

ASSESSING THE IMPACT OF LEARNING ENVIRONMENT ON THE ACADEMIC PERFORMANCE OF ELECTRICAL AND ELECTRONIC TECHNOLOGY STUDENTS OF EKITI STATE UNIVERSITY ADO-EKITI

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Abstract

The study assessed the impact of the learning environment on the academic performance of Electrical and Electronic technology students in Ekiti State University, Ado-Ekiti, Ekiti State. Three specific purposes guided the study, and three research questions were raised in line with the purposes. A descriptive survey research design was adopted for the study. The study was carried out in the Department of Vocational and Technical Education, Ekiti State University, Ado-Ekiti. The population of the study consisted 17 undergraduate and postgraduate students (Electrical and Electronic unit). A structured questionnaire titled "Impact of Learning Environment and Academic Performance of Questionnaire (ILEAPQ)" was used for data collection. The correlation coefficients were found to be 0.79. The value was considered high enough for establishing the reliability of the instrument. Data collected were analyzed using descriptive statistic of mean and standard deviation. The findings of the study revealed that physical learning facilities positively impact the academic performance of electrical and electronic technology students in EKSU. The study also found that the psychosocial learning environment significantly impacts the academic performance of electrical and electronic technology students in EKSU among others. Based on the findings of the study, it was recommended that the university management should improve funding for laboratory equipment, strengthen ICT infrastructure, provide stable electricity supply, and enhance access to modern simulation software to improve students' academic performance in Electrical and Electronic Technology. Conclusively, available, adequate and functioning physical, psychosocial and technological learning environments significantly impact the academic performance of electrical and electronic technology students of Ekiti State University, Ado-Ekiti.

Keywords: learning environment, academic performance, Electrical and Electronic students, vocational and technical education, Ekiti State University.

Introduction

The development of any nation depends largely on the quality and effectiveness of its educational system. Education is a continuous process through which individuals acquire

knowledge, skills, and competencies required to function effectively in society and contribute to national development. It promotes intellectual growth, innovation, and adaptability in a rapidly changing world (Dewey, 1916; World

Bank, 2020). One of the major determinants of effective education is the learning environment. The learning environment refers to the physical, psychology, social, and technological conditions under which teaching and learning take place (Fraser, 2018). It includes classrooms, workshops, laboratories, interpersonal relationships, and digital learning resources that collectively influence students' academic experiences and outcomes. Research has shown that a well-structured and supportive learning environment enhances student engagement, motivation, and academic achievement (Rusticus et al., 2023; Ogbuanya & Efuwape, 2018). With effective and adequate learning environment, there will be effective academic performance.

The learning environment is generally categorized into three major components: physical, psychosocial, and technological environments. The physical environment consists of infrastructure such as classrooms, workshops, laboratories, tools, and equipment, which are essential for practical-based disciplines like Electrical and Electronic Technology. Studies have established that adequate physical facilities significantly improve skill acquisition and academic performance in technical education (Nwabudike et al., 2023; Ogu, 2024). The psychosocial environment refers to the quality of interaction between students and lecturers, peer relationships, and the overall emotional climate of the institution. A positive psychosocial environment fosters collaboration, reduces anxiety, and enhances students' motivation to learn (Li & Xue, 2023; Procedia-Social and Behavioral Sciences, 2015). Poor interpersonal relationships and lack of academic support negatively affect students' academic performance.

The technological environment involves the availability, adequacy and use of ICT tools, e-learning platforms, simulation software, and digital learning resources that support modern teaching and learning processes. In Electrical and Electronic Technology, access to simulation software, internet facilities, and computer-based tools is critical for effective learning and practical training (Murire & Gavaza, 2025; Muhammad et al., 2023). This study is anchored by Bronfenbrenner's Ecological Systems Theory, which posits that human development is influenced by multiple interacting environmental systems (Bronfenbrenner, 1979). The theory explains that students' academic performance is shaped by their interaction with physical, social, and technological learning environments. Teaching and learning of electrical and electronic technology concept with available and adequate learning environment impact the students' academic performance.

Academic performance refers to the extent to which students achieve educational objectives as measured through examinations, practical assessments, and overall academic outcomes (Hailu et al., 2024). In vocational and technical education, academic performance also includes practical competence and the ability to apply theoretical knowledge in real-life situations. Vocational and Technical Education (VTE) is designed to equip learners with employable and practical skills necessary for industrial and technological development (Okoro, 2010; UNESCO, 2022). One of the courses in vocational and technical education is electrical and electronic technology. Electrical and Electronic Technology is a core area of VTE that focuses on installation, maintenance, and

repair of electrical systems. Effective training in this field requires adequate facilities and a conducive learning environment.

Ekiti State University (EKSU), Ado-Ekiti, offers Vocational and Technical Education programmes, including Electrical and Electronic Technology. However, concerns persist regarding the impact of learning environments in many Nigerian tertiary institutions, particularly in technical disciplines. This study examines the impact of the learning environment on the academic performance of Electrical and Electronic students in EKSU.

Statement of the Problem

One of the key factors influencing effective teaching and learning, as well as the academic performance of students, is the learning environment. Learning environment encompasses the physical, social, psychology, technology, and digital contexts within which teaching and learning occur. Vocational and technical education in particular, effective, adequate and relevant physical, digital and psychosocial learning environment is necessary for effective teaching and learning. In an ideal situation learning environment is not an option but necessary and need to be adequate and functional. This is applicable to electrical and electronic technology.

In Electrical and Electronic Technology programmes, a functional learning environment is critical because students require adequate laboratories, workshops, equipment, tools, and practical exposure to develop relevant knowledge, technical skills, entrepreneurship skills, soft skills. The achievement of the above-mentioned skills depends on the provision of a learning environment that prepares

students for a rapidly changing and technology-driven world. In this regard, the United Nations Sustainable Development Goal 4 (SDG 4) emphasizes inclusive and equitable quality education, highlighting the importance of conducive learning environments that support skill acquisition and lifelong learning. Consequently, Nigerian universities, including Ekiti State University (EKSU), are expected to invest in modern workshops, technological facilities, and qualified academic support that will impact the academic performance of students in electrical and electronic technology.

It is revealed from different studies and experience that dispart the significant of learning environment on the academic performance of students it is observed across several Nigerian universities that learning environments are often not adequately equipped to support effective practical training in Electrical and Electronic Technology programmes. Public universities in Nigeria continue to face challenges of chronic underfunding, which has resulted in inadequate laboratory equipment, obsolete tools, overcrowded practical sessions, insufficient technical infrastructure, limited access to modern digital resources, and unfavourable psychosocial conditions between students and lecturers. These deficiencies negatively affect students' understanding of core concepts, practical competence, and overall academic performance in Electrical and Electronic studies.

There are several studies on learning environment and it impacts on academic performance, however, most studies focus on secondary schools and general university population; few studies examine technology-based disciplines. There is no evidence of study specifically

targeting electrical and electronic technology students at Ekiti State University, Ado-Ekiti. These challenges are widely reported in Nigerian public universities, it remains unclear whether the same conditions exist in Ekiti State University, Ado-Ekiti (EKSU), particularly within the Electrical and Electronic Technology programme. In particular, the extent to which the physical, technological, and psychosocial aspects of the learning environment impact the academic performance of Electrical and Electronic students at EKSU has not been sufficiently investigated. This creates a gap of empirical evidence of the impact of learning environment on the academic performance of electrical and electronic technology students in EKSU. This raises a fundamental question on the impact of learning environment on electrical and electronic technology students of Ekiti State University.

Purpose of the Study

The main purpose of the study is to assess the impact of the learning environment on academic performance of Electrical and Electronic Technology Students in Ekiti State University, Ado-Ekiti. Specifically, the study:

- i. examined the impact of physical learning facilities on the academic performance of Electrical and Electronic students in EKSU.
- ii. determined the impact of the psychosocial environment on students' academic performance.
- iii. assessed the impact of technological resources on the academic performance of Electrical and Electronic students.

Research Questions

The following research questions were raised to guide the study:

1. What is the impact of physical learning facilities on the academic performance of Electrical and Electronic Technology students in EKSU?
2. What is the impact of the psychosocial environment on the academic performance of Electrical and Electronic Technology students in EKSU?
3. What is the impact of technological resources on the academic performance of Electrical and Electronic Technology students in EKSU?

Methodology

The study employed a descriptive survey research design. A descriptive survey design is appropriate because it enables the collection of data from respondents without manipulation of variables, allowing for the objective description of existing conditions in the learning environment (Creswell & Creswell, 2018). The design was used to determine the impact of learning environment on academic performance of electrical and electronic technology students in Ekiti State University, Ado-Ekiti

The population of the study comprised 17 participants made up of 4 postgraduate students and 13 undergraduate students of Electrical and Electronic Unit in the Department of Vocational and Technical Education (VTE), Faculty of Education, Ekiti State University, Ado-Ekiti. The study adopted a census sampling technique, where all members of the population were included in the study.

The instrument used for data collection was a structured questionnaire titled: "Impact of Learning Environment on the Academic Performance of Electrical and Electronic Technology

Students Questionnaire (ILEAPUPSQ)". The questionnaire was divided into two sections: Session A which obtained the demographic information of the respondents and session B that sought answers to the Impact of Learning Environment on the Academic Performance of Electrical and Electronic Technology Students of Ekiti State University which was further divided to three stages. Stage 1: comprised 12 items seeking answers to research question one on the impact of physical learning facilities on the academic performance of Electrical and Electronic students in EKSU. Stage 2 was made up of 12 items answered research question two on the impact of the psychosocial environment on the academic performance of Electrical and Electronic students in EKSU. While, stage 3 also comprises 12 items sought answers to research question three on the impact of technological resources on the academic performance of Electrical and Electronic students. All items were structured on a 4-point scale: Strongly Agreed (4) Agreed (3) disagreed (2) and strongly disagreed (1).

The research instrument undergoes face and content validity. The instrument was validated by three experts in electrical and electronic technology, department of Vocational and Industrial Technology Education, Bamidele Olumilua University of Education, Science and Technology, Ikere-Ekiti. The observation and corrections made by the experts were corrected and fixed before the final copied were administered to the respondents. Reliability of the instrument

was determined through a pilot study conducted on 5 electrical and electronic students in the department of Vocational and Industrial Technology Education, Bamidele Olumilua University of Education, Science and Technology, Ikere-Ekiti. Split-half test was used to determine the reliability coefficient of the instrument. The data collected on the test were subjected to Cronbach Alpha. A reliable coefficient of 0.79 was obtained, and the instrument was adjusted to be reliable for the study.

All the Google forms questionnaire were administered online to the respondents and the returned rate representing 100%. Respondents were given adequate time to complete the questionnaire, and completed copies were collected immediately to ensure a high return rate.

Data collected were analyzed using descriptive statistic of Mean and Standard Deviation to answered the research questions raised for the study. The criterion mean score of 2.50 was adopted as the decision rule for interpreting responses to each item on the instrument. Consequently, any item with a mean score of 2.50 and above were regarded as Agree, while any item with a mean score below 2.50 was regarded as Disagree.

Results

Research Question 1: What is the impact of physical learning facilities on the academic performance of Electrical and Electronic students in EKSU?

Table 1: the responses of the respondents on the impact of physical learning facilities on the academic performance of Electrical and Electronic students in EKSU.

S/N	Item	$\bar{x}$	SD	R
1	Electrical/Electronic workshop are well equipped with functioning instruments and equipment to carry out practical training	3.00	0.82	A
2	The workshop and project studio spaces available in the department are well-maintained, safe, and adequate for carrying out engineering project work.	2.80	0.75	A
3	The seating arrangements and furniture in classrooms are comfortable enough to sustain my attention and engagement during long lectures	2.60	0.83	A
4	Electricity supply in the department supports my academic performance	2.40	0.85	D
5	Safety facilities are properly provided in the workshop	3.10	0.74	A
6	Classrooms are conducive for teaching and learning	3.20	0.71	A
7	The library resources relevant to Electrical and Electronic Technology are sufficient to support my academic work.	2.70	0.80	A
8	The lecture halls in my department are spacious enough and adequately furnished to support effective learning during classes	2.30	0.84	D
9	The general cleanliness, aesthetic condition, and maintenance culture of departmental facilities create an environment that is conducive to academic concentration and performance.	2.50	0.88	A
10	The availability of functional demonstration and simulation equipment in the department enhances my understanding of theoretical concepts taught in class.	2.60	0.82	A
11	Workshop environment is conducive for learning	2.90	0.78	A
12	Adequate lighting and ventilation in classrooms and workshops make it comfortable for me to concentrate and learn effectively.	3.00	0.76	A
Grand Mean		2.72	0.79	A

Keys: $\bar{x}$ = Mean, SD = Standard Deviation, R = Remark, A = agree and D = disagree

The findings show that physical learning facilities are generally adequate, with most items rated above 2.50. However, power supply (2.40) and equipment maintenance (2.30) were rated below the acceptance level, indicating challenges in these areas. The grand mean of 2.72 confirms that physical learning facilities have a significant positive impact on academic performance of electrical and electronic technology students in EKSU. Although, there is need for improvement is needed

in power supply and equipment maintenance. The grand standard deviation is 0.79 which indicated that the respondents are not too far and consistent in the respondents' opinions.

Research Question 2: What is the impact of psychosocial environment on the academic performance of electrical and electronic technology students in EKSU?

Table 2: the responses of the respondents on the impact of psychosocial environment on the academic performance of electrical and electronic technology students in EKSU.

S/N	Item	$\bar{x}$	SD	R
1	The quality of relationship i have with my lecturers motivates me to put in greater effort in my academic work.	3.20	0.76	A
2	Lecturers in my department demonstrate sufficient mastery of their subject matter, which helps me to understand course content effectively.	3.00	0.77	A
3	The feedback I receive from lecturers on assignments and examinations is timely and constructive enough to improve my academic performance.	2.80	0.8	A
4	The level of collaboration encouraged among students in laboratory and project work in my department positively contributes to my academic achievement.	2.60	0.81	A
5	Stressful interpersonal relationships within the department is manageable	2.30	0.85	D
6	Academic counselling and student support services in EKSU are accessible and have been helpful in improving my academic performance.	3.10	0.75	A
7	The level of encouragement i receive from lecturers to participate actively in class discussions enhances my understanding of course material.	3.20	0.72	A
8	The emotional atmosphere in my department makes me feel safe enough to ask questions and seek academic help without fear of ridicule.	2.67	0.8	A
9	Competition and peer pressure among students in my department support my academic concentration and performance.	2.40	0.83	D
10	Interactions with my fellow students in the department create a supportive academic environment that positively influences my performance.	3.10	0.78	A
11	Being recognised and acknowledged for my academic efforts by lecturers or peers in the department increases my motivation to study harder.	2.90	0.76	A
12	The social cultural activities enhance my emotion to learn	3.20	0.74	A
Grand Mean		2.83	0.78	A

Keys: $\bar{x}$ = Mean, SD = Standard Deviation, R = Remark, A = Agree and D = Disagree

Table 2 revealed that the psychosocial environment is generally supportive, with most items above the acceptance level of 2.50. However, stress interpersonal relationship (2.30) and competition and peer relationships (2.40) were rated below 2.50, indicating disagree. This mean that stress and unhealthy competition and relationship negatively impact their academic performance. The grand mean of (2.83) and standard deviation (0.78) indicates

that psychosocial factors have a positive impact on the academic performance of electrical and electronic technology students in EKSU and their response are not far from one another.

Research Question 3: What is the impact of technological resources on the academic performance of Electrical and Electronic technology students in EKSU?

Table 3: the responses of the respondents on the impact of technological resources on the academic performance of Electrical and Electronic technology students in EKSU

S/N	Item	$\bar{x}$	SD	R
1	I have access to functional computers positively impact my academic performance	3.00	0.82	A
2	The availability of reliable internet access within the department enables me to access academic materials and resources that improve my academic performance.	2.40	0.88	D
3	The engineering simulation software (such as MATLAB, PSPICE, or Proteus) are available and adequate in the department laboratory	2.30	0.85	D
4	The absence or inadequacy of modern digital teaching aids in some courses in my department limits my understanding of complex courses	2.80	0.79	A
5	My ability to use digital research tools has significantly contributed to the quality of my assignments and projects.	3.00	0.76	A
6	Lecturers who use technology-enhanced instructional methods make course content clearer and more engaging	2.50	0.84	A
7	The department's use of an e-learning platform or learning management system (LMS) supports my academic work.	2.40	0.86	D
8	The use of digital assessment tools by lecturers in my department improves my engagement and academic outcomes.	2.70	0.81	A
9	Computer laboratories are functional	3.00	0.77	A
10	Technical support is available	2.60	0.82	A
11	E-learning resources are adequate	2.50	0.8	A
12	Current industry-relevant digital technologies and software in my department's curriculum increase my academic performance	3.10	0.74	A
Grand Mean		2.66	0.81	A

Keys: $\bar{x}$ = *Mean*, *SD*= *Standard Deviation*, *R*= *Remark*, *A*=*Agreed* and *D*=*Disagreed*

The results on table 3 shows that technological resources have impact the academic performance of electrical and electronic technology students of EKSU. This is because the grand mean of 2.66 is greater than the criterion mean of 2.50. It is revealed also that some of the technology learning environments do not impact the academic performance of electrical and electronic technology students such as items 2, 3 and 7 which have their mean less than 2.50. which is below the acceptance level, indicating major gaps in digital infrastructure.

Discussion of Findings

The findings of research question one revealed that physical learning facilities impact the academic performance of electrical and electronic technology students in Ekiti State University, Ado-Ekiti. This indicates that facilities such as laboratories, workshop tools, classroom spaces, safety equipment, and ventilation largely contribute to teaching and learning and practical activities of electrical and electronic technology students which in turn have positive impact on their academic performance. This finding is consistent with the study of Edokpolor and Dumbiri (2019), who reported that

adequate physical facilities are essential for effective teaching and learning in Technical and Vocational Education and Training (TVET) programmes. Nwabudike et al. (2023) found that adequate workshops and laboratory infrastructure significantly improve students' academic performance in technical education. It means that, physical learning facilities if available, adequate and functional impact academic performance of students.

However, the result also revealed that power supply and the lecture hall are available do not support the academic performance of electrical and electronic technology students in EKSU. This supports Ogu (2024), who observed that unstable electricity supply and poor maintenance culture negatively affect practical skill acquisition in vocational institutions. These deficiencies may limit students' ability to fully engage in hands-on electrical and electronic practical sessions.

The findings of research question two indicated that the psychosocial learning environment impact the academic performance of electrical and electronic technology students in EKSU. It was revealed that there is effective relationship between lecturers-students and between students-students, the lecturers demonstrated the teaching professional by mastering and effectively delivered their lecture for better understanding of the students. The suggests that lecturer-student relationships, classroom interactions, motivation, and academic guidance were largely positive and conducive to learning. This finding agrees with the findings of Fraser (2018), who emphasized that a positive psychosocial environment enhances student engagement and academic achievement. Similarly, Rusticus et al. (2023) reported

that supportive learning environments characterized by respect, encouragement, and teacher accessibility significantly improve student performance. Li and Xue (2023) also confirmed that psychosocial factors such as teacher support and peer collaboration have a strong influence on academic success of the student. The effective psychology and social environment improve and enhances the emotion of the students and increase the students' interest that will enhance the learning activities which will impacts the academic performance of the students.

The findings of research question three showed that technological resources impact the academic performance of electrical and electronic technology students in EKSU. It was revealed that with accessibility of computer, digital tools and other technology resources electrical and electronic students' academic performance were improve. This is contrary to the finding of Okolocha and Onyeneke (2021), who reported that inadequate ICT infrastructure limits effective teaching and learning in vocational education programmes in Nigerian universities. Similarly, et al. (2025) noted that poor digital infrastructure and weak internet connectivity in developing countries reduce students' engagement in technology-based learning.

It was revealed that there is lack of internet connectivity and some of the digital tools in the department which limit the students accessibility to some of updated online resources that will enhance their academic performance, this finding agree with the findings of World Bank (2024) emphasized that limited access to digital learning tools continues to hinder technical education in developing economies. Since Electrical

and Electronic Technology depends heavily on simulation tools such as Proteus and MATLAB, the absence or inadequacy of these resources may reduce students' practical competence and technical skill development.

Conclusion

The learning environment plays a significant role in impacting the academic performance of electrical and electronic students. Learning environment comprises physical learning facilities, psychosocial environment, and technological resources that collectively support effective teaching and learning. The availability, adequacy and functionality of these components enhance students' academic performance, practical skills development, and overall learning experience.

The study was anchored on Bronfenbrenner's Ecological Systems Theory, which emphasizes that an individual's development and academic performance are influenced by interactions within their learning environment. The theory highlights the importance of providing a supportive, well-structured, and resourceful learning environment to enhance students' academic success.

The findings of the study revealed that physical learning facilities significantly impact the academic performance of electrical and electronic technology students in Ekiti State University, Ado-Ekiti with a grand mean of 2.72. The study further established that the psychosocial environment is supportive and conducive for teaching and learning, with a grand mean of 2.83. Which indicated that electrical and electronic technology students' academic performance in EKSU is impacted positively.

In addition, the study revealed that technological resources with a grand mean of 2.66. indicated that there is significant impact on the academic performance of electrical and electronic technology students in EKSU. Although the learning environment at Ekiti State University impacts the academic performance of Electrical and Electronic students to a reasonable extent, there is still a need for significant improvement in technological infrastructure and key aspects of physical facilities to achieve optimal academic outcomes and practical competence.

Recommendations

Based on the findings of this study, the following recommendations are made:

1. The university management in collaboration with the state government and Non-Governmental Organization should provide stable electricity through alternative energy sources such as solar power systems to support practical activities in Electrical and Electronic workshop.
2. The university should collaborate with Non-Governmental Organizations and other bodies to install and improve internet connectivity and provide reliable high-speed internet services to facilitate research, online learning, and access to digital educational resources.
3. Modern simulation software such as Proteus, MATLAB, Multisim, and other Electrical/Electronic design applications should be made available to students to enhance practical learning and technical competence. The department in collaboration with the school management to reach out to the

graduated students who are working with foreign and education bodies for contribution and donations.

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