



Classroom management competences as predictors of online teaching effectiveness in TVET institutions in Uganda

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ABSTRACT

Online TVET learning enables trainees to access education remotely through digital communication technologies, including virtual classrooms. However, effective online teaching requires not only appropriate digital technologies and instructional content but also trainers with competencies to manage virtual learning environments. While previous studies have emphasized online content design, learning management systems, and digital readiness, comparatively limited attention has been given to classroom management competence in online TVET delivery. This study examined classroom management competence as a predictor of online teaching effectiveness among TVET trainers in Uganda. The study adopted a positivist research paradigm and used quantitative data from a mixed-methods parent study. Data were collected using a structured questionnaire administered through KoboToolbox from participants in seven TVET institutions across Uganda. A multi-stage sampling approach combining stratified and random sampling was used, resulting in 471 valid responses comprising 196 trainers and 275 trainees. Data were analyzed using descriptive and inferential statistics in RStudio. Independent-samples t-tests were used to examine differences in classroom management competence between online-savvy and non-online-savvy participants, while Ordinary Least Squares regression was used to determine predictors of online teaching effectiveness. The findings showed significant differences in classroom management competence across the dimensions assessed between online-savvy and non-online-savvy participants. Classroom management competence had a strong positive relationship with online teaching effectiveness and emerged as the strongest predictor in the regression model ($\beta = 0.66$, $p < .001$). The model explained 54.2% of the variation in online teaching effectiveness ($R^2 = 0.542$). Trainer experience, education level, digital exposure, field of specialization, and institutional factors also contributed significantly to online teaching effectiveness. Trainers in practical fields such as Electrical Installation Systems and Maintenance and Electronics showed lower levels of online teaching effectiveness. The study concludes that classroom management competence is an important component of effective online TVET delivery and should be integrated into trainer professional development alongside digital and pedagogical competencies.

Keywords: classroom management competence; online teaching effectiveness; TVET; trainers; digital pedagogy; Uganda.

I. INTRODUCTION

Despite the global demand for TVET, many institutions face trainer shortages and inadequate professional preparation. In several OECD countries, incentives for trainer development are limited, and those transitioning from industry often lack sufficient pedagogical support (Lee et al., 2022). Trainers are sometimes required to follow curricula designed by academics with little awareness of local or industry needs (Lee et al., 2022). Moreover, the demand for digital competencies to equip trainees for the Fourth Industrial Revolution presents an additional challenge, though it also offers an opportunity to rethink and modernize trainer training in more innovative and engaging ways (Karuhanga & Muhwezi, 2025). Technical and Vocational Education and Training (TVET) play a crucial role in Uganda's national development strategy, equipping trainees with practical skills for employment and entrepreneurship (Kirya, 2016). The COVID-19 pandemic accelerated the adoption of online teaching, creating new pedagogical and managerial demands. Classroom management traditionally linked to order and engagement in physical space now requires digital competences such as



virtual interaction management, time discipline in online sessions, and adaptive pedagogy. Trainer competence in this area has become central to effective TVET delivery.

1.1 Research Objectives

- i. To assess classroom management competence among TVET trainers in Uganda.
- ii. To examine the relationship between classroom management competence and online teaching effectiveness.
- iii. To determine the predictive effect of classroom management competence on online teaching effectiveness among TVET trainers in Uganda.

II. LITERATURE REVIEW

2.1 Theoretical Review

Globally, ICTs are being used to improve education systems in order to increase knowledge diffusion, expand access to information, and improve the quality and efficacy of learning, as highlighted by the Education 2030 Framework for Action. In order to reap the benefits of ICT-enabled learning, the Uganda government has pledged through Vision 2040 to mainstream ICTs in education. The shift to online education in developed economies has highlighted the need for trainers to develop new class management competencies distinct from those used in traditional classrooms. Effective online teaching requires a blend of pedagogical, technical, and managerial skills to ensure student engagement, learning outcomes, and classroom order.

This study is guided by the Technological Pedagogical Content Knowledge (TPACK) framework developed by Mishra and Koehler (2006), which explains the knowledge and competencies required by teachers to effectively integrate technology into teaching and learning. The framework proposes that effective technology-supported instruction occurs through the interaction of technological knowledge (TK), pedagogical knowledge (PK), and content knowledge (CK). Unlike traditional teaching environments where pedagogical skills may operate independently of technology, online teaching requires trainers to combine technological capabilities with appropriate teaching strategies and subject knowledge.

Within the context of TVET institutions, the TPACK framework provides a relevant foundation for understanding online teaching effectiveness because vocational education requires trainers to manage both knowledge transmission and practical skill development. In online learning environments, classroom management competence represents an important pedagogical component that enables trainers to organize virtual interactions, manage learner participation, provide feedback, maintain engagement, and effectively use digital learning platforms. Therefore, the framework suggests that trainers who possess stronger classroom management competence are more likely to achieve higher levels of online teaching effectiveness.

According to Pulham and Graham (2018) observed that the top 20 class management skills are flexibility, personalization, mastery-based learning, data usage, and software management. Martin et al. (2019) showed that the perception of online teaching competences is more important than ability, gender, years of teaching online, and delivery method, influencing their readiness to teach online. In Malaysia, Badiozaman (2023) reported that course design is the most important online teaching competency. In the USA, instructors at private universities were somewhat prepared to teach online during a pandemic, with confidence in online teaching being more important than experience (Bolliger & Halupa, 2021). During the COVID-19 pandemic, instructor competences in literacy, science and technology mastery, class management skills, and communication and social competences were not optimal, requiring development for better online learning experiences (Sudrajat, 2020).

The emergence of online learning platforms, significantly accelerated by global events such as the COVID-19 pandemic, has necessitated a critical re-evaluation of pedagogical approaches within technical and vocational education and training institutions (OECD, 2020). This shift demands a concerted focus on the competence of trainers to strengthen their ability to effectively manage virtual classrooms in a bid to ensure the continued quality and efficacy of TVET programs in Uganda. Mutebi et al. (2024) supported this by revealing that online classes are equally important as physical classes. Also, Turyatamba (2023) countered this by reporting that the key impediment to having online classes in TVET was the limited equipment needed to have an online class.

2.2 Empirical Literature

2.2.1 Classroom Management Competence among TVET Trainers

Previous studies have highlighted the importance of trainer competence in determining the quality of teaching and learning in TVET institutions. Abba and Rashid (2020) examined teachers' competency requirements for



implementation of inclusive education in Nigeria and emphasized the importance of teacher competencies, including instructional practices, classroom management, and assessment skills, in improving learning experiences.

Pulham and Graham (2018) observed that the top 20 class management skills required for online and blended teaching include flexibility, personalization, mastery-based learning, data usage, and software management. These competencies demonstrate the changing nature of classroom management in technology-supported learning environments.

Martin et al. (2019) showed that the perception of online teaching competences is more important than ability, gender, years of teaching online, and delivery method, influencing instructors' readiness to teach online. Similarly, Sudrajat (2020) reported that during the COVID-19 pandemic, instructor competences in literacy, science and technology mastery, class management skills, and communication and social competences were not optimal, requiring development for better online learning experiences. These studies suggest that classroom management competence has become an important requirement for trainers operating within online and blended learning environments.

2.2.2 Online Teaching Effectiveness among TVET Trainers

The adoption of online teaching has significantly changed instructional approaches within education systems globally. The emergence of online learning platforms, significantly accelerated by global events such as the COVID-19 pandemic, has necessitated a critical re-evaluation of pedagogical approaches within technical and vocational education and training institutions (OECD, 2020).

In Malaysia, Badiozaman (2023) reported that course design is the most important online teaching competency. In the USA, instructors at private universities were somewhat prepared to teach online during a pandemic, with confidence in online teaching being more important than experience (Bolliger & Halupa, 2021).

Aina and Ogegbo (2022) investigated TVET college educators' experiences while transitioning from the traditional classroom to the virtual classroom during the COVID-19 pandemic and highlighted the challenges and adjustments required for effective online teaching.

Mutebi et al. (2024) supported this by revealing that online classes are equally important as physical classes. However, Turyatamba (2023) reported that the key impediment to having online classes in TVET was the limited equipment needed to have an online class.

2.2.3 Relationship between Classroom Management Competence and Online Teaching Effectiveness

Empirical studies have shown that effective online teaching requires the integration of technological, pedagogical, and managerial competencies. Mhlango (2023) identified class management skills as essential competencies for online and blended teaching environments, while Martin et al. (2019) demonstrated that instructors' perceptions of their online teaching competence influence their readiness to teach online.

Nahamya and Nakawala (2020) further emphasized the importance of course design competency, while Bolliger and Halupa (2021) found that confidence in online teaching was an important factor influencing instructors' preparedness.

Within TVET contexts, Okumu and Bbaale (2019) highlighted the need for digital competency frameworks among TVET teachers to prepare trainers for the Fourth Industrial Age. Similarly, Hashim et al. (2021) emphasized the importance of effective assessment practices in TVET environments.

Together, these studies demonstrate that classroom management competence forms part of the broader competencies required for effective online teaching. However, limited empirical attention has been given specifically to how classroom management competence predicts online teaching effectiveness among TVET trainers in Uganda.

Although several studies have demonstrated the usefulness of ICT adoption, ICT training, and establishing infrastructure in TVET institutions to have an effective online class, none of the previous studies have examined the role of specific competences, particularly the classroom management competence, which involves organizing a fully-fledged online class by preparing the learning equipment, such as the projector, simulators for illustrative learning, a microphone, setting rules, managing distractions, and leveraging technology. Additionally, much of the previous work has been limited to identifying challenges associated with online teaching effectiveness, leaving out the key ingredient to holding an online class, thus creating one-sided results.

III. METHODOLOGY

The study examined the effect of classroom management competence on online teaching effectiveness among TVET trainers using a quantitative, post-positivist research paradigm focusing on purely quantitative forms of data. The



data used in this study were the quantitative strand of the mixed-methods parent study. A structured questionnaire, approved by university supervisors, was digitized on Kobo Toolbox to reduce costs and facilitate real-time monitoring.

This process aids data generation with the highest level of flexibility and convenience. In this study, to protect personal details, the participants were categorized into the TVET trainers of selected TVET institutions and the learners. The study was conducted in selected government-aided TVET institutions in Uganda that offer certificate courses across Uganda to assess the influence of instructor competence on effective online teaching.

Participants were trainers and trainees from seven government-aided TVET institutions across Uganda, selected to ensure regional diversity. The institutions included: Ntinda VTI, Lugogo VTI, and Nakawa VTC (Central region), Jinja VTI and Iganga TI (Eastern region), Minakulu TI (Northern Region), and Nyamitanga TI (Western region). This form of selection was motivated by the desire to have full inclusivity but also to ensure that the selected TVET institutions have a diverse range of trainers with various experiences in training, pedagogy, ICT, research, and development in a bid to address the study objective.

Particularly, the study targeted 406 trainees and 184 trainers based on a sampling frame of 4145 trainees and 339 trainers obtained from the TVET institutions selected. Given that the selected TVET institutions are geographically dispersed across different regions of Uganda, there was a high likelihood of missing responses due to instructors' availability and scheduling constraints. So, the study considered a non-response rate of 5% to account for possible non-response bias typical in the field thus giving a new sampling frame of 4,484 potential participants.

Using Taro Yamane's formula, a sample of 471 respondents (275 trainees and 196 trainers) was drawn from 4,484 potential participants. Out of the totality of 590 questionnaires distributed, 471 were fully completed, giving a response rate of 79.8%. A multi-stage sampling design was used; institutional lists of trainers and trainees were stratified by role, and final participants were selected randomly.

The questionnaire measured demographics, socio-economic factors, and teaching competences, including classroom management (assessed on a 5-point Likert scale). Perceptions of online teaching effectiveness were also rated on dimensions such as efficiency, timeliness, and flexibility. The dependent variable, online teaching effectiveness, was measured as a unidimensional construct, with items assessed on a five-point Likert scale ranging from 1 (strongly disagree) to 5 (strongly agree). The measures of the effectiveness of online teaching were statements about the accuracy of course content, the timelines of delivery, the usability and flexibility of online learning platforms, the inclusiveness for diverse learners, and the possibility of feedback for improvement. Later, these statements were aggregated to form numeric data. The numeric data formed a continuous variable, which was a collection of each construct. This type of modeling is common with organizational data where various attributes add to one salient factor.

Both descriptive and inferential statistics were employed in this study. Frequency tables were used to find out the demographic profile of the study participants between online-savvy and non-online-savvy participants. Data were analyzed in RStudio using descriptive statistics, t-tests, and Ordinary Least Squares regression. Reliability was confirmed with Cronbach's alpha (0.89 for classroom management dimensions and over 0.9 for most items under it. From the confirmatory factor analysis, the study showed convergent validity of 51/52 items representing 98.1%, and divergent validity of 84.6% across the 44/52 items analyzed.

IV. RESULTS AND DISCUSSION

4.1 Characteristics of the study participants

Table 1 presents the characteristics of participants.

Table 1: Online teaching and learning by background characteristics of trainers

Characteristics of Participants	Online Teaching		Overall
	No (N=132)	Yes (N=339)	
Sex			
Female	48 (36.4%)	84 (24.8%)	132 (28.0%)
Male	84 (63.6%)	254 (74.9%)	338 (71.8%)
Region of respondents			
Central	18 (13.6%)	70 (20.6%)	88 (18.7%)
Eastern	87 (65.9%)	165 (48.7%)	252 (53.5%)
Northern	13 (9.8%)	42 (12.4%)	55 (11.7%)
Western	14 (10.6%)	61 (18.0%)	75 (15.9%)
Non-Ugandan	0 (0%)	1 (0.3%)	1 (0.2%)



Religion			
Anglicans/Pentecostals	47 (35.6%)	120 (35.4%)	167 (35.5%)
Born Again Christians	20 (15.2%)	59 (17.4%)	79 (16.8%)
Catholics	47 (35.6%)	115 (33.9%)	162 (34.4%)
Muslims	16 (12.1%)	28 (8.3%)	44 (9.3%)
Other	1 (0.8%)	8 (2.4%)	9 (1.9%)
Seventh Day Adventist	1 (0.8%)	8 (2.4%)	9 (1.9%)
Region of institute location			
Central	35 (26.5%)	150 (44.2%)	185 (39.3%)
Eastern	86 (65.2%)	144 (42.5%)	230 (48.8%)
Northern	5 (3.8%)	16 (4.7%)	21 (4.5%)
Western	6 (4.5%)	28 (8.3%)	34 (7.2%)
Participant			
Instructor	39 (29.5%)	157 (46.3%)	196 (41.6%)
Trainee	93 (70.5%)	182 (53.7%)	275 (58.4%)
Marital status			
Married	32 (24.2%)	132 (38.9%)	164 (34.8%)
Other	1 (0.8%)	1 (0.3%)	2 (0.4%)
Single	95 (72.0%)	206 (60.8%)	301 (63.9%)
Widowed	4 (3.0%)	0 (0%)	4 (0.8%)
Highest education level of trainer			
Bachelor's degree	17 (19.5%)	70 (80.5%)	87 (100%)
Diploma	17 (17.7%)	79 (82.3%)	96 (100%)
Master's degree	3 (23.1%)	10 (76.9%)	13 (100%)
Field/Department			
Automotive Mechanics	17 (12.9%)	77 (22.7%)	94 (20.0%)
Building and Construction	22 (16.7%)	41 (12.1%)	63 (13.4%)
Carpentry and Joinery	6 (4.5%)	18 (5.3%)	24 (5.1%)
Electrical Installation Systems and Maintenance	23 (17.4%)	50 (14.7%)	73 (15.5%)
Electronics	5 (3.8%)	9 (2.7%)	14 (3.0%)
Fashion and Garment Design	24 (18.2%)	34 (10.0%)	58 (12.3%)
Fitting and Machining	8 (6.1%)	20 (5.9%)	28 (5.9%)
Other	24 (18.2%)	63 (18.6%)	87 (18.5%)
Welding and Fabrication	3 (2.3%)	27 (8.0%)	30 (6.4%)
Years of experience of trainer			
1-5 years	0 (0%)	163 (83.2%)	163 (83.2%)
6-10 years	0 (0%)	33 (16.8%)	33 (16.8%)
Less than 1 year	0 (0%)	0 (0%)	0 (0%)
More than 10 years	0 (0%)	0 (0%)	0 (0%)
Type of place of residence of trainer			
rural	65 (49.2%)	97 (28.6%)	162 (34.4%)
urban	67 (50.8%)	241 (71.1%)	308 (65.4%)
Period of stay of trainer			
1-5 years	67 (50.8%)	169 (49.9%)	236 (50.1%)
6-10 years	10 (7.6%)	35 (10.3%)	45 (9.6%)
Less than 1 year	42 (31.8%)	102 (30.1%)	144 (30.6%)
More than 10 years	13 (9.8%)	32 (9.4%)	45 (9.6%)
Income Generating Activities (IGA)			
no	80 (60.6%)	135 (39.8%)	215 (45.6%)
yes	52 (39.4%)	203 (59.9%)	255 (54.1%)
Internet access			
no	30 (22.7%)	13 (3.8%)	43 (9.1%)
yes	102 (77.3%)	326 (96.2%)	428 (90.9%)
Internet provider			
funder as a donation	1 (0.8%)	1 (0.3%)	2 (0.4%)
institution	23 (17.4%)	89 (26.3%)	112 (23.8%)



other	2 (1.5%)	6 (1.8%)	8 (1.7%)
personal investment	76 (57.6%)	230 (67.8%)	306 (65.0%)
Internet hours			
1 hour	12 (9.1%)	35 (10.3%)	47 (10.0%)
2 hours	22 (16.7%)	64 (18.9%)	86 (18.3%)
3 hours	25 (18.9%)	49 (14.5%)	74 (15.7%)
4 hours	12 (9.1%)	50 (14.7%)	62 (13.2%)
5+ hours	34 (25.8%)	128 (37.8%)	162 (34.4%)
Visited institutions			
Iganga TI	53 (40.2%)	111 (32.7%)	164 (34.8%)
Jinja VTI	33 (25.0%)	39 (11.5%)	72 (15.3%)
Lugogo VTI	9 (6.8%)	24 (7.1%)	33 (7.0%)
Minakulu TI	5 (3.8%)	16 (4.7%)	21 (4.5%)
Nakawa VTC	8 (6.1%)	46 (13.6%)	54 (11.5%)
Ntinda VTI	19 (14.4%)	80 (23.6%)	99 (21.0%)
Nyamitanga TI	5 (3.8%)	23 (6.8%)	28 (5.9%)

Source: Primary Data Collection, 2025

Table 1 show that males (75%; $n = 254$) were more in support of online teaching in TVET as compared to females (25%; $n = 84$). The highest proportion (49%) of participants from the Eastern region of Uganda supported the integration of online teaching in TVET, followed by those in the Central region (21%), the Western region (18%), and lastly the Northern region (12.4%). This could be because most of the trainees and trainers travel longer distances to come to the TVET institutions in the Eastern region; therefore, they believed that having blended online studies would create a bit of convenience for them. In terms of religion, almost equal proportions of Anglicans/Pentecostals (35.4%) and Catholics (33.9%) supported online learning, followed by Born Again Christians (17.4%) and Muslims (8.3%), with the least support from Seventh Day Adventists and other faiths (2.4% each).

The Western region had the highest level of support, with 61 of 75 respondents (81.3%) expressing support, followed closely by the Central region, where 70 of 88 respondents (79.5%) supported online teaching. The Northern region also demonstrated relatively high support, with 42 of 55 respondents (76.4%) in favor. Although the Eastern region contributed the largest number of respondents who supported online teaching (165 respondents), this represented only 65.5% of respondents from that region, indicating a lower level of support relative to the Central, Northern, and Western regions.

Out of the 339 participants who were in support of online teaching, 157 were instructors (46%), and 182 were trainees (54%). This shows that slightly more trainees desired online teaching than the instructors. Regarding marital status, most supporters were single (60.8%), followed by married participants (38.9%).

Concerning the trainers, about 81% ($n = 87$) of the trainers with a Bachelor's degree hailed the functionality of online teaching. 82% of the trainers with a diploma showed support for online teaching, while 77% of those with a Master's degree were impressed by the idea. The percentages show a linear trend of support. Almost all trainers, regardless of level of education, believe online teaching is a magical transition.

With respect to the field of specialization, the largest proportions came from Automotive Mechanics (22.7%), followed by Electrical Installation (14.7%), Building and Construction (12.1%), and Fashion and Garment Design (10%), with lower proportions from Carpentry, Electronics, Fitting and Machining, Welding, and others.

Of the 196 trainees, 83% ($n = 163$) of those with less than 5 years in the field were in support of online classes, while about 17% of those with less than 10 years of experience supported online classes at TVET institutions. This implies that fresh instructors come with new ideas of teaching and are compatible with online teaching as a medium of instruction.

Access to resources strongly shaped perceptions: most who supported online learning had reliable internet access (96.2%), with the majority funding their own connections (67.8%) or relying on institutions (26.3%). Those who used the internet for more than 5 hours a day (37.8%) were the strongest supporters, followed by those with 2–3 hours of usage. Finally, by institution, the largest support came from Ntinda VTI (23.6%) and Iganga TI (32.7%), followed by Nakawa VTC (13.6%), Nyamitanga TI (6.8%), Lugogo VTI (7.1%), Minakulu TI (4.7%), and Jinja VTI (11.5%).

4.2 Classroom management competence among TVET trainers in Uganda

The first objective assessed classroom management competence among TVET trainers in Uganda. This was achieved by examining variations in classroom management competence across TVET institutions, participants'

educational levels, and online teaching experience, as well as comparing competence levels between online-savvy and non-online-savvy participants. The results are shown below.

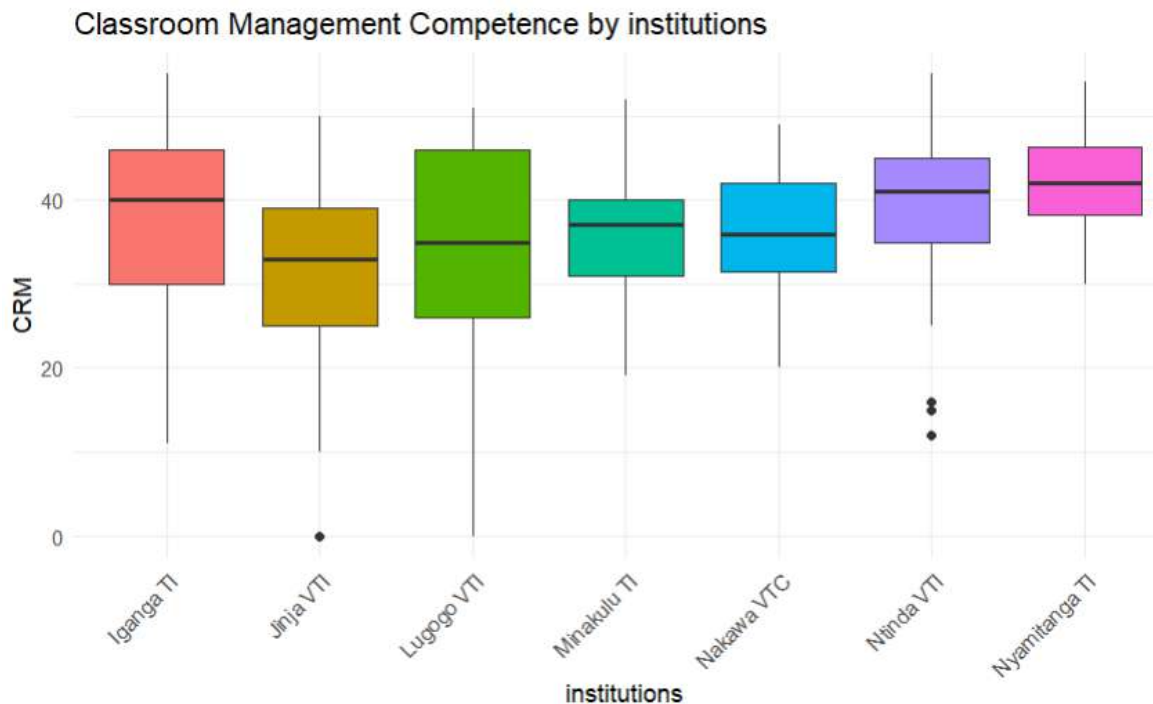


Figure 1: Classroom management competence by the TVET institutions

According to Figure 1, Nyamitanga TI recorded the highest median classroom management competence scores, followed by Ninda VTI, Iganga TI, Minakulu TI, and Nakawa VTC, while Lugogo VTI and Jinja VTI registered the lowest scores. Classroom management competence was assessed based on three key indicators: the availability of adequate facilities to support functional online classes, the institution's willingness to adopt online learning, and the commitment to integrating online classes with traditional face-to-face teaching approaches.

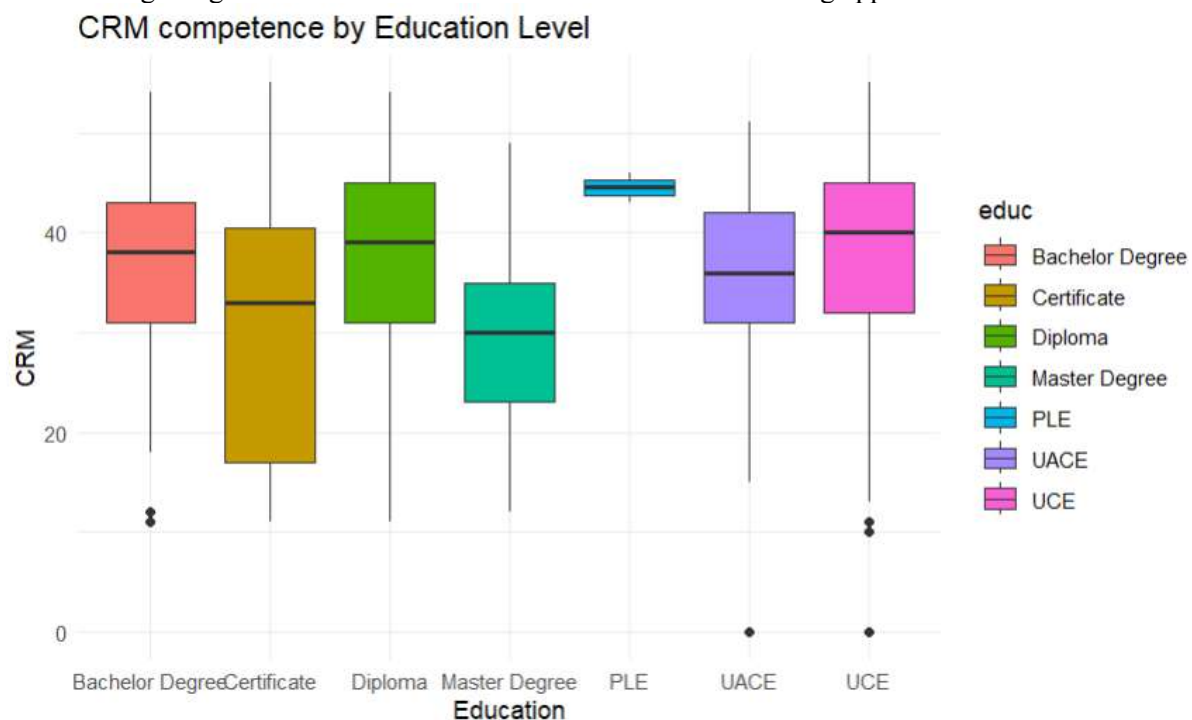


Figure 2: Classroom management competence by highest education level.

As seen in Figure 2, the boxplot shows that individuals with a Bachelor's Degree and those with PLE (Primary Leaving Examination) exhibit the highest median scores in classroom management competence. The Bachelor group



shows a relatively high and consistent distribution, while the PLE group, despite its narrow range, has an elevated median. In contrast, Master's Degree holders display a lower median CRM score, and the Certificate, Diploma, UACE, and UCE groups fall somewhere in between, with wider variability and more outliers.

While Bachelor's Degree holders (mostly trainers) show strong median CRM scores, individuals with only Primary Leaving Examination (mostly trainees) also demonstrate significantly high competence, despite their lower formal education level. Meanwhile, Master's degree holders typically considered more educated, show comparatively lower median CRM scores, probably due to their current university curriculum, which focuses on more diverse theoretical aspects than practical skills. This pattern implies that practical classroom management skills may be shaped more by experience, context, or personal aptitude than by academic attainment alone. Competence, in this case, appears across both ends of the educational spectrum.

Table 2: Differences in CRM between online-savvy and non-online-savvy participants

Classroom Management Dimensions	<i>t</i>	<i>df</i>	<i>p</i>	<i>d</i>	95% CI
Online class activities are effectively managed and organized.	-3.46	197.96	.001***	-0.39	[-0.60, -0.19]
Trainees have full-time access and flexibility to an online teaching	-4.20	201.97	< .001***	-0.47	[-0.67, -0.27]
Online classes start and end as scheduled	-3.82	209.44	< .001***	-0.42	[-0.62, -0.22]
The online learning environment is inclusive, respects diversity	-5.02	205.59	< .001***	-0.56	[-0.76, -0.35]
Student participation is adequately monitored	-3.03	222.14	.003**	-0.32	[-0.52, -0.12]
Technical issues are addressed promptly to minimize disruptions	-4.40	210.27	< .001***	-0.48	[-0.69, -0.28]
A sense of community is promoted among online learners	-3.64	202.12	< .001***	-0.41	[-0.61, -0.21]
Clear expectations for online behavior and etiquette are set	-5.61	203.61	< .001***	-0.63	[-0.83, -0.42]
Feedback from participants is used to improve class management.	-5.13	187.36	< .001***	-0.60	[-0.81, -0.40]
There is stable internet to both the instructors and trainees	-2.40	230.71	.017*	-0.25	[-0.45, -0.05]
There is an appropriate use of the software by the trainers	-4.28	214.93	< .001***	-0.46	[-0.67, -0.26]

Source: Primary Data Collection, 2025

The results in Table 2 reveal significant differences in classroom management competence (CRM) between online-savvy and non-online-savvy participants across nearly all dimensions assessed. Based on the t-test results, there was a statistically significant difference in the reporting regarding whether online class activities are effectively managed and organized between online-savvy participants and non-online-savvy participants ($t = -3.46$, $p = .001$, $d = -0.39$). Additionally, they expressed significant discernment regarding the trainees having full-time access and flexibility to online teaching ($t = -4.20$, $p < .001$, $d = -0.47$). A higher Cohen's d shows a stronger effect size than the previous dimension. Similarly, there was a significant difference in perceptions about whether online classes start and end as scheduled ($t = -3.82$, $p < .001$, $d = -0.42$), and whether the online learning environment is inclusive and respectful of diversity ($t = -5.02$, $p < .001$, $d = -0.56$). The latter reflects one of the larger effect sizes, indicating a more pronounced difference between the two groups. Participants also differed significantly in their views on whether student participation is adequately monitored ($t = -3.03$, $p = .003$, $d = -0.32$) and whether technical issues are addressed promptly ($t = -4.40$, $p < .001$, $d = -0.48$). Both results highlight moderate effect sizes, suggesting meaningful but not extreme differences. A sense of community among online learners was another area with significant differences ($t = -3.64$, $p < .001$, $d = -0.41$), as was the establishment of clear expectations for online behavior and etiquette ($t = -5.61$, $p < .001$, $d = -0.63$). The latter represents the strongest effect size across all dimensions, underscoring substantial differences in perceptions. Feedback utilization also showed a significant divergence, with participants reporting that feedback from trainees is used to improve class management ($t = -5.13$, $p < .001$, $d = -0.60$), again indicating a large effect size. Finally, more modest yet significant differences were found in perceptions of internet stability ($t = -2.40$, $p = .017$, $d = -0.25$), and the

appropriate use of software by trainers ($t = -4.28, p < .001, d = -0.46$). While the internet stability dimension showed the weakest effect size, it was still statistically meaningful.

4.3 Relationships between classroom management competence and online teaching effectiveness among TVET participants

The second objective examined the relationship between classroom management competence and online teaching effectiveness among TVET participants. This was achieved by assessing the association between trainers' classroom management competence and their perceived effectiveness in online teaching using correlation analysis. The findings are shown below.

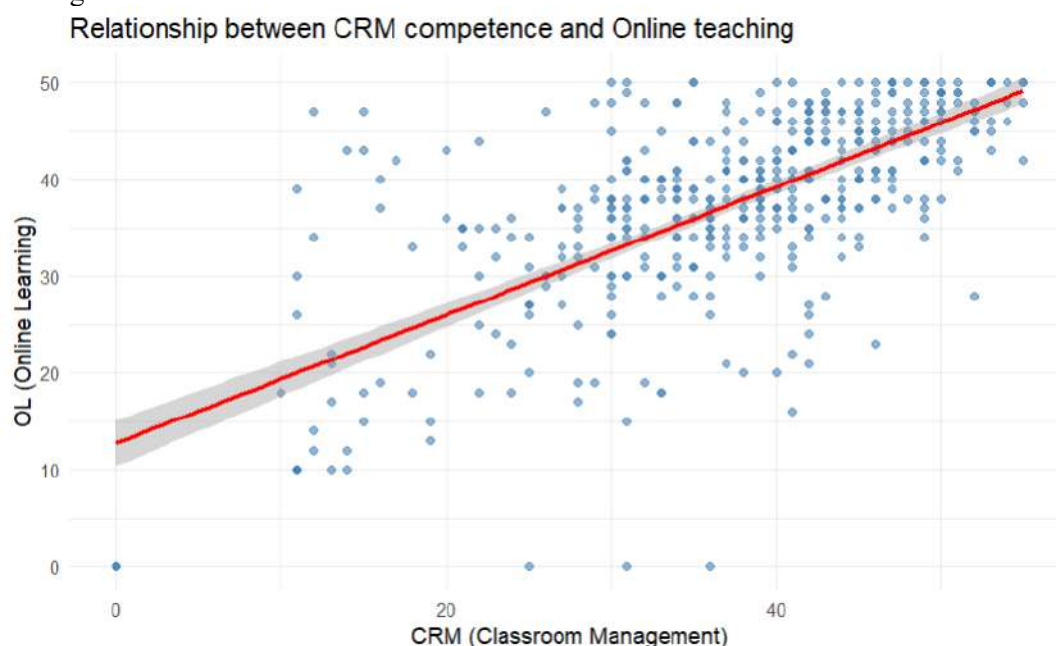


Figure 2: Scatterplot showing the correlation between CRM and online teaching effectiveness

Figure 2 shows that there is a strongly positive correlation between trainer classroom management competences with online teaching effectiveness. This implies that trainers who excelled in managing classroom dynamics, setting clear expectations, managing learning equipment, and handling disruptions from both the trainees and the gadgets tend to have more effective online teaching experiences and success. Figure 3 below shows the median scores for classroom management competence by the level of education.

4.4 Effect of classroom management competence on online teaching effectiveness among TVET trainers in Uganda

The third objective determined the predictive effect of classroom management competence on online teaching effectiveness among TVET trainers in Uganda. This was achieved using an OLS regression model to examine the contribution of classroom management competence while controlling for selected participant and institutional characteristics.

Table 3: Predicting online teaching effectiveness based on CRM and other covariates

	OL						
Predictors	Estimates	std. Error	std. Beta	standardized std. Error	CI	standardized CI	p
(Intercept)	13.58	2.23	-0.04	0.20	- Inf – Inf	-Inf – Inf	<0.001
CRM	0.63	0.04	0.66	0.04	- Inf – Inf	-Inf – Inf	<0.001



experience [More than 10 yrs]	15.24	3.25	0.12	0.31	- Inf – Inf	-Inf – Inf	0.004
educ [Master Degree]	10.88	2.74	-0.28	0.26	- Inf – Inf	-Inf – Inf	0.049
internet hours [5+ hours]	7.50	4.65	0.71	0.44	- Inf – Inf	-Inf – Inf	0.008
Electrical Inst Systems Mtce.	-3.71	1.19	-0.35	0.11	- Inf – Inf	-Inf – Inf	0.002
field [Electronics]	-5.09	2.29	-0.49	0.22	- Inf – Inf	-Inf – Inf	0.027
field [Other]	-2.90	1.14	-0.28	0.11	- Inf – Inf	-Inf – Inf	0.011
institutions [Lugogo VTI]	3.62	1.67	0.35	0.16	- Inf – Inf	-Inf – Inf	0.031
institutions [Nakawa VTC]	3.40	1.54	0.32	0.15	- Inf – Inf	-Inf – Inf	0.028
institutions [Ntinda VTI]	2.42	1.05	0.23	0.10	- Inf – Inf	-Inf – Inf	0.021

Observations 471

R^2 / R^2 adjusted 0.542 / 0.509

Source: Primary Data Collection, 2025

The coefficient of determination ($R^2 = 0.542$) in Table 3 implies that classroom management competence (CRM) and other covariates account for 54% of the variation in online teaching effectiveness, highlighting a substantial explanatory power of the model. Among these predictors, CRM emerged as the strongest determinant ($\beta = 0.66, p < .001$), indicating that a one-unit improvement in CRM translates into a 63% expansion in online teaching effectiveness. Teaching experience also contributed meaningfully, with participants possessing more than 10 years of experience showing a positive effect ($\beta = 0.12, p = 0.004$), suggesting that highly experienced trainers are more inclined to adopt online teaching compared to their less experienced peers. Regarding education level, the model shows that having a Master's degree was associated with improvements in online teaching ($\beta = 10.88, p = 0.049$). Simply put, trainers with a Master's degree were more attracted to holding online classes as compared to Diploma and Certificate holders. Moreover, digital exposure played a strong role, as trainers spending five or more hours online daily exhibited a significant positive effect ($\beta = 0.71, p = 0.008$), reflecting the vital importance of sustained engagement with digital platforms. Conversely, field of specialization revealed noteworthy constraints, with trainers from Electrical Installation Systems and Maintenance ($\beta = -0.35, p = 0.002$), Electronics ($\beta = -0.49, p = 0.027$), and other unspecified fields ($\beta = -0.28, p = 0.011$) significantly less likely to adopt online teaching, possibly due to the inherently practical and hands-on nature of these disciplines. Finally, institutional factors also proved influential: trainers from Lugogo VTI ($\beta = 0.35, p = 0.031$), Nakawa VTC ($\beta = 0.32, p = 0.028$), and Ntinda VTI ($\beta = 0.23, p = 0.021$) were significantly more likely to adopt online teaching compared to their counterparts in other institutions, suggesting that organizational readiness and infrastructure play a critical role in shaping adoption outcomes.

Diagnostic Tests for the OLS Regression Model

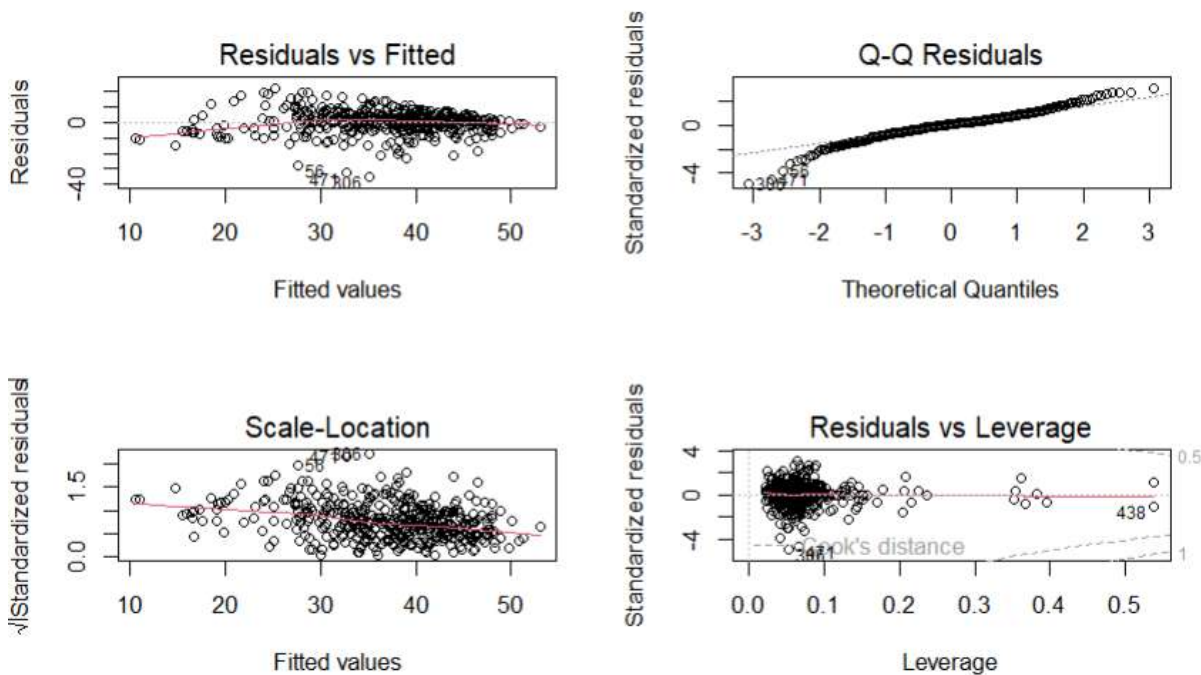


Figure 3: Diagnostic Check Plot

The residuals vs fitted plot shows a roughly random scatter, supporting linearity, though slight patterns hint at possible non-linearity or mild heteroscedasticity. The Q-Q plot indicates that residuals are approximately normally distributed, with minor deviations at the tails. The scale-location plot shows fairly constant variance across fitted values, though some variation suggests mild heteroscedasticity. Finally, the residuals vs leverage plot flags one potentially influential observation (point 438), which may warrant further investigation to ensure it's not unduly affecting the model's estimates. Therefore, the diagnostic plots suggest that the linear regression model is generally acceptable but not flawless.

4.5 Discussion

The findings indicate that classroom management competence varies across TVET institutions in Uganda and differs significantly between online-savvy and non-online-savvy participants. The strongest differences were observed in setting clear expectations for online behaviour, using feedback to improve class management, promoting an inclusive learning environment, and managing online activities. These findings are consistent with Pulham and Graham (2018), who identified flexibility, personalization, data usage, and software management among important competencies for online and blended teaching. They also agree with Martin et al. (2019) and Sudrajat (2020), who emphasized the importance of online teaching competence, class management skills, and communication competencies in preparing teachers for effective online instruction. The institutional differences observed in this study may reflect variations in digital exposure, institutional readiness, and access to resources.

The study also found a strong positive relationship between classroom management competence and online teaching effectiveness. Trainers, who were better able to organize online activities, establish clear expectations, monitor participation, manage technical disruptions, and promote interaction tended to report more effective online teaching experiences. This finding is consistent with Pulham and Graham (2018), Martin et al. (2019), Badiozaman (2023), and Bolliger and Halupa (2021), who emphasized the importance of pedagogical and online teaching competencies in effective technology-supported instruction. In the TVET context, the finding is particularly relevant because online delivery presents additional challenges for practical skills training (Mutebi et al. 2023; Barigye, 2024).

More importantly, the regression analysis demonstrated that classroom management competence was the strongest predictor of online teaching effectiveness ($\beta = 0.66$, $p < .001$), while the model explained 54.2% of the variation in online teaching effectiveness ($R^2 = 0.542$). This finding suggests that effective online teaching depends not only on access to digital technologies but also on trainers' ability to manage the learning environment. Other factors, including



teaching experience, internet use, field of specialization, and institution, also contributed significantly to the model, indicating that online teaching effectiveness is shaped by both individual and institutional conditions.

The findings provide support for the TPACK framework of Mishra and Koehler (2006), which emphasizes the integration of technological, pedagogical, and content knowledge for effective technology-supported teaching. In this study, classroom management competence represents an important pedagogical capability through which trainers organize and facilitate online learning. The findings therefore suggest that strengthening TVET trainers' classroom management and pedagogical competencies, alongside improving digital infrastructure, may enhance the effectiveness of online teaching in Uganda.

V. CONCLUSION AND RECOMMENDATIONS

5.1 Conclusion

This study demonstrates that classroom management competence is a significant predictor of online teaching effectiveness in Ugandan TVET institutions. The findings show that effective online teaching extends beyond digital literacy and course design to include the ability of trainers to organize virtual learning activities, establish clear expectations, monitor participation, address technical and learner-related disruptions, provide feedback, and foster engagement. Classroom management competence emerged as the strongest predictor of online teaching effectiveness, explaining a substantial proportion of the observed variation when considered alongside other participant and institutional factors. The study therefore highlights classroom management as an important component of effective online TVET delivery and provides a basis for strengthening trainer preparation and institutional support for online vocational education in Uganda and similar contexts.

5.2 Recommendations

Based on the findings, three key recommendations are proposed. First, TVET policy and reform frameworks should integrate classroom management competence into digital pedagogy and online teaching capacity-building programmes, rather than focusing exclusively on technical ICT skills. Second, TVET institutions should strengthen trainers' capacity in online classroom management, learner engagement, feedback, and management of technical disruptions, with particular attention to practical and hands-on disciplines where online delivery presents greater challenges. Third, further research should examine blended teaching models that combine face-to-face practical training with online learning and classroom management strategies to determine how discipline-specific challenges can be effectively addressed.

Declaration of Interest

The authors declare that they do not have any known competing financial interests or personal relationships that could have appeared to influence the work reported in this paper.

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