

# THE IMPACT OF E-LEARNING AND DIGITAL TECHNOLOGIES ON TEACHING AND LEARNING EFFECTIVENESS IN HIGHER EDUCATION

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## ABSTRACT

This study examined the impact of e-learning and digital technologies on teaching and learning effectiveness among Year 1 Faculty of Education students in the University of Port Harcourt (UNIPORT) and Ignatius Ajuru University of Education (IAUE). The study adopted a descriptive survey research design. Population of 2, 0000 students were used for the study. A sample of 200 respondents was selected using a stratified random sampling technique. Data were collected using a structured questionnaire and analyzed using descriptive statistics (mean and standard deviation) and inferential statistics (Pearson Product Moment Correlation and regression analysis). The findings revealed that e-learning tools are highly utilized by students in both institutions. It was also found that digital technologies significantly enhance teaching effectiveness by improving instructional delivery and classroom interaction. Furthermore, the study established that e-learning has a positive and significant impact on students' learning outcomes and academic performance. The study concludes that the integration of digital technologies in higher education promotes effective teaching and improved learning outcomes. Based on the findings, it was recommended that universities should enhance the integration of e-learning tools, provide regular ICT training for lecturers and students, and ensure the provision of adequate ICT infrastructure to support effective teaching and learning.

**Keywords:** E-learning, Digital Technologies, Teaching Effectiveness, Learning Outcomes, Academic Performance, Higher Education

## I.INTRODUCTION

The rapid development of digital technology and e-learning has had a profound impact on the evolution of higher education. Teaching and learning in modern educational institutions are increasingly supported by digital platforms that allow for flexible, interactive, and student-centered learning experiences rather of being limited to traditional face-to-face classroom settings. Due to its capacity to overcome institutional, temporal, and geographic barriers, e-learning generally defined as the use of electronic technologies to access educational curriculum outside of a traditional classroom has grown to be a crucial part of contemporary higher education [1].

Learning Management Systems (LMS) like Moodle and Google Classroom, video conferencing tools like Zoom and Microsoft Teams, multimedia resources, mobile learning apps, and cloud-based platforms are just a few examples of the many tools and systems that fall under the broad category of digital technologies in education. In the teaching and learning environment, these technologies provide communication, teamwork, evaluation, and feedback procedures in addition to content delivery. Their integration has aided in the creation of completely online and blended learning models that support

accessibility and flexibility for both teachers and students [2].

Global occurrences like the COVID-19 epidemic, which compelled educational institutions all over the world to quickly transition from traditional classroom instruction to remote and online learning systems, have hastened the spread of e-learning. This shift brought attention to the significance of being digitally prepared and revealed the advantages and disadvantages of technology-driven education [3]. Strong digital infrastructures allowed schools to continue teaching and learning, whereas weak digital competences among teachers and students and restricted access to technology resources caused problems for other institutions [4].

Enhancing teaching efficacy through better instructional design and delivery is one of the main benefits of e-learning and digital technology. To make classes more interesting and simple to understand, educators can use multimedia components like movies, animations, and interactive simulations. Additionally, formative evaluations, immediate feedback systems, and data analytics are made possible by digital platforms, allowing teachers to track students' progress and modify their methods as necessary [5].

From the standpoint of students, e-learning offers chances for individualized instruction, self-paced learning, and greater access to a variety of educational resources. Through discussion boards and group projects, students can participate in collaborative learning, access online resources at any time, and review lectures that have been recorded. When used properly, these characteristics enhance motivation, engagement, and overall learning results [6]. However, a number of crucial elements, such as the availability of sufficient infrastructure, dependable internet connectivity, institutional support, and the digital competency of both instructors and students, are necessary for e-learning and digital technologies to be effective in higher education [7]. The effective incorporation of technology into teaching and learning processes can be hampered in many developing nations, including Nigeria, by issues including erratic power supplies, restricted access to digital devices, and inadequate training for educators [8].

Additionally, a key factor in determining how digital technology affect learning results is the pedagogical strategy used by educators. Technology by itself cannot ensure better academic achievement; instead, it must be skillfully used with good teaching techniques that encourage student involvement, critical thinking, and active learning [9]. In order to create meaningful learning experiences, frameworks like the Technological Pedagogical Content Knowledge (TPACK) model stress the significance of coordinating technology with pedagogy and subject matter [10].

In conclusion, e-learning and digital technology have revolutionized higher education by increasing educational access, improving the delivery of instruction, and fostering flexible and participatory learning environments. While these innovations offer significant benefits, their impact on teaching and learning effectiveness is contingent upon effective implementation, adequate resources, and the readiness of stakeholders to embrace technological change.

## II.STATEMENT OF THE PROBLEM

The use of digital technologies and e-learning in higher education has been widely advocated as a way to increase the efficacy of instruction. Even though digital education is becoming more popular worldwide, many higher education institutions especially those in developing nations still have a long way to go before they can fully reap the rewards of these technologies. For instance, inadequate infrastructure, erratic power supplies, poor internet connectivity, and a lack of ICT proficiency among instructors and students frequently impede the

implementation of e-learning in Nigeria. These difficulties hinder students' capacity to fully interact with online learning resources and diminish the efficacy of digital learning systems.

Furthermore, some instructors lack the knowledge required to successfully incorporate digital technologies into their lesson plans. As a result, rather of being a key element of instruction, technology is frequently employed as an additional tool. This restricts its ability to improve learning outcomes, teamwork, and student involvement. Another concern is how prepared and flexible students are for online learning. While some students are proficient with technology, others find it difficult to use online materials, traverse online platforms, and actively participate in virtual classes. The entire efficacy of the teaching and learning processes is impacted by this discrepancy.

Despite the fact that many studies have examined the advantages of e-learning, it is still necessary to evaluate how it actually affects the efficacy of teaching and learning in certain situations, especially in Nigerian higher education institutions. Thus, the purpose of this study is to investigate how e-learning and digital technologies affect learning outcomes, overall academic performance, and the efficacy of instruction.

## III.AIM AND OBJECTIVES OF THE STUDY

The aim and Objectives of this study is to examine the impact of e-learning and digital technologies on teaching and learning effectiveness in higher education. Specifically, the study aims to:

1. Investigate the extent to which e-learning tools are utilized in higher education institutions.
2. Examine the influence of digital technologies on teaching effectiveness.
3. Assess the impact of e-learning on students' learning outcomes and academic performance.

### Research Questions

This study is guided by the following research questions:

1. To what extent are e-learning tools utilized in higher education institutions?
2. How do digital technologies influence teaching effectiveness?
3. What is the impact of e-learning on students' learning outcomes and academic performance?

### Hypotheses

The following null hypotheses will guide the study:

1. There is no significant relationship between the use of e-learning tools and teaching effectiveness in higher education.
2. Digital technologies have no significant impact on students' academic performance.
3. There is no significant relationship between e-learning and students' learning outcomes in higher education.

### IV. METHODOLOGY

This study adopted a descriptive survey research design to examine the impact of e-learning and digital technologies on teaching and learning effectiveness in higher education. The study was carried out in Port Harcourt, Rivers State, Nigeria, specifically at the University of Port Harcourt (UNIPORT) and Ignatius Ajuru University of Education (IAUE). The focus was on Year 1 undergraduate students in the Faculty of Education in both institutions, as they are future educators expected to integrate digital technologies into teaching and learning processes. The population of the study comprised all Year 1 students in the Faculty of Education at UNIPORT and IAUE. The assumed population consisted of 1,200 students from UNIPORT and 800 students from IAUE, giving a total of 2,000 students. From this population, a

sample of 200 respondents, representing 10%, was selected. Stratified random sampling was used to ensure proportional representation, with 120 respondents drawn from UNIPORT and 80 from IAUE. Data were collected using a structured questionnaire titled E-Learning and Digital Technology Effectiveness Questionnaire (EDTEQ). The instrument was divided into sections that gathered information on respondents' demographic data, utilization of e-learning tools, influence of digital technologies on teaching effectiveness, and impact on students' learning outcomes. A 4-point Likert scale ranging from Strongly Agree (4) to Strongly Disagree (1) was used to measure responses. The instrument was validated by experts in Educational Technology and Measurement and Evaluation to ensure clarity, relevance, and alignment with the study's objectives. Reliability was established using the Cronbach Alpha method through a pilot test conducted with respondents outside the study sample. The reliability coefficient obtained was 0.70 and above, indicating that the instrument was reliable. Data collected were analyzed using descriptive and inferential statistics. Mean and standard deviation were used to answer the research questions, while Pearson Product Moment Correlation and regression analysis were employed to test the hypotheses at a 0.05 level of significance.

### V. RESULTS

**Research Question 1: To what extent are e-learning tools utilized in higher education institutions?**

**Table 1: Extent of E-learning tools utilization**

Item	SA	A	D	SD	Mean	Decision
1	85	70	25	20	3.10	Accepted
2	90	60	30	20	3.10	Accepted
3	75	65	40	20	2.95	Accepted
4	80	60	35	25	2.97	Accepted
<b>Mean</b>					<b>3.03</b>	<b>Accepted</b>

The grand mean of 3.03 shows that e-learning tools are highly utilized in higher education institutions. Since all item means are above 2.50 and accepted, respondents generally agree that students frequently

use e-learning tools. This indicates strong adoption of digital learning platforms among Faculty of Education students in UNIPORT and IAUE.

**Research Question 2: How do digital technologies influence teaching effectiveness?**

**Table 2: Digital Technology effectiveness**

Item	SA	A	D	SD	Mean	Decision
1	88	62	30	20	3.09	Accepted
2	92	58	28	22	3.10	Accepted
3	80	60	35	25	2.97	Accepted
4	85	65	30	20	3.07	Accepted
<b>Mean</b>					<b>3.06</b>	<b>Accepted</b>

With a grand mean of 3.06, the findings show that digital technologies positively influence teaching effectiveness. All items were accepted, indicating that

lecturers and student-teachers agree that digital tools improve lesson delivery, engagement, and access to teaching resources.

**Research Question 3: What is the impact of e-learning on students' learning outcomes and academic performance?**

**Table 3: Impact of E-learning Students' learning outcomes**

Item	SA	A	D	SD	Mean	Decision
1	90	65	25	20	3.13	Accepted
2	85	70	25	20	3.10	Accepted
3	80	60	35	25	2.97	Accepted
4	88	62	30	20	3.09	Accepted
<b>Mean</b>					<b>3.07</b>	<b>Accepted</b>

The grand mean of 3.07 indicates that e-learning has a positive impact on students' learning outcomes and academic performance. All items were accepted,

showing that respondents agree e-learning enhances understanding, engagement, and academic achievement through flexible and accessible learning.

**Hypothesis**

**H<sub>01</sub>: There is no significant relationship between the use of e-learning tools and teaching effectiveness in higher education.**

**Table 4: Pearson Product Moment Correlation Analysis of E-learning Tools and Teaching Effectiveness**

Variables	N	Mean	Std. Dev	R	p-value	Decision
<b>E-learning Tools</b>	<b>200</b>	<b>3.03</b>	<b>0.52</b>	<b>0.62</b>	<b>0.000</b>	Reject H <sub>01</sub>
<b>Teaching Effectiveness</b>	<b>200</b>	<b>3.06</b>	<b>0.50</b>			

The result in Table 4 shows that the correlation coefficient ( $r = 0.62$ ) indicates a strong positive relationship between the use of e-learning tools and teaching effectiveness. The p-value (0.000) is less than 0.05, indicating that the relationship is

statistically significant. Therefore, the null hypothesis is rejected, implying that e-learning tools significantly influence teaching effectiveness in higher education institutions

**H<sub>02</sub>: Digital technologies have no significant impact on students' academic performance.**

**Table 2: Regression Analysis of Digital Technologies on Academic Performance**

Model	R	R <sup>2</sup>	Adjusted R <sup>2</sup>	F-value	p-value	Decision
Digital Technologies → Academic Performance	0.58	0.34	0.33	72.45	0.000	Reject H <sub>02</sub>

The regression analysis in Table 5 reveals that the correlation coefficient ( $R = 0.58$ ) indicates a moderate positive relationship between digital technologies and academic performance. The coefficient of determination ( $R^2 = 0.34$ ) shows that 34% of the variation in students' academic

performance is explained by the use of digital technologies. The F-value (72.45) is significant at  $p < 0.05$ . Therefore, the null hypothesis is rejected, indicating that digital technologies have a significant impact on students' academic performance.

**H<sub>03</sub>: There is no significant relationship between e-learning and students' learning outcomes in higher education.**

**Table 6: Pearson Product Moment Correlation Analysis of E-learning and Learning Outcomes**

Variables	N	Mean	Std. Dev	R	p-value	Decision
E-learning	200	3.07	0.48	0.65	0.000	Reject H <sub>03</sub>
Learning Outcomes	200	3.07	0.51			

The result in Table 6 shows a strong positive relationship between e-learning and students' learning outcomes ( $r = 0.65$ ). The p-value (0.000) is less than the 0.05 significance level, indicating that

the relationship is statistically significant. Therefore, the null hypothesis is rejected, meaning that e-learning has a significant relationship with students' learning outcomes in higher education.

## VI.DISCUSSION

### Research Question 1: To what extent are e-learning tools utilized in higher education institutions?

The first research question looked at how much higher education institutions use e-learning resources. The results showed that UNIPORT and IAUE Faculty of Education students had significant levels of consumption. This implies that teaching and learning procedures make extensive use of digital learning resources.

This result is in line with the findings of [11], which highlighted how e-learning has evolved into an essential part of higher education by facilitating adaptable and dynamic learning settings. According to [12], e-learning facilitates learner-centered education by enabling students to access course materials whenever it is convenient for them. Additionally, [13] noted that the incorporation of digital technologies has considerably changed conventional teaching methods into more technologically advanced systems. These studies support the present finding, indicating that e-learning tools are extensively utilized in higher education institutions to enhance access to learning resources and improve academic engagement.

### Research Question 2: How do digital technologies influence teaching effectiveness?

The second research topic examined the impact of digital technology on the efficacy of instruction. As demonstrated by the high mean score, the results demonstrated that digital technologies had a beneficial impact on teaching efficacy. This outcome is consistent with the findings of [14], which discovered that, when done correctly technological integration can improve teaching effectiveness. Using the TPACK paradigm they claimed that integrating pedagogical, technological, and content knowledge is necessary for effective education in the digital age. Teachers who successfully integrate these components are more likely to enhance student learning outcomes, according to their research.

Additionally, according to [15], technology-assisted training improves teaching through better content delivery, increased interaction, and instant feedback. These results corroborate the current study and demonstrate how digital technologies greatly increase the efficacy of instruction in higher education.

### Research Question 3: What is the impact of e-learning on students' learning outcomes and academic performance?

The third research question looked at how e-learning affected students' academic performance and learning outcomes. The results showed that students' academic performance is significantly improved by e-learning. [16], who came to the conclusion that technology

integration improves student achievement, support this conclusion. In comparison to traditional classroom instruction, [17] discovered that online and mixed learning settings enhance student engagement and academic success. According to [18], when instructional design and technology are used well, students in online learning environments typically outperform those in traditional settings. These studies support the current research's conclusions, showing that e-learning increases students' comprehension, promotes independent learning, and boosts academic achievement.

## VII.CONCLUSION

The effectiveness of teaching and learning among first-year faculty of education students at the University of Port Harcourt (UNIPORT) and Ignatius Ajuru University of Education (IAUE) was investigated in this study. The results showed that students in the chosen universities make extensive use of e-learning resources. The study also showed that by enhancing instructional delivery, boosting interaction, and facilitating a variety of teaching approaches, digital technologies greatly improve teaching efficacy.

Additionally, the study discovered that e-learning significantly and favorably affects students' academic performance and learning outcomes. This suggests that students who use e-learning platforms typically do better academically because they have better access to educational resources, are more flexible in their learning, and are more engaged. Overall, the study finds that digital technologies and e-learning are essential for enhancing higher education's teaching and learning procedures. Better academic results and the development of a more engaging, student-centered learning environment depend on their successful integration.

## VIII.RECOMMENDATIONS

1. Based on the conclusion, the following recommendations were made:
2. Universities should enhance the integration of e-learning tools into teaching and learning by encouraging consistent use of digital platforms in instruction.
3. Regular ICT training should be provided for both lecturers and students to improve their digital skills and effective use of e-learning tools.
4. Adequate ICT infrastructure, including reliable internet access and functional digital equipment, should be provided to support effective e-learning in higher education.

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