

**A COMPARATIVE STUDY OF COMPUTER STUDENT'S PERFORMANCE IN  
E-LEARNING AND PHYSICAL CLASSES**

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**A PROJECT SUBMITTED TO THE DEPARTMENT OF CURRICULUM AND  
INSTRUCTIONAL TECHNOLOGY, FACULTY OF EDUCATION IN PARTIAL  
FULFILLMENT OF THE REQUIREMENTS OF THE AWARD OF BACHELOR  
OF SCIENCE DEGREE IN COMPUTER EDUCATION B.SC.(Ed) OF THE  
UNIVERSITY OF BENIN, BENIN CITY, NIGERIA**

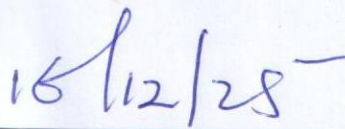
**NOVEMBER 2025**

## CERTIFICATION

We, the undersigned, certify that this research work was carried out by Emmanuel Kolise Ani in the Department of Curriculum and Instructional Technology, Faculty of Education, University of Benin, in partial fulfillment of the requirements for the award of a Bachelor of Science (Ed) Degree in Computer Science.



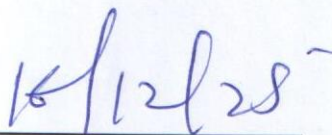
**Dr. (MRS). I.K. OTEZE**  
(Project Supervisor)



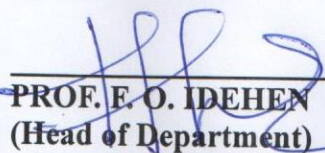
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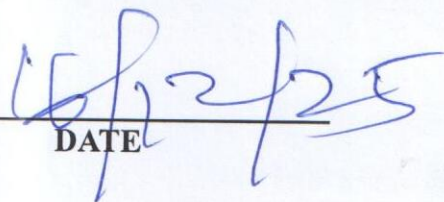
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(Project Co-Ordinator)



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(Head of Department)



**DATE**



## DEDICATION

This project is dedicated to Almighty God, who has been the researcher's strength and sustainer throughout his academic journey. He saw him through every stage of this work, and for His guidance, provision, and unfailing love, he is deeply grateful.

I am also grateful to the members of my faculty, the Head of Department Dr. P.O. Nwankwo and the Project Co-ordinator Dr. (Mrs) J. K. Odo as well as the academic and administrative staff of the Department of Curriculum and Instruction, Federal College of Education, Owerri, for their kind assistance which improved the quality of this study.

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I must also express my appreciation to the respondents who gave the time to participate in this study. Without their cooperation, this data collection would not have been possible.

I am deeply indebted to my family and friends for their unwavering love and emotional support. Special thanks to Mr. and Mrs. Peter and Evelyn for their belief in my abilities and for keeping me motivated during the challenging moments. Special thanks go to my siblings, Miracle, Sharon and Victoria. I would also like to thank my aunts and uncles for their financial contribution to the development of this study. A big thank you to my friends, Fevora, Ighite, Miracle and Nathaniel for their support throughout my academic journey at the University of Benin and the development of this study.

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## ABSTRACT

This study examined the comparative academic performance of Computer Science and related students in e-learning versus physical classroom settings at the University of Benin. The background of the study highlights the global shift from traditional face-to-face interaction to digital platforms, a transition significantly accelerated by the COVID-19 pandemic, which exposed the need to evaluate the effectiveness of both learning modes. The primary objective was to determine which environment best supports educational results by analyzing student experiences with both methods. The study was guided by five research questions designed to investigate performance levels, influencing factors, and specific challenges associated with traditional and e-learning classrooms.

The methodology adopted for this study was a descriptive survey research design, which allowed for the systematic investigation of student perspectives. The population and sample consisted of 100 respondents drawn from Computer Science, Computer Education, Computer Engineering, and related ICT centers who have experienced both e-learning and physical classroom systems. Data collection was carried out using a structured instrument titled "Comparative Analysis of Students' Performance in E-Learning and Physical Classes Questionnaire (CASPEPCQ)," which was validated by experts and tested for reliability using the Cronbach Alpha method. The data obtained were analyzed using mean and standard deviation, with a benchmark mean of 2.50 used to determine the level of agreement.

The findings revealed that while students appreciated e-learning for the ability to learn at their own pace (Mean = 3.54), they generally agreed that physical classes provided better hands-on learning opportunities (Mean = 3.30) and ultimately resulted in better academic performance (Mean = 2.96). Significant challenges identified included the lack of electricity and poor internet for e-learning, and overcrowded classrooms for physical sessions. The study concluded that while e-learning is superior for theoretical review, it cannot yet replace physical classes for practical courses due to infrastructural deficits. Consequently, it is recommended that the university adopt a blended learning model to leverage the strengths of both systems, while urgently upgrading power supply and internet access.

## CHAPTER ONE

### INTRODUCTION

#### Background of the Study

Education has always been vital for development, to promote the growth of individuals and societies. Over many years, the teaching and learning process mainly took place in physical classrooms, where there was only a face-to-face interaction between teachers and students, immediate feedback, and social interaction. This conventional approach to learning has long been practiced in many educational institutions, relying on a fixed timetable and direct physical supervision. However, the development of digital technology and the internet have introduced new and arguably better methods for the teaching and learning process (Cavanaugh & Jacquemin, 2015; Shachar & Neumann, 2010). E-learning involves the use of electronic devices and online platforms to facilitate learning. It gives users flexibility in time and location, allowing learners to access educational lessons and materials from anywhere at any time (Batool et al., 2023; Jamal et al., 2023). The growth of E-learning has been accelerated by advancements in information and communication technology (ICT) and the global shift towards digitalization.

The COVID-19 pandemic of 2020 significantly amplified the adoption of E-learning, as schools and universities were forced to make use of online platforms to ensure educational activities continued during the lockdown (Chisadza et al., 2021; Fouad et al., n.d.). This abrupt change exposed both the strengths and weaknesses of E-

learning. On one hand, it offered uninterrupted access to education and supported learning at the student's own pace. On the other hand, it exposed challenges such as inadequate internet connectivity, lack of technical skills, different educational results across diverse population in Nigeria and varying levels of student engagement (AsgharzadehBonab et al., 2022). For example, the number of people who enroll for online courses have grown, some research even says that students who learn online perform the same (Lyke & Frank, 2012; Qin, 2022) or even better than those in traditional classrooms.

This study focuses on two major variables: the mode of learning (E-learning and traditional classroom learning) as the independent variable, and student's academic performance as the dependent variable. Academic performance will be evaluated based on measurable indicators such as exam scores, grades, and completion of learning outcomes to determine which learning environment supports better educational results.

Post COVID, many students have experienced both the E-learning and physical classroom settings, providing a basis for comparing their academic outcomes in each setting. While some studies suggest that e-learning can be as effective/potent as traditional methods when well-designed, others say that physical classes are more effective to achieve educational objectives due to personal and physical interaction and the immediate support gotten from physically present educational instructors. These different perspectives have created a question: which mode of learning leads to better academic performance while still aligning with educational policies?

In Nigeria, factors such as access to technology, literacy towards financial/economic status and support from Educational Institutions greatly determine the effectiveness of both of the means of learning. This makes it necessary to conduct a comparative study to determine whether students perform better through E-learning or in traditional classroom settings. The results of that study will provide useful information for educational administrators and students, to help improve teaching and learning strategies in the 21st century.

### **Statement of the Problem**

The methods used to deliver instructions and carry out teaching and learning activities are really important to ensure educational objectives are met. While physical classroom teaching has been the traditional approach, the increase of E-learning has raised questions about its impact on a student's academic performance. Some education professionals argue that E-learning offers flexibility, unlimited access to educational materials, and give learners an opportunity to learn at their own pace. While, supporters of physical classroom instruction hammer down on the benefits of face-to-face interaction, immediate physical feedback, and structured classroom environments.

Despite the different points of view, there is a partial agreement on which mode of learning produces better academic performance (Daymont & Blau, 2008), especially in the Nigerian educational sector. The COVID-19 pandemic exposed the strengths and weaknesses of both of the modes, still studies comparing student's performance in these two learning environments are not enough.

Without hard and factual evidence from experiments, deciding which mode of learning is better whether E- learning, physical classes or even a mix of both is simply based on assumptions and the prejudice of the educational admin in charge, rather than on facts (Jia, 2024; Johnson-Smith et al., 2014; Vallée et al., 2020). This makes educators and policymakers unsure of effective teaching strategies to use. Therefore, it is necessary to carry out a comparative analysis to evaluate and analyze student's performance in e-learning and physical classes, with the objective of determining which mode is more effective.

### **Research Questions**

The study will be guided by the following research questions:

1. What is the level of academic performance of student in traditional classroom.
2. What is the level of academic performance of student in E-learning classroom.
3. What are the factors that influence academic performance in traditional and E-learning classrooms?
4. What are the challenges that influence academic performance in E-learning and traditional classrooms?
5. Is there a significant difference in the factors that influence performance in E-learning and traditional classrooms

### **Purpose of the Study**

The main purpose of this study is to compare the academic performance of students in E-learning and physical classroom settings. Specifically, the study seeks to:

1. Examine the differences in academic performance between students engaged in E-learning and those in physical classes.
2. Identify the factors that influence student's performance in each mode of learning.
3. Determine the challenges and advantages associated with E-learning and physical classes.
4. Provide suggestions on the most effective approach for improving student's academic performance.

### **Significance of the Study**

The results of this study will be of great importance to various stakeholders in the education sector:

1. **Students:** The study will help students understand which mode of learning is better to help them achieve academic success, giving them the information and knowledge to make good decisions about the best method to learn.
2. **Teachers/Lecturers:** The study will provide knowledge and an understanding of teaching strategies that can be modified to work effectively with different modes of learning, thereby improving instructional delivery and promoting student engagement.
3. **School Administrators:** By listing out the strengths and weaknesses of each mode, the study will guide administrators in developing policies that improve the quality of instruction and learning outcomes.

4. **Policy Makers:** The study will provide factual results from experiments that will inform educational policy makers on how to integrate E-learning and physical classes for the best results.
5. **Researchers:** The study will serve as a reference for future research on teaching methods, technology integration, and student performance.

### **Scope of the Study**

This study will be focused on comparing student's academic performance in e-learning and physical classroom environments within a selected tertiary institution in Nigeria. The study will be on students who have experienced both of the modes of learning, especially in regards to the recent changes in education because of the increased use of technology and the COVID-19 pandemic. The comparison will evaluate academic performance by looking at concrete measures like exam scores, continuous assessment results, and overall GPAs (Firdousi et al., 2024).

### **Limitations of the Study**

The study may be limited by certain factors. These include:

1. **Access to accurate and consistent records:** It may be difficult to find accurate and reliable academic performance data from the institution (Shanta, 2022; Stack, 2015).
2. **Limited Time:** The limited amount of time available will determine how deep the study goes.
3. **Generalization of results:** Since the study focuses on an institution, the results may not be general for all the tertiary institutions in Nigeria.

4. **Students bias:** Students bias will affect how they respond to interviews and questionnaires because different individuals have their own personal preferences for which learning mode is better.

### **Definition of Terms**

For the purpose of this study, the following terms are defined as follows:

1. **E-learning:** This is a method of delivering educational content and the interaction between teachers/instructors and students through online platforms and electronic devices.
2. **Physical classes:** Traditional face-to-face instructional lessons that happen in a classroom setting.
3. **Academic performance:** This is a measurable result of student's learning, shown through scores, grades, or GPA.
4. **Comparative study:** A research approach that examines similarities and differences between two or more variables or groups.

## CHAPTER TWO

### REVIEW OF RELATED LITERATURE

This chapter reviews existing literature that is relevant to the comparative study of student's performance in E-learning versus physical (face-to-face) classroom settings.

The review is organized under the following subheadings:

1. Conceptual Framework.
2. Theoretical Framework.
3. E-Learning and Student Performance.
4. Physical Classroom Learning and Student Performance.
5. Comparative Studies.
6. Factors Influencing Student Performance and Summary.

#### **Conceptual Framework**

##### **Concept of Learning**

Learning refers to the process through which knowledge, skills, values, attitudes, or behaviors are acquired, developed, or modified. It often involves cognitive, emotional, and environmental influences (Schunk, 2012). In educational research, measurement of learning typically uses outcomes such as test scores, grades, knowledge retention, and ability to apply information.

##### **Concept of E-Learning**

E-learning generally refers to the use of information and communication technologies (ICTs) to provide instruction, facilitate interaction, and deliver educational content

asynchronously or synchronously via digital platforms (Garrison & Vaughan, 2008). It includes video lectures, discussion boards, learning management systems (LMSs), webinars, and virtual classrooms. During the COVID-19 pandemic, E-learning became widespread as a necessity, revealing both potentials (flexibility, access) and limitations (technology access, student engagement).

### **Concept of Physical Classroom Learning**

Physical classroom learning (also called face-to-face instruction) involves students and instructors sharing the same physical space for lectures, discussions, labs, etc. Key features include direct interpersonal interaction, immediate feedback, structured schedules, and in-person supervision. This traditional mode has long been considered the standard in many educational systems.

### **Concept of Academic Performance**

Academic performance refers to how well students achieve learning objectives. It is operationalized through scores on exams, continual assessment results, final grades, grade point averages (GPAs), or performance in projects or assignments. In comparative studies, "performance" is the dependent variable used to assess effectiveness of different instructional modes.

### **Theoretical Framework**

A number of theories help explain how and why different learning modes (E-learning vs physical) might lead to different student outcomes.

### **Constructivist Learning Theory**

Constructivism suggests that learners build new knowledge upon prior knowledge by means of active participation in learning environments (Piaget, Vygotsky). In physical classrooms, this happens through discussions, group work, direct mentoring; in E-learning settings, through online discussion boards, interactive modules, peer learning, and projects. Constructivism supports blended models that utilize both physical and online modes to optimize learning.

### **Cognitive Load Theory**

Cognitive Load Theory (CLT), developed by John Sweller and colleagues (1988), holds that human working memory has limited capacity. If instructional design places too much load (intrinsic, extraneous, or germane) on working memory, learning can be impeded. In E-learning, poorly designed interfaces, too much non-relevant multimedia, or complex navigation can increase extraneous load. Physical classrooms may also impose load via rapid pace, crowded content, or poor clarity. Studies in digital classroom design have used CLT to guide how content is presented in online settings to avoid overload (Surbakti, Umboh, Pong, & Dara, 2024; Agbonifo & Ibam, 2015).

### **Social Learning Theory**

Bandura's Social Learning Theory emphasizes that learning occurs through observing, modeling, and interacting with others. Physical classes provide rich opportunities for social learning: teacher modeling, peer interaction, spontaneous question-answer. E-

learning environments mimic these through discussion forums, group work, peer review, but may suffer from delays, reduced richness of interaction, or less spontaneous feedback.

### **Connectivism**

Connectivism is a theory for understanding learning in the digital age. It argues that knowledge is distributed across networks, and learning consists of the ability to form connections within networks of information, ideas, and people. It underscores the importance of technology, access, and being able to navigate and use digital resources. In E-learning, students can connect with global resources, online communities; physical classes are more limited in this dimension. This theory helps explain some advantages E-learning may have.

### **E-Learning and Student performance**

#### **Benefits of E-Learning**

From the literature, several advantages emerge:

1. **Flexibility in time and place:** Students can access learning at their convenience, reducing commuting and scheduling conflicts.
2. **Access to resources:** Use of videos, recorded lectures, digital libraries, and interactive materials enhances opportunities for review and deeper learning.
3. **Cost savings:** Reduced need for physical materials, travel, facility costs. Particularly in settings with limited resources, E-learning reduces dependence on printed materials. For example, in Nigeria, E-learning helps lessen costs related to printing and distribution of notes.

4. **Scalability:** Larger numbers of students can be reached without proportionally increasing physical space or infrastructure.

### **Challenges of E-Learning**

However, E-learning has its drawbacks:

1. **Technology and infrastructure issues:** Poor internet connectivity, unstable electricity supply, lack of appropriate devices are recurring problems in developing contexts.
2. **User attitudes and digital literacy:** In both staff and students: the ability to use platforms, comfort with technology. Some lecturers may not be fully trained or comfortable with E-learning tools.
3. **Reduced face-to-face interaction:** Students may feel isolated, have fewer opportunities for immediate feedback.
4. **Self-discipline and motivation:** E-learning demands high self-regulation; students lacking in motivation may fall behind.

### **Empirical Studies on E-Learning Performance**

1. Oguguo, Ocheni, & Adebayo (in National Open University, Nigeria) compared student achievement in synchronous vs asynchronous E-learning platforms. They found synchronous E-learning significantly improved achievement over the asynchronous mode.
2. The "Influence of Online and Physical Classroom on Students' Academic Performance" study at University of Ilorin in Nigeria found that both modes

positively influenced performance, but students in online learning had slightly higher mean scores than those in physical classes (mean difference of 2.38) in some faculties.

3. At Covenant University, students in practical-related courses during COVID-19 using Zoom and Moodle platforms were studied; findings indicated mixed effects depending on resource availability and course type (the practical nature posed special challenges).

## **Physical Classroom Learning and Student Performance**

### **Benefits of Physical Classroom Learning**

1. **Direct interaction:** Immediate feedback, dynamic adjustment by teachers in response to student cues, clearer communication.
2. **Structured schedule and supervision:** Routines often help students maintain discipline and regular attendance.
3. **Peer interaction and social support:** Students benefit from group learning, spontaneous discussions, collaborative tasks.
4. **Better environment for practical and hands-on tasks:** Labs, workshops, physical demonstrations are easier when face-to-face.

### **Challenges of Physical Classroom Learning**

1. **Inflexibility:** Fixed schedules, commuting, rigid class times can hinder students who have other commitments or live far from campus.

2. **Resource constraints:** Class overcrowding, limited physical infrastructure, inadequately equipped classrooms.
3. **Interruption:** Strikes, pandemics, or other disruptions can halt face-to-face instruction more severely.
4. **Variation in quality of instruction:** Differences in teacher skill, teaching materials, class size can affect learning outcomes.

### **Empirical Studies on Physical Learning Performance**

1. The University of Ilorin study mentioned earlier found that, though both modes had positive effects, physical mode sometimes lags in mean performance depending on specific conditions (faculty, resource provisions).
2. Studies in Nigeria show that physical classes continue to be preferred in many instances, particularly for courses with practical components or where students benefit from more hands-on support. For example, the study of E-learning facility utilization in a Nigerian private university (M-University) revealed that although physical in-person interaction remains highly valued, many instructors and students believe that the full potential of E-learning is not yet realized due to infrastructure gaps.

### **Comparative Studies of E-Learning and Physical Classes**

#### **International Perspectives**

1. Apart from Nigeria, comparative studies internationally often show that blended or hybrid models outperform either mode alone in many settings, especially when

well designed (good technological support, strong instructional design, teacher training).

2. The "Performance-based assessment in virtual versus non-virtual classes" study (Asia-Pacific) showed that online classes significantly enhanced motivation and resilience compared to physical classrooms when certain assessment strategies were used.

### **Nigerian Context**

1. The University of Ilorin study (Omolafe & Onasanya) is directly relevant: it found that online-taught students sometimes outperform those in physical classes under certain conditions.
2. The National Open University study (synchronous vs asynchronous) showed synchronous E-learning produces better results than asynchronous, which has implication for how E-learning is structured in Nigeria.
3. M-University study: While facilities are adequate in some private institutions, there remains the issue of maximizing utilization, digital literacy among lecturers, attitudinal barriers.

### **Post-COVID-19 Comparative Research**

1. COVID-19 accelerated online education, forcing many institutions to adopt E-learning modes. Studies post pandemic show mixed performance: some students did well due to flexibility, others suffered due to lack of infrastructure or isolation. The Covenant University study of practical courses during COVID-19 showed

effectiveness was mediated by how well platforms could simulate or support practical learning and how students adapted.

2. Also, challenges such as fidelity of instruction for practical portions, access to stable internet, and student perception influenced outcomes significantly in these comparisons.

### **Factors Influencing Student Performance in E-learning and Physical Classes**

From the literature, the following factors repeatedly emerge as influencing student performance:

1. **Technological Factors:** Internet speed/stability; access to devices; learning platform usability; digital literacy of both students and instructors.
2. **Socio-Economic Factors:** Family income, availability of personal devices, power supply, cost of data/Internet.
3. **Motivation & Self-Discipline:** Especially in E-learning where students need to manage their own schedule, maintain attention, resist distractions.
4. **Teacher-Student Interaction:** Quality and frequency of feedback; perception of teacher presence; peer interactions.
5. **Institutional Support and Resources:** Training for lecturers, investment in infrastructure, provision of support services (ICT help desks, lending devices), policies that support blended/hybrid models.

## Summary of Literature Review

The literature indicates that both E-learning and traditional classroom instruction present unique advantages and limitations.

E-Learning provides flexibility, scalability, and broader access; however, its effectiveness largely depends on reliable infrastructure, sound instructional design, and the learner's capacity for self-regulation. Physical classroom learning fosters direct interaction, structured guidance, and social engagement, making it especially effective for hands-on or practical components of curricula. Nonetheless, it lacks flexibility and is more susceptible to disruptions.

In the Nigerian context, existing studies suggest that online or blended learning can match or even exceed the outcomes of face-to-face classes when favorable conditions such as robust infrastructure, synchronous delivery modes, and supportive instructors are in place. Despite this potential, persistent inequities in access and digital readiness pose serious challenges.

Notably, the literature lacks large-scale, multi-institutional comparative studies in Nigeria that systematically account for influencing factors such as socio-economic background, discipline, course type, and digital literacy. This gap highlights the necessity of the present study.

## CHAPTER THREE

### METHODOLOGY

This chapter presents the methods and procedures that was used for the study. It is organized under the following sub-headings:

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

#### Design of the Study

The survey method of descriptive research was adopted for this study. This design is appropriate because it allows the researcher to systematically investigate and obtain information from a sample of computer science students who have experienced both e-learning and physical classroom instruction. The design enables the researcher to compare students' academic performance and identify the factors influencing learning outcomes in each mode.

### Population of the Study

The population of the study consists of all full-time computer science and other computer-based students with a 4-year tenure in the University of Benin. This spreads across students inside and outside of the faculty of Education. They are all students who have experienced both E-learning and Physical classroom systems, especially during and after the COVID-19 era. For example, it is estimated that the number of full-time students across all levels in the University of Benin studying computer science any computer-based course is 1000 students.

S/N	Departments	Total no of Students
1.	Computer Education	270
2.	Computer Science	430
3.	Computer Engineering	180
4.	ICT International Training Centre	70
5.	Centre for Maritime Studies and ICT	50
	<b>Total</b>	<b>1000</b>

### Sample and Sampling Technique

A sample of 100 students will be selected from the population using simple random sampling technique. Ten percent (10%) of students from each department from inside and outside the faculty of Education will be sampled to ensure fair representation. The total

sample size will be determined based on accessibility, availability, and cooperation of respondents.

S/N	Departments	Total no of students	Sample Collected (10%)
1.	Computer Education	270	27
2.	Computer Science	430	43
3.	Computer Engineering	180	18
4.	ICT International Training Centre	70	7
5.	Centre for Maritime Studies and ICT	50	5
<b>Total</b>		<b>1000</b>	<b>100</b>

### Research Instrument

The main instrument for this study is a structured questionnaire titled: **“Comparative Analysis of Students’ Performance in E-Learning and Physical Classes Questionnaire (CASPEPCQ)”**

The questionnaire is divided into two sections:

**Section A:** Demographic information of respondents.

This section will focus on the necessary information like the faculty, department, level, gender and age. This information is crucial to properly analyze each respondent’s point of view. This questionnaire will be designed to be simple, clear and concise to minimize response errors and ensure ease of completion.

## **Section B**

This section will focus on eliciting information from each respondent to understand their stance on the research questions. Twenty (20) items are designed to elicit information related to the research questions, focusing on academic performance, influencing factors, and challenges in e-learning and physical classrooms. The items are measured using a four-point Likert scale ranging from Strongly Agree (5) to Strongly Disagree (1).

### **Validity of the Instrument**

To ensure content and face validity, the questionnaire will be submitted to the research supervisor and two experts in the Department of Curriculum and Instructional Technology (Computer Education) for review. Their corrections and recommendations will be incorporated before final administration.

### **Reliability of the Instrument**

A pilot study will be conducted using 20 computer science students who are not part of the main sample. Data collected will be analyzed using Cronbach Alpha reliability method. A reliability coefficient of 0.70 and above will be considered acceptable, showing that the instrument is reliable.

### **Method of Data Collection**

The researcher will personally administer the questionnaire to the selected respondents within the institution. The purpose of the study will be clearly explained, and confidentiality will be assured to encourage sincere responses. Completed copies of the questionnaire will be retrieved immediately to avoid loss.

## 8. Method of Data Analysis

Data obtained will be coded, organized, and analyzed using:

- Frequency and simple percentage for demographic data
- Mean and standard deviation to answer all research questions

Decision Rule:

A benchmark mean of **2.50** will be used to determine the level of agreement with each item.

A total of 100 questionnaires were administered to students across five departments, representing 100% of the population as defined by the methodology. All 100 copies were returned and found valid for analysis, resulting in a 100% response rate. The data is analyzed using frequency counts, simple percentages, mean scores, and standard deviations.

### Presentation of Results

This section presents the personal data of the respondents, including Department, Level, Gender, and Age.

### Demographic Characteristics of Respondents

Table 1: Distribution of Respondents by Department

Category	Frequency (N)	Percentage (%)
Computer Science	43	43%
Computer Education	27	27%
Computer Engineering	18	18%
ICT International Training	2	2%

## CHAPTER FOUR

### PRESENTATION OF RESULTS, AND DISCUSSION OF FINDINGS

This chapter presents the analysis of data collected from the respondents. The study was designed to compare students' performance in E-learning and physical classes. The data was collected using a structured questionnaire titled 'Comparative Study of Student's Performance in E-Learning and Physical Classes Questionnaire'.

#### Findings of the Study

A total of 100 questionnaires were administered to students across five departments, representing 10% of the population as defined in the methodology. All 100 copies were retrieved and found valid for analysis, resulting in a 100% response rate. The data is analyzed using frequency counts, simple percentages, mean scores, and standard deviations.

#### Presentation of Results

This section presents the personal data of the respondents, including Department, Level, Gender, and Age.

#### Demographic Characteristics of Respondents

**Table 1: Distribution of Respondents by Department**

Category	Frequency (N)	Percentage (%)
Computer Science	43	43%
Computer Education	27	27%
Computer Engineering	18	18%
ICT International Training	7	7%

Centre		
Centre for Maritime Studies and ICT	5	5%
<b>Total</b>	<b>100</b>	<b>100%</b>

Table 1 shows the distribution of the sample size. In adherence to the study's design, Computer Science had the highest number of respondents (43%), followed by Computer Education (27%) and Computer Engineering (18%), while the ICT centers made up the remaining 12%.

**Table 2: Distribution by Gender**

Category	Frequency (N)	Percentage (%)
Female	54	54.0%
Male	46	46.0%
<b>Total</b>	<b>100</b>	<b>100.0%</b>

Table 2 reveals a balanced gender distribution, with 51% female respondents and 49% male respondents. This suggests that the study's findings represent the views of both genders almost equally.

**Table 3: Distribution by Age**

Category	Frequency (N)	Percentage (%)
19 - 21	56	56.0%
22- 24	24	24.0%
16 - 18	15	15.0%
25 and above	5	5.0%
<b>Total</b>	<b>100</b>	<b>100.0%</b>

Table 3 indicates that the majority of respondents are between the ages of 19 and 21 (56%), followed by the 22-24 age group (24%), 16-18 age group (15%) and the least is 25 and above (5%).

### Analysis of Research Questions

The research questions were analyzed using Mean and Standard Deviation. A criterion mean of 2.50 was used as the benchmark for decision-making. Any item with a mean score of 2.50 or above is regarded as 'Agree', while scores below 2.50 are regarded as 'Disagree'.

**Research Question 1:** How does physical classroom learning affect student's academic performance?

**Table 4: Mean Ratings on Performance in Physical Classes**

Item Statement	N	Mean	SD	Remark
I understand course contents better in physical classes.	100	3.28	0.64	Agree
Face-to-face interaction improves my academic performance.	100	3.30	0.66	Agree
I receive immediate feedback from my lecturers in physical classes.	100	2.99	0.70	Agree
Physical supervision helps me stay focused during learning.	100	3.16	0.73	Agree
<b>Grand Mean</b>		<b>3.18</b>		<b>Agree</b>

Table 4 shows that respondents agreed with all items regarding physical classes. The highest mean was recorded for Item 2 (Face-to-face interaction), indicating it is a key driver of performance.

**Research Question 2:** How does E-learning affect student's academic performance?

**Table 5: Mean Ratings on Performance in E-Learning**

Item Statement	N	Mean	SD	Remark
E-learning allows me to learn at my own pace.	100	3.54	0.54	Agree
My academic performance improves because learning resources are always available online.	100	3.41	0.60	Agree
I perform better in assessments done online.	100	3.18	0.67	Agree
I find it easier to review recorded lectures and materials.	100	3.04	0.74	Agree
<b>Grand Mean</b>		<b>3.29</b>		<b>Agree</b>

Table 5 reveals strong agreement regarding E-learning. The highest mean in the entire survey was for Item 5, showing that 'learning at one's own pace is the most significant benefit.

**Research Question 3:** What factors influence student's performance in both learning modes?

**Table 6: Mean Ratings on Influencing Factors**

Item Statement	N	Mean	SD	Remark
Internet connectivity affects how well I perform in E-learning.	100	3.28	0.65	Agree
Learning environment at home affects my performance online.	100	3.05	0.77	Agree
Lecturer engagement influences my performance in both learning modes.	100	3.26	0.63	Agree
Motivation affects how well I perform in online learning.	100	3.10	0.66	Agree
<b>Grand Mean</b>		<b>3.17</b>		<b>Agree</b>

Table 6 highlights that external factors significantly impact performance. Respondents agreed that internet connectivity and lecturer engagement are critical determinants.

**Research Question 4:** What are the challenges associated with E-learning and Physical classes?

**Table 7: Mean Ratings on Challenges**

Item Statement	N	Mean	SD	Remark
E-learning reduces social interaction and makes learning difficult.	100	2.50	0.72	Agree
Lack of electricity interrupts my online learning.	100	3.46	0.59	Agree
Overcrowded classes reduce my performance in physical learning.	100	3.36	0.76	Agree
I find it difficult to concentrate during online learning sessions.	100	2.61	0.76	Agree
<b>Grand Mean</b>		<b>2.98</b>		<b>Agree</b>

Table 7 identifies the major hurdles. The most significant challenge identified was 'Lack of electricity' for online learning, followed closely by 'Over crowded classes' for physical learning.

**Research Question 5:** Is there a significant difference between performance in E-learning and Physical classes?

**Table 8: Comparative Statements**

Item Statement	N	Mean	SD	Remark
I perform better academically in physical classes than in E-learning.	100	2.96	0.76	Agree
E-learning saves time, allowing better academic planning.	99	3.29	0.58	Agree
Physical classes provide better hands-on learning opportunities	100	3.30	0.58	Agree
There is a significant difference between my performance in E-learning and physical classes.	100	3.24	0.62	Agree
<b>Grand Mean</b>		<b>3.20</b>		<b>Agree</b>

Table 8 presents the direct comparison. Students agreed that they perform better in physical classes, yet they also acknowledged that E-learning saves time.

### **Discussion of Findings**

The analysis of the data gathered from the 100 respondents across the Departments of Computer Science, Education, Engineering, and ICT centers yielded several significant findings.

#### **Performance in Learning Modes:**

The findings reveal that students perceive both learning modes as having distinct advantages. Respondents agreed that physical classes improve understanding through face-to-face interaction and supervision. However, they rated the performance benefits of

E-learning slightly higher overall, particularly praising the ability to learn at their own pace.

### **Factors and Challenges:**

The study identified infrastructure as a critical variable. For E-learning, the lack of electricity and internet connectivity were major concerns. Conversely, for physical classes, overcrowding was identified as a significant detractor from academic performance.

### **Comparative Assessment:**

A clear distinction appeared in the nature of learning. Students agreed that Physical classes are superior for hands-on opportunities, which is crucial for computer-based courses. However, they admitted that E-learning is superior for time management and planning. Interestingly, while students utilized E-learning tools effectively, they still maintained a belief that they perform better academically in physical classes, likely due to the structure and discipline imposed by the physical environment.

In summary, the data suggests a 'blended' reality: students appreciate the flexibility and resource availability of E-learning but rely on physical classes for hands-on skills, immediate supervision, and overcoming the infrastructural deficits.

## CHAPTER FIVE

### SUMMARY, CONCLUSION, AND RECOMMENDATIONS

#### Introduction

This chapter presents the summary of the study's findings, conclusions drawn from the analysis, and recommendations based on the results. The primary objective of this study was to conduct a comparative study of student performance in E-learning and physical classes among Computer Science and related students at the University of Benin.

#### Summary of Findings

The data collected from 100 respondents across five departments (Computer Science, Computer Education, Computer Engineering, ICT International Training Centre, and Centre for Maritime Studies and ICT) was analyzed to answer the research questions. The key findings are summarized as follows:

1. **Effectiveness of Physical Classes:** The study revealed that students generally agree that physical classes effectively improve academic performance (Grand Mean = 3.18). Specifically, respondents emphasized that **face-to-face interaction** (Mean = 3.30) and physical supervision significantly aid their understanding of course contents.
2. **Benefits of E-Learning:** E-learning was also rated positively (Grand Mean = 3.29), with a slightly higher overall agreement than physical classes regarding resource availability. The most significant advantage identified by students was

the ability to **learn at their own pace** (Mean = 3.54) and the convenience of having learning resources always available online.

3. **Influencing Factors:** The study found that success in both learning modes is heavily dependent on external factors. **Internet connectivity** (Mean = 3.28) and **lecturer engagement** (Mean = 3.26) were identified as critical determinants of student performance.

4. **Challenges Encountered:** The findings highlighted distinct challenges for each mode. For E-learning, **lack of electricity** (Mean = 3.46) was the most severe disruption, followed by poor internet connectivity. For physical classes, **overcrowded classrooms** (Mean = 3.36) were identified as a major hindrance to academic performance.

5. **Comparative Performance:** While students appreciated the time-saving nature of E-learning (Mean = 3.29), they maintained that **physical classes provide better hands-on learning opportunities** (Mean = 3.30). Consequently, a majority agreed that they ultimately perform better academically in physical classes (Mean = 2.96) compared to online settings.

## Conclusion

Based on the findings, it is concluded that while E-learning offers unmatched flexibility and fosters self-paced study, it cannot yet fully replace physical classes, particularly for computer-based courses that require hands-on practical application.

Students perceive a "blended" value proposition: E-learning is superior for theoretical review and time management, while physical classes are superior for interaction, supervision, and practical skill acquisition. However, the potential of E-learning is currently severely hampered by infrastructural deficits, specifically unreliable power supply and internet access. Conversely, the physical learning environment is degraded by overcrowding. Therefore, neither mode is currently operating at its maximum potential.

### **Recommendations**

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

1. **Adoption of a Blended Learning Model:** The university should officially adopt a hybrid curriculum where theoretical courses are delivered online to allow self-paced learning, while practical, hands-on courses are reserved for physical sessions. This leverages the strengths of both systems.
2. **Infrastructural Upgrade:** To make E-learning viable, there is an urgent need for improved power supply and reliable, subsidized internet access for students within the campus and its environs.
3. **Decongesting Classrooms:** To solve the issue of overcrowding in physical classes, the management should split large classes into smaller streams or utilize the E-learning platform to offload general university courses, thereby freeing up physical space for core departmental courses.

4. **Teacher Training for Online Engagement:** Since lecturer engagement was cited as a key factor, academic staff should undergo training on digital pedagogy to ensure they can engage students effectively online, rather than simply dumping materials on a portal.

5. **Optimization of Practical Sessions:** Physical classes should be strictly prioritized for interactive and practical sessions (hands-on) rather than dictation of notes, which can be handled via E-learning platforms.

### **Contributions to Knowledge**

This study contributes to the existing body of knowledge by providing empirical evidence on the specific trade-offs students make between E-learning and physical classes in a Nigerian university context. It specifically highlights that students do not view these modes as mutually exclusive but as complementary tools hindered by specific environmental barriers (electricity and overcrowding).

### **Suggestions for Further Studies**

1. This study focused on Computer Science and related departments. A broader study covering non-technical faculties (e.g., Arts or Law) could be conducted to see if the preference for physical classes holds where "hands-on" practical is less central.
2. A correlational study could be conducted to statistically measure the relationship between hours spent on E-learning platforms and actual GPA results, rather than just perceived performance.

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3. Age 1-18 ( ) 19-21 ( ) 22-24 ( ) 25 & Above ( )

Section II: Likert Items

Instructions: Tick (✓) the column that best represents your view  
SA = Strongly Agree | A = Agree | D = Disagree | SD = Strongly Disagree

SN	Item	SA	A	D	SD
<b>A. Performance in Physical Classes</b>					
1	I understand course contents better in physical classes				
2	Face-to-face interaction improves my academic performance				
3	I receive immediate feedback from my lecturers in physical classes				
4	Physical supervision helps me stay focused during learning				
<b>B. Performance in E-Learning</b>					
5	E-learning allows me to learn at my own pace				
6	My academic performance improves since my learning resources are always available online				
7	I perform better in assessments done online				
8	I find it easier to review recorded lectures & assignments				

## APPENDIX I

### QUESTIONNAIRE

**Title:** Comparative study of Computer Student's Performance In E-Learning and Physical Classes.

#### Instructions

This questionnaire is developed for academic purposes to gather information on student's performance in e-learning compared to physical classroom learning. Kindly respond truthfully. Your responses will be treated confidentially.

Thank you.

#### Section A: Demographic Information

Please tick (✓) where appropriate.

1. Level: 100 ( ) 200 ( ) 300 ( ) 400 ( )
2. Gender: Male ( ) Female ( )
3. Age: 16–18 ( ) 19–21 ( ) 22–24 ( ) 25 & Above ( )

#### Section B: Main Items

Instruction: Tick [✓] the option that best represents your view.

SA = Strongly Agree | A = Agree | D = Disagree | SD = Strongly Disagree

S/N	Item	SA	A	D	SD
<b>A. Performance in Physical Classes</b>					
1.	I understand course contents better in physical classes.				
2.	Face-to-face interaction improves my academic performance.				
3.	I receive immediate feedback from my lecturers in physical classes				
4.	Physical supervision helps me stay focused during learning				
<b>B. Performance in E-Learning</b>					
5.	E-learning allows me to learn at my own pace.				
6.	My academic performance improves because learning resources are always available online.				
7.	I perform better in assessments done online.				
8.	I find it easier to review recorded lectures and materials.				

**Factors Influencing Performance**

9.	Internet connectivity affects how well I perform in e-learning.				
10.	Learning environment at home affects my performance online.				
11.	Lecturer engagement influences my performance in both learning modes.				
12.	Motivation affects how well I perform in online learning.				

**C. Challenges in Both Modes**

13.	E-learning reduces social interaction and makes learning difficult.				
14.	Lack of electricity interrupts my online learning				
15.	Overcrowded classes reduce my performance in physical learning.				
16.	I find it difficult to concentrate during online learning sessions.				

**D. Comparative Statements**

17.	I perform better academically in physical classes than in e-learning.				
18.	E-learning saves time, allowing better academic planning.				
19.	Physical classes provide better hands-on learning opportunities				
20.	There is a significant difference between my performance in e-learning and physical classes.				

**APPENDIX II**  
**RELIABILITY**

**Scale:** ALL VARIABLES

**Case Processing Summary**

<b>CASES</b>	N	%
	Valid	20
	Excluded	0
	Total	20

- a. Listwise deletion based on all variables in the procedure.

**Reliability Statistics**

<b>Cronbach's Alpha</b>	<b>N of Items</b>
.876	20