Innovations

Digital Transformation and Academic Staff Performance of Universities in Southeast Nigeria

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Abstract: *This study focuses on digital transformation and academic staff performance of South-Eastern, Nigeria universities. Specifically, the study objectives were to assess the effect of technological adoption on teaching effectiveness; determine the effect of Information Technological (I.T) infrastructural investment on research output and, evaluate the effect of digital skills training on teaching innovations. The study population consist of the academicstaff of Southeast, Nigeria universities, given as eight thousand, five hundred and ninety-two (8,592). Trek's (2004) sampling size determination toolwas used to derive a sample size of three hundred and eighty-three (383). Questionnaire was the primary source of data for the study. Validation of the questionnaire was done by research experts and digital professionals. Regression analysis was used for analysing data at 5% error margin. Results indicate that: technological adoption had a significant effect on the teaching effectiveness. Again, the study revealed that information technology infrastructural investment significantly affected research output. More so, digital skills training had a significant effect on teaching innovations. In conclusion, digital transformation is a veritable tool that has the potential of enhancing teaching effectiveness, research output, and teaching innovation. Recommendation for the study was that management of universities should focus on incorporating advanced technological tools and platforms into their teaching methods to enhance teaching effectiveness and innovation.*

Key Words: *Digital Transformation, Academic Staff Performance, Teaching Effectiveness, Research Output, Teaching Innovation.*

1.1 Introduction

Digital transformation is all about the significant and fast-paced changes that digital technology brings to every part of our lives. It's not just about using new digital tools; it's about completely rethinking and redesigning how organisations

work, how they create value for their customers, and how they interact with everyone involved. The global pandemic in 2019 significantly accelerated digital transformation across organizations (Subramaniam et al., 2021). Regardless of their industry, size, history, or profit status, organizations, whether public or private, for-profit, or non-profit, are compelled to undergo digital transformation to stay relevant and survive (Mergel, Edelmann, & Haug, 2019). According to Vial (2019), digital transformation (DT) is a systematic process of using innovative technological tools to transform organizational processes. This process involves digitizing relationships (using digital technology to foster collaborative partnerships between organizations and stakeholders), digitalizing services (employing digital technology to digitize organizational services), and adopting new technologies (Zhang, Ding, & Xiao, 2023).

The significance of digital transformation is particularly evident as it offers a novelty avenue for businesses across several regions to gain compete effectively in dynamic markets (Robertson & Lapiņa, 2023). It enhances existing services, products, and processes while introducing new ones to meet rapidly changing market demands, thereby enhancing kaizen-based sustainability (Wu, Kozanoglu, Min, & Zhang, 2021). Mayakova (2019) argues that digital transformation drives innovation by necessitating ideas, skill and expertise that are new, promoting internal and external strategic partnerships in organizations, creating noveltymodels in business, while, ensuring that resources in the organization are sustained.

Academic staff performance refers to the effectiveness, efficiency, and impact of individuals employed in educational institutions, such as universities or schools, in fulfilling their roles related to teaching, research, and other academic responsibilities (Van Daele et al., 2017). Evaluation criteria for academic staff performance include teaching quality, research productivity, mentoring, and contributions to the institution's mission.

Globally, the performance of academic staff is crucial as it directly affects the quality of education, institutional reputation, and students' overall development. Effective academic staff members provide a more engaging and enriching learning experience. Their teaching methods, enthusiasm, and dedication positively influence student motivation and comprehension (Hattie, 2017). Trowler (2010) emphasized the essential role of academic staff in delivering quality education, noting that their expertise, subject knowledge, and teaching skills are critical for ensuring students are imparted with requisite expertise and ability for a sustainable future.

Digital transformation has become essential for educational institutions worldwide, extending beyond mere technological application (Al-shkili, Alamassi, & Elshareef, 2022). Adopting digital transformation in academic institutions can significantly enhance the performance of academic staff in various domains (Zawacki-Richter et al., 2019). By leveraging digital technologies, tertiary institutions can streamline administrative processes, improve teaching

and learning experiences, facilitate research endeavors, and support professional development initiatives.

However, the journey towards digital transformation in Nigerian institutions faces significant challenges. Many institutions in Nigeria struggle with inadequate ICT infrastructure, limited funding, a substantial digital skills gap among staff and students, and persistent cybersecurity concerns. Additionally, resistance to change exists among some institution leaders who are averse to technology. Moreover, regulatory complexities, particularly in standardization and accreditation, contribute to the difficulty of adopting digital technology in Nigerian institutions.

Despite the increasing recognition of digital transformation's importance, there is a notable gap in the literature regarding its impact on academic staff performance. While studies have explored various aspects of digital transformation in fields such as environment and green energy (Truong, 2022), medicine (Lattouf, 2022), and healthcare (Ghosh & Dohan, 2022), comprehensive examinations of its relationship with academic staff performance in Nigerian education are limited. Against this backdrop, the research investigates digital transformation'sinfluence on academic staff performance of Southeast, Nigeria universities.

1.2 Problem Statement

Digital transformation holds several significances particularly in Nigerian institutions. According to Kim, Choi, and Lew (2021), digital transformation holds the potential to narrow gaps, improve educational outcomes, and empower both academic staff and students. Consistent with this perspective, Ulas (2019) emphasized that digital transformation is significant in transforming contemporary institution and educationallandscape in Nigeria, promising to revolutionize teaching, learning, administrative processes, enhance efficiency, and broaden access to knowledge.

Nevertheless, the journey towards digital transformation in Nigerian institutions faces numerous formidable challenges. Many institutions in Nigeria still grapple with issues such as insufficient ICT infrastructure, limited funding, a substantial digital skills gap among both staff and students, and persistent concerns about cybersecurity. Additionally, resistance to change exists among some institution leaders who are averse to technology. Moreover, regulatory complexities, particularly in the realms of standardization and accreditation, contribute to the daunting challenge of adopting digital technology in Nigerian institutions.

Althoughdigital transformation has gained wide recognition, yet,there seem to be noticeable gaps in empirical studiespertaining its impact on performance of academic staff. While studies have delved into various aspects of digital transformation in diverse fields such as environment and green energy (Truong, 2022), green energy (Gao, Li, & Yu, 2022), medicine (Lattouf, 2022), and the healthcare sector (Ghosh & Dohan, 2022), there is a limited comprehensive

examination of its relationship with academic staff the performance within the educational landscape of Nigeria. Against this backdrop, the researcher investigates digital transformation's influence on academic staff performance of Southeastern, Nigeria universities.

1.3 The Study Objectives

This research investigates digital transformation and academic staff performance of Southeast Nigerian universities. Specifically, the objectives were to:

i. Assess the effect of technological adoption on teaching effectiveness.
ii. Determine the effect of Information Technological (I.T) infrastructural investment on research output.
iii. Evaluate the effect of digital skills training on teaching innovations.

1.4 Research questions

The following are the questions formulated for the study:

i. What is the effect of technological adoption on teaching effectiveness?
ii. What is the effect ofinformation technological (I.T) infrastructural investment on research output?
iii. What is the effect of digital skills training on teaching innovations?

2.1Literature Review

2.1. Concept of Digital Transformation

There are several definitions of digital transformation. According to Westerman, Bonnet, and McAfee (2017), digital transformation entails the adoption and implementation of innovative digital tools into every aspect of the organization, thereby changing the entire organizational processes and services. Ross, Beath, and Mocker (2018) describe it as a comprehensive reimagining and restructuring of business processes and models to fully exploit digital technologies, resulting in greater efficiency, innovation, and customer satisfaction.

The significance of digital transformation in organizations is immense. It enables companies to improve customer experiences, streamline operations, and stay competitive in a fast-evolving business landscape (McAfee & Brynjolfsson, 2017). It fosters innovation and agility, allowing businesses to quickly adapt to market changes (Gupta & George, 2017). According to Huang, Wang, and Zhao (2023), organizations can gain valuable insights from data analytics, enhancing decision-making and driving efficiency. It also creates new revenue streams through digital products and services (Matt, Hess, & Benlian, 2017).

The process of digital transformation is continuous. Organizations utilize digital tools in making fundamental changes in their operations, culture, and customer experiences. This transformation is driven by the need to stay competitive, responsive, and innovative in a rapidly evolving digital landscape. Organizations pursue digital transformation to enhance customer experiences, maintain competitiveness, increase operational efficiency, and respond to changing market

dynamics (Hess, Matt, Benlian, & Wiesböck, 2017). This often requires a cultural shift within the organization, promoting agility, innovation, and a customer-centric approach (Kotter & Cohen, 2017). However, implementing digital transformation comes with challenges, including resistance to change, data security concerns, and the need for continuous learning and adaptation (O'Reilly & Tushman, 2017).

2.1.2 Academic Staff Performance

Performance of academic staff portrays an essential element used to determineeducational quality and research within higher education institutions. It involves delivering high-quality teaching that engages students, encourages critical thinking, and effectively imparts knowledge (Kember, 2017). Academic staff performance covers various aspects of teaching, research, and service, requiring a balanced set of skills (Bhattacharya & Sharma, 2019). According to Cronin and Genovese (2017), academic staff are responsible for their actions and the impact of their work on students, colleagues, and the institution. Effective academic staff continuously engage in self-assessment and professional development to improve their performance (Hativa, 2020).

The importance of academic staff performance is immense. Effective performance leads to better student learning outcomes, promoting critical thinking, knowledge acquisition, and skill development (Darby & Lang, 2019). High-performing academic staff enhance the reputation and ranking of their institutions, attracting more students and research opportunities (Hazelkorn, 2017). Strong performance also results in increased research output, more publications, and innovative contributions to various fields of knowledge (Kyvik & Olsen, 2017). According to Kuh (2019), engaged academic staff positively affect student engagement, leading to higher student satisfaction and retention rates.

2.1.3 Technological Adoption and Teaching Effectiveness

According to Davis, Bagozzi, and Warshaw (2019), technology adoption involves integrating new technologies into organizational routines and processes. This includes the acceptance and use of innovations, making them part of regular practices (Moore, 2019).Technology adoption offers significant benefits, such as increased productivity, streamlined processes, and competitive advantages through cutting-edge solutions (Bhattacherjee, 2017). It also reduces costs via automation, enhances connectivity and collaboration, and provides valuable data for decision-making and growth. Additionally, it boosts customer satisfaction, extends global reach, and supports environmental and social goals (Rogers, 2017).Challenges include resistance to change, high costs, and insufficient technical support. Users may resist due to fear of change or job security concerns, while high costs and lack of support can impede adoption (Bhattacherjee, 2017; Venkatesh et al., 2017).

Teaching effectiveness, crucial for improving educational quality, involves creating engaging environments that develop students' skills (Prince & Felder,

2017; Kuh, 2017). Effective teaching enhances learning outcomes, participation, and adapts to students' needs, incorporating innovative practices (Greenwald & Gillmore, 2017).Technology can boost teaching effectiveness by offering interactive tools, personalized learning, and valuable data for assessment (Means et al., 2020; Picciano, 2021; Dede, 2020). It also improves accessibility and inclusivity (Bates, Poole, & Mackey, 2017).

2.1.4. IT Infrastructural Investment and Research Output/Productivity

In today's digital age, investing in Information Technology (IT) is vital for businesses and organizations worldwide. These investments drive growth, improve efficiency, and enhance competitiveness in a technology-focused environment. IT investment is a continuous process that enhances organizational capabilities, fosters innovation, and ensures security and compliance. Benefits include streamlined processes, automation, increased productivity, and reduced costs (Chen et al., 2020). Organizations gain a competitive edge by adapting quickly to market changes and outperforming rivals (Barua et al., 2017). IT investments also encourage innovation, enabling businesses to experiment with new solutions and meet evolving customer needs (Bharadwaj et al., 2019).

Research productivity involves efficiently conducting research, optimizing resources, and effectively sharing findings (Papanikolaou, 2017). It is key to advancing knowledge, understanding complex issues, and developing innovative solutions. High research productivity leads to recognition, career advancement, and collaboration opportunities (Abramo & D'Angelo, 2018). Institutions and countries with high research output are better positioned for global competitiveness in innovation and economic growth, offering practical solutions to societal challenges and accelerating scientific progress (Narvaez et al., 2017).

Studies highlight the strong link between research productivity and IT infrastructure investment. Khan (2018) notes that robust IT infrastructure is crucial for data management, security, and accessibility in research. It provides access to online resources, improving research quality (Igbeka & Nwodo, 2021), and supports global collaboration through virtual meetings and shared platforms, boosting research output (Ekpoh & Ugboma, 2020). Additionally, IT infrastructure facilitates research analytics, helping institutions monitor and evaluate research for informed decision-making (Ishola & Olatokun, 2021).

2.1.5 Digital Skills Training and Teaching Innovation

Digital skill training involves gaining the knowledge and proficiency needed to effectively use digital technologies like computers, software, and the internet (Eshet-Alkalai, 2017). It includes developing the ability to operate digital devices, software, and hardware, enabling individuals to perform tasks and solve digital-related problems (Bell & Bell, 2017).Digital skill training is crucial as it enhances employability by increasing job market competitiveness, with many roles

requiring digital literacy (Borghans, Ter Weel, & Weinberg, 2017). It also drives economic growth by fostering innovation and productivity across industries (World Bank, 2018). Moreover, it helps bridge the digital divide, ensuring access and inclusivity in using digital tools (Hargittai& Shaw, 2017).

Teaching innovation involves adopting new strategies, methods, and tools to engage students and improve learning outcomes. It includes exploring and implementing pedagogical approaches that enhance student engagement and critical thinking (Kember, 2017).Innovation in teaching is essential in higher education, promoting active learning, critical thinking, and problem-solving (Prince, 2017; Bonwell & Eison, 2019). It allows for personalized learning that caters to diverse needs and often integrates technology to prepare students for a knowledge-based economy (Johnson & Liber, 2018; Bates & Sangrà, 2017).

The connection between teaching innovation and digital skill training is strong, as innovative teaching often involves using digital tools in the classroom, helping students develop essential digital literacy for the modern workplace (Ertmer, 2017; Puentedura, 2017).

2.2 Theoretical Review

2.2.1 The Innovation Adoption Theory (IAT)

Everett Rogers in 1962 propounded the innovation adoption theory. This theory outlines the stages that individuals or organizations go through when deciding to adopt a new policy, accept an idea, or purchase a product or service. Rogers categorizes these stages based on the time it takes for individuals to move from initial awareness to adoption or purchase.

According to York (2009), the Innovation Adoption Theory posits several stages that individuals or customers progress through, starting from unawareness, moving through awareness and interest, then trial, and finally to adoption or purchase. Here, individuals are segmented into various categories including quick adopters, quick majority, late majority, and laggards due to the time it takes them to make decisions (York, 2009).

Therefore, effective communication campaigns are crucial in creating the necessary awareness, stimulating interest, and encouraging trial that leads to early adoption of ideas or policies, or early purchase of products or services. These campaigns must effectively generate awareness and interest to the extent that after evaluation and trial, the target audience promptly decides to adopt or purchase the promoted product, policy, or idea (York, 2009).

2.3 Empirical Review

Al-Harbi (2022) conducted research titled "Examining the Role of Blended Learning in Enhancing Teaching and Learning Effectiveness in Higher Education: An Empirical Study." The study investigated how teaching and learning effectiveness are impacted by organized learning in tertiary institutions. Using a mixed-methods approach, data was gathered from 200 students and 20 teachers at

a university in Saudi Arabia. The findings indicate that blended learning positively influences teaching and learning outcomes. Students are more satisfied, motivated, and engaged when they participate in organized and blended learning courses in relation to conventional classroom courses. Teachers also reported that blended learning enhanced their teaching effectiveness and ability to meet student needs.

Nweze and Okoro (2019) conducted research on "The Impact of Digital Training on Teaching Innovations and Research Productivity in Universities in Southeast Nigeria." This study aimed to explore how digital training affects productivity and teaching innovations in universities in Southeast Nigeria. Employing a mixed-methods design, the study surveyed 250 lecturers from eight universities in the region. The findings revealed that digital training positively influences teaching innovations and research productivity among lecturers. Those with digital training skills are more likely to adopt innovative teaching methods and utilize technology in their classrooms, leading to higher-quality research outputs. The study recommended that universities invest in digital training to enhance lecturers' skills, which could improve student learning outcomes and research productivity.

Okeke and Emenike (2023) conducted a study titled "The Impact of Digital Training Skills on Teaching Innovations in Universities in Southeast Nigeria." This research examined how digital training skills influence teaching innovations in universities in Southeast Nigeria. Using a mixed-methods approach, data was collected from 200 lecturers and 400 students across six universities in the region. The study found that digital training skills positively affect teaching innovations, with lecturers who possess these skills more likely to employ innovative teaching methods and technologies. Students also expressed higher satisfaction with lecturers who had undergone digital training. The study recommended that universities provide digital training for lecturers to enhance their skills, encouraging the adoption of innovative teaching practices and technologies in classrooms.

3.1 Study Methodology

Quantitative research approach employing a survey-based descriptive methodology was adopted in this study. Data collection involved a structured questionnaire, while the second focused on variables central to the study. The study coveredSoutheast Nigeria universities including Michael Okpara University of Agriculture, Umudike, Abia State; Nnamdi Azikiwe University, Awka, Anambra State; Alex Ekwueme Federal University, Ndufu-Alike, Ikwo, Ebonyi State; University of Nigeria, Nsukka, Enugu State; and Federal University of Technology, Owerri, Imo State. These universities were chosen for their size and educational prominence in the region.

The study population consisted of 8,592 staff members from these universities. Sample size determination utilized Stat Trek's sampling technique resulting in 383 responses collected from university staff.

Content validity of the questionnaire was assessed by two research experts from the University of Nigeria, Enugu Campus (UNEC). In testing the instrument's reliability, Cronbach Alpha test was used. Data analysis employed regression analysis at a 5% significance level.

4.1 Data Presentation and Analysis

The first analysis focused on the demographic variables of the respondents. As illustrated in the Table 4.1.1., majority of the respondents were male (57%), followed by female (43%). In the age category, most participants were between the ages of 31-40years (33%), followed by those aged 18-30 years old (29%), others aged 41-50 years old (27%) and finally those above 50 years (11%). In the marital status category, 70% were married, these formed majority of the participants, then (25%) were single, and finally separated (5%). Finally, the educational qualification shows that majority of the respondents had MBA/M.Sc (50%), those with PhD holders (30%), while those with B.Sc were (20%).

Table 4.1.1: Demographic Variables

Respondent's Information	Options	Freq	Percent
Gender	**Male**	**218**	**57.0%**
	Female	**165**	**43.0%**
	Total	**383**	**100%**
Age	**18-30**	**110**	**29.0%**
	31-40	**125**	**33.0%**
	41-50	**104**	**27.0%**
	51 and Above	**44**	**11.0%**
	Total	**383**	**100%**
Educational Qualifications	**BSC**	**75**	**20.0%**
	MBA/M.Sc.	**192**	**50.0%**
	Ph.D	**116**	**30.0%**
	Total	**383**	**100%**
Marital Status	**Single**	**97**	**25.0%**
	Married	**267**	**70.0%**
	Separated	**19**	**5.0%**
	Total	**383**	**100%**

Source: Researcher Field Survey, 2024

4.1 Test of Hypothesis

Ha_1: Technological adoption significantly affects teaching effectiveness in South-eastern, Nigeria universities.

Table 1a: Summary

	R	R^2	Adjusted R Square	Std. Error Est
1	.939[a]	.881	.842	30.46883
Predictor: technological adoption				

Table 1b: Analysis of Variance

		Square Sums	Df	Mean	F	Sig.
		20670.1	1	20670.1	22.265	0.002
		2785.0	382	928.3		
		23455.2	383			
Predictors: technological adoption						
Dependent Variable (DV): teaching effectiveness						

Table 1c: Coefficients

		Unstandardized Coefficients		Standardized Coefficients		
		B	Std. Error	Beta	t	Sig.
		116.031	47.849		2.425	.074
		1.964	.416	.939	4.719	.008
DV: teaching effectiveness						

Interpretation of Result

Having analysed the data from the questionnaire using regression analysis to determine the effect of technological adoption on teaching effectiveness in universities in South-east, Nigeria, the Tables 1 a, b & c revealed that the regression result shows the existence of significant result on the variables (R** calc = .0939 > at p< 0.05). From the table, 0.02 was the significant level, hence, we reject the null hypothesis and accept the alternate one which state that Technological adoption significant affect teaching effectiveness in universities in South-east, Nigeria.

Ha_2: Information technology infrastructural investment significantly affect research output in universities in South-east, Nigeria.

Table 2a: Summary

	R	R Square	Adjusted R Square	Std. Error Est
1	0.539[a]	0.516	0.519	57.91
Predictors: IT infrastructural investment				

Table b: Analysis of Variance

Model		Square Sums	Df	Mean	F	Sig.
1		16221.1	1	19110.0	6.103	.003[a]
		7711.2	382	3131.0		
		23932.3	383			
Predictors: IT infrastructural investment						
D V: research output						

Table 2c: Coefficients

		Unstandardized Coefficients		Standardized Coefficients		
		B	Std. Error	Beta	t	Sig.
1		14.112	42.533		1.117	.011
		.667	.312	.819	3.710	.016
DV: research output						

Interpretation of Result

Regression analysis was used in the analysis to ascertain how Information Technological (I.T) infrastructural investment affect research output, tables 2 a, b & c showed a significant result on the variables (R^2 = .516, F = 6.103 > at p< 0.05). The table showed a significant level of 0.03, hence, we reject the null hypothesis and accept the alternate one which states IT infrastructural investment significantly affect research output in universities in South-east, Nigeria.

Ha_3: Digital skills training significantlyaffect teaching innovations in Southeast Nigeria universities.

Table 3a: Summary

	R	R Square	Adjusted R Square	Std. Error Est
1	.447[a]	.391	.399	30.46883
Predictors: digital skills training				

Table 3b: Analysis of Variance

		Square Sums	Df	Mean	F	Sig.
1		20670.1	1	20670.1	12.123	.002[a]
		2785.0	382	528.3		
		23455.2	383			
a. Predictors: digital skills training						
b. DV: teaching innovations						

Table 3c: Coefficients

		Unstandardized Coefficients		Standardized Coefficients		
		B	Std. Error	Beta	t	Sig.
1		116.031	47.849		2.425	.001
		1.964	.416	.939	4.719	.003
DV: teaching innovations						

Interpretation of Result

Regression analysis was used in the analysis to determine the effect of digital skills training on teaching innovations in universities in South-east, Nigeria, the Tables.3 a, b & c showed the existence of significant result on the variables (R^2 calc = .391, F = 12.123 > at p< 0.05). From the table, 0.02 significant level was found, hence, we reject the null hypothesis and accept the alternate one which states digital skills training significant affects teaching innovations in Southeast Nigeria universities.

4.2 Discussion of the Findings

Regression analysis was used in testing hypothesis one, which aimed to assess the effect of technological adoption on teaching effectiveness.Findings showed that technological adoption has significant affect teaching effectiveness in Southeast Nigeria universities(R** calc = .0939 > at p< 0.05). This result is in line with that of Al-Harbi (2022), who studied "Exploring the Role of Blended Learning for

Teaching and Learning Effectiveness in Institutions of Higher Learning: An Empirical Investigation." The findings indicate that blended learning positively influences teaching and learning outcomes. Students are more satisfied, motivated, and engaged when they participate in organized and blended learning courses in relation to conventional classroom courses. Teachers also reported that blended learning enhanced their teaching effectiveness and ability to meet student needs.

Regression analysis was used to test hypothesis two todetermine the effect of Information Technological (I.T) infrastructural investment on research output. The study indicates that Information technology infrastructural investment significantly affect research output in Southeast Nigeria universities(R^2 calc = .516, F = 6.103 > at p< 0.05).This result is in line with that of Nweze and Okoro (2019), who investigated digital training's the impact on productivity and teaching innovations and research in universities. The findings revealed that digital training positively influences teaching innovations and research productivity among lecturers. Those with digital training skills are more likely to adopt innovative teaching methods and utilize technology in their classrooms, leading to higher-quality research outputs. The study recommended that universities invest in digital training to enhance lecturers' skills, which could improve student learning outcomes and research productivity.

Hypothesis three was tested using regression analysis to evaluate the effect of digital skills training on teaching innovations. Findings indicate that digital skills training significantlyaffect teaching innovations in Southeast Nigeria universities (R^2 calc = .391, F = 12.123 > at p< 0.05). This finding corroborates with the result of Okeke and Emenike (2023), who studied "The Impact of Digital Training Skills on Teaching Innovations in Universities in Southeast Nigeria." Their results showed that digital training skills have a positive impact on teaching innovations in universities in Southeast Nigeria. Lecturers who have digital training skills are more likely to use innovative teaching methods and technologies in their classrooms.

5.1 Conclusion and Recommendations

In conclusion. digital transformation is significant for enhancing academic staff performance in universities in South-east Nigeria. Specifically, it shows that incorporating new technologies significantly enhances teaching effectiveness. By using advanced technological tools and platforms, academic staff can present content more effectively, engage students more thoroughly, and foster a more interactive and dynamic classroom experience.

Furthermore, investing in information technology infrastructure greatly influences research outputs. Universities that dedicate resources to developing and maintaining strong IT infrastructures including digital library access, quick internet facilities, and modern computer labs, are suitable for academic research purposes. This infrastructure supports all stages of research, from data collection

and analysis to dissemination, leading to more prolific and higher-quality research publications. Improved IT infrastructure also encourages collaborative and interdisciplinary research, advancing knowledge and innovation.
Additionally, providing digital skills training encourages innovative teaching practices. When academic staff receive thorough training in digital tools and technologies, they are better prepared to develop and implement new teaching strategies. This includes the use of multimedia resources, virtual simulations, and virtual evaluations, to improve learning outcomes and keep the curriculum relevant in a rapidly changing technological environment.

Based on the findings, the study recommended that:

1. University managements should focus on incorporating advanced technological tools and platforms into their teaching methods. This includes the use of digital classrooms, e-learning systems, and other educational technologies to enhance teaching effectiveness.
2. Management and educational stakeholder should provide adequate resources for developing and maintaining robust IT infrastructures. This entails upgrading hardware, improving internet connectivity, and ensuring access to essential software and databases to enhance research capabilities.
3. Management of universities should carryout regular and comprehensive training programs for academic staff to improve their digital competencies. This will enable them to effectively use technology in teaching and innovate their instructional approaches.

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