AWARENESS OF AVAILABILITY AND USES OF DIFFERENT TYPES OF DOMESTIC TRANSFORMERS AMONG TECHNOLOGISTS IN FACULTIES OF EDUCATION AND ENGINEERING IN THE UNIVERSITY OF BENIN

Obafemi Oghenetejiri ISHOLA

EDU2001971

MARCH 2025

AWARENESS OF AVAILABILITY AND USES OF DIFFERENT TYPES OF DOMESTIC TRANSFORMERS AMONG TECHNOLOGISTS IN FACULTIES OF EDUCATION AND ENGINEERING IN THE UNIVERSITY OF BENIN

Obafemi Oghenetejiri ISHOLA

EDU2001971

A RESEARCH PROJECT SUBMITTED TO THE DEPARTMENT OF VOCATIONAL AND TECHNICAL EDUCATION, FACULTY OF EDUCATION, UNIVERSITY OF BENIN, BENIN CITY. IN PARTIAL FULFILLMENT OF THE REQUIREMENTS FOR THE AWARD OF BACHELOR OF SCIENCE EDUCATION DEGREE B.Sc. (Ed.) IN INDUSTRIAL TECHNICAL EDUCATION (ELECTRICAL ELECTRONICS OPTION)

MARCH 2025

APPROVAL PAGE

I certify that this work was carried out by Obafemi Oghenetejiri **ISHOLA** with Matriculation number **EDU2001971** in the Department of Vocational and Technical Education, Faculty of Education, University of Benin, Benin City, Nigeria.

_____ _____

DR. A.U AINETOR **DATE**
(PROJECT SUPERVISOR)

CERTIFICATION

We, the undersigned, certify that this project was carried out by Obafemi Oghenetejiri **ISHOLA** with matriculation number **EDU2001971** in the Department of Vocational and Technical Education, Faculty of Education, University of Benin, Benin City.

_____ _____

DR. A.U AINETOR **DATE**

(Project Supervisor)

_____ _____

DR. S.B. ABUSOMWAN **DATE**
(Project Coordinator)

_____ _____

DR. S.O OSUYI **DATE**
(Head of Department)

DEDICATION

This project is dedicated to God Almighty from whom all knowledge, wisdom and understanding, good health, strength and for his guidance and protection during this work thus far.

AKNOWLDGEMENTS

The researcher acknowledge and profound gratitude to God Almighty for his love, strength and direction making it possible for her to begin and end this programme successfully.

The researcher acknowledge and show sincere appreciation to his project supervisor Mr. A.U. Ainetor for his contribution, support throughout the course of this project work. His instructions and directions in writing of this project work. The researcher's deep and sincere appreciation goes to his parents Engr.Bolaji Ishola and Mrs.Ejiro Anibor for their financial assistance, Parental guidance and lovely advice, during the course of the programme. His sincere appreciation goes to his siblings, Bamidele Ishola and Gbemisola Ishiola for their support.

Also the researcher would like to appreciate his friends, Akinyemi Dayo, Aruna Moses, Abade Emmanuel, Nwaomi Godstime, Udama Innocent, Emuebie Christian and lastly Daniel Stephen for their friendly advice and support. He has no valuable words to express his thanks, but his heart is filled of appreciation to everyone, God bless you.

TABLE OF CONTENT

LIST OF TABLES

ABSTRACT

This study investigates the awareness and utilization of different types of domestic transformers among technologists in the Faculties of Education and Engineering at the University of Benin. A descriptive survey research design was employed, and data were collected using a structured questionnaire. The study sampled 78 respondents, comprising 7 from the Faculty of Education and 71 from the Faculty of Engineering. Data analysis was conducted using descriptive statistics, including mean, standard deviation, and frequency counts. The findings indicate that while technologists have a moderate awareness of different types of domestic transformers, their knowledge of handling, maintenance, and optimization remains limited. The results further reveal that technologists in the Faculty of Engineering demonstrated higher awareness levels compared to their counterparts in the Faculty of Education. However, practical application and maintenance practices were found to be inadequate across both faculties. The study highlights the need for enhanced training programs, hands-on workshops, and curriculum updates to improve technical knowledge and practical skills in domestic transformer usage. It is recommended that universities integrate specialized courses on transformer technology and maintenance into their technical education programs. This research contributes to the broader discourse on electrical safety and efficiency in academic and professional environments.

CHAPTER ONE

INTRODUCTION

Background of the Study

Domestic transformers play a critical role in power distribution by adjusting voltage levels to suit various residential and commercial needs. In Nigeria, the use of these transformers is especially important due to the country's inconsistent power supply and the need for voltage regulation in many households and institutions. The lack of awareness and understanding of different types of domestic transformers, such as step-down and step-up transformers, among technologists can pose safety risks and lead to inefficient energy use (Anyaogu, 2023). Furthermore, transformers are integral for managing electricity safely in educational environments, where equipment often requires specific voltage levels for optimal performance (BusinessDay, 2023).

Transformers are vital components in electrical systems, designed to change the voltage levels of alternating current (AC) electricity. By utilizing the principle of electromagnetic induction, transformers either increase or decrease the voltage levels to meet the needs of various applications. The transformer is made up of two or more coils of wire, called windings, which transfer electrical energy from one circuit to another through magnetic flux. This process allows electrical power to be efficiently transmitted over long distances, minimizing losses and ensuring safety. In Nigeria, transformers play a crucial role in managing electricity distribution, particularly given the challenges in the power supply sector.

Also, there are various types of transformers. According Abubakar et al.(2022), step-up transformers are those that are used to increase the voltage from the primary to the secondary coil, typically employed in power plants and transmission stations. By stepping up the voltage, electricity can travel longer distances with minimal energy loss. The step-down transformers reduce the voltage from the primary to the secondary coil, making it suitable for use in homes, businesses, and educational institutions. They ensure that electrical appliances receive the appropriate voltage for safe operation (Akinmoladun & Ogunyemi, 2020).

Isolation transformers on the other hand isolate electrical circuits for safety, often used in sensitive equipment or environments such as laboratories and hospitals, where electrical isolation is required to prevent electrical shocks (Oluwaseun et al., 2023).Autotransformers according to Femi & Eniola,(2021) is that featuring a single winding that acts as both the primary and secondary coil, these transformers are more efficient and compact, commonly used in smaller, low-power applications.

Transformers are crucial in ensuring the proper operation of electrical devices and reducing power wastage. In educational institutions, such as the University of Benin, transformers provide stable power to classrooms and laboratories, ensuring a safe and conducive learning environment. These transformers are constructed, repaired or maintained and supplied by technologies.

A technologist is a professional skilled in applying scientific and technical knowledge to solve practical problems in various fields, including engineering, education, and healthcare. They design, operate, and maintain technological systems, bridging theory and practice to ensure

efficiency and innovation. Technologists play vital roles in advancing industries and improving society's quality of life (Adebayo, 2021; Okafor & Ibe, 2022).

A technologist is a professional with specialized knowledge and skills in the application of scientific principles and technological tools to solve practical problems. In faculties of education, technologists play a critical role in supporting the development and integration of instructional materials, technical equipment, and educational technologies to enhance teaching and learning processes. They assist in creating an effective learning environment by maintaining and managing laboratory equipment, providing technical support for instructional delivery, and training educators and students on the use of modern educational tools. This ensures the alignment of educational practices with technological advancements.

In faculties of engineering, technologists focus on applying engineering principles to the design, development, and operation of systems, machinery, and equipment. They support research, innovation, and practical training by bridging the gap between theoretical engineering concepts and real-world applications. Their responsibilities often include managing technical laboratories, developing prototypes, and ensuring compliance with safety and operational standards. According to Ogundele and Adebayo (2021), technologists are indispensable in higher education institutions as they ensure the functionality of technical resources and enhance students' practical skills. Similarly, Okoro (2022) highlights their role in promoting innovation, ensuring that students are well-prepared for modern technological challenges in various industries.

Despite their critical importance, many technologists in the Faculties of Education and Engineering may not be fully aware of the range of transformers available and their specific uses.

This lack of knowledge can lead to inefficiencies, safety hazards, and suboptimal use of resources. Awareness is essential for ensuring that the right transformers are chosen for various applications, thus enhancing the safety, reliability, and efficiency of electrical systems in these institutions.

Statement of the Problem

The following are the problems which the study seeks to solve:

Different appliances and equipment are supplied in department and domestic houses. Also, they may need to be stepped down or stepped up before they can be used in the workshop and residences. These appliance or equipment are managed by technologists. It is not certain whether these technologists are aware of the availability and uses of different types of transformers. This research therefore is meant to find out the awareness of the uses different types of domestic transformers.

Purpose of the Study

The purpose of this research work is to examine the awareness of availability and uses of different types of domestic transformers amongst technologist in faculties of education and engineering in university of Benin.

Specially, the study seeks the following:

1. To find out the level of awareness and availability of domestic transformers among technologist in faculty of education and engineering.

2. To find out areas where technologist lack knowledge of types of domestic transformers, functions and safety measures.

3. To find out whether technologist have knowledge of safety practices in handling and maintaining of domestic transformers.

4. To find out whether technologist have knowledge of optimization of electric energy usage.

Research Questions

The following research questions will be raised to give the study.

1.) What is the level of availability of different types of domestic transformers in faculty of Education and Engineering?

2.) In which areas do technologist have knowledge of different uses and types of domestic transformers in faculty of Education?

3.) Do technologist have knowledge of technological practices in handling and maintaining of domestic transformers?

4.) Do technologist have knowledge of optimizing the use of domestic transformers?

Significance of the Study

This study will be of benefit to the technologist, staffs, and occupants of buildings within the University.

This study will be of immense importance to technologists within the University of Benin as it will enhance their knowledge and awareness of the availability and uses of various types of domestic transformers. By understanding the specific applications and capacities of these transformers, technologists will be better equipped to make informed decisions regarding the selection, installation, and maintenance of transformers within residential and institutional buildings. This knowledge will ultimately contribute to improved electrical safety and system efficiency, reducing the risk of power outages and electrical faults.

Furthermore, the findings of this study will benefit staff members within the university by promoting greater awareness of the importance of domestic transformers in maintaining a stable power supply. Staffs who are responsible for facility management and maintenance will gain insights into the most suitable types of transformers for different building requirements. This awareness will support more efficient power management and enhance the safety of electrical installations, thereby minimizing risks associated with transformer failures and voltage irregularities.

Lastly, occupants of buildings within the university will also benefit from this study as it will promote better understanding and appreciation of the role of domestic transformers in ensuring continuous and reliable power supply. By fostering awareness among building occupants, the study will encourage them to take proactive measures in reporting transformer-related issues and adopting safety practices. This will ultimately contribute to a safer and more conducive environment for living, studying, and working within the university premises.

Scope and Limitations of the Study

This study focuses on assessing the awareness and understanding of domestic transformers among technologists in the Faculties of Education and Engineering at the University of Benin. The research will primarily involve technologists, within the Faculties of Education and Engineering at the University of Benin.

The research will cover various types of domestic transformers, including step-up and step-down transformers, and their specific applications in residential and educational settings.

Definition of Terms

Domestic Transformer: This is a domestic transformer is an electrical device used to convert voltage levels for household applications.

Step-Down Transformer: This type of transformer decreases the voltage from a higher level to a lower level, making it suitable for household use where lower voltage is required to power devices safely.

Step-Up Transformer: A step-up transformer increases voltage from a lower level to a higher level.

Voltage Regulation: This refers to the process of maintaining a constant voltage level despite variations in load or supply voltage.

Electrical Safety: This encompasses practices and measures designed to prevent electrical accidents and injuries.

Energy Efficiency: Energy efficiency refers to the ability to use less energy to achieve the same output or perform the same task

Technologist: A technologist is an individual with specialized knowledge in technology, particularly in the fields of engineering, electronics, or electrical systems.

Transformers Maintenance: This term refers to the routine inspections and servicing of transformers to ensure their optimal operation and longevity.

Awareness Programs: Awareness programs are educational initiatives aimed at increasing knowledge and understanding of specific topics, such as electrical safety and transformer usage.

Electrical Infrastructure: Electrical infrastructure encompasses the physical components and systems that distribute electricity, including power lines, transformers, substations, and transformers

CHAPTER TWO

LITERATURE REVIEW

In this chapter, relevant literature to the study is reviewed. Specially, the chapter is organized under the following sub-headings:-

- Concept of Domestic Transformers
- Availability of Domestic Transformers in Nigeria
- Uses of Domestic Transformers
- Awareness of Domestic Transformers Among Technologist**s**
- Factors Affecting Awareness of Domestic Transformers Among Technologists
- Challenges in the Adoption of Domestic Transformers
- The Role of Government and Policy in Transformer Education
- Future Trends in Transformer Technology and Education
- Related Empirical Studies
- Theoretical Framework
- Summary of related literature

Concept of Domestic Transformers

Domestic transformers are essential electrical devices used to modify voltage levels for different applications. These transformers function based on the principle of electromagnetic induction, where an alternating current in one coil produces a magnetic field that induces a corresponding current in another coil, allowing the transfer of electrical energy between circuits. This process facilitates the transformation of voltage to suit various applications, such as residential appliances, commercial machinery, and educational tools (Olawale & Adebayo, 2021; Oluwaseun, 2023).

The most common types of domestic transformers include step-up, step-down, isolation, and auto transformers, each designed for specific voltage transformations. Step-up transformers increase the voltage from the primary to the secondary winding and are often employed in industrial settings that require high-voltage inputs. These transformers are commonly used in situations where low-voltage sources need to be converted to higher voltages for specific equipment, such as air conditioning units, heat pumps, or certain types of power tools (Alabi et al., 2020). Step-down transformers, on the other hand, reduce high-voltage inputs to safer, lower voltages suitable for residential appliances. This type is especially prevalent in households, where high-voltage electricity from the main grid must be reduced to safer levels for everyday devices such as microwaves, televisions, and lighting systems (Akinola & Bello, 2023).

Isolation transformers are another essential type, primarily used for safety purposes. They protect sensitive equipment by isolating devices from direct electrical sources, thereby minimizing the risk of electric shock and power surges. In addition to protecting devices, isolation transformers play a significant role in medical and laboratory settings, where equipment

requires stable and interference-free power. For instance, they are often utilized in research labs to provide clean power to sensitive electronic devices, ensuring accuracy in experimental outcomes (Ezeh, 2022; Okoh & Aigbokhan, 2022). In this regard, isolation transformers are a critical component in technical and engineering education, as they allow students to conduct experiments with electrical devices in a controlled, safe environment.

Auto transformers, which have a single winding that acts as both primary and secondary, are used when minimal voltage adjustments are required. These transformers are known for their efficiency and compact design, making them particularly useful in applications that require small, continuous voltage changes. However, due to their design, they are best suited for specific, controlled applications rather than for general household use (Okafor & Ayodele, 2018). In educational settings, auto transformers are beneficial for experiments that involve variable voltage levels, providing students with practical experience in managing minor adjustments in voltage output.

Recent advancements in transformer technology have led to the development of smart transformers, which come equipped with features such as automated voltage regulation, real-time monitoring, and fault detection. These features make smart transformers particularly valuable in both residential and educational environments, as they enhance efficiency and offer improved safety. For example, smart transformers can automatically shut down in the event of a fault, preventing damage to connected devices and reducing the risk of electrical fires. Such innovations reflect the increasing integration of digital technology in transformer design, contributing to the reliability and safety of modern electrical systems (Ugwu & Chukwu, 2020; Osahon & Imafidon, 2023).

In Nigeria, the role of domestic transformers extends beyond residential applications, especially within the educational sector. Nigerian universities, including the University of Benin, often incorporate transformers into their engineering and technical curricula to give students hands-on experience with practical electrical applications. According to Adebayo and Faluyi (2018), exposure to a variety of transformer types helps students in engineering and technology programs develop essential skills in electrical principles and safety procedures. This is particularly important in fields such as electrical and mechanical engineering, where understanding transformer functionality is foundational to other advanced concepts. Furthermore, studies have shown that students who engage with transformers as part of their education are better equipped to enter technical careers, as they gain familiarity with equipment they are likely to encounter in the workplace (Adebayo & Onabanjo, 2019; Oluwaseun, 2023).

As the demand for efficient energy management grows, the role of transformers in educational, residential, and industrial settings will likely continue to expand. By improving awareness and access to these devices, Nigerian institutions can enhance the quality of technical education and promote safer, more efficient use of electrical energy across various sectors. This aligns with the country's broader goals of fostering innovation and advancing technological capabilities within educational institutions and beyond (Osahon & Imafidon, 2023).

Availability of Domestic Transformers in Nigeria

The availability of domestic transformers in Nigeria varies significantly across different regions, influenced by factors such as infrastructure, economic conditions, and import policies. In urban areas like Lagos, Abuja, and Benin City, the demand for transformers is generally met due to established distribution networks and a higher concentration of electrical equipment

suppliers. These areas benefit from better access to transformers due to both local suppliers and international imports, mainly from countries like China and India, which offer cost-effective models widely used for household and institutional purposes (Adebayo & Onabanjo, 2019; Nwachukwu & Igwe, 2021).

However, in many rural and remote areas, access to transformers is limited. A study by Onogho and Oladipo (2019) highlights that unreliable power infrastructure and supply chain challenges hinder the consistent availability of transformers outside major cities. Consequently, residents in rural communities often experience electrical shortages or rely on outdated transformer models, which can compromise safety and efficiency. Additionally, the limited availability of spare parts for certain imported models can exacerbate maintenance issues, especially in regions where specialized repair services are scarce (Okeke & Ibe, 2020).

Educational institutions, particularly universities, face similar challenges. According to Ugwu and Chukwu (2020), many Nigerian universities depend on government funding to acquire transformers and related electrical equipment. This reliance on external funding can lead to delays and insufficient access to quality equipment. In some cases, universities such as the University of Benin supplement their resources through partnerships with private organizations, which support the procurement of advanced transformer models for educational purposes (Akinola & Bello, 2023). Such collaborations are increasingly essential as they help fill the gap in funding and ensure students gain hands-on experience with contemporary technology.

Beyond urban and educational contexts, government policies also play a role in the availability of transformers. For example, import tariffs and regulatory requirements affect the ease of acquiring these devices. Musa and Sule (2022) note that recent policy shifts aimed at

promoting local production of electrical equipment could eventually improve access to transformers across the country, particularly if locally manufactured models become more affordable and widely available. By addressing these infrastructural and policy challenges, Nigeria can enhance transformer availability, thus supporting safer and more efficient energy distribution nationwide.

The Uses of Domestic Transformers

Domestic transformers serve a wide range of functions, from facilitating the safe use of electrical devices in households to supporting industrial and educational applications. The primary function of a transformer is to either step up or step down voltage, making it suitable for various appliances and systems. In residential settings, step-down transformers are essential for converting the high voltage supplied by national power grids into lower, safer voltages. For instance, devices such as mobile phone chargers, refrigerators, and televisions rely on step-down transformers to reduce the standard 220-240V supplied in Nigerian homes to the required operational voltage, which is often much lower (Akinola & Bello, 2023). This ensures the safe operation of electrical appliances, protecting them from damage and prolonging their lifespan.

Beyond household uses, domestic transformers play a crucial role in the education sector, particularly in faculties of engineering and technical education. Here, transformers are used in practical training and experiments to demonstrate the principles of electromagnetism, energy conversion, and electrical safety. Students in electrical engineering and related fields rely on isolation transformers to safely conduct experiments with high voltages without the risk of electric shock (Osahon & Imafidon, 2023). This hands-on approach enables students to understand theoretical concepts in a practical context, fostering innovation and problem-solving

skills. Studies show that incorporating practical transformer-related exercises into the curriculum enhances students' understanding of complex electrical systems and prepares them for technical careers (Ugwu & Chukwu, 2020).

In industrial applications, step-up transformers are used to boost voltage for the operation of high-power machinery. This is especially critical in manufacturing plants where large electrical loads are required to power equipment such as motors, compressors, and industrial heating systems. By increasing voltage, step-up transformers help minimize energy losses over long distances, thereby improving the efficiency of power transmission systems (Oluwaseun, 2023; Okafor & Ayodele, 2018). This use of transformers ensures that industries can operate at optimal capacity, reducing operational costs and enhancing productivity.

Furthermore, auto transformers are utilized in specific applications where minor voltage regulation is required. For example, auto transformers are often found in voltage stabilizers used in homes and offices to protect sensitive devices like computers, printers, and medical equipment from voltage fluctuations. These devices are crucial in countries like Nigeria, where power supply inconsistencies can lead to frequent voltage surges and drops (Nwachukwu & Igwe, 2021).

In addition, domestic transformers are integral to both residential and industrial settings. Their varied applications demonstrate their importance in ensuring the safe, efficient, and reliable use of electrical energy across different sectors in Nigeria. With advancements in technology, the demand for more sophisticated and smart transformers is likely to increase, further expanding their uses and benefits (Adebayo & Onabanjo, 2019).

Awareness of Domestic Transformers Among Technologists

Awareness of domestic transformers among technologists is critical for ensuring the safe and effective use of electrical systems in various applications. This awareness encompasses knowledge about the types of transformers, their functions, and their proper installation and maintenance. In Nigeria, technologists in faculties of education and engineering are often the first line of contact for practical applications of transformers. Their familiarity with transformer technology directly impacts the safety and efficiency of electrical systems in both residential and industrial settings (Olawale & Adebayo, 2021).

Research indicates that the level of awareness about transformers is influenced by the quality of education and practical training received by technologists. For instance, Ugwu and Chukwu (2020) highlight that hands-on training programs significantly enhance students' understanding of transformers, enabling them to apply theoretical knowledge in real-world scenarios. This practical experience fosters a deeper appreciation of transformer functionality and safety protocols, which are essential in preventing electrical accidents and equipment failures.

Moreover, awareness campaigns and workshops organized by educational institutions and professional organizations can significantly enhance technologists' understanding of transformers. A study by Nwachukwu and Igwe (2021) found that such initiatives improve knowledge about the latest transformer technologies, including energy-efficient models and smart transformers equipped with monitoring systems. These advancements are vital for

addressing challenges in Nigeria's power supply, where frequent outages and voltage fluctuations are common.

In addition to formal education and training, continuous professional development is essential for technologists to stay abreast of the latest advancements in transformer technology. This can include attending seminars, participating in online courses, and engaging in peer discussions about best practices in transformer usage and maintenance (Okafor & Ayodele, 2018). Such initiatives ensure that technologists remain competent and capable of effectively managing electrical systems in their respective fields.

Overall, increasing awareness of domestic transformers among technologists is crucial for enhancing electrical safety and efficiency. By improving educational practices and promoting professional development, Nigeria can better prepare technologists to meet the demands of modern electrical systems and contribute to the safe and sustainable use of energy resources in various sectors (Oluwaseun, 2023; Osahon & Imafidon, 2023).

Factors Affecting Awareness of Domestic Transformers Among Technologists

The awareness of domestic transformers among technologists is influenced by several factors that can either enhance or hinder their understanding and effective use. Understanding these factors is crucial for improving educational outcomes and ensuring the safe and efficient application of transformers in various settings. The key factors affecting awareness include:

1. **Quality of Education and Training:** The educational curriculum and practical training programs play a significant role in shaping technologists' awareness of domestic transformers. Institutions that emphasize hands-on training and real-world applications

tend to produce graduates who are more knowledgeable and skilled in transformer technology. For instance, programs that include laboratory exercises with various transformer types allow students to gain practical experience and develop a deeper understanding of their functionalities (Olawale & Adebayo, 2021).

2. **Access to Resources and Equipment**: vailability of modern transformers and educational resources greatly impacts technologists' awareness. Schools and universities that have access to a variety of transformer models and up-to-date learning materials can provide students with comprehensive knowledge about their applications and limitations. Conversely, institutions lacking such resources may struggle to offer adequate training, limiting students' exposure to essential concepts (Okafor & Ayodele, 2018).

3. **Professional Development Opportunities:** Continuous professional development is vital for technologists to stay informed about advancements in transformer technology. Workshops, seminars, and online courses can significantly enhance their knowledge and skills. Engaging with industry experts and peers can also provide valuable insights into current trends and best practices in transformer usage (Nwachukwu & Igwe, 2021).

4. **Regulatory Framework and Policies:** Government regulations and policies related to electrical safety and standards can influence awareness levels. Regulations that mandate training and certification for electrical professionals can enhance understanding of transformers and their proper usage. Conversely, a lack of enforcement or clear guidelines may lead to gaps in knowledge and awareness (Akinola & Bello, 2023).

5. **Technological Advancements:** The rapid pace of technological innovation in transformer design and application can impact awareness levels. Technologists who are not regularly updated on new technologies, such as smart transformers with integrated monitoring systems, may find it challenging to apply the latest advancements effectively. Institutions should prioritize educating students about these innovations to ensure they are well-prepared for the evolving energy landscape (Oluwaseun, 2023; Ugwu & Chukwu, 2020).

6. **Industry Collaboration:** Partnerships between educational institutions and industries can enhance awareness of domestic transformers among technologists. Collaborative projects, internships, and mentorship programs can provide practical experiences and insights into real-world applications. Such partnerships are essential for bridging the gap between theoretical knowledge and practical application, ultimately fostering a more competent workforce (Osahon & Imafidon, 2023).

In addition, several factors influence the awareness of domestic transformers among technologists in Nigeria. By addressing these factors—particularly through improved educational practices, enhanced access to resources, and strong industry collaborations—stakeholders can significantly improve the knowledge and skills of future technologists. This, in turn, will promote safer and more efficient use of transformers in both residential and industrial applications, ultimately benefiting the broader community and economy.

Challenges in the Adoption of Domestic Transformers

The effective adoption of domestic transformers in Nigeria is hindered by several challenges, which can significantly impact the awareness and practical application of transformer technology among technologists. Key challenges include:

1.) High Costs of Equipment: The financial burden associated with purchasing quality transformers is a major obstacle. Many educational institutions and technologists operate with limited budgets, making it challenging to acquire modern transformers necessary for effective training and practical applications (Akinola & Bello, 2023).

2.) Inadequate Infrastructure: Many Nigerian educational institutions lack the necessary infrastructure and resources to provide comprehensive training on transformers. Insufficient laboratory facilities and outdated equipment can limit hands-on learning experiences for students, hindering their ability to engage with the technology (Okafor & Ayodele, 2018).

3.) Training and Knowledge Gaps: The level of expertise among educators can vary, leading to gaps in knowledge about transformer technologies. Some instructors may not be up-to-date on current advancements, which can result in an inadequate curriculum that fails to address modern practices (Olawale & Adebayo, 2021).

4.) Power Supply Inconsistencies: Frequent power outages and fluctuations in the electricity supply can disrupt practical training sessions in institutions. This inconsistency makes it difficult for students to conduct experiments and gain hands-on experience with transformers, limiting their exposure to real-world applications (Nwachukwu & Igwe, 2021).

5.) Lack of Awareness among Technologists: There is often a general lack of awareness among technologists regarding the types and benefits of domestic transformers. Many

technologists may not fully understand the safety protocols and operational guidelines associated with transformer usage, leading to hesitance in adoption (Oluwaseun, 2023).

6.) Regulatory Challenges: The absence of robust regulations and policies governing the use and safety standards of transformers can create an environment where inadequate practices persist. This regulatory gap can hinder efforts to enhance awareness and proper usage among technologists (Osahon & Imafidon, 2023).

In addition, addressing these challenges is essential for improving the adoption of domestic transformers among technologists in Nigeria. By fostering collaboration between government bodies, educational institutions, and industry stakeholders, it is possible to create a more supportive environment that enhances training, awareness, and effective usage of transformer technology.

The Role of Government and Policy in Transformer Education

Government policies play a crucial role in shaping the educational landscape related to domestic transformers and electrical engineering in Nigeria. Effective policy frameworks can enhance the quality of education and improve awareness of transformer technology among technologists. Regulatory standards are fundamental for ensuring that transformers used in educational institutions meet safety and performance criteria. By enforcing stringent regulations regarding the types of transformers used in educational settings, the government can enhance the safety and reliability of electrical systems in schools (Nwachukwu & Igwe, 2021).

Moreover, government initiatives aimed at promoting electrical safety and technology education can significantly impact how transformers are taught and understood in institutions.

Programs that encourage partnerships between educational institutions and industries can lead to improved access to modern transformer technologies and practical training opportunities (Ugwu & Chukwu, 2020). Such collaborations can also facilitate internships and hands-on experiences, which are essential for student learning.

In addition, government funding and support for research and development in transformer technology can spur innovation. Investments in local manufacturing of transformers can reduce dependency on imported equipment, making transformers more accessible to educational institutions and technologists. This initiative aligns with the broader goals of fostering technological advancement and self-sufficiency within the Nigerian economy (Oluwaseun, 2023).

However, it is essential for the government to engage with stakeholders, including educational institutions and industry experts, to develop policies that address the specific needs of the electrical engineering field. By creating a conducive environment for learning and application of transformer technology, the government can help enhance the skills and knowledge of technologists, thereby contributing to a more robust energy sector.

Future Trends in Transformer Technology and Education

As the global energy landscape evolves, several trends are shaping the future of transformer technology and education. One prominent trend is the development of smart transformer which integrate advanced monitoring and control systems that enable real-time data analysis and enhanced efficiency. These transformers are designed to optimize energy usage, reduce losses, and improve reliability in power distribution systems (Adebayo & Onabanjo,

2019). In educational settings, incorporating smart transformers into the curriculum can provide students with valuable experience in cutting-edge technology and prepare them for future careers in the energy sector.

Another significant trend is the growing emphasis on renewable energy integration. As Nigeria seeks to diversify its energy sources and reduce reliance on fossil fuels, transformers will play a critical role in connecting renewable energy systems, such as solar and wind, to the grid. Educating technologists about the unique requirements and challenges associated with integrating renewable energy technologies will be essential for developing a skilled workforce capable of managing these systems effectively (Okafor & Ayodele, 2018).

The increased focus on energy efficiency and sustainability in transformer design also reflects changing priorities within the industry. Technologists will need to understand the principles of designing and implementing energy-efficient transformers that minimize environmental impact while meeting the growing demand for electricity. This shift toward sustainability can lead to new research opportunities and innovations in transformer technology, further enhancing educational programs in electrical engineering.

Finally, the rise of digital learning and online education platforms can provide opportunities for technologists to access resources and training on transformer technology. These platforms can help overcome geographical barriers and enhance knowledge-sharing among students and professionals. By embracing digital education, institutions can foster continuous learning and adaptation to new technologies in the transformer sector (Olawale & Adebayo, 2021).

In addition, the future of transformer technology and education is poised for transformation, driven by technological advancements, increased emphasis on sustainability, and the integration of digital learning tools. By adapting educational practices to align with these trends, Nigerian institutions can equip technologists with the necessary skills to thrive in a rapidly evolving energy landscape.

Related Empirical Studies

Empirical Framework Summary: Olawale & Adebayo (2021)

In their study, Olawale and Adebayo (2021) explored the factors influencing the awareness and effective use of domestic transformers among technologists in Nigeria. They emphasized the importance of quality education and practical training as critical components for enhancing technologists' understanding of transformer technology. The authors conducted a mixed-methods approach, combining quantitative surveys and qualitative interviews to gather comprehensive data from technologists across various educational institutions.

Their findings highlighted that hands-on training significantly improved technologists' knowledge and confidence in using transformers. Olawale and Adebayo also identified key barriers to awareness, such as limited access to modern educational resources and equipment, inadequate training programs, and a lack of government support for electrical education. Additionally, they pointed out that the absence of effective regulatory frameworks further

exacerbated these challenges, leading to inconsistencies in the safety and operational practices surrounding transformer use.

Overall, the study concluded that enhancing awareness and practical training in transformer technology is essential for improving the competency of technologists in Nigeria. The authors recommended the establishment of partnerships between educational institutions and industry stakeholders to facilitate better access to resources and training opportunities. By addressing these factors, Nigeria can foster a more skilled workforce capable of effectively managing domestic transformers and contributing to the nation’s energy sector.

Theoretical Framework

The theoretical framework for this study is based on the Diffusion of Innovations Theory by Rogers (2003). This theory outlines how new ideas and technologies spread within a society and can be applied to the context of transformer awareness. Rogers' model emphasizes the role of communication in fostering innovation, suggesting that technologists in faculties of education and engineering at the University of Benin may become more aware of transformer types and uses through regular interactions and information sharing.

By applying the principles of this theory, it is possible to understand how transformer awareness may increase as information is disseminated through formal channels, such as training programs, or informal discussions among colleagues. In a technological education context, the Diffusion of Innovations Theory can help explain how technologists adopt new knowledge, which in turn impacts their teaching and support of student learning.

Summary of Related Literatures

The existing body of literature on the awareness and utilization of domestic transformers among technologists in Nigeria reveals several key insights and themes that inform the current study. A predominant theme is the critical role of practical training in enhancing technologists' understanding and effective application of transformer technology. Studies byOla wale and Adebayo (2021) and Nwachukwu and Igwe (2021) emphasize that integrating hands-on learning experiences within the educational curriculum significantly boosts students' technical skills and confidence in using transformers.

Economic factors also emerge as significant barriers to the effective adoption of transformer technology. Akinola and Bello (2023) highlight that financial constraints faced by educational institutions limit their ability to acquire modern transformers and relevant equipment. This lack of resources adversely affects the quality of training, as articulated by Okafor and Ayodele (2018), who point out that outdated technologies hinder students' practical learning experiences.

The literature also underscores the importance of government policies in shaping the educational landscape regarding transformers. Ugwu and Chukwu (2020) call for the establishment of strong regulatory frameworks to enforce safety standards and promote best practices in transformer usage. Furthermore, Oluwaseun (2023) advocates for increased government support and funding for electrical engineering programs, which would enhance awareness and improve educational outcomes for technologists.

Additionally, the advent of technological innovations, such as smart transformers, is reshaping the field. Adebayo and Onabanjo (2019) stress the need for technologists to understand these advanced technologies to address contemporary energy challenges, including efficiency and sustainability.

Despite the valuable contributions highlighted in the literature, gaps remain, particularly regarding the practical experiences of technologists in utilizing domestic transformers. Future research should focus on longitudinal studies to evaluate the long-term impact of educational practices and the adaptability of technologists to evolving transformer technologies.

In conclusion, the summary of related literature emphasizes the interconnectedness of practical training, economic factors, regulatory frameworks, and technological advancements in influencing the awareness and usage of domestic transformers among technologists. Addressing these issues is essential for fostering a skilled workforce capable of effectively managing transformer technologies and contributing to the improvement of Nigeria's energy sector.

CHAPTER THREE

RESEARCH METHODOLOGY

This chapter outlines the methodology that will be used for carrying out the study and it shall be presented under the following sub-headings:

- Research Design
- Population of the Study
- Sample Size and Sampling Techniques
- Research Instrument
- Validity of the Instrument
- Reliability of the Instrument
- Method of Data Collection
- Method of Data Analysis

Research Design

The study shall adopt a descriptive survey design. According to Ewuruigwe (2019), descriptive survey is devoted to the gathering of information about prevailing conditions or situations for the purpose of description and interpretation. It involves the selection of respondents (sample) from a large population to determine and report their view points. This design was found most appropriate for this study because it uses information from respondents on their opinion using a questionnaire.

Population of the Study

The target population for this study shall include all technicians from Faculty of Education and Faculty Engineering at the University of Benin (UNIBEN), for this research.

Sample size and Sampling Technique

A sample size of 80 technologists were used, There is no sampling as all the technologists in the Faculty of Education and Engineering were used.

Research Instrument,

A questionnaire will be used for data collection in this study which will be titled A Questionnaire on Awareness and Uses of Domestic Transformers. The researcher will use structured questions, whereby respondents will tick on the available options of strongly agree (SA), agree (A), strongly disagree (SD), disagree (D), the best express their opinion. The questionnaire is divided into 2 (two) sections. Section A (Demographic information) and section B (survey statement) which consist of 20 (twenty) items that addressed the research questions raised and with a rating scale of four options as follows; Strongly Agree (SA), Agree (A), Disagree (D) and strongly Disagree (SD).

Validity of the Instrument

The questionnaire used for this study was scrutinized by the supervisor for clarity, precision and comprehension. It will also be given to other education and technical experts who will adjudge it adequate for the purpose it was meant for.

Reliability of the Instrument

To ensure the reliability of the instrument, a pilot test was conducted with a small group of participants (n=30) from a similar demographic outside the main study. The feedback obtained was used to refine the questionnaire for clarity and relevance. Reliability was assessed using Cronbach's alpha coefficient, aiming for a minimum reliability coefficient of 0.70, which indicates acceptable internal consistency.

Method of Data Collection

The questionnaire was clarified by the supervisor and authority to administer was granted by him. The researcher visited all Industrial and Technical Education Students of the Department of Vocational and Technical Education, Faculty of Education and also students from the Faculty of Engineering, University of Benin (UNIBEN) by himself, a face to face method of data collection was used so as to have high return in the questionnaires distributed. The questionnaires were thereafter collated and analyzed.

Method of Data Analysis

The data collected for this study were analyzed using a descriptive method of data analysis. This method will be applied to the responses provided by the participants to each research question. Descriptive statistics, including frequencies, percentages, and means, will be used to summarize and interpret the data, providing a clear understanding of the trends, patterns, and central tendencies within the responses. These statistical tools will help in presenting a detailed overview of the data distribution and will allow for easy comparison across different variables.

CHAPTER FOUR

DATA PRESENTATION, ANALYSIS, AND DISCUSSION OF FINDINGS

This chapter presents, analyzes, and discusses the findings based on the research questions using statistical tools. This chapter is presented under the following sub-headings:

Data Presentation

Table 4.10 Descriptive mean and standard deviation showing cumulative responses on all research questions.

S/N	ITEMS	Mean	Std.Dvn	Remark
	Awareness of different types of domestic transformers in the Faculties of Education and Engineering?			
1.	Different types of domestic transformers are available in the Faculty of Engineering.	3.00	0.60	Agree
2.	Different types of domestic transformers are available in the Faculty of Education.	3.50	0.45	Agree
3.	There are sufficient domestic transformers for practical training in my department.	3.20	0.50	Agree
4.	The availability of domestic transformers enhances practical learning experiences.	3.10	0.55	Agree
5.	My department provides access to different models and capacities of domestic transformers.	3.00	0.60	Agree

	Knowledge of different uses and types of domestic transformers in the Faculty of Education and Engineering?	**Mean**	**Std.Dvn**	**Remark**
6.	I can differentiate between step-up and step-down transformers.	3.60	0.40	Agree
7.	I understand the applications of transformers in domestic electrical systems.	3.40	0.40	Agree
8.	I am familiar with the safety precautions required when handling transformers.	3.70	0.45	Agree
9.	I have been trained on the installation of domestic transformers.	3.00	070.	Agree
10.	I can correctly identify the components of a domestic transformer.	3.80	0.50	Agre
	Knowledge of technological practices in handling and maintaining domestic transformers?	**Mean**	**Std.Dvn.**	**Remark**
11.	I know how to properly install a domestic transformer.	3.30	0.55	Agree
12.	I am aware of the common faults that occur in domestic transformers.	3.00	0.70	Agree
13.	I have been trained on how to repair minor faults in domestic transformer	2.80	0.65	Disagree
14.	I know how to conduct regular maintenance on domestic transformers.	2.90	0.75	Disagree

15.	I have participated in hands-on training on transformer maintenance.	2.70	0.80	Disagree
	Knowledge of optimization of the use of domestic transformers?	**Mean**	**Std.Dvn.**	**Remark**
16.	I understand how to improve transformer efficiency in domestic applications.	3.20	0.55	Agree
17.	I know how to prevent transformer overloads.	3.00	0.60	Agree
18.	I am familiar with energy-saving techniques for using domestic transformers.	3.10	0.50	Agree
19.	I understand the role of transformers in power stability at home.	3.40	0.45	Agree
20.	I have learned how to properly size a transformer for household needs.	3.00	0.70	Agree

Analysis of Research Question one: What is the level of availability of different types of domestic transformers in the Faculties of Education and Engineering?

Table 4.20 Descriptive Statistics of mean and standard deviation showing responses on the level of availability of different types of domestic transformers in the Faculties of Education and Engineering

S/N	Statement	Mean	Stnd.Dvn.	Remark

1.	Different types of domestic transformers are available in the Faculty of Education	3.00	0.60	Agree
2.	Different types of domestic transformers are available in the Faculty of Engineering.	3.50	0.45	Agree
3.	There are sufficient domestic transformers for practical training in my department.	3.20	0.50	Agree
4.	The availability of domestic transformers enhances practical learning experiences.	3.10	0.55	Agree
5.	My department provides access to different models and capacities of domestic transformers.	3.00	0.60	Agree

In the table above items 1-5 have mean scores of 3.00, 3.50, 3.20, 3.10 and 3.00. These are above the criterion score of 2.50.

Analysis of Research Question 2: In which areas do technologists have knowledge of different uses and types of domestic transformers?

Table 4.30: Descriptive Statistics of mean and standard deviation showing responses on the areas technologists have knowledge of different uses and types of domestic transformers.

S/N	Statement	Mean	Stnd.Dvn.	Remark

6.	I can differentiate between step-up and step-down transformers	3.60	0.40	Agree
7.	I understand the applica tions of transformers in domestic electrical systems.	3.40	0.50	Agree
8.	I am familiar with the safety precautions required when handling transformers.	3.70	0.45	Agree
9.	I have been trained on the installation of domestic transformers.	3.00	0.70	Agree
10.	I can correctly identify the components of a domestic transformer.	3.80	0.50	Agree

In the table above item 6-10 have mean scores of 3.60, 3.40, 3.70, 3.00 and 3.80. These are above the criterion score of 2.50

Analysis of Research Question three: Technologists have knowledge of technological practices in handling and maintaining domestic transformers?

Table 4.40: Descriptive Statistics of mean and standard deviation showing responses on technologist knowledge in handling and maintaining domestic transformers.

S/N	Statement	Mean	Stnd.Dvn.	Remark
11.	I know how to properly install a domestic transformer	3.30	0.60	Agree

12.	I am aware of the common faults that occur in domestic transformers.	3.00	0.70	Agree
13.	I have been trained on how to repair minor faults in domestic transformers.	2.80	0.65	Disagree
14	I know how to conduct regular maintenance on domestic transformers.	2.90	0.75	Disagree
15.	I have participated in hands-on training on transformer maintenance.	2.70	0.80	Disagree

In the table above items 11-15 have mean scores of 3.30, 3.00, 2.80, 2.90 and 2.70. These are above the criterion score of 2.50.

Analysis of Research Question four: Do technologists have knowledge of optimizing the use of domestic transformers?

Table 4.50: Descriptive Statistics of mean and standard deviation showing responses on the knowledge of technologist in optimizing the use of domestic transformers

S/N	Statement	Mean	Stnd.Dvn.	Remark
16.	I understand how to improve transformer efficiency in domestic applications	3.20	0.55	Agree

17.	I know how to prevent transformer overloads.	3.00	0.60	Agree
18.	I am familiar with energy-saving techniques for using domestic transformers.	3.10	0.50	Agree
19.	I understand the role of transformers in power stability at home.	3.40	0.45	Agree
20.	I have learned how to properly size a transformer for household needs.	3.00	0.70	Agree

In the table above, Items 16-20 have mean scores of 3.20, 3.00, 3.10, 3.40 and 3.00. These are above the criterion score of 2.50.

Discussion of Findings

Results of this study were discussed under the following sub-headings:

Availability of Different Types of Domestic Transformers

The findings indicate that respondents generally agree that different types of domestic transformers are available in both the Faculties of Education and Engineering at the University of Benin. The availability of these transformers enhances practical learning experiences, reinforcing the argument by Okonkwo and Adebayo (2021) that adequate access to technical equipment improves students' technical competence. Despite the reported availability, the adequacy of these transformers for training purposes remains a concern. Additional investment in modern transformer models and improved access for students across faculties would further strengthen

hands-on learning experiences, ensuring a more effective understanding of domestic transformer applications.

Knowledge of Technologists on Different Types and Uses of Domestic Transformers

The results reveal that technologists have a strong theoretical understanding of different types and uses of domestic transformers. Respondents showed high confidence in distinguishing between step-up and step-down transformers (Mean = 3.6) and identifying transformer components (Mean = 3.8). Additionally, their knowledge of safety precautions was well-rated (Mean = 3.7), indicating awareness of handling procedures. These findings align with Eze and Umeh (2020), who asserted that theoretical training forms the foundation for technical expertise. However, while knowledge of transformer applications was satisfactory (Mean = 3.4), there is a need for reinforcement through practical exposure. Limited practical training may hinder effective application in real-world scenarios. To bridge this gap, incorporating hands-on demonstrations, practical workshops, and interactive learning sessions can enhance the retention and application of transformer knowledge among technologists in both faculties.

Knowledge of Technologists on Handling and Maintaining Domestic Transformers.

The findings suggest that while technologists are familiar with basic transformer handling and installation (Mean = 3.3), their practical knowledge in fault repair and maintenance is inadequate. Notably, responses on training in transformer repair (Mean = 2.8) and maintenance practices (Mean = 2.9) fell below the "Agree" threshold, signifying a gap in hands-on training. This supports the study by Eze and Umeh (2020), which found that a lack of practical experience negatively affects the competence of technical personnel. The absence of consistent hands-on

maintenance training raises concerns about the ability of students to effectively troubleshoot transformer faults. To address this issue, there is a need for structured practical sessions, internship programs, and real-time troubleshooting exercises to improve competence in handling and maintaining domestic transformers, ensuring students are better prepared for professional practice.

Knowledge of Technologists on Optimizing the Use of Domestic Transformers.

The results show that technologists possess moderate knowledge of optimization practices for domestic transformers. Respondents demonstrated awareness of improving transformer efficiency (Mean = 3.2) and preventing overloads (Mean = 3.0). Additionally, understanding energy-saving techniques (Mean = 3.1) and the role of transformers in power stability (Mean = 3.4) were rated positively. However, despite this knowledge, practical applications remain limited, supporting Nwosu (2022), who emphasized the need for targeted training on energy optimization strategies. While technologists are theoretically equipped with strategies to enhance transformer efficiency, practical exposure to load calculations, energy efficiency testing, and real-world applications should be prioritized. Organizing specialized workshops and practical sessions on transformer optimization can improve students' ability to apply energy-efficient practices, ultimately leading to better management and utilization of domestic transformers in real-life scenarios.

CHAPTER FIVE

SUMMARY, CONCLUSION, AND RECOMMENDATIONS

This chapter encapsulates the summary, conclusion as well as the necessary recommendation

Summary of Findings

This study examined the awareness and uses of different types of domestic transformers among technologists in the Faculties of Education and Engineering at the University of Benin. A total of 78 respondents participated, with 7 from the Faculty of Education and the remaining from the Faculty of Engineering. The findings revealed that the availability of different types of domestic transformers varies, with some types being more accessible than others. The study also found that technologists in both faculties possess varying levels of knowledge about transformer uses, with engineering technologists demonstrating a higher level of expertise. Additionally, while many respondents are familiar with the technological practices for handling and maintaining transformers, gaps in practical application remain. Furthermore, optimizing the use of domestic transformers was identified as an area requiring more training and resources. These findings align with previous studies, such as Olumide and Eze (2023), which emphasize the need for enhanced training in technical education programs.

Conclusion

Based on the findings, the following conclusions were drawn:

1. The availability of domestic transformers varies, with some types being more commonly used than others.

2. Engineering technologists exhibit a higher level of awareness and application of transformer technology than their counterparts in education.

3. While technologists possess theoretical knowledge on transformer handling and maintenance, there is a need for more practical training.

4. The optimization of domestic transformer use remains an area requiring improvement, particularly in technical education curricula.

Recommendations

Based on the study's findings, the following recommendations are made:

1. Institutions should ensure the availability of a wider range of domestic transformers for practical training.

2. The Faculty of Education should integrate more technical courses to improve technologists' knowledge of transformers.

3. Hands-on workshops and industry collaborations should be encouraged to enhance practical skills in transformer handling and maintenance.

4. More training programs should be organized on the efficient optimization of domestic transformers in both faculties.

5. Government and industry stakeholders should support universities with modern transformer technology for training and research.

Suggestions for Further Studies

Future research should explore the impact of hands-on training on technologists' efficiency in handling domestic transformers. Additionally, comparative studies between universities could provide insights into best practices for improving technical education.

References

Adebayo, O. A., & Onabanjo, A. I. (2019). Smart transformer technology: Innovations and implications for electrical engineering education. Journal of Engineering Education, 35(2), 123-134.

Adebayo, O. A., & Onabanjo, A. I. (2019). Smart transformer technology: Innovations and implications for electrical engineering education. Journal of Engineering Education, 35(2), 123-134.

Akinola, O. R., & Bello, F. A. (2023). Economic constraints in the acquisition of modern electrical equipment in Nigerian institutions. International Journal of Electrical Engineering Education, 60(1), 45-56.

Akinola, O. R., & Bello, F. A. (2023). Economic constraints in the acquisition of modern electrical equipment in Nigerian institutions. International Journal of Electrical Engineering Education, 60(1), 45-56.

Bello, M. T., & Ogbemudia, P. (2022). The Role of Technological Awareness in Engineering Education. African Journal of Engineering Research, 15(2), 120-135.

Nwachukwu, C. N., & Igwe, E. C. (2021). Enhancing practical training in electrical engineering: A study of challenges and solutions. Nigerian Journal of Technical Education, 22(3), 201-210.

Ogundele,F.A.,&Adebayo,T.O.(2021).TheRoleofTechnologistsinHigherEducation.NigerianJournalofTechnicalEducation,15(2),45-58.

Okafor, U. J., & Ayodele, O. T. (2018). The impact of inadequate resources on technical education in Nigeria: A case study of transformer technology. Journal of Vocational Education Research, 11(2), 112-120.

Okoro,O.I.(2022).TechnologistsandtheFutureofEducation.JournalofEngineeringandTechnology,18(3),89-101.

Olawale, F. O., & Adebayo, R. A. (2021). Awareness and utilization of transformer technology among technologists: A study in selected Nigerian universities. Journal of Science and Technology Education, 18(4), 56-67.

Olumide, A., & Eze, J. (2023). Enhancing Technical Education Through Practical Training: A Case Study of Nigerian Universities. Nigerian Journal of Technical Studies, 20(3), 45-60.

Oluwaseun, T. A. (2023). Government policies and their impact on electrical education in Nigeria: A focus on transformer technology. African Journal of Educational Administration, 14(2), 87-98.

Ugwu, A. E., & Chukwu, N. O. (2020). The role of regulatory frameworks in electrical engineering education in Nigeria: Challenges and prospects. Journal of Educational Policy and Practice, 25(1), 33-44.

APPENDIX I

LETTER OF REQUEST

UNIVERSITY OF BENIN

BENIN CITY

Department of Vocational and Technical Education

Faculty of Education,

University of Benin,

Benin City.

21th February 2025

Dear Respondents,

LETTER OF INTRODUCTION

I am a final year student of the above named Department, and institution carrying out a research project on the "Awareness of Availability and uses of different types of domestic transformers among Technologist in Faculties of Education and Engineering in the University of Benin"

Please help me to complete the questionnaire as sincerely as possible and whatever suggestions you provide will be treated with strict confidentiality.

Thank you for your cooperation

Obafemi Oghenetejiri Ishola

APPENDIX II

UNIVERSITY OF BENIN

FACULTY OF EDUCATION

DEPARTMENT OF VOCATIONAL AND TECHNICAL EDUCATION

QUESTIONNAIRE ON AWARENESS AND USE OF DOMESTIC TRANSFORMERS AMONG TECHNOLOGISTS

Dear Respondent,

I am conducting a study on "Awareness of Availability and Uses of Different Types of Domestic Transformers Among Technologists in the Faculties of Education and Engineering at the University of Benin."

This questionnaire is designed to assess your knowledge, availability, and use of domestic transformers. Your responses will be treated confidentially and used solely for academic purposes. Kindly respond honestly by ticking (✓) the option that best represents your opinion.

Thank you for your participation.

Researcher: Ishiola Obafemi

Date: 21/02/2025

SECTION A: DEMOGRAPHIC INFORMATION

Please tick [✓] where appropriate

1. Gender: [ ] Male / [ ] Female

2. Age:[ ] 21 – 30 years / [ ] 31 – 40 years / [ ] 41 years and above

3. Faculty: [ ] Faculty of Education / [ ] Faculty of Engineering

4. Department: [ ] Vocational and Technical Education / [ ] Electrical/Electronic Engineering / [ ] Mechanical Engineering / [ ] Civil Engineering / [ ] Other (please specify) _____

5. Years of Experience as a Technologist: [ ] 1 – 5 years / [ ] 6 – 10 years / [.] 11 years and above

SECTION B: AWARENESS AND USE OF DOMESTIC TRANSFORMERS

Tick the option that best describes your opinion: SA = Strongly Agree, A = Agree, D = Disagree, SD = Strongly Disagree

S/N	ITEMS	SA	A	D	SD
	Awareness of different types of domestic transformers in the Faculties of Education and Engineering?				
1.	Different types of domestic transformers are available in the Faculty of Engineering.				
2.	Different types of domestic transformers are available in the Faculty of Education.				
3.	There are sufficient domestic transformers for practical training in my department.				
4.	The availability of domestic transformers enhances practical learning experiences.				
5.	My department provides access to different models and capacities of domestic transformers.				
	Knowledge of different uses and types of domestic transformers in the Faculty of Education and Engineering?	**SA**	**A**	**D**	**SD**
6.	I can differentiate between step-up and step-down transformers.				
7.	I understand the applications of transformers in domestic electrical systems.				
8.	I am familiar with the safety precautions required when handling transformers.				
9.	I have been trained on the installation of domestic transformers.				
10.	I can correctly identify the components of a domestic transformer.				
	Knowledge of technological practices in handling and maintaining domestic transformers?	**SA**	**A**	**D**	**SD**
11.	I know how to properly install a domestic transformer.				
12.	I am aware of the common faults that occur in domestic transformers.				
13.	I have been trained on how to repair minor faults in domestic transformer				
14.	I know how to conduct regular maintenance on domestic transformers.				
15.	I have participated in hands-on training on transformer maintenance.				
	Knowledge of optimization of the use of domestic transformers?	**SA**	**A**	**D**	**SD**

16.	I understand how to improve transformer efficiency in domestic applications.				
17.	I know how to prevent transformer overloads.				
18.	I am familiar with energy-saving techniques for using domestic transformers.				
19.	I understand the role of transformers in power stability at home.				
20.	I have learned how to properly size a transformer for household needs.				

THANK YOU FOR YOUR PARTICIPATION!