

## Digital Tools and Performance of Lecturers in Federal Universities, South East, Nigeria

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### Abstract

This study investigated the relationship between digital tools and lecturer performance in Federal Universities in South East Nigeria. The research examined how Learning Management Systems (LMS) and Virtual Classroom Software, impact various aspects of lecturer performance, including Quality Service Delivery and Lecturer Commitment. The work was anchored on diffusion of innovation theory by Everett Rogers 1962 which states that the adoption of innovation transpires gradually. The study employed a survey research design with a total population of 12,172 from academic staff of the selected Federal Universities. Taro Yamane was used to determine the sample size of 303 lecturers from five Federal universities in South East Nigeria, selected through a multistage sampling technique. Data were collected using a structured questionnaire and analyzed using descriptive statistics, Pearson Product-Moment Correlation Coefficient, and Simple Linear Regression. The findings revealed significant positive relationships between digital tools and lecturer performance metrics. Specifically, Learning Management Systems showed a strong positive correlation with Quality Service Delivery ( $r=0.682, p<0.001$ ), indicating that LMS implementation enhances the quality of educational service delivery. Virtual Classroom Software demonstrated a strong positive relationship with Lecturer Commitment ( $r=0.724, p<0.001$ ), suggesting that virtual teaching tools increase lecturer engagement and dedication. The study concludes that the adoption of digital tools has not only enhanced the efficiency of lecturers work but has also opened up new avenues for collaboration and innovation, enabling lecturers to streamline their administrative tasks, improve the delivery of course content and engage students in more interactive and immersive learning experiences. Based on the findings, the study recommends that university management need to invest in robust digital infrastructure, provide comprehensive training for lecturers, and implement effective support systems for digital tool adoption.

**Keywords:** Digital tools, Lecturers, Performance, Federal Universities, Nigeria

### Introduction

The integration of digital tools into the educational landscape has transformed the way lecturers in Federal universities in South-East Nigeria engage with their students and deliver quality education. As the world increasingly embraces technology, higher education institutions are compelled to adapt to these changes to enhance their teaching and learning processes. Among the various digital tools available, Learning Management Systems (LMS), virtual classroom

software, academic research software, and digital assessment tools stand out as pivotal in shaping the performance of lecturers (Serutla, Mwanza and Celik, 2024). These tools not only facilitate effective teaching and learning but also contribute significantly to quality service delivery, lecturers' commitment, academic visibility, and data transparency. Understanding the impact of these digital tools on lecturers' performance is crucial for improving educational outcomes in the region. In Nigeria, the adoption and integration of digital technologies in the higher education system have gradually gained momentum over the past two decades (Ogwu, Emelogo, Azor and Okwo, 2023). However, the pace of this transformation has been uneven, with the South East region of the country facing unique challenges and opportunities.

Performance in the academic context refers to the effectiveness and efficiency with which lecturers fulfill their roles as educators. This encompasses various dimensions, including instructional delivery, student engagement, research output, and overall contribution to the academic community. The performance of lecturers is influenced by numerous factors, such as institutional support, professional development opportunities, and personal motivation (Ibrahim, Uchechukwu, and Ndubuisi-Obi, 2023). In recent years, there has been a growing recognition of the role that digital tools play in enhancing lecturer performance. For instance, the use of online platforms can facilitate better communication with students, streamline administrative tasks, and provide access to a wealth of educational resources that can enrich teaching practices (Nwankwo, Ezeani, and Okoroafor, 2022). However, the extent to which lecturers in Federal universities in the South East region have embraced and utilized these digital tools varies, with some institutions and individuals being more proactive than others (Wawak, Teixeira Domingues and Sampaio, 2024). It is against this backdrops that this study undertakes to investigate the relationship between Digital tools and the performance of lecturers in South-East Nigeria.

### **Statement of the Problem**

The rapid evolution of digital tools has transformed various sectors including higher education by enhancing teaching methodologies, promoting knowledge, disseminating and fostering engagement among students and lecturers. Despite the robust educational system, there is a pressing need to address the challenges that impede the effective integration of technology within the classroom. In recent years, the integration of digital tools into higher education has become increasingly vital, particularly in the context of Federal Universities in South East Nigeria. Despite the potential benefits these tools offer, there remains a significant gap in understanding their impact on lecturer performance. It appears that Some lecturers struggle with the effective utilization of Learning Management Systems (LMS), which are designed to enhance quality service delivery. The lack of comprehensive institutional support, coupled with inadequate training programs, maybe responsible for lecturers' ability to fully harness the capabilities of these systems. This situation raises critical questions about the relationship between LMS usage and the quality of education provided in these institutions. Without a thorough examination of this relationship, it is challenging to ascertain how digital tools can be optimized to improve service delivery and enhance educational outcomes.

In addition to LMS, the growing reliance on virtual classroom software presents another layer of complexity in the educational landscape. While these platforms offer innovative ways to facilitate learning and interaction, the commitment of lecturers to engage with them effectively is often compromised by insufficient training and support. Some lecturers may find themselves unprepared to navigate the complexities of virtual teaching environments, which can lead to frustration and disengagement.

The intertwined issues of institutional support, inadequate training, and lack of experience exacerbate the challenges faced by lecturers in effectively employing digital tools. Many institutions may provide access to these technologies but fail to offer the necessary training and

resources to help lecturers develop the required skills. As a result, lecturers may feel overwhelmed and ill-equipped to utilize digital tools to their fullest potential. This situation not only limits their performance but also compromises the overall quality of education delivered to students. Addressing these multifaceted problems is essential for enhancing the performance of lecturers in Federal Universities in South East Nigeria.

### **Objectives of the Study**

The broad objective of the study is to determine the relationship between Digital tools and performance of Lecturers in Federal Universities, South East, Nigeria. While specifically, the study seeks to:

1. Examine the relationship between Learning Management System and Quality Service Delivery in Federal Universities, South East, Nigeria.
2. Ascertain the relationship between Virtual Classroom software and Lecturers Commitment in Federal Universities, South East, Nigeria.

### **Research Questions**

The following questions was used to achieve the research objectives:

1. What is the relationship between Learning Management System and Quality Service Delivery in Federal Universities, South East, Nigeria?
2. How does Virtual Classroom software relate with Lecturers Commitment in Federal Universities, South East, Nigeria?

### **Research Hypotheses**

The following null hypotheses will guide the study:

**HO<sub>1</sub>:** There is no significant relationship between Learning Management System and Quality Service Delivery in Federal Universities, South East, Nigeria.

**HO<sub>2</sub>:** There is no Significant relationship between Virtual Classroom software and Lecturers Commitment in Federal Universities, South East, Nigeria.

### **Scope of the Study**

The study on "Digital Tools and Performance of Lecturers" will specifically be delimited to five selected Federal universities in South East Nigeria which includes: Federal University of Technology, Owerri, Imo State, Micheal Okpara University of Agriculture, Umudike, Abia State, Nnamdi Azikiwe University, Awka, Anambra State, Alex Ekwueme Federal University Ndifi Alike Ikwo, Ebonyi State and University of Nigeria, Nsukka, Enugu State. The independent variable is "Digital Tools" and its proxies are: Learning Management System (LMS) and Virtual Classroom software, while the dependent variable is "Lecturers Performance" and its proxies are: Quality Service Delivery and Lecturers Commitment. The target population will be the Teaching staff of the selected five Federal Universities.

## **REVIEW OF RELATED LITERATURE**

### **Digital Tools**

Digital tools (DT) are defined as programs, websites, applications, and other internet-based and computerized resources that facilitate, enhance, and implement digital processes and overall digitization initiatives (Saro, 2023). Digital tools can be defined as a collection of online resources that enhance organizational effectiveness in traversing the dynamic digital landscape through the utilization of modern technology and its accompanying digital mechanisms (WalkMe, 2023). Digital tools denote software applications or online resources utilized for the creation, communication, and storage of information in a digital format. Examples encompass social media platforms (such as Facebook), productivity applications (such as Google Docs), and

digital design software (such as Adobe Photoshop), among others (Fiveable, 2024). E-learning exemplifies a digital instrument. In addition to e-learning, numerous other tools exist to provide students with an excellent learning experience. Moreover, digital tools are optimal for facilitating sustained behavioral change. Consider instructing a novel learning approach that students can utilize for sustained self-application over the long term. A difficult, yet achievable with digital tools! Conditional upon the e-learning satisfying specific criteria (Pluvo,2023). Instances of digital instruments that facilitate successful and enduring behavioral transformation.

### **Learning Management System**

A learning management system (LMS) or virtual learning environment (VLE) is a software application utilized for the administration, documenting, tracking, reporting, automation, and delivery of educational courses, training programs, resources, or learning and development initiatives (Ellis, 2024). Learning management systems have had significant rise in utilization owing to the focus on distant education during the COVID-19 pandemic (Raza, Qazi, Khan, and Salam, 2021). Contemporary Learning Management Systems (LMSs) incorporate sophisticated algorithms to generate automatic course suggestions according to a user's ability profile, while also extracting information from educational materials to enhance the precision of these recommendations (Aldahwan and Alsaeed, 2020). This system enhances quality service delivery by streamlining administrative tasks and enabling lecturers to focus more on teaching rather than logistical issues. Moreover, LMS platforms often include features such as discussion forums, assignment submissions, and grading systems that promote student engagement and foster a collaborative learning environment. By utilizing an LMS, lecturers can ensure that their teaching materials are accessible to all students, accommodating diverse learning needs and preferences. This accessibility not only enhances the learning experience but also empowers lecturers to provide timely feedback and support, ultimately leading to improved academic performance among students.

### **Virtual Classroom Software**

A virtual classroom is an online educational environment where instructors and students can present course materials, interact with one another, and collaborate in groups. A virtual classroom is characterized by its occurrence in a live, synchronous environment. Online coursework may include the examination of pre-recorded, asynchronous content, whereas virtual classroom environments facilitate real-time interaction between educators and learners (Owl Lab Staff, 2023). Virtual classrooms may differ in appearance based on the program or platform utilized, although they typically possess certain common characteristics. Virtual classroom software further complements the efforts of lecturers by creating interactive and engaging learning environments. These platforms enable real-time communication between instructors and students, allowing for dynamic discussions that mimic traditional classroom settings while overcoming geographical barriers. Features such as screen sharing, breakout rooms, and interactive whiteboards facilitate collaborative learning experiences that encourage active participation from students.

### **Performance**

Performance refers to the quality and amount of work contributed by employees to the organization's success. Orishede and Bello (2019) asserted that performance had to be evaluated based on employees' contributions to the firm within a specific timeframe. Performance is a documented measure of success derived from the execution of a specific job or activity over a defined timeframe. Employee performance is assessed through six categories: quality, quantity, punctuality, effectiveness, independence, and job commitment (Okafor, 2019, Uchenna et al, 2022).

Employee performance has consistently garnered significant attention over the past few decades and is often emphasized in society. According to Silitonga and Sadeli (2020), employee performance is often viewed as indicative of organizational performance and directly influences the organization's reputation. Organizational managers should address employees' emotional and physical needs and improve their personal and professional performance through several strategies, including training, job design, and performance evaluation (Abdulkhalil and Mohammadali, 2019).

### **Measurement of Lecturers Performance**

Measuring lecturers' performance is essential for enhancing the quality of education in universities, particularly in the context of using digital tools in teaching and learning. A multifaceted approach to measuring lecturers' performance that includes student feedback, teaching effectiveness, research output, and service contributions is essential for fostering a high-quality educational environment (Alakoum, Nica and Abiad, 2024). By leveraging digital tools to enhance these areas, universities can not only improve lecturer performance but also enrich the overall student experience, ultimately leading to better educational outcomes and institutional success.

### **Quality Service Delivery**

Service quality is the assessment of an organization's performance in delivering its services relative to customer expectations (Acho et al, 2021; Uchenna et al, 2021 & Noor, Alhidayatullah 2023). Prior to visiting a business, such as a retail store or restaurant, each consumer anticipates the kind of service they will receive. Customers acquire services to address particular demands; thus, organizations that fulfill or surpass these expectations provide a superior level of service. A typical consumer, whether consciously or unconsciously, possesses a predefined benchmark for the adequacy of a company's service delivery in meeting their needs. A corporation of superior quality provides services that meet or above client expectations (Edna et al, 2021 & Indeed, 2023).

Status.net (2023) asserts that quality service delivery is a crucial factor evaluated by managers and supervisors during performance reviews; it pertains to the volume of work an employee accomplishes within a specified timeframe. Assessment can be conducted by analyzing the quantity of tasks, projects, or assignments completed, together with the adherence to their associated dates. Assessing an employee's service delivery level offers critical information into their efficiency, productivity, and time management abilities.

### **Lecturers Commitment**

Becker, Billings, Eveleth, and Gilbert (2019) observed that efficient and committed employees are essential for attaining organizational strategic objectives, and employee performance and retention correlate with employee commitment. Job satisfaction pertains to an individual's level of contentment with their position, while organizational commitment relates to an individual's dedication, loyalty, and enthusiasm for the advancement of the business (Garg and Ramjee, 2020). Garg and Ramjee (2020) observed that individuals with a robust commitment to the organization experience cohesion and derive satisfaction from their membership. Farahani, Kashef, and Keshavarz (2021) asserted that academics have identified three characteristics of employee commitment: affective commitment, continuation commitment, and normative commitment. Affective commitment refers to the degree to which employees have emotional connection, affiliation, and engagement with their organization, hence fostering a desire and necessity to continue with it (Gelaidan and Ahmad, 2019).

In the contemporary competitive landscape, every firm has new challenges related to sustained productivity and fostering a dedicated workforce (Andavar, Ali, and Ali, 2020); no organization

can achieve peak performance unless all employees are aligned with its objectives. The commitment of lecturers constitutes a tie between the lecturer and the organization, wherein the lecturer, as an employee, want to persist in serving the organization and assisting it in attaining its objectives. Employees exhibiting strong organizational commitment enhance performance by decreasing turnover and absenteeism while elevating service quality. Moreover, highly dedicated employees recognize that organizational commitment not only enhances effectiveness in a particular function but also motivates individuals to undertake numerous volunteer actions essential for the organization's vitality (Schwepker and Dimitriou, 2021).

### **Empirical Gap**

Elbyaly and Elfeky, (2023) identified the effectiveness of advanced organizations within the virtual classroom to enhance the acceptance of technology during disasters. The sample of the study consisted of (200) students in the optimal investment diploma who are enrolled in the digital applications course in USA. After dividing them randomly into two, equal groups. The first group studied the course through virtual classrooms supported by advanced organizations. The second group studied the course through virtual classrooms without the use of advanced organizers. The technology acceptance model factors questionnaire tool was used to achieve the objective of the current study. The results revealed strong supporting evidence for the proposed extended technology acceptance model. The applicant organizations had a significant and direct positive impact on the perceived usefulness and perceived ease of use of the virtual classroom. The perceived ease of use also had a significant and direct positive effect on the perceived benefit of virtual classrooms as a result of the use of advanced organizers. The perceived benefit further reinforced both the behavioral intention and the tendency to use the virtual classroom for the students of the first group. The perceived ease of use reinforced both the usage orientation (directly) and the behavioral intention (indirectly) to use the virtual classroom for students of the same group as well.

Filatova, Galyamova, and Burkhanova, (2023) presented a classification of digital services with an indication of a brief characteristic of the direct purpose of the tool. The material of the article is based on the experience of teachers of Mathematics and Informatics Department of Naberezhnye Chelny State Pedagogical University (Russian Federation). The example of the Zoom service, designed for video conferencing, is used to examine the technology of organizing a training lesson for students on a specific topic of a geometry lesson. On the basis of the digital tool LearningApps and other similar services there are demonstrated methods of organizing didactic material within the framework of a training session. The practical part of the article gives some recommendations for working in virtual environments when developing interactive tasks.

Seufert, Oberdörfer, Roth, Gafe, Lugrin, and Latoschik, (2022) investigated whether pre-service teachers improve their classroom management (CM) competencies more effectively in a virtual reality (VR) setting compared to traditional methods. To address the lack of practical training opportunities, the study integrated a fully immersive VR application into selected CM courses and assessed self-reported and instructor-rated competencies. Participants included 55 pre-service teachers from the University of Würzburg, who were randomly assigned to either the VR group, using the virtual classroom "Breaking Bad Behaviors" ( $n = 39$ ), or a video-assisted control group ( $n = 16$ ). Results showed significant differences between the two groups, with the VR group demonstrating a notable improvement in CM competencies ( $p < 0.001$ , Cohen's  $d = 1.06$ ) from pre-test to post-test. Self-assessments also indicated that VR participants rated their competencies higher post-test ( $p = 0.02$ , Cohen's  $d = 0.39$ ), while the video group also showed improvement ( $p = 0.02$ , Cohen's  $d = 0.67$ ), highlighting discrepancies between self-assessment and external evaluation. Although both groups gained similar theoretical knowledge, the VR setting led to greater development of CM competencies. Participants found the VR training system valuable for evaluating and reflecting on their teaching actions, with its immersive nature

enhancing the realism of the training scenarios. These findings suggest that VR-based environments can significantly enhance pre-service teachers' CM competencies.

### **Theoretical Framework**

This study will utilize the Diffusion of Innovations Theory, which, despite its critiques, remains a key framework for understanding how new ideas and technologies spread. Developed by Everett Rogers, the theory categorizes the adoption process into stages: awareness, interest, evaluation, trial, and adoption. This structured approach is particularly relevant in educational contexts, where integrating digital tools can enhance teaching and learning. By recognizing these stages, institutions can create targeted strategies to support lecturers. For example, they can raise awareness through workshops and provide resources for evaluating specific tools. Opportunities for hands-on trials can help lecturers feel more confident in using new technologies. This structured approach not only facilitates smoother transitions but also empowers educators to embrace innovation, ultimately benefiting both lecturers and students.

The Diffusion of Innovations Theory also emphasizes the significance of perceived attributes of innovations, which influence lecturers' adoption of new digital tools. Tools that demonstrate clear advantages—such as enhancing student engagement or improving efficiency—are more likely to be adopted. Understanding these attributes allows institutions to promote tools that align with lecturers' needs. Furthermore, social networks play a crucial role in the adoption process, as early adopters can influence their peers, creating a ripple effect of acceptance. By fostering a collaborative environment where lecturers share experiences, educational institutions can cultivate a culture of continuous improvement. Insights from the theory can lead to better teaching practices and enhanced student learning outcomes, making it a vital framework for guiding educational innovation.

### **Gap in Literature**

#### **Variable Gap**

Most of the reviewed studies focused on individual digital tools or specific aspects of lecturer performance separately. For example, Ummadi (2024) focused solely on virtual classroom experience, while Elbyaly and Elfeky (2023) concentrated on technology acceptance. There is limited research comprehensively examining the relationship between multiple digital tools (LMS, Virtual Classroom software, Cloud Storage, Academic Research Software, and Digital Assessment tools) and their combined impact on various dimensions of lecturer performance (Quality Service Delivery, Lecturers Commitment, Work flexibility, Academic Visibility, and Data Transparency) within a single study.

#### **Methodological Gap**

Most previous studies have relied on either quantitative or qualitative methods. For example, Ferrara et al. (2022) conducted a systematic review, while Anakpo et al. (2023) focused on a literature review. However, few have utilized a mixed-method approach that combines survey research with correlation and regression analysis to explore the relationship between digital tools and lecturer performance. This study aims to fill that gap by employing both correlation coefficients and regression analysis, offering a more comprehensive understanding of the relationships between these variables.

#### **Theoretical Gap**

Previous studies have largely focused on technology acceptance theories or learning theories in isolation. For example, Raza et al. (2021) used UTAUT model, while others used TAM. There is a gap in applying a comprehensive theoretical framework that combines the Diffusion of Innovation Theory with practical aspects of digital tool implementation in higher education. This

study bridges this gap by using the Diffusion of Innovation Theory to understand both the adoption process and the impact of digital tools on lecturer performance in a more holistic manner

## METHODOLOGY

This study employed a survey research design to gather primary data through structured questionnaires, which are commonly used in social sciences to understand opinions, attitudes, and behaviors. Focusing on the Southeastern region of Nigeria, primarily inhabited by the Igbo people with a rich history and pivotal role in the country's independence, the research targeted academic staff from five major universities, totaling 12,172 individuals. A multistage sampling technique was utilized to select a sample of 387 respondents, ensuring representation from each state. Data collection involved a structured questionnaire featuring a five-point Likert scale to assess perspectives, with validity confirmed by expert review and reliability tested using Cronbach's alpha, indicating strong internal consistency for various constructs related to digital tools and service delivery. The data collection methods included both face-to-face and online distribution to enhance response rates. Analysis used descriptive statistics, Pearson Product-Moment Correlation Coefficient for hypothesis testing at a significance level of 5%, and simple linear regression to evaluate relationships between dependent and independent variables.

## DATA PRESENTATION AND ANALYSIS

### Analysis of Data Related to Research Question

#### Decision Rule:

The decision in the analysis section is determined by the average of the responses of respondents. Strongly Agreed (5 points), Agreed (4 points), Disagreed (3 points), Strongly Disagreed (2 points) and Undecided (1 point). The average of the responses:

$$\frac{(5 + 4 + 3 + 2 + 1)}{5} = 3.0$$

Therefore, a mean score below 3.0 would be considered rejected and a mean score of 3.0 and above would be considered accepted.

#### RQ1: What is the relationship between Learning Management System and Quality Service Delivery in Federal Universities, South East, Nigeria?

S/N	Items	N	Mean	Std Dev	Remark
<b>Learning Management System (LMS)</b>					
1	I do have network challenge when navigating the LMS for my courses	303	3.31	1.304	Accepted
2	LMS helps to support the organisation of my course materials	303	3.72	1.219	Accepted
3	I am not satisfied with the support and training provided for using the LMS	303	3.22	1.296	Accepted
4	LMS helps me in personalising learning experiences for my students	303	3.76	1.126	Accepted
<b>Quality Service Delivery</b>					
5	I ensure that my lectures meet the academic standards expected by my institution	303	3.99	1.039	Accepted
6	I take extra steps to provide timely and constructive feedback on assignments and exams	303	3.85	1.172	Accepted
7	I always make my lectures engaging and interactive for my students	303	4.03	1.079	Accepted
8	I ensure that the materials and resources I provide are accurate and up-to-date	303	3.99	1.089	Accepted
<b>Grand Mean</b>		<b>303</b>	<b>3.73</b>	<b>1.166</b>	<b>Accepted</b>

Source: Field survey, 2024

The table examines Learning Management System and Quality Service Delivery. Based on the decision rule (acceptance level >3.0), all items were accepted. For LMS, network challenges

(M=3.31, SD=1.304), organizational support (M=3.72, SD=1.219), training satisfaction (M=3.22, SD=1.296), and learning personalization (M=3.76, SD=1.126) were all significant. For Quality Service Delivery, academic standards (M=3.99, SD=1.039), feedback provision (M=3.85, SD=1.172), lecture engagement (M=4.03, SD=1.079), and resource accuracy (M=3.99, SD=1.089) all showed significant positive responses.

**RQ2: How does Virtual Classroom software relate with Lecturers Commitment in Federal Universities, South East, Nigeria?**

S/N	Items	N	Mean	Std Dev	Remark
<b>Virtual Classroom Software</b>					
1	I incorporate multimedia elements into my lessons using visual classroom software	303	3.90	1.151	Accepted
2	I integrate visual classroom software with other teaching tools and resources	303	3.83	1.150	Accepted
3	I do create visually appealing and informative presentations with the software	303	3.74	1.188	Accepted
4	Visual classroom software supports my efforts to provide clear and concise explanations	303	3.78	1.210	Accepted
<b>Lecturer Commitment</b>					
5	I take necessary steps to ensure that I am fully prepared for each of my lectures	303	3.99	1.076	Accepted
6	I balance my time between teaching, research, and other responsibilities to maintain my commitment	303	3.94	1.091	Accepted
7	I manage my workload to prevent burnout and maintain a high level of commitment	303	3.96	1.086	Accepted
8	I hardly prioritise my responsibilities to ensure that I meet all my commitments to students and the institution	303	3.99	1.065	Accepted
<b>Grand Mean</b>		<b>303</b>	<b>3.89</b>	<b>1.127</b>	<b>Accepted</b>

Source: Field survey, 2024

The table analyzes Virtual Classroom Software and Lecturers Commitment. All items exceeded the acceptance threshold. Virtual Classroom Software items showed significant positive responses: multimedia incorporation (M=3.90, SD=1.151), tool integration (M=3.83, SD=1.150), visual presentations (M=3.74, SD=1.188), and clear explanations (M=3.78, SD=1.210). Lecturer Commitment items also showed strong positive responses: lecture preparation (M=3.99, SD=1.076), time balance (M=3.94, SD=1.091), workload management (M=3.96, SD=1.086), and responsibility prioritization (M=3.99, SD=1.065).

### Hypothesis Testing

**Decision Rule:** For hypothesis 1 to 3, reject the null hypothesis if the p-value is less than or equal to 0.05 ( $p \leq 0.05$ ), indicating a statistically significant relationship between the variables, while the strength of this relationship is determined by the magnitude of the correlation coefficient ( $r$ ). However, for hypothesis 4 and 5, reject the null hypothesis if  $p \leq 0.05$ , indicating a statistically significant effect. The strength of the effect is determined by the  $R^2$  value.

### Hypothesis One:

**Ho:** There is no significant relationship between Learning Management System and Quality Service Delivery in Federal Universities, South East, Nigeria.

**H<sub>A</sub>:** There is a significant relationship between Learning Management System and Quality Service Delivery in Federal Universities, South East, Nigeria.

#### Correlation between Learning Management System and Quality Service Delivery

		LMS	QSD
LMS	Pearson correlation	1.000	.682**
	Sig. (2-tailed)		.000
	N	303	303
QSD	Pearson correlation	.682**	1.000
	Sig. (2-tailed)	.001	
	N	303	303

\*\* Correlation is significant at the 0.001 level (2-tailed).

Source: SPSS Version 27.0 Output, 2024

The table shows a significant positive correlation between Learning Management System and Quality Service Delivery ( $r=0.682$ ,  $p<0.001$ ,  $N=303$ ). Given  $p<0.05$ , we reject the null hypothesis, indicating a significant positive relationship between these variables.

#### Hypothesis Two:

**Ho:** There is no Significant relationship between Virtual Classroom software and Lecturers Commitment in Federal Universities, South East, Nigeria.

**Ha:** There is a Significant relationship between Virtual Classroom software and Lecturers Commitment in Federal Universities, South East, Nigeria.

#### Correlation between Virtual Classroom Software and Lecturers Commitment

		VCS	LC
VCS	Pearson correlation	1.000	.724**
	Sig. (2-tailed)		.000
	N	303	303
LC	Pearson correlation	.724**	1.000
	Sig. (2-tailed)	.000	
	N	303	303

\*\* Correlation is significant at the 0.01 level (2-tailed).

Source: SPSS Version 27.0 Output, 2024

The table reveals a strong positive correlation between Virtual Classroom Software and Lecturers Commitment ( $r=0.724$ ,  $p<0.001$ ,  $N=303$ ). With  $p<0.05$ , we reject the null hypothesis, confirming a significant relationship exists.

#### Discussion of Findings

The findings of this study revealed several significant insights about the relationship between digital tools and lecturer performance in Federal Universities in South East Nigeria. Results from hypothesis one indicated a significant positive relationship between Learning Management Systems (LMS) and Quality Service Delivery. This relationship arises because LMS equips lecturers with integrated tools for course organization, content delivery, and student engagement, thus enhancing educational service quality. The Diffusion of Innovations Theory supports this, suggesting that innovations like LMS are more likely to be adopted when they show clear advantages and compatibility with existing practices. This finding aligns with Putri and Sari (2020), who noted that LMS improved teaching quality in Indonesian universities, and Raza et al. (2021), who found similar results in Malaysian institutions. Additionally, Girdzijauskienė et al. (2022) showed that digital learning tools enhance teaching quality and student engagement, while Nosirova (2023) highlighted that LMS offers accessibility and flexibility, further improving educational service delivery.

Hypothesis two revealed a strong positive relationship between Virtual Classroom Software and Lecturers' Commitment. This relationship is attributed to how such software provides innovative

teaching tools that enhance lecturer engagement and responsibility. It aligns with the Diffusion of Innovations Theory, which highlights that the observability and trialability of innovations affect their adoption and impact. Supporting this finding, Seufert et al. (2022) found significant improvements in teaching competencies due to virtual classroom usage. Similarly, Manegre and Sabiri (2020) noted that virtual classrooms foster a positive teaching environment and boost teacher commitment. Elbaly and Elfeky (2023) also found that virtual classroom technologies notably improved teacher engagement and effectiveness.

### Summary of Findings

The findings of this study can be summarized as follows

1. There is a significant positive relationship between Learning Management System and Quality Service Delivery ( $r=0.682$ ,  $p<0.001$ ). This implies that investment in LMS infrastructure and training will likely lead to improved quality of educational service delivery in Federal Universities.
2. There is a strong positive relationship between Virtual Classroom Software and Lecturers Commitment ( $r=0.724$ ,  $p<0.001$ ). This implies that enhanced adoption of virtual classroom technologies can significantly boost lecturer engagement and commitment to teaching responsibilities.

### Conclusion

The integration of digital tools in teaching and research practices has indeed been a transformative experience for many lecturers in Federal universities within the South East region of Nigeria, as the adoption of these technologies has not only enhanced the efficiency of their work but has also opened up new avenues for collaboration and innovation, enabling lecturers to streamline their administrative tasks, improve the delivery of course content, engage students in more interactive and immersive learning experiences, and amplify the impact of their scholarly work through the use of collaborative platforms and academic research software, and the lecturer's confidence in the potential for digital tools to drive marked improvements in the performance.

### Recommendations

Based on the findings of this study, the following recommendations can be considered

1. The university management should invest in robust Learning Management Systems (LMS) infrastructure and provide regular training for lecturers to optimize its use. Ensure that LMS platforms are user-friendly and address network challenges to improve user experience.
2. The university management should promote the adoption of Virtual Classroom Software with adequate technical support and training to enhance lecturer engagement. Ensure the integration of multimedia features to make virtual teaching more interactive and effective.

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