

Possession of E-learning Ability for Enhancing Technical and Vocational Education Training (TVET) among Lecturers of Tertiary Institutions in Enugu State

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Abstract

Purpose. This study determined the extent to which lecturers of technical and vocational education and training (TVET) in tertiary institutions in Enugu State, Nigeria, possess the e-learning abilities required to enhance TVET delivery. **Methodology.** A descriptive survey design was adopted. The population comprised 312 TVET lecturers in five public tertiary institutions; the entire population was studied. Data were collected with the 22-item E-learning Ability Possession Questionnaire (ELAPQ), face-validated by three experts (overall Cronbach's alpha = .89). Of 312 copies distributed, 296 (94.9%) were analysed. Mean and standard deviation answered the research questions; independent-samples t-tests tested two null hypotheses at the .05 level. **Findings.** Lecturers possessed online instructional delivery abilities to a high extent ($M = 2.54$) but possessed e-content development ($M = 2.28$) and online assessment abilities ($M = 2.20$) to a low extent. There was no significant gender difference, $t(294) = 0.67$, $p = .503$. University-based lecturers reported significantly higher possession than lecturers in colleges of education and polytechnics, $t(294) = 3.45$, $p = .001$, $d = 0.41$. **Originality.** The study measures three distinct clusters of e-learning ability among TVET lecturers across universities, colleges of education and polytechnics within a single Nigerian state, a comparison that has been largely absent from the local literature. **Research implications.** Capacity building should target pedagogically rich e-content and performance-based digital assessment rather than communication tools alone, and should prioritise colleges of education and polytechnics.

Keywords: e-learning ability; digital competence; technical and vocational education and training; TVET lecturers; tertiary institutions; Enugu State

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1. Introduction

Technical and vocational education and training (TVET) occupies a strategic place in national development because it supplies the skilled manpower on which industrialisation, self-employment and economic diversification depend. In Nigeria, the National Policy on Education positions technical and vocational education as the segment of education that provides trained manpower in applied science, technology and business, and that equips individuals with the skills required for self-reliance (Federal Republic of Nigeria, 2013). Scholars have long argued that the country's ambition of transforming from a consumer to a producer economy rests substantially on the quality of its TVET system (Lawal, 2013). Globally, UNESCO (2016) has similarly identified TVET as central to youth employment, decent work and sustainable development, urging member states to modernise TVET provision in line with the digital transformation of work.

The quality of any TVET programme depends heavily on the competence of those who teach it. TVET lecturers are expected to combine occupational expertise with pedagogical skill, and they must now add a

third layer: the ability to design, deliver and assess learning in digital environments (Cattaneo et al., 2022). This expectation has been intensified by the rapid growth of e-learning, which may be described as the use of electronic technologies, particularly internet-connected platforms, to support or deliver instruction. The COVID-19 pandemic exposed the consequences of weak digital preparedness in higher education, as institutions across the world were forced into emergency remote teaching with varying degrees of success (Hodges et al., 2020; Dhawan, 2020). In many developing countries, including Nigeria, the disruption demonstrated that institutions whose staff lacked e-learning ability were largely unable to sustain teaching when physical classes were suspended (Ali, 2020; Almaiah et al., 2020).

E-learning holds distinctive promise for TVET. Although practical skills are ultimately acquired through hands-on practice, digital resources such as recorded demonstrations, simulations, virtual laboratories and online assessment tools can extend practice time, reduce the cost of consumable materials, standardise demonstrations across large classes and allow learners to revisit procedures at their own pace (Bates, 2019). Realising these benefits, however, depends less on the presence of technology than on whether lecturers possess the ability to use it meaningfully for teaching. Research on teacher technology integration consistently shows that knowledge, confidence and pedagogical beliefs mediate whether available technology is used in ways that improve learning (Ertmer & Ottenbreit-Leftwich, 2010; Tondeur et al., 2017).

In Enugu State, TVET programmes are offered in universities, colleges of education and polytechnics, covering areas such as industrial technical education, agricultural education, business education, computer education and home economics. These institutions have, to varying degrees, adopted learning management systems, videoconferencing platforms and social media tools, especially since 2020. Yet anecdotal reports and institutional experience suggest that many TVET lecturers continue to rely on face-to-face lectures and handouts, and that digital tools, where used, are frequently limited to messaging applications for sharing notes. Whether TVET lecturers in the state actually possess the full range of e-learning abilities needed to enhance TVET delivery has not been systematically established. This study was therefore designed to determine the extent of possession of e-learning ability among TVET lecturers of tertiary institutions in Enugu State.

2. Literature Review

2.1 Conceptual clarification

E-learning ability in this study refers to the combination of knowledge, skills and dispositions that enables a lecturer to plan, develop, deliver, manage and assess instruction through electronic and web-based technologies. The concept overlaps with the broader construct of educators' digital competence, which the European Framework for the Digital Competence of Educators (DigCompEdu) organises into areas such as digital resources, teaching and learning, assessment and empowering learners (Redecker, 2017). The UNESCO ICT Competency Framework for Teachers likewise describes a progression from technology literacy through knowledge deepening to knowledge creation, emphasising that teachers must move beyond basic tool use towards pedagogically transformative applications (UNESCO, 2018). Drawing on these frameworks, the present study conceptualises e-learning ability in three clusters: e-content development ability, online instructional delivery ability and online assessment ability.

E-content development ability is the capacity to create, adapt and organise digital learning materials, including multimedia presentations, instructional videos, interactive learning objects and simulations. For TVET, this cluster is especially important because practical procedures can be captured, annotated and reused. *Online instructional delivery ability* concerns the lecturer's capacity to teach through synchronous and asynchronous channels, including videoconferencing, discussion forums and blended or flipped arrangements that combine online theory with workshop practice. Garrison et al. (2000) stress that effective online teaching requires not only the transmission of content but the deliberate cultivation of teaching, social and cognitive presence. *Online assessment ability* refers to the capacity to design and administer valid digital assessments, provide

timely electronic feedback, use e-portfolios and rubrics for practical tasks, and interpret learner data generated by learning platforms.

Technical and vocational education and training refers to education and training that prepares learners for occupations and fields of work, combining general knowledge with practical skills, know-how and understanding required in particular occupations (Maclean & Wilson, 2009; UNESCO, 2016). TVET lecturers in tertiary institutions therefore teach both the theoretical foundations and the practical competencies of occupational areas, and increasingly they are expected to model the digital practices that their graduates will encounter in contemporary workplaces.

2.2 Theoretical framework

Two complementary frameworks underpin this study. The first is the Technological Pedagogical Content Knowledge (TPACK) framework proposed by Mishra and Koehler (2006). TPACK holds that effective teaching with technology emerges from the interaction of three knowledge domains: content knowledge, pedagogical knowledge and technological knowledge. The framework cautions that technological skill alone is insufficient; lecturers must understand how particular technologies transform the representation of specific content and how they can be combined with appropriate pedagogy. For TVET lecturers, TPACK implies that e-learning ability should be judged not by familiarity with devices or applications but by the capacity to use them to teach occupational content effectively, for example by recording a machining procedure in a way that highlights critical safety steps.

The second framework is the Technology Acceptance Model (TAM) developed by Davis (1989), which proposes that perceived usefulness and perceived ease of use determine a person's intention to use, and actual use of, a technology. TAM was later extended into the Unified Theory of Acceptance and Use of Technology, which adds social influence and facilitating conditions as determinants (Venkatesh et al., 2003). A meta-analytic structural equation study by Scherer et al. (2019) confirmed that TAM explains teachers' adoption of digital technology reasonably well, with perceived usefulness emerging as a key predictor. TAM is relevant here because lecturers' possession of e-learning ability both shapes and is shaped by their perceptions: lecturers who find e-learning tools difficult are unlikely to use them, and those who rarely use them are unlikely to develop deeper ability. Facilitating conditions, such as institutional infrastructure and training, may also explain differences between types of institutions.

2.3 Empirical review

Several empirical studies have examined teachers' digital and e-learning competence. Cattaneo et al. (2022) assessed the digital competence of vocational teachers in Switzerland using an instrument aligned with DigCompEdu and found that vocational teachers' competence was moderate overall, with stronger performance in basic resource use than in areas such as digital assessment and empowering learners. The study also identified institutional support and teachers' attitudes as underlying factors. This pattern, in which communicative and resource-sharing uses outpace pedagogically complex uses, is consistent with the broader literature on technology integration (Ertmer & Ottenbreit-Leftwich, 2010).

Instefjord and Munthe (2017) studied the integration of professional digital competence in Norwegian teacher education and reported that teacher educators' own modelling of digital practice was a strong factor in preparing digitally competent teachers. The implication for TVET is that lecturers who lack e-learning ability are unlikely to produce graduates, many of whom will themselves become technical teachers, with such ability. Tondeur et al. (2017), in a systematic review of qualitative evidence, further showed that teachers' pedagogical beliefs and technology use are bidirectionally related, meaning that successful experiences with technology can shift beliefs towards more learner-centred practice.

In the Nigerian context, Eze et al. (2018) investigated the utilisation of e-learning facilities in a Nigerian university and reported that, although e-learning facilities were available, their utilisation was constrained by factors including inadequate staff skills, unstable electricity, poor internet connectivity and limited

institutional support. Aboderin (2015) examined e-learning at the National Open University of Nigeria and identified challenges such as insufficient ICT skills among staff and learners, infrastructural deficits and cost of access. Odelewe and Agomuo (2016), working with students at a university in South-East Nigeria, found that a blended learning (B-learning) environment produced higher achievement in computer programming than a purely face-to-face environment, demonstrating that e-learning can improve learning outcomes in technical subjects when lecturers are able to design and manage it.

Studies conducted during the COVID-19 pandemic reinforce these findings. Almaiah et al. (2020) identified technological, financial and change-management challenges, alongside users' readiness, as critical factors influencing e-learning system usage, while Ali (2020) argued that the pandemic made online and remote learning a necessity for which staff readiness was a prerequisite. Dhawan (2020) noted that the pandemic accelerated the adoption of online learning but also exposed gaps in faculty preparedness and pedagogical design. Collectively, the reviewed literature suggests that possession of e-learning ability is uneven, tends to be concentrated in lower-order uses and is influenced by institutional conditions.

2.4 Gap in the literature

Although studies have examined e-learning utilisation and challenges in Nigerian universities, few have specifically measured the extent to which TVET lecturers possess distinct clusters of e-learning ability, and fewer still have compared lecturers across universities, colleges of education and polytechnics within a single state. Evidence from Enugu State, which hosts a diverse mix of such institutions, is particularly limited. The present study addresses this gap.

3. Statement of the Problem

TVET is expected to produce graduates equipped with current occupational and digital skills, yet the delivery of TVET in many Nigerian tertiary institutions remains largely traditional. Large class sizes, inadequate workshop equipment and shortages of consumable materials limit students' practical exposure, problems that well-designed e-learning resources could partly mitigate. The pandemic-era closures revealed that many institutions could not sustain teaching remotely, raising questions about whether lecturers possess the abilities needed to exploit e-learning. In Enugu State, institutions have invested in learning platforms and ICT facilities, but there is little empirical evidence on whether TVET lecturers can use these facilities to develop e-content, deliver instruction online and assess learners digitally. Without such evidence, capacity-building interventions risk being generic and poorly targeted. The problem of this study, therefore, is: to what extent do TVET lecturers of tertiary institutions in Enugu State possess the e-learning abilities required to enhance TVET delivery?

4. Purpose of the Study

The general purpose of the study was to determine the extent of possession of e-learning ability for enhancing TVET among lecturers of tertiary institutions in Enugu State. Specifically, the study determined the extent to which TVET lecturers possess (a) e-content development ability, (b) online instructional delivery ability and (c) online assessment ability.

4.1 Research questions

The following research questions guided the study: (1) To what extent do TVET lecturers of tertiary institutions in Enugu State possess e-content development ability? (2) To what extent do TVET lecturers possess online instructional delivery ability? (3) To what extent do TVET lecturers possess online assessment ability?

4.2 Hypotheses

The following null hypotheses were tested at the .05 level of significance. H01: There is no significant difference between the mean ratings of male and female TVET lecturers on the extent of their possession of e-learning ability. H02: There is no significant difference between the mean ratings of TVET lecturers in universities and those in colleges of education and polytechnics on the extent of their possession of e-learning ability.

5. Method

5.1 Research design

The study adopted a descriptive survey research design. This design was considered appropriate because the study sought to collect data from a defined group of lecturers in order to describe the extent to which they possess specified abilities, without manipulating any variable.

5.2 Area of the study

The study was carried out in Enugu State, located in the South-East geopolitical zone of Nigeria. The state hosts federal and state-owned tertiary institutions that offer TVET programmes at degree, National Certificate in Education (NCE) and diploma levels. The five public tertiary institutions involved were the University of Nigeria, Nsukka; Enugu State University of Science and Technology; Federal College of Education, Eha-Amufu; Enugu State College of Education (Technical), Enugu; and the Institute of Management and Technology, Enugu. The state was considered suitable because of its concentration of TVET-offering institutions of different types.

5.3 Population and sample

The population of the study comprised 312 lecturers teaching in TVET departments of the five institutions, as shown in Table 1. Because the population was of a manageable size, no sampling was carried out and the entire population was studied. This census approach exceeds the sample of approximately 175 recommended by Krejcie and Morgan (1970) for a population of this size, thereby strengthening the precision of the estimates.

Table 1. Distribution of the Population of TVET Lecturers by Institution

Institution	Institution type	Population	Returned
University of Nigeria, Nsukka	University	72	72
Enugu State University of Science and Technology	University	46	46
Federal College of Education, Eha-Amufu	College of education	81	75
Enugu State College of Education (Technical)	College of education	58	54
Institute of Management and Technology, Enugu	Polytechnic	55	49
Total		312	296

Note. Returned copies represent usable questionnaires (94.9% of the population).

5.4 Instrument for data collection

The instrument was a structured questionnaire titled E-learning Ability Possession Questionnaire (ELAPQ), developed by the researchers after a review of related literature and of the DigCompEdu and UNESCO ICT competency frameworks (Redecker, 2017; UNESCO, 2018). Section A elicited demographic information (gender and institution type). Section B contained 22 items in three clusters: e-content development ability (8 items), online instructional delivery ability (7 items) and online assessment ability (7 items). Items were rated on a four-point scale of Very High Extent (4), High Extent (3), Low Extent (2) and Very Low Extent (1).

5.5 Validity and reliability of the instrument

The ELAPQ was face-validated by three experts: two in TVET and one in measurement and evaluation. Their corrections on clarity, relevance and coverage of items were incorporated into the final version. To establish reliability, the instrument was trial-tested on 20 TVET lecturers in a tertiary institution in Ebonyi State, which was outside the study area but shares similar characteristics. Cronbach's alpha (Cronbach, 1951) yielded coefficients of .84, .81 and .86 for the three clusters and .89 for the entire instrument. These values exceed the threshold of .70 commonly regarded as acceptable (Nunnally & Bernstein, 1994).

5.6 Method of data collection

The researchers, assisted by five research assistants (one per institution) who were briefed on the purpose of the study and the procedure for administration, distributed the 312 copies of the questionnaire by hand. Participation was voluntary and respondents were assured of anonymity and confidentiality. Of the copies distributed, 296 (94.9%) were properly completed and retrieved over a period of three weeks.

5.7 Method of data analysis

Mean and standard deviation were used to answer the research questions. A mean of 2.50, the midpoint of the four-point scale, was used as the decision rule: item or cluster means of 2.50 and above were interpreted as High Extent, while means below 2.50 were interpreted as Low Extent. The hypotheses were tested using the independent-samples t-test at the .05 level of significance; a hypothesis was rejected where the p-value was less than .05. Cohen's d was computed as a measure of effect size where a difference was significant (Cohen, 1988).

6. Results

6.1 Research question 1

To what extent do TVET lecturers of tertiary institutions in Enugu State possess e-content development ability? Data answering this question are presented in Table 2.

Table 2. Mean Ratings of TVET Lecturers on Possession of E-content Development Ability (n = 296)

S/N	E-content development ability	M	SD	Decision
1	Create and organise a course page on a learning management system	2.71	0.89	HE
2	Develop multimedia lecture slides with embedded audio and video	2.64	0.92	HE
3	Record and edit instructional videos of practical demonstrations	2.18	0.96	LE
4	Use authoring tools to build interactive learning content	1.87	0.84	LE
5	Design simulations or virtual laboratories for workshop practice	1.72	0.81	LE
6	Organise digital resources into modules with stated objectives	2.53	0.90	HE
7	Apply copyright and open licensing rules when adapting content	2.09	0.93	LE
8	Convert print manuals and handouts into accessible e-formats	2.47	0.95	LE
	Cluster mean	2.28	0.90	LE

Note. HE = High Extent ($M \geq 2.50$); LE = Low Extent ($M < 2.50$).

Table 2 shows that lecturers possessed three of the eight e-content development abilities to a high extent, with item means ranging from 2.53 to 2.71. These relate to creating course pages on a learning management system, developing multimedia slides and organising resources into modules. The remaining five items, which involve recording practical demonstrations, using authoring tools, designing simulations, applying copyright rules and converting print materials, had means between 1.72 and 2.47. The cluster mean of 2.28 indicates that TVET lecturers possessed e-content development ability to a low extent. The standard deviations (0.81 to 0.96) show moderate dispersion in responses.

6.2 Research question 2

To what extent do TVET lecturers possess online instructional delivery ability? Data answering this question are presented in Table 3.

Table 3. Mean Ratings of TVET Lecturers on Possession of Online Instructional Delivery Ability (n = 296)

S/N	Online instructional delivery ability	M	SD	Decision
9	Conduct live lectures through videoconferencing platforms	2.88	0.87	HE
10	Use messaging-application groups to share instruction and notes	3.21	0.78	HE
11	Moderate asynchronous online discussion forums	2.36	0.94	LE
12	Use screen sharing and virtual whiteboards to demonstrate procedures	2.42	0.91	LE
13	Blend online theory with face-to-face workshop practice (flipped mode)	2.29	0.93	LE
14	Monitor online attendance and learner engagement analytics	2.02	0.88	LE
15	Troubleshoot basic connectivity and platform problems	2.57	0.90	HE
	Cluster mean	2.54	0.89	HE

Note. HE = High Extent ($M \geq 2.50$); LE = Low Extent ($M < 2.50$).

Table 3 reveals that lecturers possessed three of the seven online instructional delivery abilities to a high extent, namely using messaging-application groups ($M = 3.21$), conducting live lectures through videoconferencing ($M = 2.88$) and troubleshooting basic connectivity problems ($M = 2.57$). Abilities relating to moderating discussion forums, virtual demonstrations, flipped delivery and engagement monitoring were possessed to a low extent. The cluster mean of 2.54 indicates that, overall, TVET lecturers possessed online instructional delivery ability to a high extent, although only marginally above the criterion mean.

6.3 Research question 3

To what extent do TVET lecturers possess online assessment ability? Data answering this question are presented in Table 4.

Table 4. Mean Ratings of TVET Lecturers on Possession of Online Assessment Ability (n = 296)

S/N	Online assessment ability	M	SD	Decision
16	Construct auto-graded online quizzes	2.61	0.91	HE
17	Use e-portfolios to assess practical projects	1.94	0.86	LE
18	Assess practical skills through video submissions and rubrics	2.11	0.92	LE
19	Provide digital feedback through text or audio comments	2.48	0.94	LE
20	Use plagiarism-detection tools on students' written work	2.23	0.97	LE
21	Analyse learner performance data from a platform gradebook	1.96	0.89	LE
22	Ensure the integrity and security of online examinations	2.05	0.90	LE
	Cluster mean	2.20	0.91	LE

Note. HE = High Extent ($M \geq 2.50$); LE = Low Extent ($M < 2.50$).

Table 4 shows that only one of the seven online assessment abilities, constructing auto-graded online quizzes ($M = 2.61$), was possessed to a high extent. The remaining six items had means ranging from 1.94 to 2.48, with the lowest ratings recorded for e-portfolio assessment and analysis of learner performance data. The cluster mean of 2.20 indicates that TVET lecturers possessed online assessment ability to a low extent.

6.4 Hypothesis 1

H01: There is no significant difference between the mean ratings of male and female TVET lecturers on the extent of their possession of e-learning ability. The result is presented in Table 5.

Table 5. Independent-Samples t-Test of Male and Female Lecturers' Mean Ratings on Possession of E-learning Ability

Gender	n	M	SD	df	t	p	Decision
Male	184	2.36	0.61	294	0.67	.503	Not rejected
Female	112	2.31	0.64				

Note. Independent-samples t-test; two-tailed. The null hypothesis was not rejected.

Table 5 shows that male lecturers ($M = 2.36$, $SD = 0.61$) and female lecturers ($M = 2.31$, $SD = 0.64$) did not differ significantly in their possession of e-learning ability, $t(294) = 0.67$, $p = .503$. The null hypothesis was therefore not rejected.

6.5 Hypothesis 2

H02: There is no significant difference between the mean ratings of TVET lecturers in universities and those in colleges of education and polytechnics on the extent of their possession of e-learning ability. The result is presented in Table 6.

Table 6. Independent-Samples t-Test of Lecturers' Mean Ratings on Possession of E-learning Ability by Institution Type

Institution type	n	M	SD	df	t	p	Decision
University	118	2.49	0.58	294	3.45	.001	Rejected
College/polytechnic	178	2.24	0.63				

Note. Independent-samples t-test; two-tailed. Effect size $d = 0.41$ (small to medium).

Table 6 reveals that lecturers in universities ($M = 2.49$, $SD = 0.58$) reported significantly higher possession of e-learning ability than lecturers in colleges of education and polytechnics ($M = 2.24$, $SD = 0.63$), $t(294) = 3.45$, $p = .001$. The effect size ($d = 0.41$) is small to medium by conventional benchmarks (Cohen, 1988). The null hypothesis was therefore rejected.

7. Discussion

The finding that TVET lecturers possessed e-content development ability to a low extent is significant for TVET, where the capacity to capture and represent practical procedures is central to the value of e-learning. Lecturers were comfortable with familiar, presentation-oriented tasks such as creating course pages and multimedia slides, but they reported low ability in recording demonstrations, using authoring tools and designing simulations, which are precisely the abilities that could compensate for inadequate workshop equipment and large classes. This pattern reflects what the TPACK framework would predict when technological knowledge is not integrated with pedagogical and content knowledge (Mishra & Koehler, 2006): lecturers can operate general tools but have not developed the specialised knowledge required to represent occupational content digitally. The finding agrees with Cattaneo et al. (2022), who reported that vocational teachers' digital competence was strongest in basic resource use and weaker in more complex areas. The low ability to apply copyright and open licensing rules also suggests that lecturers may be underusing open educational resources, which could reduce the cost of e-content development.

The finding that lecturers possessed online instructional delivery ability to a high extent, albeit only marginally, should be interpreted cautiously. The cluster mean was driven by messaging-application groups and videoconferencing, which became widespread during and after the pandemic (Dhawan, 2020; Hodges et al., 2020). In contrast, abilities associated with pedagogically richer delivery, such as moderating asynchronous discussion, flipped delivery and engagement monitoring, were rated low. This suggests that lecturers have largely replicated lecture-based teaching in digital channels rather than redesigning instruction for online and blended environments. Garrison et al. (2000) argue that meaningful online learning depends on deliberately structured teaching and social presence, which messaging-based note distribution does not by

itself provide. The high rating for messaging applications is consistent with TAM (Davis, 1989), because such tools are perceived as easy to use and are already embedded in lecturers' daily communication.

Online assessment ability was the weakest cluster. Apart from the construction of auto-graded quizzes, lecturers reported low ability across all assessment items, including e-portfolios, video-based practical assessment and the analysis of learner data. For TVET, where assessment should capture performance rather than mere recall, this gap is consequential: auto-graded quizzes are suitable for testing knowledge but cannot adequately assess practical competence. The finding supports Eze et al. (2018) and Aboderin (2015), who identified inadequate staff skills as a major constraint on e-learning in Nigerian institutions, and it echoes Cattaneo et al. (2022), who found digital assessment to be one of the weaker competence areas among vocational teachers. It also means that the credibility of online examinations remains a concern, given the low ability reported for ensuring examination integrity.

The absence of a significant gender difference indicates that e-learning ability among TVET lecturers is not a function of gender. Male and female lecturers appear to have been exposed to similar institutional conditions and professional development opportunities, and both groups share the same pattern of strength in communication-oriented tools and weakness in content development and assessment. This suggests that capacity-building interventions need not be differentiated by gender, although they should remain inclusive.

The significant difference by institution type, favouring university-based lecturers, may be explained by differences in facilitating conditions, which the extended acceptance model identifies as a determinant of technology use (Venkatesh et al., 2003). Universities in the state have generally had earlier access to institutional learning management systems, broader internet infrastructure and more frequent staff development programmes. Lecturers in colleges of education deserve particular attention because they train the teachers who will teach technical subjects in secondary and technical schools; as Instefjord and Munthe (2017) observed, teacher educators' own digital practice strongly shapes the competence of the teachers they produce. The effect size, although modest, is practically meaningful at the level of institutional policy.

8. Conclusion

The study concluded that TVET lecturers of tertiary institutions in Enugu State possess e-learning ability unevenly. Their ability is concentrated in communication-oriented online delivery, particularly messaging applications and videoconferencing, while their e-content development and online assessment abilities, which are most critical for enhancing practical skill acquisition in TVET, are possessed only to a low extent. Gender does not significantly influence the possession of e-learning ability, but institution type does, with lecturers in colleges of education and polytechnics lagging behind their university counterparts. Consequently, the potential of e-learning to enhance TVET in the state is not yet being fully realised.

9. Recommendations

Based on the findings, the following recommendations are made. First, tertiary institutions in Enugu State, with support from relevant funding and regulatory agencies, should organise structured, hands-on capacity-building programmes for TVET lecturers that focus on recording and editing practical demonstrations, using authoring tools, and deploying simulations and virtual laboratories. Second, staff development should move beyond basic platform use to online pedagogy, including the moderation of discussion forums and the design of flipped arrangements that combine online theory with workshop practice. Third, institutions should build lecturers' capacity in performance-based digital assessment, including e-portfolios, video-based practical assessment with rubrics, learner analytics and measures for securing online examinations. Fourth, government and institutional management should prioritise colleges of education and polytechnics in the provision of e-learning infrastructure, institutional learning management systems and training, in order to close the gap identified between institution types. Fifth, institutions should establish e-learning support units staffed with instructional designers and media technicians who can collaborate with TVET lecturers in producing quality

e-content. Finally, e-learning competence should be incorporated into criteria for staff appraisal and promotion to motivate sustained professional development.

10. Limitations and Suggestions for Further Studies

The study relied on lecturers' self-reports, which may be influenced by social desirability and may overestimate or underestimate actual ability. It was also limited to public tertiary institutions in one state. Further studies could employ performance-based assessment or classroom observation to measure e-learning ability directly, extend the investigation to private institutions and other states in South-East Nigeria, and examine the effect of targeted training interventions on TVET lecturers' e-learning ability and students' practical skill acquisition.

Disclosure statement

The author reports there are no competing interests to declare.

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