

**ANALYZING THE CHALLENGES OF ELECTRICITY
INTERRUPTION ON ACADEMIC ACTIVITIES IN THE UNIVERSITY
OF BENIN**

BY

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BENIN CITY**

DECEMBER, 2024

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**A PROJECT SUBMITTED TO THE DEPARTMENT OF
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DECEMBER, 2024

CERTIFICATION

We the undersigned, certify that this research work was carried out by
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DEDICATION

To my parents, Mr. and Mrs. Akaninyene Sambo and my siblings, Wisdom Sambo and Abasido Sambo who were there for me throughout my stay in school.

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ABSTRACT

The supply of electricity is essential for supporting academic operations in universities, especially in a time when technology and digital education are indispensable to learning. This research investigates how electricity disruptions affect academic operations at the University of Benin, concentrating on students, faculty, and administrative personnel. Data were gathered through structured questionnaires. The results indicate that frequent power failures significantly disrupt lecture delivery, research efforts, access to online educational resources, and administrative activities. Students find it difficult to complete assignments and study efficiently, while instructors and researchers encounter difficulties in preparing course materials and conducting virtual learning. The research also underscores the coping strategies employed by stakeholders, such as dependence on generators, inverters, and alternative study options off-campus. Even with these adjustments, electricity interruptions continue to pose a significant challenge to academic productivity. The research suggests improving power infrastructure, investing in alternative energy resources, and strategic policies to reduce the adverse effects of electricity disconnections on academic activities.

CHAPTER ONE

INTRODUCTION

Background of the Study

Electricity is an essential resource in modern educational institutions, supporting a wide range of academic, research, and administrative functions.

The provision of electricity power is essential for providing services that will benefit students. Power outages has an adverse effect on students academic performances

According to Aremu, and Adeyemi (2011), power is the speed at which energy is transferred; as a result, in our everyday life, power and energy are used interchangeably. In actuality, the amount of energy a mechanical system can hold is directly proportional to the amount of power it can produce. Therefore energy and power are related because a system with a high energy will also produce a high power.

According to the research conducted by the European Commission, Energy plays a crucial role in maintaining human standard of living. It has become evident over the years that man is wholly dependent on energy for both his personal and professional life. In actuality, energy is used in every industry. With the widespread use of electrical energy in almost every aspect of life, from household use to entertainment, education, amusement, and industrial use, the

reliance on energy is even more evident in the twenty first century. Power availability is typically associated with efficiency, prosperity, and a higher standard of living across all sectors of the economy.

It's legally mandated for the power holding company of Nigeria (PHCN), a privatized version of the National Electric Power Authority (NEPA), to generate and distribute electricity for use in commercial, industrial, and commercial settings as well as for residential purposes. PHCN is an arm of the Federal Ministry of Power and Steel. PHCNs performance over the years has been criticized due to poor and declining quality of services it offers to its customers. According to Aberie, Fayomi, Opera and Panda (2011), in 1999, Nigeria installed capacity of 5,876 MW was reduced to 1600 MW, and only 19 of the 79 generating units were operating.

It is clear from the following that Nigerians, particularly Nigerian colleges and students, are suffering from energy poverty and crises. For example, Akpama, Okoro, and Chikuni (2008) found that the University of Benin has been dealing with energy difficulties from its establishment and continues to do so. Despite Nigeria's rich energy resources, about 40% of the people still lacks access to electricity (UNDP, 2001; Ajanaku, 2007; Adegbamigbe, 2007). . As a result, Nigerian higher institutions are unable to sufficiently provide energy, which is essential in the everyday operation of the school. This development poses a

difficulty to students since it reduces productivity and has an impact on academic achievement.

Students' academic performance is an important aspect of education (Rono, 2013). It is regarded as the wheel around which the entire educational system revolves. According to Narad and Abdullah (2016), academic performance of students influences the success or failure of any academic institution. Singh, Malik, and Singh (2016) also stated that student academic achievement has a direct influence on a country's socioeconomic growth. Similarly, Farooq, Chaudhry, Shafiq, and Behanu (2011) claimed that academic achievement of students serves as a foundation for knowledge acquisition and skill development.

Epileptic power supply has been one of the major challenges faced by students and this has greatly affected their performance in school.

The University of Benin (UNIBEN) situated in Benin City, Nigeria, is frequently subject to power outages which have a significant impact on both operational efficiency and the overall academic environments. This chapter aims at exploring the impact of these disruptions on UNIBEN academic activities by identifying key difficulties encountered and suggesting ways to lessen their effects.

Statement of the Research Problem

Both young and old in Nigeria have expressed grave concerns about the inconsistent power supply in the nation. Individuals from all walks of life have been affected in one way or the other. Secondary school and university students have suffered because they rely on electricity to read, research, learn, and do other things.

Over the years, Nigerian students have expressed a desire to enjoy uninterrupted electricity like their western counterparts. They want to experience the use of up-to-date technology for learning and research, as well as have proper online classes without interruption. With the current lighting issues in universities, this wish can never be met.

University of Benin's frequent power outages interferes with academic operations, affecting students, faculties, and administrative processes. Understanding the nature and extent of these disruptions is crucial for developing strategies to maintain a conducive learning environment and enhance overall productivity.

Research Questions

This research will employ the following questions:

- a) How does electricity uninterrupted affect teaching and learning processes at the University of Benin?

- b) What are the specific challenges faced by students during power outages in the University of Benin?
- c) What measures can be implemented to mitigate the impact of electricity interruption on academic activities in the University of Benin?

Purpose of the Study/ Research Objectives

The major aim of this study is to analyze the challenges of electricity interruption and its impact on academic activities in the University of Benin.

Other objectives are:

- a) To access the frequency and duration of electricity interruption in the university of Benin.
- b) To investigate how academic activities and access to learning resources are affected by power interruption.
- c) To study how faculty productivity and research activities are affected by electricity interruption.
- d) To make suggestions for improving power reliance and reducing the impact of power disruption

Significance of the Study

The study will benefit the energy industry as it will provide information about the effect of electricity interruption on academic activities specifically in the University of Benin (UNIBEN). School administrators will also benefit as the

findings from this research will inform them of the policies that should be implemented to ensure sustainable electricity reliability so as to avert electricity interruption in the University of Benin.

Lastly, the study will be used as a reference in the future and as existing materials for researchers to conduct further research on

Scope of the Study

This study will focus specifically on the University of Benin in Benin City, Nigeria. It will examine the impact of electricity interruption on teaching and learning processes, research activities, and administrative operations within the university campus. It will focus on difficulties encountered by students due to electricity interruption. The research will focus on recent years, while collecting data from student, faculty, and administrative staff through surveys, interviews, and review of relevant literature.

Limitations of the Study

This study will be limited to the challenges of electricity interruption and its impact on academic activities in the University of Benin. Other impacts on academic activities will not be focused on. The findings from this study may only apply to the University of Benin and not other universities or institutions faced with similar operational challenges.

Furthermore, access to historical data on electricity interruptions may be limited, affecting the comprehensive analysis of trends.

Definition of Terms

Challenges: difficulties or difficult situations

Electricity interruption: an act of stopping the supply of electrical power

Power outage: the loss or interruption of the electrical power network supply to an end user

This chapter sets the stage for the comprehensive analysis of how electricity interruptions impact academic activities at the University of Benin, outlining the methodology as and expected outcomes of the study.

CHAPTER TWO

REVIEW OF RELATED LITERATURE

This chapter is a review of related literature on the topic “Analyzing the Challenges of Electricity Interruption on Academic Activities in the University of Benin. It shall discuss the following subheadings:

Theoretical framework

The concept of electricity

Causes of electricity interruption

Theories of electricity

Sources of electricity

Strategies to mediate electricity interruption

Effectiveness of the strategies to mediate electricity interruption

Summary of literature reviewed.

Theoretical Framework

This section provides the theoretical foundation for understanding how electricity interruption affects academic activities. It incorporates relevant theories like energy access theory, systems theory, maslow's hierarchy of needs, social learning theory (Bandura), and disruption theory to look into the possible impacts of power outages on students, faculty, and the educational institution as a whole.

Energy Access Theory

Energy Access Theory explores the critical role of energy in socio-economic development, emphasizing that reliable energy access is foundational for improving quality of life, productivity, and education. The theory links access to energy with enhanced opportunities in education, as stable electricity powers learning resources, libraries, and technology-based tools. In the context of this study, this theory explains how frequent electricity interruptions disrupt students' ability to study, access digital resources, and researching for staffs, thereby negatively impacting academic activities.

Systems Theory

Systems Theory views organizations or entities (like universities) as interconnected systems with various subsystems. A disruption in one part of the system (e.g., electricity supply) has negative effects on other parts, such as

classroom activities, research facilities, and administrative processes. This theory underscores the interdependence of resources within a system, emphasizing that all parts work together for betterment of the institution and that one cannot do without the other. This theory highlights how electricity interruptions ripple through academic activities, causing disruptions to lectures, laboratory experiments, and even dormitory life, thus affecting the entire university ecosystem.

Maslow's Hierarchy of Needs

Maslow's theory posits that basic needs, such as physiological and safety needs, must be fulfilled before individuals can focus on higher-level tasks like learning and self-actualization. Electricity plays a crucial role in meeting these basic needs by providing lighting, internet access, and comfortable study environments. Power outages prevent students from meeting basic needs like cooking, due to unavailability of water in the hostels for basic hygiene and domesticity leading to discomfort, sickness and diminished focus in students, ultimately affecting their academic performance and mental well-being. Staffs are not left out as this can impose a higher percentage of stress on them due to poor ventilation and lighting in offices. Pile up of power aided task in the institution can be stressful and draining to lecturers.

Social Learning Theory (Bandura)

This theory posits that learning occurs in social contexts through observation, interaction, and imitation. Access to electricity is crucial for facilitating modern learning tools, such as online lectures, collaborative platforms, and video tutorials, which enhance social learning. Power outages can hinder students' access to these tools, limiting their ability to participate in group discussions, virtual classrooms, and other social learning opportunities. This disruption affects both individual and collective learning outcomes.

Disruption Theory

Disruption Theory focuses on the negative effects that interruptions have on systems, productivity, and performance. In an academic context, electricity interruptions represent disruptions that interrupt class schedules, delay laboratory experiments, and impede students' ability to complete assignments or access resources. This framework can be used to analyze the short-term and long-term impacts of frequent power outages on the academic calendar, learning efficiency, and students' psychological readiness for examinations.

The application of the above theoretical frameworks to the study involves a combination of energy access theory, systems theory, Maslow's hierarchy of needs, social learning theory (Bandura), and disruption theory. This comprehensive framework enables the analysis of the impact of electricity interruptions on academic activities at the University of Benin. Each theory emphasizes the crucial importance of reliable electricity in facilitating the

educational journey and points out the possible repercussions for students, faculty, and the institution. In utilizing these theoretical frameworks, the research will delve into the impact of electricity interruptions on academic activities and propose possible strategies to address these obstacles. This theoretical framework provides a structured approach for examining the challenges related to electricity interruption within the setting of university academic activities.

The Concept of Electricity

Electricity is the flow of electrical power or charge; it is of a secondary source, meaning that it is obtained by conversion from other energy sources, such as coal, natural gas, oil, nuclear power, and other natural sources, which are called primary sources. The energy sources that are used to produce electricity can be renewable or non-renewable, but electricity itself is neither. Electricity as a form of energy results from the existence of charged particles, such as electrons or protons.

The basics of electricity were progressively recognized, starting with Benjamin Franklin's experiment with a kite one stormy night in Philadelphia. Before the invention of electricity more than a century ago, people heated their homes with wood-burning stoves, or coal. chilled their food in iceboxes, and lighted their homes with kerosene lamps. After perfecting his invention, the electric light bulb, Thomas Edison changed the lives of all people. Arc lights were outdoor

lighting devices that employed direct current (DC) electricity prior to 1879. Late in the 1800s, The production, distribution, and usage of alternating current (AC) electricity—which is capable of traveling far longer distances than direct current—were all invented by Nikola Tesla. Thanks to Tesla's ideas, we can now power industrial machinery and have interior lights in our houses.

We use electricity more than any other energy source, and it is a fundamental aspect of the natural world. It is an essential part of modern life, supplying energy to homes, businesses, and institutions. Electricity is necessary in academic settings for a number of purposes, such as lighting, heating, and air conditioning, as well as for operating laboratory equipment and facilitating the use of digital tools and the internet. Computers, projectors, and other electronic equipment used in education are made easier to operate by electricity. Additionally, it helps with administrative tasks including record-keeping, registration, and internal communication at the university. These activities are disrupted when there is no electricity, which makes it challenging to keep a conducive learning atmosphere.

Electricity interruption at the University of Benin

In July 2024, the University of Benin (UNIBEN) experienced a power outage due to a dispute with the Benin Electricity Distribution Company (BEDC) over an electricity bill. The university power was disconnected by the Benin Electricity Distribution Company (BEDC) over a contentious utility bill.

Officials of BEDC, attributed the upward review of the university's electricity bill to the stable power supply on campus and the recent classification of customers. The institution's management expressed discontent after Benin Disco reportedly made an upward review of the university's monthly electricity charge from about N80 million to between N200 and N280 million, a development that forced the university to resort to power-generating sets. The decision to resort to power generators led to load shedding on the campus, with student hostels getting as low as three hours per day of power supply. However, this occurrence negatively affected all individuals in the school, from academic to non-academic staffs and even those who resided in school hostels. The rate of class attendance dropped drastically due to the interruption. The unavailability of water for basic domesticities, hygiene or survival in the school hostel coupled with the inability to prepare for their forthcoming first semester exams which was in about two weeks led the students of the University of Benin to protest the power interruption by blocking the Benin-Ore Highway. The protest led to the university shutting down indefinitely and the ongoing session halted.

Theories of electricity

James Clerk Maxwell's Theory of Classical Electrodynamics

Maxwell's equations, formulated in the 19th century, are a set of four differential equations that describe how electric and magnetic fields interact and propagate. Maxwell demonstrated that electricity and magnetism are two

aspects of the same phenomenon, now called electromagnetism. He showed that oscillating electric and magnetic fields propagate as waves, and travel at the speed of light, laying the groundwork for understanding light as an electromagnetic wave. This Theory can be applied to address electricity interruption at the University of Benin through enhanced power transmission such as designing better transmission lines and minimizing energy loss during power supply, Improve renewable energy systems such as optimization of solar panels and wind turbines, offering potential alternative energy sources for the university.

Quantum Electrodynamics (QED)

QED is a quantum field theory developed in the mid-20th century that explains the interactions of charged particles through the exchange of photons. Electric and magnetic forces arise from the exchange of virtual photons between charged particles. QED is the most precise theory in physics that accurately predicted phenomena such as the electron's magnetic moment and the Lamb shift. While QED is highly theoretical, its precision in describing interactions between light and matter has practical implications that can reduce power interruptions. QED contributes to the development of superconductors and efficient semiconductors, which can reduce energy losses in electrical systems. Improved understanding of photon-based systems can help maintain efficient and uninterrupted control

of electricity flow. QED enables the development of laser diagnostics for power systems, which can identify disruptions and facilitate quicker fixes.

Circuit Theory

Circuit theory focuses on the behavior of electrical circuits comprising elements like resistors, capacitors, and inductors. It simplifies complex electrical systems into manageable mathematical models. Its laws and theorems include Ohm's Law, Kirchhoff's Laws, and Thevenin's and Norton's theorems. This theory is essential for designing and analyzing electrical and electronic systems, such as power grids, electronic devices, and communication systems. Unlike Maxwell's equations, circuit theory abstracts away the detailed dynamics of fields and focuses on the flow of current and voltage relationships. Circuit theory offers direct, practical solutions to mitigate electricity interruption. By modeling and simulating the university's electrical grid, engineers can identify weak points and optimize the system for stable power supply. Designing efficient circuits for uninterruptible power supplies (UPS) ensures continuity during outages. Circuit analysis allows targeted repairs, reducing downtime and costs associated with electricity restoration.

Sources of Electricity

Electricity can be generated from various sources, broadly categorized into renewable and non-renewable sources. Each category has its own characteristics, advantages, and challenges. Understanding these sources is crucial for addressing the issues of electricity interruption and ensuring a stable and sustainable power supply.

1. Renewable Sources of Electricity

- Solar Energy
- Wind Energy
- Hydroelectric Power
- Biomass Energy
- Geothermal Energy

2. Non-Renewable Sources of Electricity

- Fossil Fuels e.g Natural Gas, Coal, Oil
- Nuclear Energy

Renewable sources of electricity

Renewable energy sources are derived from natural processes that are continuously replenished and play a vital role in reducing greenhouse gas emissions. The main types of renewable energy sources are:

Solar energy uses the power of the sun to generate electricity. Photovoltaic (PV) cells convert sunlight directly into electricity, while solar thermal systems use mirrors or lenses to concentrate sunlight and produce steam to drive turbines. Its advantage is the fact that solar energy is abundant, inexhaustible, and produces no emissions during operation. It is particularly useful in remote and off-grid locations. The challenges are that solar power generation is intermittent, depending on sunlight availability and it requires significant initial investment and large areas for installation.

Wind energy converts the kinetic energy of wind into electrical power using wind turbines. Wind farms can be located onshore or offshore, depending on wind availability and environmental considerations. Its advantage is that wind energy is renewable, abundant, and produces no emissions during operation. It can be a cost-effective source of power in windy regions. The challenges are that wind power generation is variable and site-specific. Wind turbines can impact local wildlife and face opposition due to aesthetic and noise concerns.

Hydroelectric power plants generate electricity by harnessing the energy of flowing or falling water. Large-scale hydropower projects use dams to store water, while small-scale projects utilize natural water flows. Its advantage is that hydroelectric power is reliable, efficient, and can provide large amounts of electricity. It also offers benefits such as water supply management and flood control. The challenges are that large dams can have significant environmental

and social impacts, including habitat disruption and displacement of communities. Hydropower generation is also subject to seasonal and climatic variations.

Biomass energy is derived from organic materials such as wood, agricultural residues, and animal waste. These materials can be burned directly or converted into biofuels to generate electricity. Its advantage is that biomass energy is renewable and can utilize waste materials, reducing landfill use. It can be a versatile and reliable source of power. The challenges are that biomass combustion can produce emissions, and the availability of feedstock can be variable. Sustainable management of biomass resources is essential to avoid deforestation and other environmental impacts.

Geothermal energy harnesses the heat from the Earth's interior to generate electricity. Geothermal power plants use steam produced from hot water reservoirs beneath the Earth's surface to drive turbines. Its advantage is that geothermal energy is reliable, provides a constant power supply, and has a small land footprint. It produces low emissions compared to fossil fuels. The challenges are that geothermal resources are location-specific and require significant upfront investment. There can be concerns about induced seismic activity and water usage.

Non-renewable sources of electricity

Non-renewable energy sources are limited and cannot be replenished within a human timescale. They have historically been the dominant sources of electricity due to their availability and energy density. The main types of non-renewable energy sources are fossil fuels, including coal, natural gas, and oil, these are the most widely used non-renewable energy sources. They are burned in power plants to generate electricity. Coal is a solid fossil fuel that is abundant and inexpensive. It is burned to produce steam, which drives turbines to generate electricity. Its advantage is that coal is widely available and provides a stable and high-energy output. The challenge is that coal combustion produces significant greenhouse gas emissions and air pollutants, contributing to climate change and health problems. Natural gas is a cleaner-burning fossil fuel compared to coal and oil. It is used in combined-cycle power plants to generate electricity. Its advantage is that: Natural gas power plants are efficient, have lower emissions than coal, and can be quickly ramped up or down to meet demand. The challenges is that natural gas extraction, particularly through hydraulic fracturing (fracking), can cause environmental and health issues, including water contamination and methane emissions.

Oil is less commonly used for electricity generation due to its higher cost compared to coal and natural gas. It is mainly used in regions where other resources are not available. Its advantage is that Oil-fired power plants can be

built quickly and have a flexible operational profile. The challenge is that Oil combustion produces significant emissions, and oil extraction and transportation pose environmental risks, including spills and habitat destruction.

Nuclear energy is produced through the fission of uranium or plutonium atoms in nuclear reactors. The heat generated by fission is used to produce steam, which drives turbines to generate electricity. Its advantage is that nuclear power plants produce large amounts of electricity with low greenhouse gas emissions. They have a high capacity factor, meaning they can operate continuously for long periods. The challenges are that: Nuclear energy poses significant risks, including radioactive waste disposal, potential nuclear accidents, and high initial capital costs. The long-term sustainability of nuclear power depends on advancements in technology and waste management.

Strategies to Mediate Electricity Interruption

Several strategies can be implemented to mitigate the impact of electricity interruptions on academic activities:

1. Installing backup generators, solar panels, and other renewable energy systems can provide a reliable power supply during outages.
2. Implementing energy-saving practices can reduce the demand for electricity and minimize the risk of overloading the system.

3. Investing in modern and resilient power infrastructure can reduce the frequency and duration of power outages.
4. Developing policies and regulations that prioritize the stable supply of electricity to educational institutions can enhance reliability.
5. Educating students and staff about energy conservation and emergency preparedness can help manage the impact of power outages.

Effectiveness of the Strategies to Mediate Electricity Interruption

Ensuring a stable electricity supply is crucial for maintaining academic activities at universities like the University of Benin. Various strategies can be implemented to mitigate the impact of electricity interruptions. These strategies can be broadly categorized into technical, administrative, and policy-based approaches.

Technical strategies

Provide backup Power Systems like Generators, Uninterruptible Power Supplies (UPS), Battery Storage Systems. Renewable Energy Integration like Solar Panels, Wind Turbine, Hybrid Systems. Microgrids. Smart Grid Technologies such as Demand Response programs, Real-Time Monitoring.

Administrative strategies

There should be regular maintenance, and infrastructure upgrades, Energy Efficiency Programs like Energy Audits, Efficiency Measures should be in place, Load Management systems such as Scheduling or Priority Systems

Policy-based strategies

Government policies and regulation such as support for renewables, regulatory standards should be implemented. Public-Private Partnerships like Collaborative Projects, Research and Development should be considered. Training Programs, Awareness Campaigns should be encouraged.

Summary of Literature Reviewed

This literature review has explored the theoretical and conceptual frameworks, causes of recent electricity interruption in the University of Benin, role of electricity in academic institutions, the effects of electricity interruptions, focusing majorly on electricity interruption in the University of Benin and also discussed relevant theories of electricity and how they can be applied to address electricity interruption, Sources of electricity and strategies to mitigate power outages. The review highlights the significant challenges posed by electricity interruptions at the University of Benin and the importance of implementing effective solutions to ensure a stable power supply. By addressing the gaps in

existing research, this study aims to contribute to the development of strategies that will enhance the reliability of electricity in academic settings.

CHAPTER THREE

METHODOLOGY

This chapter describes the research methodology that was used in the study under the following sub-headings.

1. Research Design
2. Population of the Study
3. Sample and Sampling Technique
4. Research Instrument
5. Validity of the Instrument
6. Reliability of the Instrument
7. Administration of the Instrument
8. Method of Data Analysis

Research Design

This study employs a descriptive survey research method, utilizing a structured questionnaire to gather primary data. Descriptive survey is considered appropriate for this research because questionnaire is to be used as the research instrument to analyze the challenges of electricity interruption on academic activities in the University of Benin.

Population of the Study

The population for this study consists of all undergraduate students of the University of Benin, Benin City, Nigeria.

Sample Size and Sampling Techniques

A sample size of 100 students would be used for this study. The students would be divided into strata based on their faculties to ensure proportional representation from different academic disciplines.

Research Instruments

The instrument for data collection is a structured google form questionnaire designed by the researcher. The questionnaire will be divided into two sections: Section A focused on the demographic data of respondents such as participants' age, gender, level, and faculty to help categorize responses and understand any variations based on demographics, while Section B consisted of fifteen (15) research items.

Validity of the Instrument

In order to check the validity of the Instrument, the questionnaire designed by the researcher would be given to the supervisor and two other experts (lecturers) in the Faculty of Education, University of Benin, for scrutiny and for necessary corrections to ensure content as well as face validity

Administration of the Instrument

The questionnaire would be administered personally by the researcher to the respondents. The respondents would be assured of confidentiality after a careful explanation of how to respond to the items and urged to answer the questions honestly to the best of their knowledge. The response will be auto-generated on spreadsheet for data analysis.

Method of Data Analysis

The data collected on a spreadsheet will be statistically analyzed with the use of simple percentage.

CHAPTER FOUR

DATA ANALYSIS AND DISCUSSION OF RESULT

This chapter deals with the analysis and interpretation of data collected for this research work. Within the context of this research work, a total of 100 questionnaires were distributed to students of the University of Benin. Section A of the questionnaire covered the demographic information of the respondents, While, section B comprises of challenges faced by students during electricity interruption, its impact on their academic activities and suggestions to mitigate power outages on campus.

SECTION A: Demographic Information

Table 1: Gender distribution

GENDER	RESPONDENTS	PERCENTAGE (%)
Male	42	42%
Female	58	58%
TOTAL	100	100%

Table 2: Age group

AGE GROUP	RESPONDENTS	PERCENTAGE (%)
below 20	9	9%
20-25	78	78%
26-30	12	12%
30 and above	1	1%
TOTAL	100	100%

Table 3: Level of study

LEVEL OF STUDY	RESPONDENTS	PERCENTAGE (%)
100 Level	3	3%
200 Level	13	13%
300 Level	21	21%
400 Level	46	46%
500 Level	11	11%
Others	6	6%
TOTAL	100	100%

Table 4: Faculty

FACULTY	RESPONDENTS	PERCENTAGE (%)
Education	33	33%
Arts	6	6%
Social Sciences	14	14%
Engineering	10	10%
Medicine	4	4%
Life science	10	10%
Management science	8	8%
Basic medical sciences	4	4%
others	11	11%
TOTAL	100	100%

Table 5: Length of Time at the University

LENGTH OF TIME AT THE UNIVERSITY	RESPONDENTS	PERCENTAGE (%)
1 – 2 years	17	17%
3 – 4 years	61	61%
Over 4 years	22	22%
TOTAL	100	100%

SECTION B: RESPONSE TO THE RESEARCH ITEMS

Research question one: What is the frequency and duration of electricity interruption in the University of Benin

Table 6

S/N	ITEMS	SD(%)	D(%)	N(%)	A(%)	SA(%)
1.	Electricity interruptions occur frequently at the University of Benin.	4 (4%)	14 (14%)	9 (9%)	30 (30%)	43 (43%)
2.	The duration of power outages is typically long enough to disrupt academic activities.	5 (5%)	8 (8%)	4 (4%)	33 (33%)	50 (50%)
3.	Power outages occur more often during peak academic hours.	8 (8%)	3 (3%)	9 (9%)	31 (31%)	49 (49%)

Table 4 above shows the result from 100 respondents, item 1 shows that 4 respondents of 4% strongly disagreed, 14 respondents representing 14% disagreed, 9 respondents were neutral in response, 30 respondents representing 30% agreed while 43 respondents representing 43% strongly agreed that electricity interruption occur frequently at the University of Benin. In item 2, 5% of the sampled population strongly disagreed, 8% of the population disagreed, 4% remained neutral, 33% agreed and 50% of the population strongly agreed that the duration of power outages is typically long enough to disrupt academic activities. The last item on the table shows that 8% of the respondents strongly disagreed that Power outages occur more often during peak academic hours, 3% disagreed, 9% stayed neutral and 31% agreed while 49% strongly agreed respectively.

Research Question Two: How does electricity uninterrupted affect teaching and learning processes at the University of Benin?

Table 7

S/N	ITEMS	SD(%)	D(%)	N(%)	A(%)	SA(%)
4.	Electricity interruptions disrupt classroom teaching and learning processes.	6 (6%)	9 (9%)	9 (9%)	30 (30%)	46 (46%)
5.	Access to digital resources, such as online libraries and computer rooms are limited by power outages.	3 (3%)	9 (9%)	6 (6%)	29 (29%)	53 (53%)
6.	Frequent power cuts impact my ability to study or complete assignments on campus.	6 (6%)	7 (7%)	8 (8%)	26 (26%)	53 (53%)
7.	Electricity interruptions lead to delays in meeting research project deadlines	6 (5%)	4 (4%)	10 (10%)	30 (30%)	49 (49%)

Findings in this study as represented in the item 1 of table 7 above shows that 6% of the total respondents strongly disagreed to the claim that electricity interruptions disrupt classroom teaching and learning processes, 9% disagreed, 9% also were neutral, 30% agreed while 46% strongly agreed. In item 2, only 3% out of 100 strongly disagreed that Access to digital resources, such as online

libraries and computer rooms are limited by power outages, 9% disagreed, 6% remained neutral, 29% agreed while, 53 strongly agreed that Access to digital resources are limited by power outages. Item 3 shows that 6% strongly disagreed, 7% disagreed, 8% remained neutral, 26% agreed while, 53% strongly agreed that Frequent power cuts impact their ability to study or complete assignments on campus. Lastly, item 4 indicates that 6% of the total population strongly disagreed that electricity interruptions lead to delays in meeting research project deadlines, 4% disagreed, 10 stayed neutral, 30% agreed to this statement while, 49% strongly agreed to it

Research Question Three: What are the specific challenges faced by students during power outages in the University of Benin?

Table 8

S/N	ITEMS	SD(%)	D(%)	N(%)	A(%)	SA(%)
8.	Electricity outages hinder faculty productivity in teaching and academic administration.	4 (4%)	5 (5%)	16 (16%)	36 (36%)	39 (39%)
9.	Research activities, such as data analysis and experiments, are disrupted by electricity interruptions.	2 (2%)	6 (6%)	9 (9%)	37 (37%)	46 (46%)
10.	Faculty administrative tasks, such as grading and record-keeping are affected by power outages.	3 (3%)	7 (7%)	14 (14%)	37 (37%)	39 (39%)
11.	Electricity interruptions affects collaborative research efforts between faculty and students	5 (5%)	6 (6%)	9 (9%)	33 (33%)	46 (46%)

From table 8 above, item 1 shows that only 4 respondents strongly disagreed that electricity outages hinder faculty productivity in teaching and academic administration, 5 of them disagreed, 16 stayed neutral, 36 agreed while, 39 strongly agreed. Item 2 of this table shows that 2% of the entire population strongly disagreed, 6% disagreed, 9% were neutral, 37% agreed while, 46%

strongly agreed that research activities, such as data analysis and experiments, are disrupted by electricity interruptions. For item 3, 3% strongly disagreed, 7% disagreed, 14% remained neutral, 37% agreed while, 39% strongly agreed that to the fact that faculty administrative tasks, such as grading and record-keeping are affected by power outages. From item 4, 5% strongly disagreed, 6% agreed, 9% were neutral, 33% agreed that electricity interruptions affects collaborative research efforts between faculty and students while, 46% strongly agreed to it.

Research Question Four: What measures can be implemented to mitigate the impact of electricity interruption on academic activities in the University of Benin?

Table 9

S/N	ITEMS	SD(%)	D(%)	N(%)	A(%)	SA(%)
12.	Backup power sources (e.g., generators, solar) would reduce disruptions in academic activities.	3 (3%)	3 (3%)	3 (3%)	26 (26%)	65 (65%)
13.	Investing in more stable electricity infrastructure should be a priority for the university.	2 (2%)	1 (1%)	1 (1%)	18 (18%)	78 (78%)
14.	The university should develop alternative power solutions specifically for research labs and libraries.	0 (0%)	1 (1%)	1 (1%)	25 (25%)	73 (73%)
15.	The university should gather regular feedback from students and faculty on power reliability issues.	1 (1%)	0 (0%)	3 (3%)	25 (25%)	71 (71%)

From table 9 above, 3% from item 1 strongly disagreed that backup power sources (e.g., generators, solar) would reduce disruptions in academic activities, 3% disagreed, 3% stayed neutral, 26% agreed while, 65% strongly agreed that

backup power sources would reduce disruptions in academic activities. In the next item, 2% strongly disagreed, 1% disagreed, 1% neutral, 18% agreed while, 78% strongly agreed that investing in more stable electricity infrastructure should be a priority for the university. From item 3 of the same table, no respondent strongly disagreed except 1 respondent disagreeing, 1% stayed neutral, 25% agreed while, 73% strongly agreed that the University should develop alternative power solutions specifically for research labs and libraries. Lastly, item 4 shows that 1% of the entire respondents strongly disagreed, there was no disagreement, 3% remained neutral, 25% agreed while, 71% strongly agreed that the University should gather regular feedback from students and faculty on power reliability issues.

Other suggestions on sustainable power supply in the University of Benin

Students suggested the need for the University of Benin to invest in solar systems though it might be expensive but, it's worth it. Some suggested that the school should be granted autonomy to generate electricity independently. furthermore, there were suggestions that faculties, Libraries, and school hostels should be equipped with backup power plan so as to avert the effect of electricity interruption. The issue of the existence of a big river behind the school was also raised with suggestions that the University of Benin can utilize the river to create its own dam for a steady supply of hydropower.

CHAPTER FIVE

SUMMARY, CONCLUSION AND RECOMMENDATIONS

Summary

The purpose of this research work is to find out the challenges posed by electricity interruption on academic activities at the University of Benin. Drawing from theoretical frameworks such as Energy Access Theory, Systems Theory, and Social Learning Theory that was discussed in chapter one, we find out that power outages disrupt essential educational functions like lectures, research, and student engagement. The study highlights key findings such as electricity interruption adversely affects students' study schedules, academic performance, and use of digital learning tools. Laboratories, libraries, and administrative operations experience significant setbacks due to unreliable power supply. These disruptions have negative effects on the overall learning environment and institutional efficiency. This project emphasizes the relationship between reliable electricity and academic success noting the challenges and opportunities for resolution.

A total of 100 responses of students from different faculties of the University of Benin were analyzed for this study. A structured questionnaire containing 15 items was used to collect information from respondents and a simple percentage was used for data analysis.

Conclusion

Considering the findings of this study, it can be concluded that reliable electricity is important for an effective and sustainable learning environment. The frequent power outages at the University of Benin has negatively impacted student's academic activities, creating barriers to achieving educational goals. The findings stress that improving electricity reliability is a necessity for academic excellence and institutional growth.

Recommendations

Based on the above mentioned findings, the proposed recommendations are:

1. The University of Benin should invest in Renewable Energy Solutions; There should be solar panels and other renewable energy sources to complement the national grid, ensuring backup power during outages. Microgrids should be used for critical areas like libraries, laboratories, and administrative offices
2. There should be upgrade of existing infrastructure; electrical systems should be upgraded to handle higher loads and minimize breakdowns and also there should be frequent monitoring and fault-detection systems for quicker response to outages.
3. The university should conduct energy audits to identify and address issues in the current power system and also train staff and students on energy conservation practices to reduce strain on the power supply.

4. The university should Partner with private energy companies for innovative solutions, such as on-campus renewable energy projects.
5. Lastly, for a more sustainable power supply in the University of Benin, the big river behind the school that was suggested by students should be considered to see if it can be used to create dam for power supply.

By implementing these recommendations, the University of Benin can reduce the challenges of electricity interruption on academic activities, improve learning experience, and serve as a model for other institutions facing similar issues.

REFERENCES

- National Energy Education Development Project. (2007). *Intermediate Energy Infobook*. The NEED Project.
- Ekpenyong, J. E., & Ekpenyong, A. E. (2016). Power Supply and the Academic Performance of Students: Evidence from Nigerian Tertiary Institutions. *International Journal of Academic Research in Business and Social Sciences*, 6(5), 197-207.
- Griffiths, D. J. (2017). Introduction to Electrodynamics (4th ed.). *Cambridge University Press*.
- Phiri, C., et al (2021). An assessment of the impact of Electricity Power Outages on University Students' life, Lusaka, Zambia: A University perspective study. *Canadian Journal of Health Research*, vol 1 1-12
- Ogunode, N. j., & Ayoko, V. O. (2022). Implication of Unstable Power (Energy) on Administration of Tertiary Institutions in Nigeria. *European Multidisciplinary Journal of Modern Science*, vol 6, 1-10
- Ogundele, M. O., & Oluwaseun, J. A. (2015). The Role of Electricity in Enhancing the Learning Environment in Nigerian Universities. *Educational Research and Reviews*, 10(17), 2449-2456.
- University of Benin (2020). *UNIBEN Annual Report 2019-2020*. Benin City: University of Benin Press.

U.S. Energy Information Administration. (n.d.). *Electricity explained*. U.S. Department of Energy

B. I. Gwaivangmin (2021). Electricity Power Supply Consumption in Education Sector and Energy Audit: Case Study of University of Jos. *Nigerian Journal of Technology*, 40 (2) 321-328