

Audio-Visual and E-Application Digital Skills Acquisition and Instructional Delivery of Office and Information Management Education Lecturers in South-South Nigeria

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Abstract

The growing digitalization of higher education has expanded the technological competencies expected of lecturers, making proficiency in audio-visual technologies and internet-based e-applications fundamental to effective instructional delivery. This study examined the relationship between audio-visual and e-application digital skills acquisition and instructional delivery among Office and Information Management (OIM) lecturers in tertiary institutions across South-South Nigeria. A correlational research design was adopted, and all 123 OIM lecturers in the region were studied using a census approach. Data were collected using validated questionnaires and analysed with descriptive statistics and the Pearson Product Moment Correlation at the .05 level of significance. The findings revealed that lecturers demonstrated greater competence in conventional audio-visual technologies than in advanced instructional tools and internet-based e-applications, with proficiency largely concentrated in widely used platforms such as WhatsApp, e-mail, and Facebook. Audio-visual digital skills were positively and significantly related to instructional delivery ($r = .824, p < .05$), while e-application digital skills exhibited an even stronger positive relationship ($r = .900, p < .05$). The study concludes that competence in both domains is strongly associated with instructional delivery, although substantial disparities remain in lecturers' mastery of specific technologies. It recommends targeted professional development and improved access to emerging digital instructional technologies to strengthen technology-enabled teaching in tertiary institutions.

Keywords: audio-visual skills, e-application skills, digital skills acquisition, instructional delivery, Office and Information Management, tertiary education

Introduction

The rapid digitalization of higher education has transformed instructional delivery from a predominantly classroom-based activity into one that increasingly relies on multiple technologies for content presentation, communication, collaboration, and learner engagement. Within this evolving environment, lecturers are expected to possess a broad range of digital competencies that enable them not only to access and disseminate knowledge but also to create interactive and flexible learning experiences. While digital competence is often discussed as a unified construct, it comprises distinct technological domains that differ in their functions, levels of complexity, and

pedagogical purposes. Among the most fundamental are competence in audio-visual technologies and internet-based e-applications, both of which have become integral to contemporary teaching. Audio-visual technologies support instructional delivery primarily through the presentation and illustration of knowledge. Tools such as projectors, digital images, videos, slides, and other multimedia resources enrich classroom instruction by making abstract concepts more concrete, sustaining students' attention, and facilitating deeper understanding through visual and auditory representation (Ibekwe, 2017; Hoyos & Velásquez, 2020). Their educational value lies not merely in their availability but in lecturers' ability to integrate them appropriately into pedagogical practice. Consequently, effective use of audio-visual technologies depends on more than technical operation; it requires the competence to select, organise, and deploy digital media in ways that enhance learning outcomes. Internet-based e-applications perform a different instructional function. Rather than supporting classroom presentation, they extend teaching beyond the physical learning environment by facilitating communication, collaboration, information sharing, feedback, and learner support. Applications such as e-mail, WhatsApp, video-conferencing platforms, and other online communication tools enable lecturers to sustain academic interaction before, during, and after formal classroom sessions, thereby increasing the flexibility and continuity of teaching and learning (Franklin & Nahari, 2018; Balakamakshi & Savithri, 2021). As higher education increasingly incorporates blended and technology-mediated learning, competence in these applications has become essential for maintaining effective lecturer-student engagement.

Although both competencies contribute to technology-enabled teaching, they represent different dimensions of digital practice. Audio-visual technologies primarily facilitate the presentation of instructional content, whereas e-applications support communication and interaction. Their acquisition therefore depends on different forms of technological experience, institutional support, and opportunities for professional development. It cannot therefore be assumed that lecturers who demonstrate competence in one domain possess comparable competence in the other, nor that each contributes equally to instructional delivery. Treating digital competence as a single, undifferentiated construct risks obscuring these important distinctions.

Existing studies have consistently recognised the importance of digital technologies for teaching in Business Education and Office and Information Management programmes. However, most have examined digital competence in broad terms or focused on patterns of technology use without distinguishing between specific competency domains. As a result, there is limited empirical evidence on how competence in audio-visual technologies and internet-based e-applications independently relates to instructional delivery, particularly among Office and Information Management lecturers in South-South Nigeria. Addressing this gap is important because these competencies underpin different aspects of technology-enhanced teaching and may therefore require different institutional interventions and professional development strategies.

Against this background, this study examined the relationship between audio-visual and e-application digital skills acquisition and the instructional delivery of Office and Information Management lecturers in tertiary institutions in South-South Nigeria. The study pursued two specific objectives to:

- i. determine the relationship between audio-visual skill acquisition and instructional delivery of OIM lecturers in South-South Nigeria
- ii. determine the relationship between e-application skill acquisition and instructional delivery of OIM lecturers in South-South Nigeria.

More so, two research questions guided the study:

- i. What is the relationship between audio-visual skill acquisition and instructional delivery

of OIM lecturers in South-South Nigeria?

ii. What is the relationship between e-application skill acquisition and instructional delivery of OIM lecturers in South-South Nigeria?

Similarly, two null hypotheses, tested at the .05 level of significance, guided the study:

H₀₁: There is no significant relationship between audio-visual skill acquisition and instructional delivery of OIM lecturers in South-South Nigeria.

H₀₂: There is no significant relationship between e-application skill acquisition and instructional delivery of OIM lecturers in South-South Nigeria.

Literature Review

Conceptual Review

Audio-Visual Operating Skills

Audio-visual (AV) technology combines audio and visual channels to address the senses of hearing and sight simultaneously in the service of teaching and learning; AV aids are, broadly, any materials that make instruction more concrete by engaging these two senses together (Ibekwe, 2017). The category is conventionally divided into audio aids (radio, tape recorders, language laboratories), visual aids (charts, maps, models, flashcards, printed materials), and true audio-visual aids that combine both channels (LCD projectors, television, computers, and multimedia systems) (Hoyos & Velásquez, 2020). The instructional case for AV materials rests on several claims: they challenge and hold student attention, stimulate imagination and mental imagery, facilitate understanding by supplementing verbal explanation with concrete illustration, and provide an incentive for active engagement (Ibekwe, 2017). Effective use, however, is conditioned on the lecturer's judgement in selecting AV materials that are relevant to the construct being taught, accurate in form, capable of sustaining interest, and pitched at a level of understandability that connects new material to what students already know (Hoyos & Velásquez, 2020).

E-Application Skills

E-applications, as measured in this study, comprise the internet-based communication and messaging platforms lecturers use to exchange academic information and interact with students outside formally scheduled contact time -- WhatsApp, e-mail, Skype, Instagram, Google Talk, video and tele-conferencing tools, telecommuting platforms, newsgroups, and computer-aided telephony. These sit adjacent to, but are distinct from, the broader e-learning literature's treatment of learning-management-system-mediated instruction (Aboderin, 2015; Elena, Svetlana, Natalia, & Yana, 2021); the present construct is narrower, concerned specifically with lecturers' competence in the everyday internet applications through which academic communication now routinely happens. Such applications allow lecturers to exchange academic information, resolve students' doubts, and conduct elements of instruction outside the physical classroom at comparatively low cost and with considerable flexibility of time and location (Franklin & Nahari, 2018; Balakamakshi & Savithri, 2021). Because most of these applications require reliable internet connectivity and a degree of comfort navigating frequently updated interfaces, e-application competence is widely treated in the digital-skills literature as more infrastructure- and exposure-dependent than the operation of standalone AV equipment (Younas, Noor, Zhou, Menhas, & Xu, 2022; Jawad & Shalash, 2020).

Instructional Delivery in Office and Information Management

As in cognate accounts of instructional delivery, effective practice in OIM classrooms depends on a lecturer's capacity to organise content logically, sustain engagement through varied presentation, and provide timely feedback, whether the medium is a projected slide, a recorded video, or a WhatsApp message answering a student query outside class hours (Moore, 2018; Simonson & Schlosser, 2019). Audio-visual and e-application tools extend a lecturer's delivery repertoire in complementary ways: AV materials chiefly enrich what happens inside the scheduled class session, while e-applications chiefly extend instructional contact beyond it. Both, however, depend on the same underlying condition identified throughout this literature -- that instructional benefit accrues only where the lecturer has actually acquired the operating competence the tool requires, not merely where the tool is nominally available (Koko & Ajinwo, 2022).

Theoretical Framework

This study is anchored on three complementary theories of technology adoption and use: The Technology Acceptance Model, the Technology-Organization-Environment framework, and Vygotsky's activity theory. The Technology Acceptance Model (TAM), propounded by Davis (1989), holds that an individual's intention to use a system is jointly determined by perceived usefulness -- the degree to which a person believes a technology will enhance performance -- and perceived ease of use -- the degree to which the technology is believed to be free of effort -- with usage intention mediating actual adoption behaviour. TAM was developed from the earlier Theory of Reasoned Action and remains among the most widely applied frameworks for explaining why lecturers, despite the acknowledged pedagogical value of digital tools, sometimes resist adopting them for classroom use. It supplies the present study's central lens for interpreting why digital-skill acquisition does not automatically translate into instructional use.

The Technology-Organization-Environment (TOE) framework, proposed by Tornatzky and Fleischer (1990), complements TAM by locating technology adoption within three contextual layers: the technological context (the characteristics of the tools themselves), the organizational context (institutional resources, structure, and readiness), and the environmental context (the wider policy and infrastructural climate in which the institution operates). Applied here, TOE draws attention to the fact that a lecturer's digital-skill acquisition and its translation into instructional delivery are shaped not only by individual competence but also by institutional facilities and the broader South-South Nigerian infrastructural environment. Vygotsky's (1978) activity theory contributes a socio-cultural dimension, viewing the human mind as constituted through a subject's interaction with the world rather than as an isolated cognitive processor. Tools -- including digital technologies -- mediate this interaction: rather than applying a natural function directly to a task, the learner interposes a technical or psychological tool between the function and the task. This perspective supports treating lecturers' digital skills as mediating tools that reorganize, rather than merely supplement, the activity of instructional delivery, and it grounds the study's expectation that stronger digital-skill acquisition should be systematically associated with more effective instructional delivery practice.

Empirical Review

Amesi, Amaewhule, and Akoku (2022) examined the digital skills required by Business Education lecturers for teaching accounting courses in tertiary institutions in Rivers State. The study found that lecturers required competencies in audio-visual technologies, software applications, and hardware operation to deliver accounting courses effectively. Based on these findings, the authors

recommended continuous professional development for lecturers and the provision of modern digital laboratories to enhance technology-supported instruction. Similarly, Koko and Ajinwo (2022) investigated the use of innovative technologies for instructional delivery in Office Management and Technology programmes in universities in Rivers State. Their findings showed that lecturers and students made substantial use of digital platforms such as Zoom and Google Classroom for teaching and learning, although the adoption of other technologies varied across applications. Both studies reinforce the growing importance of digital competence in Office and Information Management and related Business Education programmes. At the same time, they leave an important question unanswered. Their primary concern was identifying the technologies required for teaching or describing patterns of technology use rather than determining whether competence in specific digital domains translates into more effective instructional delivery. In particular, neither study isolated audio-visual and e-application skills as separate dimensions of digital competence and examined their relationship with instructional delivery. This omission limits understanding of the contribution of these competencies to teaching effectiveness. The present study addresses this gap by examining the relationship between audio-visual and e-application digital skills acquisition and instructional delivery among Office and Information Management lecturers across tertiary institutions in the six states of South-South Nigeria.

Methods

This study adopted a correlational research design, considered appropriate because the objective was to determine the relationship between two digital-skill domains -- audio-visual skills and e-application skills -- and the instructional delivery practice of lecturers, rather than to manipulate either variable (Oguzo, 2024). The study was conducted in South-South Nigeria, a six-state geopolitical zone comprising Akwa Ibom, Bayelsa, Cross River, Delta, Edo, and Rivers States. The population comprised all 123 lecturers teaching Office and Information Management (formerly Office Technology and Management) in the universities, polytechnics, and one federal college of education across the zone that offer the discipline as a course of study -- 42 lecturers from six universities, 69 from five polytechnics, and 12 from one federal college of education. Because this population was of a manageable size, the entire 123 lecturers were studied by census; no sampling technique was applied. Two researcher-developed instruments were used for data collection: the Digital Skills Acquisition and Instructional Delivery of Office and Information Management Lecturers Questionnaire (DSAOIMQ) and the Lecturers' Instructional Delivery Questionnaire (LIDQ). Both instruments were rated on a four-point scale of Strongly Agree, Agree, Disagree, and Strongly Disagree. The instruments were subjected to face and content validation by three validators -- two lecturers in Office and Information Management and one lecturer in Measurement and Evaluation -- who reviewed items for clarity and relevance and recommended modifications that were incorporated into the final instruments. Internal-consistency reliability was established using Cronbach's Alpha, yielding coefficients of 0.89 for the DSAOIMQ and 0.91 for the LIDQ, both considered adequate for the study. The instruments were administered by the researcher, assisted by two trained research assistants; all 123 copies distributed were retrieved, a 100 percent response rate. Data addressing the two research questions per variable pair were analyzed using means and standard deviations, with a cut-off mean of 2.50 distinguishing agreement (skill possessed / practice engaged in) from disagreement. The two null hypotheses were tested using the Pearson Product Moment Correlation coefficient (r) at the .05 level of significance, with the Statistical Package for the Social Sciences (SPSS). A null hypothesis was rejected where the calculated r exceeded the critical value at the stated degrees of freedom,

indicating a statistically significant relationship between the digital-skill domain and instructional delivery; it was retained where the calculated r fell below the critical value (Oguzo, 2024).

Results

Research Question 1: Audio-Visual Skills and Instructional Delivery

Table 1 presents the mean ratings of OIM lecturers' audio-visual operating skills and their corresponding utilization in instructional delivery.

Table 1: Relationship of OIM Lecturers' Audio-Visual Skills Acquisition and Instructional Delivery

Digital Skill Item	Skill Acquisition Mean	Instructional Delivery Mean	Remark
LCD projectors	2.67	2.51	Agreed
Audio CD	2.89	2.60	Agreed
Tape recording	2.78	2.40	Agreed
DVD	3.10	2.98	Agreed
Photographs	2.97	2.67	Agreed
Slides	2.67	2.57	Agreed
Personal computers	2.56	2.50	Agreed
Flashcards	2.87	2.61	Agreed
Overhead projectors	2.76	2.61	Agreed
Smart boards	1.89	1.23	Disagreed
Opaque projectors	1.87	1.62	Disagreed
Grand Mean	2.64	2.39	Agreed

Source: Field survey data, 2024

Table 1 shows that nine of the eleven audio-visual items -- LCD projectors, audio CDs, tape recording, DVDs, photographs, slides, personal computers, flashcards, and overhead projectors -- exceeded the 2.50 criterion on both skill acquisition and instructional-delivery utilization. Smart boards and opaque projectors fell below the criterion on both dimensions, consistent with these being the least commonly available and most infrastructure-dependent items in the set. The grand mean of 2.64 for skill acquisition against 2.39 for delivery utilization indicates a moderate gap between what lecturers can do with audio-visual tools and what they actually deploy in the classroom.

Research Question 2: E-Application Skills and Instructional Delivery

Table 2 presents the mean ratings of OIM lecturers' e-application skills and their corresponding utilization in instructional delivery.

Table 2: Relationship of OIM Lecturers' E-Application Skills and Instructional Delivery

Digital Skill Item	Skill Acquisition Mean	Instructional Delivery Mean	Remark
WhatsApp	3.12	3.00	Agreed
E-mail	3.33	2.98	Agreed
Facebook	2.67	2.50	Agreed
Skype	1.56	1.43	Disagreed
Instagram	1.77	1.60	Disagreed
Google Talk	1.89	1.80	Disagreed
Video/Tele-conferencing	1.97	1.82	Disagreed

Telecommuting/Tele-working	1.63	1.45	Disagreed
Newsgroup/Usenet	1.21	1.10	Disagreed
Computer-Aided Telephony	1.12	1.99	Disagreed
Grand Mean	2.03	1.97	Disagreed

Source: Field survey data, 2024

Table 2 shows a markedly narrower band of acquisition than any other digital-skill domain examined in the underlying thesis: only WhatsApp, e-mail, and Facebook cleared the 2.50 criterion on both dimensions. The remaining seven applications -- Skype, Instagram, Google Talk, video and tele-conferencing tools, telecommuting platforms, newsgroups, and computer-aided telephony -- fell below the criterion, several substantially so. The grand mean of 2.03 for skill acquisition against 1.97 for delivery utilization places e-application competence, in aggregate, below the agreement threshold altogether, driven by the concentration of very low ratings across the seven under-acquired platforms.

Test of Hypotheses

Ho₁:: There is no significant relationship between audio-visual skill acquisition and instructional delivery of OIM lecturers in South-South Nigeria.

Table 3: Pearson Correlation -- Audio-Visual Skill Acquisition and Instructional Delivery

N	123
df	121
Calculated r	0.824
Level of significance	.05
Decision on H₀	Rejected

Source: Field survey data, 2024

The calculated r of .824 exceeds the critical value at 121 degrees of freedom and the .05 level of significance. Ho₃ is therefore rejected: there is a significant relationship between audio-visual skill acquisition and instructional delivery of OIM lecturers in South-South Nigeria.

Ho₂:: There is no significant relationship between e-application skill acquisition and instructional delivery of OIM lecturers in South-South Nigeria.

Table 4: Pearson Correlation -- E-Application Skill Acquisition and Instructional Delivery

N	123
df	121
Calculated r	0.900
Level of significance	.05
Decision on H₀	Rejected

Source: Field survey data, 2024

The calculated r of .900 exceeds the critical value at 121 degrees of freedom and the .05 level of significance. Ho₄ is therefore rejected: there is a significant relationship between e-application skill acquisition and instructional delivery of OIM lecturers in South-South Nigeria. Notably, this is the strongest of the six correlations reported across the underlying thesis's fully tested digital-skill domains, despite e-application recording the lowest absolute levels of skill acquisition and instructional use -- a combination the discussion below addresses directly.

Discussion of Findings

The significant relationship found between audio-visual skills and instructional delivery ($r = .824$) is consistent with Amesi, Amaewhule, and Akoku's (2022) finding that Business Education lecturers require audio-visual content-creation skills, alongside software and hardware skills, for effective course delivery. The concentration of strong acquisition around long-established, comparatively low-cost tools -- projectors, audio and video discs, photographs, slides, flashcards -- and weak acquisition around smart boards and opaque projectors mirrors the general pattern in Table 1 of the companion analysis of software and hardware skills in this same population: competence clusters around familiar, frequently available tools and thins out around costlier or less commonly provisioned ones (Ibekwe, 2017). The e-application finding requires more careful interpretation. Although the correlation between e-application skills and instructional delivery was the strongest recorded ($r = .900$), both variables sat below the 2.50 agreement threshold in absolute terms. This combination is not contradictory: a strong correlation indicates that skill acquisition and instructional use move together consistently across lecturers, regardless of whether the overall level is high or low. In other words, lecturers who have acquired e-application skills beyond WhatsApp, e-mail, and Facebook are reliably the same lecturers who use those additional platforms for instructional delivery -- but there are simply few such lecturers, a pattern consistent with Koko and Ajinwo's (2022) finding that OIM lecturers made high use of some platforms (Zoom, Google Classroom) while largely bypassing others (WhatsApp) for instructional purposes, and with the broader observation that e-application uptake is constrained as much by infrastructure and exposure as by individual disposition (Younas, Noor, Zhou, Menhas, & Xu, 2022). Viewed through the Technology-Organization-Environment framework (Tornatzky & Fleischer, 1990), the narrow band of e-application acquisition -- three platforms cleared, seven not -- plausibly reflects the environmental context of internet connectivity and data cost in the South-South Nigerian tertiary landscape at least as much as it reflects individual technological or organisational readiness: WhatsApp, e-mail, and Facebook are the applications least demanding of consistent bandwidth and are most embedded in everyday Nigerian internet use outside the classroom, which would explain both their comparatively high acquisition and their comparatively high instructional use. Vygotsky's (1978) activity-theory framing again applies: e-application and audio-visual tools function here as mediating instruments whose instructional effect is inseparable from the lecturer's acquired fluency with them, such that the strength of the correlation, rather than the absolute level of use, is the more theoretically diagnostic finding.

Conclusion

This study set out to determine the relationship between OIM lecturers' audio-visual and e-application digital skills acquisition and their instructional delivery in South-South Nigeria. Both null hypotheses were rejected, confirming that each domain bears a strong, statistically significant relationship with instructional delivery. The two domains nonetheless present very different pictures of readiness: audio-visual competence is broad, covering nine of eleven tools examined, while e-application competence is narrow, confined in practice to three widely used, low-bandwidth platforms. The strength of the e-application correlation despite its low absolute levels underscores that acquisition and instructional use move together tightly in this domain -- which means that any expansion of e-application competence beyond WhatsApp, e-mail, and Facebook is likely to translate directly into expanded instructional use, making this a comparatively high-leverage area for targeted intervention.

Recommendations

Based on the findings, the following recommendations are made:

- i. Tertiary institutions in South-South Nigeria should prioritise training on the e-application platforms beyond WhatsApp, e-mail, and Facebook -- particularly video/tele-conferencing tools - - given both the low current acquisition and the strong likelihood, implied by the correlation strength, that new competence here would translate into instructional use.
- ii. Institutions should improve and subsidise internet connectivity for OIM lecturers, since several of the under-acquired e-applications are bandwidth-dependent and their low uptake may reflect infrastructural rather than dispositional constraints.
- iii. Given the continued strength of long-established audio-visual tools, institutions should maintain investment in projectors, recorded audio and video resources, and related display equipment rather than assuming these have been superseded by newer digital tools.
- iv. Provision and training for smart boards and opaque projectors, where acquisition lags most within the audio-visual domain, should be expanded before further such equipment is deployed into OIM classrooms.

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