Correlation	2.65
Mean Item-Total Correlation Coefficient	**0.66**
Eigenvalues	1.84
Percentages of Variance	3.02
Cronbach's Alpha	0.87

Field Survey, 2020.

In this study, the factor "recreation facilities" is made up of four item variables. The variables leisure facilities adequacy, sport facilities sufficiency and facilities increase fitness has a factor loading values of 0.69, 0.68 and 0.79 respectively which is classified as moderately conducive. This shows that the number and quality of the sport and leisure facilities provided is moderately satisfactory to the users. Leisure space conduciveness has a factor loading value of 0.49 which is classified as less conducive indicate that the space lacks some elements of conduciveness. This result is in agreement with the observation made by the study (Barghchi *et al*., 2010) The study found that, while sporting activities and sports facilities construction and development in Malaysia has progressed greatly in recent years, it has not kept pace with worldwide sports development.

4.4.9 Campus transportation

The ninth factor identified in this study is the campus transportation. The mean item-total correlation coefficient for campus transportation is 0.40, with an Eigenvalue of 1.43, a percentage of variance of 2.34, and a Cronbach alpha of 0.58. (Table 4.13). This factor is classified as less conducive based on the mean item-total correlation coefficient value of 0.40.

Table 4.13: Campus Transportation

CAMPUS TRANSPORTATION	FACTOR LOADING VALUE
The bus park is conducive	0.32
The campus shuttle provide are adequate and sufficient	0.41
The frequency of campus shuttle in a day is satisfactory	0.43
Seats of campus shuttle are comfortable	0.44
Quality of public transport in the city/town	0.40
Bus stop location are comfortable	0.40
Total Correlation	2.41
Mean Item-Total Correlation Coefficient	**0.40**
Eigenvalues	1.43
Percentages of Variance	2.34
Cronbach's Alpha	0.86

Field Survey, 2020.

Less Conducive was assigned to five of the six item variables that make up Campus Transportation. It was observed that the campus shuttle service provided is insufficient in terms of quality and frequency of passengers' picking up and dropping off, and that the bus seats and bus stop sites are uncomfortable. The bus park has a factor loading value of 0.32 which is classified as not conducive. This implies that the bus park is not conducive to the users.

This result tallies with the findings in the study Fagbouhunka (2017) on the infrastructural facility and the academic performance of students' in Adekunle Ajasin University, Akungba Akoko, Ondo State, Nigeria wherein the transportation facilities are inadequate. This finding demonstrates that campus transportation needs to be improved in order to accommodate Federal University of Technology Minna students' and staff' mix-mode living pattern, which includes both on and off campus housing.

4.4.10 Internet facilities

The tenth factor identified in this study is Internet Facilities the result of which is presented in Table 4.14. As shown in Table 4.14, This factor has a Cronbach Alpha of

0.90, eigenvalues of 1.17 (>1), and a high percentage of variance explained of 1.92 percent. This component has a mean item-total correlation coefficient of 0.38, making it non-Conducive.

Table 4.14: Internet Facilities

INTERNET FACILITIES	FACTOR LOADING VALUE
Internet network is available on campus	0.48
Internet network coverage on campus is sufficient	0.43
Internet network is of good quality	0.33
Accessing hotspot is easy	0.40
Internet network is adequate in lecture all	0.40
Available internet network in hostels is good	0.32
Downloading from internet is fast	0.33
Total Correlation	2.69
Mean Item-Total Correlation Coefficient	**0.38**
Eigenvalues	1.17
Percentages of Variance	1.92
Cronbach's Alpha	0.90

Field Survey, 2020.

It was indicated that the internet network availability, coverage, adequacy and ease of accessing have a classification of less conducive. While the quality of the internet network on campus both in hostels and academic buildings is classified as Non Conducive. This finding is consistent with the findings of Fagbohunka (2017) on Adekunle Ajasin University, Akungba Akoko, Ondo State, Nigeria's infrastructural facilities and student academic performance. Internet access was found to be insufficient in the study. Also, the result of a research on undergraduate students' access to and use of internet titled A Case Study of Olabisi Onabanjo University, Nigeria by Adekunmisi *et al*. (2013), low internet speed, a long time to view or download online sites, and frequent signal loss were identified to be the most common issues respondents had when using the internet. By implication, the internet network on campus requires serious improvement as none of the item variables give a good account.

4.4.11 Summary of conduciveness of campus infrastructure

From the results of the study as presented in Table 4.15, two factors; Laboratory & library and Recreational Facilities are classified as Moderately Conducive, seven factors; Indoor Environment, Natural Open Space Environment, Inter-Building Connectivity, Housing Facilities, Health Facilities, Lavatory Facilities and Campus Transportation are classified as Less Conducive while one factor; Internet Facilities is categorized as Not Conducive.

Table 4.15: Summary of the Conduciveness of Campus Infrastructure

Main Factor	Value	Level of Conduciveness
Indoor Environment	0.59	Less Conducive
Natural Open Space Environment	0.43	Less Conducive
Inter Building Connectivity	0.57	Less Conducive
Laboratory & Library	0.66	Moderate Conducive
Housing Facilities	0.51	Less Conducive
Health Facilities	0.57	Less Conducive
Lavatory Facilities	0.47	Less Conducive
Recreation Facility	0.66	Moderate Conducive
Campus Transportation	0.40	Less Conducive
Internet Facilities	0.38	Not Conducive
Level of Conduciveness (Percentage)	0.49 (49 %)	Less Conducive

Field Survey, 2020.

The average level of conduciveness for the study is 0.49 % which is classified as Less Conducive. This revealed low level of conduciveness of infrastructural facilities on Gidan-Kwano campus, Federal University of Technology, Minna.

4.5 To Proffer Ways to Improve the Infrastructural Facilities and Services for Quality Teaching and Learning

To offer a suitable answer to the problem addressed by this research, respondents were asked to proffer solutions to improve campus infrastructural facilities and services for quality teaching and learning. The result of which is presented in Table 4.16 below.

Table 4.16 Ways to Improve the Infrastructural Facilities and Services for Quality Teaching and Learning

Category	Subcategory	Frequency	%	Response
Internet Facilities	Quality and coverage	309	98	Need to improve on the quality of internet and its coverage
Lavatories	Accessibility	285	91	Make Toilets accessible while students are around
Transportation Facilities	Adequacy of Buses and Bus Park	293	93	The number of buses is grossly in adequate. There is need for more shading at the bus park
Electricity	Power Socket	255	80	Provision of power socket along corridors and at outdoor recreational spaces as respondents have electronics gadgets
Accommodation	Adequacy	207	65	There is need for more student and Staff accommodation on campus
Maintenance	All facilities	200	63	Timely maintenance of all facilities

Field Survey, 2020.

Table 4.16 shows the analysis of the response of the open-ended question of 315 respondents on proffering measures to improve the infrastructural facilities and services at Federal university of Technology Minna, Gidan-Kwano campus. The responses were categorized into 6 categories namely; Internet facilities, Lavatories, Transportation facilities, Energy, Accommodation and Maintenance. It is observed from the table that 98% of the respondents mention internet and this include the quality and coverage of internet facilities. Improvement of internet facilities was also recommended by

Adekunmisi *et al*. (2013) as a way to remediate the challenges of conducive learning by slow internet speed and coverage.

From Table 4.16, Access to Lavatories was identified as an improvement measure by 91% of the respondents. It can be deduced from the analysis that the toilet is available but it is locked especially during lecture times. Adequacy of school buses and provision of more shading at the Bus Park has is identified by 93% respondents. Providing Energy that is electricity power socket is identified by 80% of the respondents as an improvement measure. The location of the power sockets as suggested by the respondents should be along corridors and recreational spaces as teaching and learning is not confined to classrooms on but also outdoors (Harris, 2018) because many aspects of campus life have been penetrated by Computer-based technology (Schindler *et al,* 2017).

In Table 4.16, the provision of more accommodation for staff and student is identified as an improvement measure for conduciveness of campus infrastructural facilities and services by 65% respondents. Also, 63% of total respondent identify maintenance as an improvement measure.

4.6 Summary of Findings

The summaries of findings as obtained from the analysis of data of questionnaires administered to respondents are as presented below.

On the condition of infrastructural facilities and services, that is availability, accessibility, adequacy and quality of campus infrastructural facilities and services provided at Federal University of Technology Minna, Gidan-Kwano campus this study

reveal that pedestrian route is rated Good, Lecture Hall lighting and Number of recreational centres are rated Fair while other factors are either poor or very poor.

1. Table 4.3 reveal that all the respondents agreed that Conduciveness of Campus infrastructural facilities and services is influenced by all the thirteen (13) considerations indicated in the questionnaire. The considerations are Health, Adequacy of facilities, Availability, Safety, Efficiency, Sufficiency and Accessibility. Others are Human Comfort, Spatial planning, Energy, Cleanliness Quality of furnishing and finishing and Economy.

2. From Table 4.4, analysis show that all the respondents agreed that conducive campus infrastructure is influenced by all the elements indicated in the questionnaire. However, the analysis indicated that the top Five (5) ranked factors which are; Quality Internet Network, Comfortable Indoor Environment, Adequate Laboratory, Comfortable Lighting and Electricity respectively, which have direct impact on learning, which showed how important these elements are to the respondents for a conducive campus infrastructure.

3. The level of conduciveness of campus infrastructural facilities and services as shown on Table 4.15 indicates that the infrastructural facilities and services provided at Gidan-Kwano campus, Federal University of Technology Minna is less conducive.

5. Suggestions to Improve the Conduciveness of Campus Infrastructural Facilities and Services Include;

I. Need to improve on the quality of internet and its coverage

II. Make Toilets accessible at all times

III. Increasing the number of school Shuttle

IV. Provision of more shadings at bus park

V. Provision of power sockets at corridors and outdoor recreation spaces

VI. Provision of more accommodation for Students and Staff

VII. Timely maintenance of facilities.

CHAPTER FIVE

5.0 CONCLUSION AND RECOMMENDATIONS

5.1 Conclusion

The conception and design of a university campus setting is usually done in such a way as to produce an appealing and conducive environment that is both calming and elegant, which is desperately needed to support a proper study environment (Musa and Ahmad, 2012). Knowledge about how campus infrastructural facilities conduciveness is developed can be used by universities to develop strategies that make campuses more conducive for teaching and learning.

This study assesses the user's perception on conduciveness of infrastructural facilities and services provided at Gidan-Kwano campus of Federal University of Technology Minna, by administering questionnaire to Staffs and Students of the University. This was achieved by identifying the condition of the facilities, measures for conduciveness, the extent of conduciveness of the facilities and services and ways to improve the facilities and services for quality teaching and learning.

According to Table 4.2, the condition of the University infrastructural facilities and services is adjudged fair by the users. A fair degree of physical condition according to Canadian Infrastructure Report Card) CIRC) and American Society of Civil Engineers (ASCE)is characterized by Periodic complaint from users, users inconvenienced, may meets present capacity requirements, but not future ones, and there may be small consequences on service levels supplied. By implication, the infrastructural facilities and services in the University satisfies program/service delivery needs, although with certain inefficiencies and ineffectiveness.

Users agree with the measures of conducive campus environment as presented in literature. This means the considerations and elements of conduciveness of campus infrastructure are acceptable globally. Sustainability can be added as the respondents majorly submit that it will be good to be considered for conduciveness of campus infrastructure. Generally, in this study, no infrastructural facility and services considered is classified as Conducive which means all the facilities and services on this campus require urgent and serious improvement.

This study concludes that the infrastructural facilities and services provided at Federal University of Technology Minna, Gidan-Kwano campus is less conducive to teaching and learning. Based on the results of this study, the improvement of all campus infrastructural facilities and services to a level that is conducive is urgently required and most essentially internet infrastructure.

5.2 Recommendation

The following recommendations are provided in light of the findings of this study:

1. The University management should improve the condition of the infrastructural facilities and services by paying more attention as the current situation is not acceptable.

2. Literarily, Health, availability, safety, efficiency, accessibility, human comfort, special planning, cleaning, economy, quality of furnishing and finishing and sustainability can be adopted as considerations for conduciveness of campus infrastructural facilities and services.

3. Quality internet network, comfortable indoor environment, adequate lavatories, comfortable lighting, electricity, comfortable air movement, beautiful green

area, security, portable water, fire safety, comfortable sound, good communication system and good roads can be adopted as elements of conduciveness of campus infrastructural facilities and services.

4. To There is need to improve on the quality and coverage of internet

5. The National University Commission (NUC) procedures guide and physical development manual for Nigeria's university system which was last edited in 2004 should be reviewed to capture the reality of this time.

5.3 Contribution to Knowledge

The primary aim of the researcher in this study is to relook at the way infrastructural facilities and services affect teaching and learning in Nigerian University from a new perspective.

So far, most studies on learning environment Infrastructural facilities and services have focused on users' satisfaction only few have worked on conduciveness. Conduciveness of infrastructural facilities and services indirectly impact the students' performance and ensures the quality of life of the students and campus environment as a whole.

This research has contributed to the body of knowledge that already exists on infrastructural facilities and services effect on quality of teaching and learning.

5.4 Recommendation for further Studies

Further research can be embarked on the following related research areas;

1. The effects of unconducive infrastructural facilities and services on quality teaching and learning

2. Qualitative evaluation of conduciveness of campus infrastructure for teaching and learning

3. Evaluation of campus outdoor interactive spaces for conducive teaching and learning.

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APPENDICES

Appendix 1

DEPARTMENT OF BUILDING

SCHOOL OF ENVIRONMENTAL TECHNOLOGY

FEDERAL UNIVERSITY OF TECHNOLOGY, MINNA

Dear Respondent,

This Questionnaire is being administered for a Masters of Technology research at the Department of Building on **"EVALUATING CONDUCIVE CAMPUS ENVIRONMENT AT FEDERAL UNIVERSITY OF TECHNOLOGY MINNA".**

All information provided will be treated confidentially and solely used for the purpose of this research only.

Bashiru, Kabiru O. (Researcher)

Kabiru.bashiru@st.futminna.edu.ng

07036534267

Introduction

The need for a conducive campus environment for students to assist in achieving the success desired have been of major concern, considering the roles and potentials campus physical facilities play in the development of the students activities and wellbeing. There is need to improve campus facilities to suit users. The improvement will leads to a better environment for campus users; students, Staffs and Visitors alike; and to offer a first step into encouraging a campus sustainability program.

This study aims to evaluate conducive campus environment at Gidan-Kwano campus of Federal University of Technology, Minna with the following objectives:

i. To evaluate the condition of infrastructural facilities provided at Federal University of Technology MinnaGidan-Kwano campus.
ii. To identify the factors of conducive campus infrastructural facilities
iii. To investigate the extent of conduciveness of campus infrastructure at Federal University of Technology MinnaGidan-Kwano campus.
iv. To proffer suggestions that will improve the conduciveness of the campus infrastructure at Federal University of Technology, Minna.

SECTION A

BACKGROUND INFORMATION OF THE RESPONDENT

1. How would you describe yourself? (a) Student [ ] (b) Staff [ ]

2. What Department / School? ……

3. Age: (a) 16 – 20 [ ] (b) 21 – 30 [ ] (c) 30 – 40 [ ] (d) 41 and above [ ]

4. Gender: (a) Male [ ] (b) Female [ ]

5. Qualification: (a) Undergraduate [ ] (b) Graduate [ ] (c) Masters [ ] (d) PhD [ ]

6. How long have you spent on campus? …….

SECTION B

Objective 1. To evaluate the condition of infrastructural facilities provided at Federal University of Technology MinnaGidan-Kwano campus.

7. Please rate the condition of the following infrastructural facilities and services by ticking the created columns. **(5=Excellent, 4= Good, 3= Fair, 2= Poor and 1=Very Poor)**

s/n	INFRASTRUCTURAL FACILITIES AND SERVICES	5	4	3	2	1
1	Number of Lecture Hall					
2	Size of Lecture Hall					
3	Lecture Hall Cleanliness					
4	Lecture Hall Indoor Air Quality					
5	Available furniture					
6	Lecture Hall Lighting					
7	Outdoor noise Protection					
8	Sanitation of the open Environment					
9	Environmental planting coverage					
10	Landscape design					
11	Pedestrian routes					
12	Laboratory indoor environmental quality					
13	Availability of equipment in the Laboratory					
14	Condition of equipment in the Laboratory					
15	Library indoor environmental quality					
16	Condition of Furniture in the Library					
17	Library services i.e Books, Internet, Power, Toilet etc.					
18	Hostel indoor environmental quality					
19	Indoor space allocation					
20	Hostel services i.e power supply, water, internet					

	etc.					
21	Condition of hostel toilets					
22	Location of the health center					
23	Health center environment					
24	Health center services					
25	Lavatory cleanliness					
26	Clean water supply					
27	Access to toilet					
28	Number of recreation centers					
29	Quality of recreation space					
30	Number of school buses					
31	Quality of school buses					
32	Bus park environment					
33	Quality of internet service					
34	Coverage of internet service					

Objecive 2. To identify the measures for conducive campus infrastructural facilities

8. Please indicate the extent to which you agree with the following facilities considerations for Conducive Campus Infrastructure. **(5= Strongly agree, 4= Agree, 3= Undecided, 2= Disagree and 1= Strongly disagree)**

s/n	**Facilities considerations for conducive campus environment**	**5**	**4**	**3**	**2**	**1**
1.	Human comfort					
2.	Spatial planning					
3.	Quality of furnishing and finishing					
4.	Cleanliness					
5.	Safety					
6.	Health					
7.	Energy					
8.	Availability					
9.	Adequacy					
10.	Efficiency					
11.	Sufficiency					
12.	Accessibility					
13.	Economy					

9. If there are any other facilities considerations for Conducive Campus Environment known to you,

please specify

……

…….....

……

10. Please indicate the extent to which you agree with the following elements of Conducive Campus Infrastructure. (5= **Strongly agree, 4= Agree, 3= Undecided, 2= Disagree and 1= Strongly disagree)**

s/n	Element of Conducive Campus Environment	5	4	3	2	1
1	Comfortable lighting					
2	Comfortable indoor temperature					
3	Comfortable air movement					
4	Comfortable sound					
5	Energy (Electricity)					
6	Cleanliness					
7	Potable water					
8	Fire safety					
9	Adequate lavatories					
10	Security systems					
11	Good communication system					
12	Good roads					
13	Quality internet network					
14	Conducive public space					
15	Controlled environment					
16	Beautiful green areas					
17	Playground					
18	Conducive parks					

11. If there are any other elements for Conducive Campus Environment you want on campus, Please specify

……

…….....

……

Objective 3. To investigate the extent of conduciveness of campus infrastructure at Federal University of Technology MinnaGidan-Kwano.

12. The followings are lists of campus infrastructural facilities. Please kindly indicate,by a tick in the appropriate box, the extent to which you agree with the following as provided at Federal University of technology Minna, Gidan-kwano Campus. . (5= **Strongly agree, 4= Agree, 3= Undecided, 2= Disagree and 1= Strongly disagree)**

S/N	INDOOR ENVIRONMENT	5	4	3	2	1
1	Lecture room are always clean and comfortable					
2	Lecture rooms sizes are sufficient					
3	Chairs and tables are always comfortable					

4	Teaching equipment is available and functioning well					
5	Ceiling fan is available					
6	There is no odour in the duration of the learning process					
7	There is no outside noise disturbance during teaching and learning					
8	Windows can be opened to allow air circulation					
9	Lighting encourages teaching and learning activities					
	NATURAL OPEN SPACE ENVIRONMENT	**5**	**4**	**3**	**2**	**1**
1	Natural environment is safe and contributes to a healthy social environment and lifestyle					
2	Outdoor temperature is conducive					
3	Existing landscapes are well taken care of					
4	Parking area is convenient and sufficient to accommodate staff and campus visitors.					
5	Outdoor seats are conducive					
	INTER-BUILDINGS CONNECTIVITY	**5**	**4**	**3**	**2**	**1**
1	Linkages between buildings are comfortable for pedestrians					
2	Entrances and walkways are sheltered from sun and inclement weather					
3	Faculty and other buildings possess good accessibility					
4	Building arrangement encourages learning process					
5	Directions around Faculty, administration, commercial and pedestrian area are clear					
	LIBRARY& LAB	**5**	**4**	**3**	**2**	**1**
1	Lighting at the library is adequate					
2	Lighting at the laboratory is adequate					
3	Chairs and tables at the library are comfortable					
4	Chairs and tables in the laboratories are comfortable					
5	The interior environment of Library is clean and comfortable					
6	The interior environment of laboratories is clean and comfortable					
7	Library facilities (e.g. books, journals and computer) are quality					
8	Existing laboratory facilities are well-equipped and updated					
	HOUSING FACILITIES	**5**	**4**	**3**	**2**	**1**
1	The accommodation is always Clean and conducive					
2	The accommodation is always safe and secured					
3	Number of available accommodation is adequate					
4	Space allocation per occupant is sufficient					
5	Electricity supply supports conducive living					

6	Toilet in the accommodation is adequate and clean					
7	Water supply is sufficient					
8	The accomodation environment is conducive					
	HEALTH FACILITIES	**5**	**4**	**3**	**2**	**1**
1	There are adequate Hospital beds					
2	Healthcare facility is clean and safe					
3	Health care service delivery is acceptable					
4	Number of healthcare giver is sufficient					
5	Indoor Air Quality (Humidity Control) is good					
6	Clean water supply is available					
7	Waste is properly Disposed					
S/N	**LAVATORIES**	**5**	**4**	**3**	**2**	**1**
1	Number of available Toilet is adequate					
2	Toilets are clean and safe					
3	Location of available Toilet is conducive					
4	Access to Toilet is always easy					
5	Water is always available in Toilets					
6	Urination and defecation facilities are comfortable					
7	Wash hand basin is available and equipped with soap					
	LEISURE AND RECREATION FACILITIES	**5**	**4**	**3**	**2**	**1**
1	Leisure facilities are adequate					
2	Sports facilities are sufficient					
3	Sports facilities provided help increase fitness					
4	Leisure spaces are conducive					
	CAMPUS TRANSPORTATION	**5**	**4**	**3**	**2**	**1**
1	The bus park is conducive					
2	The campus shuttles provided are adequate and sufficient					
3	The frequency of campus shuttle in a day is satisfactory					
4	Seats of the campus shuttles are comfortable					
5	Quality of public transport in the city/town					
6	Bus stop locations are comfortable					
	INTERNET CONNECTIVITY	**5**	**4**	**3**	**2**	**1**
1	Internet network is available on campus					
2	Internet network coverage on campus is sufficient					
3	Internet network is of good Quality					
4	Accessing hot spot is easy					
5	Internet network is adequate in lecture hall					

6	Available internet network in hostels is good					
7	Downloading from internet is fast					

Objective 4. To proffer suggestions that will improve the conduciveness of the campus infrastructure at Federal University of Technology, Minna.

13. Please suggest areas of improvements in the above facilities

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Appendix 2

LETTER OF REQUEST OF STUDENT RECORD

Department of Building,
Federal University of Technology,
P.M.B. 65, Minna,
Niger State.
7th February, 2020.

The Academic Secretary,
Federal University of Technology
Minna

Through
The Registrar
Federal University of Technology
Minna

Through
HOD, Department of Building
Federal University of Technology
Minna

Sir,

REQUEST FOR NUMBER OF REGISTERED STUDENTS AND STAFF AT GIDAN-KWANO CAMPUS FOR THE ACADEMIC YEARS 2018/2019 AND 2019/ 2020

I, Bashiru Kabiru Oluwatobi, a research student of the Department of Building with Matric number MTECH/SET/2017/7322, request the numbers of Staff and students using the infrastructural facilities at Gidan-kwano Campus of this University. The numbers are required as data for my ongoing research titled EVALUATING CONDUCIVE CAMPUS ENVIRONMENT AT FEDERAL UNIVERSITY OF TECHNOLOGY MINNA.

I shall be very grateful if this request is given speedy consideration.

Thanks

Bashiru, Kabiru Oluwatobi
MTECH/SET/2017/7322
07036534267

Appendix 3

Result of the Factor Analysis

Variables	F1	F2	F3	F4	F5	F6	F7	F8	F9	F10
Lecture room are always clean and comfortable	0.74									
Lecture rooms sizes are sufficient	0.76									
Chairs and tables are always comfortable	0.69									
Teaching equipment is available and functioning well	0.44									
Ceiling fan is available	0.58									
There is no odour in the duration of the learning process	0.37									
There is no outside noise disturbance during teaching and learning	0.48									
Windows can be opened to allow air circulation	0.49									
Lighting encourages teaching and learning activities	0.78									
Natural environment is safe and contributes to a healthy social environment and lifestyle		0.43								
Outdoor temperature is conducive		0.40								
Existing landscapes are well taken care of		0.52								
Parking area is convenient and sufficient to accommodate staff and campus visitors		0.42								
Outdoor seats are conducive		0.38								
Linkages between buildings are comfortable for pedestrians			0.53							
Entrances and walkways are sheltered from sun and inclement weather			0.65							
Faculty and other buildings possess good accessibility			0.67							
Building arrangement encourages learning process			0.55							
Directions around Faculty, administration, commercial and pedestrian area are clear			0.41							
Lighting at the library is adequate				0.69						
Lighting at the laboratory is adequate				0.71						
Chairs and tables at the library are comfortable				0.58						
Chairs and tables in the laboratories are comfortable				0.74						
The interior environment of Library is clean and comfortable				0.63						
The interior environment of laboratories is clean and comfortable				0.61						
Library facilities (e.g. books, journals and computer) are quality				0.66						
Existing laboratory facilities are well-equipped and updated										

The accommodation is always Clean and conducive	0.54					
The accommodation is always safe and secured	0.46					
Number of available accommodation is adequate	0.40					
Space allocation per occupant is sufficient	0.42					
Electricity supply supports conducive living	0.62					
Toilet in the accommodation is adequate and clean	0.58					
Water supply is sufficient	0.58					
The accommodation environment is conducive	0.48					
There are adequate Hospital beds		0.59				
Healthcare facility is clean and safe		0.61				
Health care service delivery is acceptable		0.59				
Number of healthcare giver is sufficient		0.60				
Indoor Air Quality (Humidity Control) is good		0.54				
Clean water supply is available		0.50				
Waste is properly Disposed		0.58				
Number of available Toilet is adequate			0.44			
Toilets are clean and safe			0.56			
Location of available Toilet is conducive			0.51			
Access to Toilet is always easy			0.30			
Water is always available in Toilets			0.48			
Urination and defecation facilities are comfortable			0.50			
Wash hand basin is available and equipped with soap			0.50			
Leisure facilities are adequate				0.69		
Sports facilities are sufficient				0.68		
Sports facilities provided help increase fitness				0.79		
Leisure spaces are conducive				0.49		
The bus park is conducive					0.32	
The campus shuttles provided are adequate and sufficient					0.41	
The frequency of campus shuttle in a day is satisfactory					0.43	
Seats of the campus shuttles are comfortable					0.44	
Quality of public transport in the city/town					0.40	
Bus stop locations are comfortable					0.40	
Internet network is available on campus						0.48

Internet network coverage on campus is sufficient										0.43
Internet network is of good Quality										0.33
Accessing hot spot is easy										0.40
Internet network is adequate in lecture hall										0.40
Available internet network in hostels is good										0.32
Downloading from internet is fast										0.33
Total Correlation	5.33	2.55	2.81	4.63	4.08	4.02	3.29	2.65	2.41	2.69
Mean Item-Total Correlation Coefficient	**0.59**	**0.43**	**0.57**	**0.66**	**0.51**	**0.57**	**0.47**	**0.66**	**0.40**	**0.38**
Eigenvalues	14.77	7.30	6.02	4.33	3.95	3.11	2.73	1.84	1.43	1.17
Percentages of Variance	24.21	12.16	9.86	7.10	6.48	5.19	4.47	3.02	2.34	1.92
Cronbach's Alpha	0.92	0.90	0.86	0.91	0.85	0.93	0.91	0.87	0.86	0.90

Factor 1 Indoor Environment

Factor 2 Natural Open Space Environment

Factor 3 Inter-Building Connectivity

Factor 4 Library and Laboratory

Factor 5 Housing Facilities

Factor 6 Health Facilities

Factor 7 Lavatories

Factor 8 Recreational Facilities

Factor 9 Campus Transportation

Factor 10 Internet Facilities

Appendix 4

KMO and Bartlett's test

Kaiser-Meyer-Olkin Measure of Sampling Adequacy		0.86
Bartlett's Test of Sphericity	Approx. Chi Square	4126.67
	Df	43
	sig.	0.00

Reliability Test

S/N	Cluster	Construct	alpha
1	A	Condition of Facilities	0.81
2	B	Measures of Conducivenss	0.85
3	C	Extent of Conduciveness	0.83