

Comparison of skills acquired during professional development trainings and training needs of TVET Trainers in Uganda

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<https://doi.org/10.51867/ajernet.7.3.81>

ABSTRACT

Technical and Vocational Education and Training (TVET) systems depend fundamentally on the competence and adaptability of trainers. In Uganda, Continuous Professional Development (CPD) initiatives have been implemented through government and development partner interventions, yet questions remain regarding their alignment with trainers' professional development needs. Guided by Experiential Learning Theory, this study examined the skills acquired through CPD and the professional development skills and competencies still needed by TVET trainers. The study adopted a pragmatic research paradigm and a mixed-methods explanatory sequential research design. Quantitative data were collected from 204 TVET trainers from 24 TVET institutions in Uganda's Central Region using structured questionnaires, while qualitative data were obtained from 10 purposively selected key informants from the Ministry of Education and Sports TVET Department and Education Development Partners. Quantitative data were analysed using descriptive statistics, including frequencies, percentages, means and standard deviations, and regression analysis, while qualitative data were analysed thematically. The findings revealed a high level of reported skills acquisition alongside substantial continuing professional development needs. The strongest acquired skills included modern hands-on skills, communication, ICT competence and modern pedagogical skills, while major continuing needs included ICT integration, additional technical skills, assessment and evaluation, pedagogy, curriculum development and classroom management. The study concludes that CPD is contributing to substantial skills acquisition but does not fully address trainers' evolving professional development needs. It recommends a competency-based, practice-oriented CPD framework that prioritises ICT integration, technical updating, assessment, pedagogy, curriculum development and classroom management while maintaining existing strengths in communication, innovation and entrepreneurship.

Keywords: Continuous Professional Development; Professional Competencies; Skills Acquisition; TVET Trainers; Training Needs; Uganda.

I. INTRODUCTION

It is argued that Technical and Vocational Education and Training (TVET) is crucial in cultivating the practical and employable skills which are needed for Ugandan labour market and quality and relevance of TVET are hugely influenced by competences of TVET trainers who must remain up-to-date with both technical know-how and modern pedagogy and assessment methodology, digital and work-based methodology. Competences development for instructor is perceived to be an important element of the TVET system under the Ministry of Education and Sports and there are provision for continuous updating of teacher, tutors and instructor (Okumu & Bbaale, 2019).

CPD therefore is very significant in helping TVET instructors keeping abreast of technology, changing vocational and industry needs and innovative teaching and assessment methods. A research carried out in Uganda shows that CPD for TVET trainers generally feel like training is relevant and shows positive impact on instructor's competences (Wendi et al., 2025) though their actual implementation are rather disfragmented and problems like limited access, lack of support at the institution level, inadequate funding and reliance on donors or individuals exist (Sempala et al., 2025a). This CPD provision is indeed highlighted within the TVET policy framework to enable capacity building in Uganda and strengthen the relation between TVET delivery, industry and labour market.

A changing world of work also implies a constant need for upgrading skills and know-how among instructors. Besides Technical competences, TVET trainers more often than not need to possess digital competences as well as modern teaching methodology, training delivery skills, assessment competences, creativity and communication skills, entrepreneurship, and the capability of managing modern machinery and equipment (Mustaffa et al., 2025). Therefore, participation in the CPD program does not necessarily suggest that the instructors' development needs have been completely addressed and they can still learn or re-learn even after they have acquired certain competencies.

1.1 Statement of the Problem

Despite continuing investment in professional development, evidence suggests that the professional development of TVET trainers in Uganda is not yet sufficiently systematic or responsive to emerging competency requirements. Recent research reports that CPD activities are often fragmented and unevenly accessible, while mechanisms for systematically identifying trainers' specific development needs remain inadequate (Sempala et al., 2025a, 2025b). The Ministry of Education and Sports has likewise emphasized the need for capacity development within the TVET system.

Existing Ugandan studies have examined the availability, implementation and effectiveness of CPD programmes and have identified challenges in access, institutional support, needs identification and alignment with labour-market requirements (Sempala et al., 2025a, 2025b). However, limited empirical attention has been given to the alignment between skills acquired through professional development training and trainers' continuing professional development needs. In particular, it remains unclear whether areas in which trainers report high levels of acquired competence are also areas in which they continue to perceive substantial training needs. This study addresses this gap by directly examining the relationship between reported skills acquired during professional development training and the professional development needs of TVET trainers in Uganda.

1.2 Research Objectives

- i. To determine the skills TVET trainers report acquiring through professional development training
- ii. To determine the professional development skills and competencies that TVET trainers report needing.

II. LITERATURE REVIEW

2.1 Theoretical Framework

2.1.1 Experiential Learning Theory

This study is anchored in Experiential Learning Theory (ELT) developed by Kolb (1984). Experiential Learning Theory views learning as a continuous process through which individuals develop knowledge and skills by transforming experience. The learning process involves four interrelated stages: concrete experience, reflective observation, abstract conceptualisation, and active experimentation (Kolb, 1984; Kolb & Kolb, 2009). Learning therefore does not end with participation in a training activity; rather, the knowledge and skills acquired through training become meaningful when learners reflect on the experience, conceptualise what they have learned and apply it in practice.

ELT is particularly relevant to TVET trainer professional development because TVET training is strongly practice-oriented. Trainers are expected to continuously update their technical knowledge, use modern equipment and technologies, apply appropriate pedagogical approaches and translate new knowledge into effective training practices. Professional development activities such as workshops, demonstrations, industry attachments, practical training and peer learning can provide concrete experiences from which trainers develop new competencies. The subsequent application of these competencies in teaching and workplace-related activities provides opportunities for further reflection and learning.

The theory also helps explain why participation in professional development does not necessarily eliminate training needs. Trainers may acquire a particular skill during CPD but discover, through subsequent application, that they require deeper knowledge or additional skills. Professional learning can therefore be viewed as a continuing cycle rather than a one-time event. Guskey's model of teacher change similarly emphasizes that professional development is linked to changes in classroom practice and that sustained change depends on what happens when teachers apply new practices in their work (Guskey, 1986).

In the context of this study, ELT provides a basis for understanding the relationship between skills acquired through professional development training and continuing professional development needs. The acquired skills represent learning outcomes arising from previous training experiences, while the reported training needs represent areas in which further experience, reflection, conceptual development or application may be required. The theory therefore supports the study's assumption that professional competence develops progressively through repeated cycles of learning and application.

The theory is also consistent with recent research on TVET professional development. For example, Sempala, Ochieng' and Kisilu (2025) applied Experiential Learning Theory in examining mechanisms for identifying professional development needs among TVET master trainers in Uganda. Their study emphasized the importance of systematic identification of training needs and the connection between professional learning and trainer competence.

2.2 Empirical Review

2.2.1 Skills Acquired by TVET Trainers through Professional Development Training

Recent empirical evidence indicates that professional development can strengthen the technical, pedagogical and digital competencies of TVET trainers. In Uganda, Sempala, Ochieng' and Kisilu (2025a), in a mixed-methods

study of TVET master trainers, found a significant positive relationship between CPD practices and trainer competences ($r = .459$), with CPD explaining 21.1% of the variance in professional competence. However, the authors also found that CPD provision was fragmented and unevenly accessible, suggesting that the acquisition of competencies depends partly on the quality and consistency of professional development opportunities.

Evidence from other TVET contexts similarly identifies technical, pedagogical and digital skills as important outcomes of professional development. Njenga (2024a), studying 170 TVET teachers in Kenya, found that CPD activities focused more frequently on subject-content knowledge than pedagogical knowledge, highlighting the continuing importance of balancing occupational and teaching competencies.

These studies demonstrate that CPD can contribute to a broad range of trainer competencies, but they also suggest that the competencies acquired depend on the content and design of professional development. The present study therefore examines the specific skills that TVET trainers in Uganda report acquiring through professional development training, including technical, ICT, pedagogical, communication, creativity, entrepreneurship and equipment-related skills. This provides context for assessing whether current CPD provision is developing the competencies required for effective TVET training.

2.2.2 Professional Development Skills and Competencies TVET Trainers Report Needing

Studies show that TVET trainers require continuous professional development because occupational technologies, workplace practices and approaches to teaching are continually changing. Sempala, Ochieng' and Kisilu (2025b) found that training-needs identification among Ugandan TVET master trainers requires more systematic and competency-focused approaches. Their findings emphasize individualized CPD planning, industry engagement, trainee feedback and stronger monitoring mechanisms to ensure that professional development responds to actual competency requirements.

Digitalisation has further expanded trainers' professional development needs. In China, Xin, Tang and Mou (2024) found that TVET teachers had substantial variation in digital competence and identified digital knowledge, digital teaching, digital collaboration and professional development as important competency areas. Similarly, research on TVET teacher competencies in the digital age identifies curriculum development, vocational expertise, digital competence, and facilitation of learning and professional self-development as core areas requiring continuing development (Njenga, 2026).

The evidence therefore suggests that TVET trainers' needs extend beyond additional technical knowledge to include pedagogical, assessment, curriculum, classroom-management and digital competencies. This is particularly important in Uganda, where recent research recommends more systematic identification of trainer needs rather than relying mainly on conventional appraisal processes. The present study consequently examines the professional development skills and competencies that Ugandan TVET trainers report needing, with particular attention to technical skills, pedagogy, ICT, assessment and evaluation, curriculum development and classroom management.

III. METHODOLOGY

3.1 Research Design

The study adopted a mixed-methods explanatory sequential design. The quantitative phase was used to determine the skills TVET trainers reported acquiring through professional development training and the professional development skills and competencies they reported needing. The qualitative phase complemented the quantitative findings by providing further explanations and contextual understanding of trainers' experiences and professional development needs. A mixed-methods approach was considered appropriate because it enabled the study to combine numerical evidence with participants' explanations of the issues under investigation.

3.2 Study Area

The study was conducted in TVET institutions in Uganda's Central Region. The region was selected because it has TVET institutions with active Continuous Professional Development (CPD) programmes, providing an appropriate context for examining the skills acquired through CPD and the professional development needs of TVET trainers.

3.3 Target Population

The target population comprised TVET trainers in institutions with active CPD programmes in Uganda's Central Region, together with key stakeholders involved in CPD policy and implementation. The quantitative component comprised 204 trainers from 24 TVET institutions, while the qualitative component involved 10 key informants drawn from the Ministry of Education and Sports (MoES) TVET Department and Education Development Partners (EDPs) involved in CPD.

3.4 Sampling and Sample Size

TVET institutions in Uganda's Central Region with active CPD programmes were targeted for the study. The quantitative sample comprised 204 trainers and administrators from 24 TVET institutions. For the qualitative component, 10 key informants were purposively selected from the MoES TVET Department and EDPs involved in CPD. The quantitative and qualitative samples were therefore selected using different approaches appropriate to their respective purposes: the quantitative component provided broader representation of staff perceptions, while purposive selection of key informants provided contextual information on CPD policy and implementation.

3.5 Data Collection Instruments and Procedures

Data were collected using structured questionnaires and interviews. The questionnaire contained Likert-scale items measuring skills acquired through professional development training and professional development skills and competencies still required by TVET trainers. The interview component was used to obtain qualitative explanations and contextual information that could complement the quantitative findings.

Data collection was conducted after obtaining the necessary institutional permissions and informed consent from participants. Respondents were informed about the purpose of the study and their participation was voluntary. Completed questionnaires were checked for completeness before analysis, while interview responses were documented and prepared for thematic analysis.

3.6 Data Analysis

Quantitative data were coded and analysed using Statistical Package for the Social Sciences (SPSS), Version 26. Descriptive statistics, including frequencies, percentages, means and standard deviations, were used to summarize the skills acquired and professional development needs of the respondents. The results were presented in tables to facilitate comparison across the measured competency areas. Regression analysis was used to examine predictors of professional development outcomes, where applicable. Qualitative interview data were analysed thematically by identifying, coding and organizing recurring ideas and patterns relating to skills acquired and continuing professional development needs. The quantitative and qualitative findings were subsequently interpreted together to provide a more comprehensive understanding of the study findings.

3.7 Ethical Considerations

Ethical principles were observed throughout the study. Participation was voluntary, and respondents were informed about the purpose of the research before providing consent. Participants were assured that the information they provided would be treated confidentially and used only for academic purposes. Personal identifiers were not disclosed in reporting the findings, and respondents were free to decline participation or withdraw from the study without penalty. The study also obtained the required permission from the relevant authorities and participating institutions before data collection.

IV. FINDINGS & DISCUSSION

4.1 Findings

4.1.1 Skills Acquired by TVET Trainers through Professional Development Training

The study examined the skills that TVET trainers reported acquiring through professional development training. The findings indicate a generally high level of reported skills acquisition across all measured areas. The results are presented in Table 1.

Table 1

Skills Acquired during Training (N=204)

Statement	SD	D	NS	A	SA	Mean	SD
ICT competence and computer use	1 (0.5%)	3 (1.5%)	14 (6.9%)	50 (24.5%)	136 (66.7%)	4.56	0.70
Creative and innovation skills	2 (1.0%)	4 (2.0%)	16 (7.8%)	54 (26.5%)	128 (62.7%)	4.48	0.76
Entrepreneurship and business solutions	2 (1.0%)	5 (2.5%)	18 (8.8%)	56 (27.5%)	123 (60.3%)	4.44	0.78
Effective communication skills	1 (0.5%)	2 (1.0%)	12 (5.9%)	48 (23.5%)	141 (69.1%)	4.60	0.66
Modern hands-on skills	1 (0.5%)	1 (0.5%)	10 (4.9%)	46 (22.5%)	146 (71.6%)	4.64	0.61
Modern pedagogical skills	1 (0.5%)	3 (1.5%)	13 (6.4%)	52 (25.5%)	135 (66.2%)	4.56	0.69
Knowledge and skills in use of new machinery/equipment	2 (1.0%)	4 (2.0%)	15 (7.4%)	54 (26.5%)	129 (63.2%)	4.49	0.75
Knowledge and skills in equipment and workshop maintenance	2 (1.0%)	5 (2.5%)	17 (8.3%)	56 (27.5%)	124 (60.8%)	4.45	0.78
Subscale Mean						4.53	0.72

Table 1 show that modern hands-on skills recorded the highest mean ($M = 4.64$, $SD = 0.61$), followed by effective communication skills ($M = 4.60$, $SD = 0.66$). ICT competence and computer use and modern pedagogical skills both recorded a mean of 4.56, with standard deviations of 0.70 and 0.69, respectively. Other highly rated skills included knowledge and skills in new machinery and equipment ($M = 4.49$, $SD = 0.75$), creativity and innovation ($M = 4.48$, $SD = 0.76$), equipment and workshop maintenance ($M = 4.45$, $SD = 0.78$) and entrepreneurship and business solutions ($M = 4.44$, $SD = 0.78$). The results further show that the proportion of respondents giving positive responses (Agree or Strongly Agree) was high across all the measured skills. For example, 91.2% reported positively on ICT competence and computer use, while 94.1% reported positively on modern hands-on skills. Effective communication skills recorded 92.6% positive responses. These findings indicate that trainers generally perceived professional development training as having equipped them with a broad range of technical, digital, pedagogical and transferable skills.

4.1.2 Professional Development Skills and Competencies Needed by TVET Trainers

The study also examined the professional development skills and competencies that TVET trainers reported needing. The results are presented in Table 2.

Table 2

Professional development needs of TVET trainers (N=204)

Statement	SD f(%)	D f(%)	NS f(%)	A f(%)	SA f(%)	Mean	SD
I need more technical skills related to my field	2 (1.0)	6 (2.9)	18 (8.8)	82 (40.2)	96 (47.1)	4.35	0.84
I lack sufficient pedagogical knowledge and skills	4 (2.0)	12 (5.9)	28 (13.7)	88 (43.1)	72 (35.3)	4.05	0.97
I need more classroom management skills	6 (2.9)	18 (8.8)	38 (18.6)	86 (42.2)	56 (27.5)	3.81	1.06
I need more skills for curriculum development	5 (2.5)	14 (6.9)	34 (16.7)	90 (44.1)	61 (29.9)	3.92	1.02
My techniques in assessment and evaluation of training are not sufficient	3 (1.5)	8 (3.9)	22 (10.8)	84 (41.2)	87 (42.6)	4.18	0.91
I find it difficult to effectively use ICT and modern tools in training	1 (0.5)	4 (2.0)	14 (6.9)	78 (38.2)	107 (52.5)	4.41	0.79
Overall						4.12	0.78

Table 2 indicate that the highest-rated need was additional technical skills related to trainers' fields, with a mean of 4.35 ($SD = 0.84$). This was followed by difficulty effectively using ICT and modern tools in training ($M = 4.41$, $SD = 0.79$) and insufficient assessment and evaluation techniques ($M = 4.18$, $SD = 0.91$). Trainers also reported needs relating to pedagogical knowledge and skills ($M = 4.05$, $SD = 0.97$), curriculum development ($M = 3.92$, $SD = 1.02$) and classroom management ($M = 3.81$, $SD = 1.06$). The overall mean for the professional development needs scale was 4.12 ($SD = 0.78$), indicating a generally high level of reported continuing training needs. The proportion of positive responses was also substantial across the identified needs. For example, 87.3% of respondents agreed or strongly agreed that they needed more technical skills related to their fields, while 90.7% reported difficulty effectively using ICT and modern tools in training. Similarly, 83.8% indicated that their techniques in assessment and evaluation were insufficient. These findings demonstrate that substantial professional development needs remained among trainers despite the high levels of skills acquisition reported in Table 1.

4.1.3 Comparison of Skills Acquired and Professional Development Needs

A comparison of the two sets of findings reveals that high reported skills acquisition coexisted with high reported professional development needs. For example, ICT competence and computer use recorded a high acquired-skills mean of 4.56, while difficulty using ICT and modern tools in training remained high at 4.41. Similarly, modern hands-on skills recorded the highest acquired-skills mean of 4.64, while the need for additional technical skills related to trainers' fields was also high ($M = 4.35$). A similar pattern was observed for pedagogy. Modern pedagogical skills recorded a mean of 4.56 among acquired skills, while insufficient pedagogical knowledge and skills remained a reported need at $M = 4.05$. The findings therefore show that trainers reported substantial acquisition of skills while simultaneously identifying areas in which further professional development was required.

However, direct comparisons should be interpreted cautiously because not all items in the acquired-skills scale have directly corresponding items in the professional-development-needs scale. In particular, assessment and evaluation, classroom management and curriculum development appear as training needs without equivalent acquired-skills measures. Therefore, the results demonstrate a pattern of coexisting skills acquisition and continuing training needs, rather than a statistically calculated gap for every competency area.

4.2 Discussion

4.2.1 Skills Acquired by TVET Trainers through Professional Development Training

The findings demonstrate that TVET trainers perceived professional development training as providing substantial technical, pedagogical, digital and transferable competencies. The particularly high ratings for modern hands-on skills, ICT competence, modern pedagogical skills and communication indicate that current CPD activities are addressing several competencies required for contemporary TVET delivery. This finding is consistent with Sempala et al. (2025a), who reported a positive relationship between CPD practices and professional competence among TVET trainers in Uganda.

The high ratings for creativity, innovation, entrepreneurship and communication further suggest that professional development is not limited to technical updating. These transferable competencies are important because TVET trainers operate in an environment where technical knowledge must increasingly be combined with problem-solving, communication, innovation and responsiveness to workplace needs. However, the findings should be interpreted as perceived skills acquisition rather than objective evidence that CPD caused improvements in competence. The study did not establish trainers' competence before and after training. The results therefore indicate trainers' perceptions of what they acquired through professional development rather than measured changes in performance.

4.2.2 Professional Development Skills and Competencies Needed by TVET Trainers

Despite the high level of reported skills acquisition, trainers continued to report substantial professional development needs. The strongest needs concerned ICT and modern training tools, additional technical skills, assessment and evaluation, pedagogy, curriculum development and classroom management. This finding supports the argument that TVET professional development should be continuous because occupational technologies, instructional practices and competency requirements continue to change.

The particularly high ICT-related need is important. Trainers may have acquired basic or intermediate ICT competence while still experiencing difficulties applying digital technologies effectively in training. Thus, the existence of a high acquired-skills rating does not necessarily mean that the competency has been mastered to the level required for effective professional practice. The findings also reinforce the importance of systematic training-needs identification. Massi et al. (2026) found that training-needs identification among TVET master trainers in Uganda requires more systematic and competency-focused approaches. The present findings similarly suggest that future CPD should move beyond general training provision towards identifying specific areas in which trainers require deeper or more advanced competence.

4.2.3 Relationship between Skills Acquired and Continuing Professional Development Needs

The most important finding of the study is the coexistence of high reported skills acquisition and high continuing professional development needs. This finding is consistent with evidence from Kenya, where Njenga (2022) found that TVET teachers perceived themselves as relatively competent while nevertheless expressing a relatively high need for CPD. Similarly, Sempala et al. (2025a) found a positive relationship between CPD practices and professional competences among TVET master trainers in Uganda, while also emphasizing the continuing importance of CPD for sustaining and developing trainer competence. These findings suggest that professional competence should be understood as a continuing process rather than a fixed state achieved through a single training intervention.

The ICT findings illustrate this pattern particularly clearly. Trainers in the present study reported high acquisition of ICT competence, while difficulty using ICT and modern tools in training remained a substantial need. A similar pattern can be understood in light of recent TVET research showing that teachers require increasingly comprehensive digital competencies as technology becomes embedded in teaching and training. Xin, Tang and Mou (2024), for example, conceptualize TVET teachers' digital competence as extending beyond basic digital knowledge to digital teaching, collaboration and professional development. Njenga (2024b) also found that TVET CPD in Kenya focused more frequently on subject-content knowledge than pedagogical knowledge, suggesting that participation in CPD does not necessarily ensure balanced development across all competency domains.

The findings therefore suggest that CPD may provide a foundation for further professional learning rather than completely eliminating trainers' development needs. This interpretation is consistent with Sempala et al. (2025b), who argue for more systematic and competency-focused approaches to identifying TVET trainers' training needs in Uganda. It is also consistent with recent research emphasizing demand analysis and teacher diagnosis when designing TVET teacher training programmes. However, the comparison in the present study has an important measurement limitation: the acquired-skills and training-needs scales do not contain perfectly matched competency items. Consequently, the findings should not be interpreted as establishing a precise competency gap across all domains. Future CPD assessments should employ a common competency framework that measures both competences acquired and competence still required, enabling institutions to identify priority gaps more accurately and align CPD provision with trainers' actual professional requirements.

V. CONCLUSION & RECOMMENDATIONS

5.1 Conclusion

The findings tell the following story: CPD appears to be producing strong gains, but those gains are not fully aligned with the areas in which trainers still feel underprepared. The two datasets do not necessarily contradict one another but rather complement each other. TVET trainers perceive substantial benefits from professional development training while also experiencing substantial unmet training needs. The gap is therefore not between gain and no gain, but between initial improvement and sufficient professional readiness. CPD is helping trainers to move forward, but not yet far enough. The strongest unresolved pressure points are ICT integration in training, technical specialization and assessment competence, followed by pedagogical depth, curriculum development and classroom management. These areas should therefore receive greater attention in future professional development.

5.2 Recommendations

Future CPD in Uganda should move from broad generic coverage towards deeper, practice-linked and task-specific support, particularly in the instructional use of ICT and modern training tools, advanced technical updating, assessment and evaluation, curriculum development, applied pedagogy and classroom management. At the same time, communication, innovation, entrepreneurship and general pedagogy should be maintained as relative strengths of current CPD, while ensuring that these areas do not receive attention at the expense of the more urgent professional development needs.

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.

Funding Declaration

This research did not receive any specific grant from funding agencies in the public, commercial, or not-for-profit sectors.

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