

Alignment of institutional knowledge with industry requirements: Effects on holistic TVET certificate graduates in Kampala Metropolitan, Uganda

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ABSTRACT

The alignment between institutional training and industry requirements is fundamental to producing employable Technical and Vocational Education and Training (TVET) graduates in Uganda. This study examined the effect of this alignment on holistic TVET certificate graduates in Kampala Metropolitan. A convergent parallel mixed-methods design was employed, collecting quantitative data from 375 graduates using structured questionnaires and qualitative data from 10 key informants (principals and industrial partners) through interviews. The findings reveal that theoretical knowledge and trainer competence enable rapid workplace adaptation (Mean=4.35), with industry supervisors affirming training relevance (Mean=4.25). However, curriculum coverage of latest technologies showed substantial variability (Mean=3.98, SD=0.966). A significant positive relationship was found between institutional-industry knowledge alignment and holistic graduate outcomes ($r=0.598$, $p<0.001$), with regression analysis showing that alignment explains 35.8% of the variance in holistic outcomes ($R^2=0.358$). Qualitative findings confirmed that curricula are often outdated (10+ years since last review) and institutions use manual equipment while industry uses automated systems. The study concludes that while theoretical knowledge and trainer competence effectively enable workplace adaptation, systemic gaps in curriculum currency and equipment alignment limit full graduate preparedness. It recommends mandatory three-year curriculum review cycles, a centralized equipment modernization fund, formal Industry Advisory Committees for each trade programme, and a national Dual Training Framework.

Key Words: Holistic Graduate Outcomes, Institutional Knowledge Alignment, Industry Requirements, TVET Certificate Graduates, Uganda

I. INTRODUCTION

Technical and Vocational Education and Training (TVET) is widely recognized as a critical driver of economic development and youth employment in Sub-Saharan Africa (ACET, 2025). The quality of training within this sector depends heavily on the alignment between institutional knowledge and industry requirements, ensuring graduates possess competencies that match labour market demands. In Uganda, policy frameworks including the Skilling Uganda Strategy, the TVET Policy of 2019, and the TVET Act 2025 mandate employer representation on governing councils to bridge this gap, yet empirical evidence reveals persistent skills mismatch, with only 30 percent of graduates possessing the competencies employers require (Nakayiso, 2025; World Bank, 2023).

Uganda has introduced several reforms aimed at strengthening TVET graduate employability, including the shift of curriculum review authority from NCDC to UVTAB under the TVET Act 2025 (Muhwezi et al., 2025). However, alignment between institutional knowledge and industry requirements remains problematic, with studies across multiple contexts identifying outdated curricula, limited practical exposure, and weak industry linkages as persistent barriers (Cheruiyot, 2025; Massi et al., 2026). The Industrial Training Act of 1972, which governs industrial attachment, predates the 21st-century skills agenda and fails to address emerging competencies such as digital literacy, green skills, and innovation (Mugabirwe et al., 2025; Musiisi & Kitagaana, 2025). These challenges have resulted in uneven graduate preparedness and constrained the sector's ability to deliver high-quality skills training.

Against this backdrop, assessing the alignment between institutional knowledge and industry requirements becomes critical. Understanding how theoretical knowledge, practical training, curriculum currency, and trainer competence influence holistic graduate outcomes can provide a clearer picture of both progress and gaps in Uganda's TVET system. This study therefore examined the effect of alignment between institutional knowledge and industry requirements on holistic TVET certificate graduates in selected institutions in Kampala Metropolitan, Uganda. The findings are expected to inform evidence-based curriculum reforms, strengthen institutional-industry partnerships, and promote sustainable improvements in graduate employability.

1.1 Research Objective

To examine the effect of alignment between institutional knowledge and industry requirements on holistic TVET certificate graduates in selected institutions in Kampala Metropolitan, Uganda.

1.2 Research Hypothesis

H₁₁: Alignment of institutional knowledge with industry requirements has a significant positive effect on holistic TVET certificate graduates.

II. LITERATURE REVIEW

The alignment between institutional knowledge and industry requirements has been extensively studied across multiple national contexts, revealing persistent challenges despite policy recognition of its importance. In Kenya, Cheruiyot (2025) found that outdated curricula and weak industry partnerships cause graduates to fail meeting employer expectations, yet the study is limited by its reliance on secondary data without quantifying the extent of misalignment or its impact on graduate outcomes. In Tanzania, Massi et al. (2026) found that critical employer-valued skills such as digital literacy ($M=3.09$) and adaptability ($M=3.02$) are insufficiently integrated, with nearly 100 percent of employers believing VET emphasizes technical skills while soft skills remain weak, yet the study is constrained by its dependence on document analysis without employer validation. In Oman, Al Shuaili (2025) found that perceived alignment with labour market demands ($M=3.40$, $SD=0.60$) is lower than vocational skills ($M=3.62$) despite a moderate positive correlation ($r=0.57$, $P<0.001$), yet the findings are based solely on student self-reports in a university context, which may not reflect actual employer assessments of graduate competence.

The theory-practice gap is further reinforced by slow curriculum development processes, limited integration of modern technologies, and weak industry engagement. In Turkey, Düzgünçinar (2025) found long delays in approving new courses result in curricula becoming outdated before reaching learners, with 40 percent of employers struggling to find skilled vocational graduates (TÜİK, 2023), describing "training in abstraction" due to funding shortages, yet the study is based on policy analysis within a different governance context, limiting its direct relevance to Sub-Saharan Africa. In Kenya, Wahungu et al. (2023) found that only 22.12 percent of trainers recommend collaborative training models, highlighting that industry engagement is often limited to internships rather than active curriculum design as envisioned in the TVET Act of 2013, yet the study relies on trainer and trainee perceptions without employer input, leaving a gap in understanding whether limited collaboration reflects institutional capacity or employer willingness to engage. In South Africa, Majola (2025) found that National Certificate Vocational graduates struggle to apply theoretical knowledge in real work settings, yet the study is qualitative and does not quantify the extent of this struggle or its relationship to specific curriculum features.

The currency of institutional training remains a critical challenge, with evidence showing significant disparities in programme quality, outdated equipment, and weak evaluation of reforms. In Kenya, Okelo et al. (2021) found that 55.5 percent of respondents disagree that resource policies ensure adequate facilities, limiting practical training opportunities, yet the study focuses on academic outcomes rather than workplace readiness and excludes employers, leaving unanswered questions about how resource constraints translate into graduate competence gaps. In Turkey, Düzgünçinar (2025) found that slow curriculum review processes lead to outdated content in fast evolving fields such as automotive, electrical, and ICT, yet the study does not provide quantitative evidence linking review frequency to graduate employment outcomes. Evidence from South Korea and China shows that investment in modern equipment and continuous teacher training can significantly improve employment outcomes above 90 percent (World Bank, 2015), yet such models may not be feasible in resource-constrained African contexts without adaptation. These limitations reveal a clear gap concerning Uganda's TVET certificate graduates, who have received minimal research attention. The current mixed-method study addressed this gap by examining Uganda's TVET certificate graduates, quantitatively assessing alignment's impact on holistic graduate outcomes across eight dimensions, and incorporating perspectives from graduates, institutional leaders, and industrial partners within a single design.

III. METHODOLOGY

This study employed a convergent parallel mixed-methods design integrating quantitative and qualitative approaches to provide a comprehensive understanding of the relationship between institutional knowledge alignment and holistic graduate outcomes (Creswell & Plano Clark, 2018). Quantitative data were collected through structured questionnaires, while qualitative insights were gathered through key informant interviews with principals and industrial partners. The separate analysis and subsequent triangulation of both data types ensured a holistic and evidence-based understanding of alignment effects within Uganda's TVET context.

The study was conducted in the Kampala Metropolitan area, encompassing five purposively selected TVET institutions: Nakawa Vocational Training Institute, Lugogo Vocational Training Institute, Ntinda Vocational Training

Institute, St. Joseph's Vocational Training Institute-Kisubi, and Katonga Vocational Training Institute-Mpigi. These institutions were selected because they have well-established industrial attachment programmes, maintain active linkages with industry employers, and have produced multiple cohorts of graduates who have undergone structured industrial attachment between 2021 and 2024.

The target population comprised 5,368 TVET certificate graduates who completed their training between 2021 and 2024 across the five institutions, 5 principals (one from each institution), and 5 industrial partners nominated by each institution. Using Taro Yamane's formula (1967) with a margin of error of 0.05, a sample size of 372 graduates was calculated. Stratified random sampling was employed to select graduates proportionally from each institution and graduation year, ensuring representation across all five institutions and four cohorts. Census sampling was applied to include all 5 principals and all 5 industrial partners due to their specialized roles.

Two research instruments were employed: structured questionnaires for graduates, and interview guides for principals and industrial partners. The structured questionnaire captured quantitative data on institutional knowledge alignment and holistic graduate outcomes using Likert-scale items (1=Strongly Disagree to 5=Strongly Agree). The interview guides elicited in-depth insights on curriculum relevance, equipment adequacy, trainer competence, and industry feedback mechanisms. To ensure validity, all instruments underwent expert review by academic supervisors and a TVET specialist from the Ministry of Education and Sports. Construct validity was confirmed through Exploratory Factor Analysis, with all factor loadings exceeding 0.5 and Kaiser-Meyer-Olkin of .707. Reliability was established through Cronbach's alpha, with all coefficients above 0.70.

Quantitative data from questionnaires were analyzed in SPSS v27. Descriptive statistics (frequencies, means, percentages) summarized graduate responses, while inferential techniques including Pearson correlation and regression analysis tested the relationship between institutional knowledge alignment and holistic graduate outcomes. Qualitative data from interviews were transcribed, coded thematically in NVivo v15, and analyzed using both inductive and deductive approaches to capture patterns and contextual insights. Ethical clearance was obtained from the University of Eldoret Postgraduate Research Committee, the Uganda Christian University Research Ethics Committee (UCUREC), and the Uganda National Council for Science and Technology (UNCST). Official permission was granted by the Permanent Secretary of the Ministry of Education and Sports. All participants provided informed consent, and data were anonymized and handled with strict confidentiality. The study achieved a 98.2% response rate, reflecting high engagement and enhancing the credibility and representativeness of the findings.

IV. FINDINGS & DISCUSSION

4.1 Findings

Table 1

Descriptive Statistics on Alignment of Institutional Knowledge with Industry Requirements

	Statement	SD (%)	D (%)	NS (%)	A (%)	SA (%)	Mean	σ
1	The theoretical knowledge I acquired at my institution was directly applicable to the tasks I performed during Industrial Attachment.	8 (2.2)	0 (0)	21 (5.8)	170 (46.6)	166 (45.5)	4.33	.775
2	My institutional training adequately prepared me to handle the technical equipment and tools used in the industry during Industrial Attachment.	8 (2.2)	0 (0)	30 (8.2)	146 (40.0)	181 (49.6)	4.35	.810
3	The practical exercises at my institution reflected the real-world tasks I encountered during Industrial Attachment.	4 (1.1)	4 (1.1)	31 (8.5)	180 (49.3)	146 (40.0)	4.26	.749
4	There was a strong alignment between what I was taught in class and what industry supervisors expected me to know during Industrial Attachment.	12 (3.3)	6 (1.6)	51 (14.0)	210 (57.5)	86 (23.6)	3.96	.856
5	My institution's curriculum covered the latest technologies and methods that I actually used during Industrial Attachment.	8 (2.2)	23 (6.3)	56 (15.3)	158 (43.3)	120 (32.9)	3.98	.966
6	The knowledge I gained from my trainers helped me to quickly adapt to the industry work environment during Industrial Attachment.	4 (1.1)	0 (0)	23 (6.3)	177 (48.5)	161 (44.1)	4.35	.696
7	I felt confident applying my institutional knowledge to solve workplace problems encountered during Industrial Attachment.	4 (1.1)	0 (0)	23 (6.3)	191 (52.3)	147 (40.3)	4.31	.687
8	The feedback from my industry supervisor confirmed that my institutional preparation was relevant to their operations.	2 (0.5)	2 (0.5)	25 (6.8)	211 (57.8)	125 (34.2)	4.25	.650

The results show that theoretical knowledge acquired at TVET institutions is directly applicable to workplace tasks, with 92.1% of respondents agreeing or strongly agreeing (Mean=4.33, SD=0.775). Institutional training adequately prepared graduates to handle technical equipment (89.6% affirmative, Mean=4.35, SD=0.810), and practical exercises reflected real-world tasks (89.3% affirmative, Mean=4.26, SD=0.749). However, alignment between classroom teaching and industry expectations showed slightly lower agreement (81.1% affirmative, Mean=3.96, SD=0.856), with 14.0% remaining neutral, suggesting that a notable minority of graduates experienced uncertainty about expectation alignment. Curriculum coverage of latest technologies showed the highest variability (SD=0.966), with 15.3% neutral responses, indicating substantial differences across institutions in curriculum currency.

The results further reveal that knowledge gained from trainers enabled rapid workplace adaptation (92.6% affirmative, Mean=4.35, SD=0.696), with the complete absence of disagreement, suggesting that trainer competence transcends other curriculum gaps. Graduates demonstrated exceptionally strong confidence in applying institutional knowledge to solve workplace problems (92.6% affirmative, Mean=4.31, SD=0.687), again with no disagreement, positioning problem-solving confidence as a core strength of TVET training. Industry supervisors consistently affirmed the relevance of institutional preparation (92.0% affirmative, Mean=4.25, SD=0.650), providing external validation beyond graduate self-perception. The consistently high means and low standard deviations across most items indicate that graduates across different institutions, programmes, and attachment placements shared similar positive experiences regarding the foundational applicability of their training.

Table 2*Thematic Matrix of Key Informant Perspectives on Alignment of Institutional Knowledge with Industry Requirements*

Theme	Key Finding	Representative Quote	Frequency
Theory as Foundational	Theoretical knowledge provides essential safety, operational understanding, and cognitive framework without which practical skill development is impossible.	"There is no way you can learn a skill without understanding what you are going to do. It also helps them in terms of health and safety, e.g., in electrical when you are calculating current and voltage." (KI6, 2026)	10/10
Curriculum Currency Gap	Curricula are outdated (often 10+ years since last review) and cannot keep pace with rapidly evolving technology, creating gaps for both trainees and trainers.	"Technology is never static... but our curricula are not moving at the pace of technology. These gaps do not apply only to trainees but also to trainers." (KI2, 2026)	9/10
Equipment Technology Gap	Training institutions use manual/outdated equipment while industry uses automated, electrical, or CNC machines, causing initial competency challenges.	"Most Fashion and Design machines are manual, while most industrial machines are electrical and automated. Trainees find challenges with those machines in the industry, though after some time they cope up." (KI10, 2026)	7/10
Adaptation Period	Despite equipment gaps, trainees typically adjust to industry tools and environment within the first month of attachment.	"Within the first month of industrial attachment, a trainee has adjusted to industry skills, so it is quite easy for them to translate." (KI3, 2026)	8/10
Soft Skills Deficiency	Industry consistently reports that trainees lack soft skills including communication, self-drive, time management, and customer relations.	"Trainees have good hard skills but they lack soft skills. They are shy, don't know how to talk to customers, and lack entrepreneurial skills." (KI8, 2026)	8/10
Dual Training Need	Institutions and industry agree that dual training (alternating between institution and industry) is needed to bridge the technology gap.	"Due to advancement in technology, there is need to carry out dual training... TVET institutions need to copy from developed countries to introduce dual training." (KI6, 2026)	7/10
Curriculum Review Mandate Shift	Curriculum development and review mandate has shifted from NCDC to UVTAB under the TVET Act 2025, creating uncertainty about future review frequency.	"Previously it was done by NCDC, but according to the new law (TVET Act 2025), it is done by UVTAB." (KI4, 2026)	6/10
Feedback Mechanisms Exist	Institutions collect feedback from industry through supervision forms, PPP working groups, and trainee presentations, but implementation of changes is inconsistent.	"Through the PPP working group, they always give feedback from the industry every after industrial attachment." (KI1, 2026)	10/10

The qualitative results reveal that key informants unanimously affirmed the foundational role of theoretical knowledge in TVET training, with all ten informants emphasizing that theoretical instruction provides essential safety,

operational understanding, and cognitive development without which practical skill acquisition is impossible. However, this positive assessment is heavily qualified by the pervasive curriculum currency gap reported by nine of ten informants. Informants reported that curricula are significantly outdated, with the last national curriculum review occurring approximately ten years ago. As KI2 noted, technology evolves continuously while curricula remain static, creating gaps that affect not only trainees but also trainers who struggle to update their own knowledge. This finding explains the quantitative result showing lower mean scores for curriculum coverage of latest technologies (Mean=3.98) and the highest variability (SD=0.966) among all items.

The equipment technology gap was reported by seven of ten informants, with specific examples including manual sewing machines versus automated industrial machines (KI10), inspection pits versus hydraulic lifting machines (KI5), ordinary lathe machines versus CNC machines (KI6), and lack of motors in electrical departments (KI8). KI1 noted that institutions cannot continually purchase new equipment as technology changes, making industrial attachment essential for exposure to modern tools. Despite these gaps, eight informants reported that trainees adapt within the first month of attachment (KI3), explaining the high quantitative means for adaptation and problem-solving confidence despite acknowledged equipment deficiencies.

The need for dual training (alternating between institution and industry) was recommended by seven informants as a solution to the technology gap. KI4 argued that TVET institutions should adopt dual training models common in developed countries, where trainees spend part of their week in industry and part in the institution. Regarding feedback mechanisms, all ten key informants confirmed that mechanisms exist for industry to provide feedback to institutions, including supervision forms, annual Public-Private Partnership working group meetings, and trainee presentations after industrial attachment. However, implementation of changes based on this feedback remains inconsistent, as institutions lack the mandate to modify curricula independently. Under the new TVET Act 2025, curriculum review authority has shifted from NCDC to UVTAB, creating uncertainty about the frequency and process of future curriculum updates.

Table 3

Pearson Correlation between Alignment of Institutional Knowledge with Industry Requirements and Holistic TVET Certificate Graduates

Correlations			
		Institutional Knowledge	Holistic TVET certificate graduates
Institutional Knowledge	Pearson Correlation	1	.598**
	Sig. (2-tailed)		.000
	N	365	365
Holistic TVET certificate graduates	Pearson Correlation	.598**	1
	Sig. (2-tailed)	.000	
	N	365	365

**. Correlation is significant at the 0.01 level (2-tailed).

The correlation analysis in Table 6.3 revealed a moderate, positive, and statistically significant relationship between alignment of institutional knowledge with industry requirements and holistic graduate outcomes, with a correlation coefficient of $r=0.598$ ($p<0.001$). This indicates that as graduates' perception of alignment between their institutional training and industry requirements increases, their holistic outcomes also increase in a consistent and predictable manner. The significance level ($p<0.001$) falls well below the conventional threshold of 0.05, providing strong evidence against the null hypothesis. Therefore, the null hypothesis is rejected, and it is concluded that institutional knowledge alignment has a significant positive effect on holistic graduate outcomes among TVET certificate graduates in Kampala Metropolitan. These findings support the theoretical proposition that the alignment between institutional training and industry requirements enhances graduates' overall preparedness, competence, and workplace readiness.

Table 4

Regression Analysis of Institutional Knowledge Alignment with Industry Requirements and Holistic TVET Certificate Graduates

Coefficients ^a					
	Unstandardized Coefficients		Standardized Coefficients		
	B	Std. Error	Beta	t	Sig.
(Constant)	1.972	.164		12.038	.000
Institutional-industry knowledge alignment	.548	.038	.598	14.228	.000
a. Dependent Variable: Holistic TVET certificate graduates					
R	R Square	Adjusted R Square	Std. Error	F Statistic	Sig.
.598 ^a	.358	.356	.39714	202.435	.000 ^b

The regression analysis results in Table 6.4 indicate a statistically significant positive relationship between institutional knowledge alignment and holistic TVET certificate graduates. The R Square value of 0.358 shows that institutional knowledge alignment accounts for 35.8% of the variance in holistic graduate outcomes, which is a substantial contribution in the context of TVET graduate preparedness. The overall model is statistically significant, as reflected by the F-statistic of 202.435 with a p-value of 0.000, confirming that institutional knowledge alignment is a reliable predictor of holistic graduate outcomes.

The unstandardized coefficient ($B=0.548$) suggests that for every one-unit increase in institutional knowledge alignment, holistic graduate outcomes increase by 0.548 units. The standardized Beta coefficient ($\beta=0.598$) indicates a moderate to strong effect size, reinforcing the importance of aligning what is taught in institutions with what is required in industry. The t-value of 14.228 with a significance level of $p<0.001$ further validates the strength of this relationship. These results highlight that when TVET curricula and training are aligned with industry requirements, graduates demonstrate higher levels of holistic readiness including technical competence, employability skills, and professional confidence. However, with an R Square of 0.358, it is evident that 64.2% of the variance in holistic graduate outcomes is explained by other factors beyond institutional knowledge alignment, such as supervision quality, individual trainee motivation, attachment duration, and broader economic conditions.

4.2 Discussion

The finding that theoretical knowledge acquired at TVET institutions is directly applicable to workplace tasks, positions this as a fundamental strength of the current training system in Kampala Metropolitan. This finding aligns with Cheruiyot (2025) who identified curriculum relevance as a key determinant of graduate preparedness, and with Massi et al. (2026) who found that VET curricula across East Africa emphasize technical and competency-based training. However, the current study extends these findings by demonstrating that graduates themselves affirm applicability at remarkably high levels, with adaptation occurring within the first month. This contradicts the prevailing narrative in much of the literature, such as Majola (2025) in South Africa, who found that National Certificate Vocational graduates struggle to apply theoretical knowledge in real work settings. The divergence may be explained by contextual differences in curriculum review cycles, as Ugandan institutions have undergone recent curriculum revisions targeting industrial needs, unlike the static curricula reported in Kenya (Wahungu et al., 2023) and Tanzania (Massi et al., 2026). Practically, this suggests that TVET institutions in Kampala have successfully bridged the theory-practice divide through competency-based curriculum design, though the 5.8% neutral responses indicate persistent gaps that require attention through enhanced industry engagement.

The finding that institutional training adequately prepares graduates to handle technical equipment, yet this preparation is conditional upon industrial attachment to supplement institutional resources, corroborates Wahungu et al. (2023) who found that 68 percent of trainers are willing to undertake industrial attachment to update their skills. However, the current study refines these findings by quantifying that 89.6% of graduates affirm equipment preparation, with the highest mean score among all items, suggesting that Ugandan institutions have made more progress in practical training than their regional counterparts. This contrasts with Okelo et al. (2021) who found that 55.5 percent of respondents in Kenya disagreed that resource policies ensure adequate facilities. The divergence may be attributed to targeted investments in workshop facilities across Kampala Metropolitan institutions and the strategic use of industrial attachment to compensate for equipment gaps. The qualitative finding that institutions rely on attachment to compensate for equipment deficiencies, with trainees accessing CNC machines, automated welding equipment, and hydraulic lifting systems not available at their institutes, validates industrial attachment as an indispensable strategy for bridging the equipment gap.

The finding that curriculum coverage of latest technologies strongly corroborates Cheruiyot (2025) who identified outdated curricula as a major contributor to the skills gap in Kenya, and Massi et al. (2026) who reported that

while curricula are typically reviewed every five years, only 30 percent integrate digital literacy. The current study extends these findings by quantifying the variability and revealing that 15.3% of graduates remained neutral, suggesting uncertainty about what constitutes "latest technologies." This aligns with Düzgünçinar (2025) who reported that slow curriculum review processes lead to outdated content, especially in fast-evolving fields. The qualitative finding from key informants that technology evolves continuously while curricula remain static, with the last national curriculum review occurring approximately ten years ago, explains the high variability observed. Practically, this finding underscores the need for more frequent curriculum review cycles, increased investment in modern training equipment, and stronger mechanisms for incorporating emerging technologies into training programmes.

The finding that knowledge gained from trainers enables rapid adaptation to the industry work environment, demonstrates that trainer competence and preparedness transcend other curriculum gaps. This aligns with Al Shuaili (2025) who found that technical skill scores improve with years of study, suggesting that trainer effectiveness accumulates over time. However, the current study substantially extends the literature by documenting the complete absence of disagreement, indicating that regardless of other curriculum deficiencies, trainers successfully prepare graduates for workplace adaptation. This contrasts with Cheruiyot (2025) who highlighted ongoing trainer retooling initiatives in Kenya without evaluating their impact. The divergence may be explained by the emphasis on trainer preparation mechanisms in Kampala institutions, including industrial tours, continuous professional development, and orientation programmes reported by key informants. Practically, this finding validates the critical role of trainers as facilitators of workplace adaptation and suggests that investments in trainer development yield universal returns, even when equipment and curriculum updates lag behind industry standards.

The finding that industry supervisors consistently affirm the relevance of institutional preparation, providing external validation beyond graduate self-perception, corroborates the employer perspectives reported by Massi et al. (2026) who found that nearly 100 percent of employers believe VET emphasizes technical skills. The current study extends the literature by demonstrating that external validation is exceptionally consistent across all respondents ($SD=0.650$) and by documenting that 92.0% of graduates received affirmative feedback from supervisors. This contradicts the findings of Wahungu et al. (2023) who found that only 22.12 percent of trainers recommend collaborative training models, suggesting that industry engagement in Kenya remains limited. The divergence may be explained by the existence of formal feedback mechanisms in Kampala, including supervision forms, annual PPP working group meetings, and trainee presentations reported by all key informants. However, key informants also noted that implementation of changes based on this feedback remains inconsistent, as institutions lack the mandate to modify curricula independently. Practically, this finding validates the effectiveness of existing feedback mechanisms while highlighting the need for institutional mandates and resources to translate industry feedback into meaningful curriculum improvements.

V. CONCLUSION & RECOMMENDATIONS

5.1 Conclusion

Theoretical knowledge acquired through TVET programs forms a foundational asset for graduates entering the workplace, enabling rapid adaptation within the first month of industrial attachment. This foundational knowledge effectively bridges the gap between classroom instruction and workplace demands, though its full utility depends on the availability of complementary practical exposure. TVET institutions have successfully integrated competency-based curriculum design that prioritizes the transferability of theoretical concepts to authentic work settings. The complete absence of graduate disagreement regarding adaptation and problem-solving confidence indicates that the pedagogical approaches employed are fundamentally sound and effectively prepare graduates for employment.

The preparation of trainees to handle technical equipment and tools is heavily dependent on industrial attachment to supplement institutional resources, as training institutions cannot sustainably maintain equipment that keeps pace with rapid technological advancement. Industrial attachment serves as a critical bridge that compensates for institutional equipment limitations while exposing trainees to the tools and machinery they will encounter in modern workplaces. This compensatory function makes attachment placements indispensable for developing hands-on technical competence across the TVET system. The positive graduate perceptions of equipment preparation coexist with acknowledged equipment gaps, suggesting that foundational knowledge and trainer competence matter more than access to the latest technology in determining graduate preparedness.

Curriculum currency presents a mixed picture across the TVET landscape, with some institutions successfully integrating modern technologies while others lag considerably behind industry advancements. The wide variation in exposure to up-to-date content suggests that institutional capacity, rather than policy direction, determines the pace of curriculum modernization. Industrial attachment functions as an informal but essential curriculum update mechanism, exposing trainees to technologies and methods that formal curricula have yet to incorporate. The shift of curriculum review authority from NCDC to UVTAB under the TVET Act 2025 creates both opportunity and uncertainty for future curriculum currency.

Trainer knowledge stands as the most universally valued asset in preparing graduates for workplace adaptation, enabling rapid adjustment to industry environments even when other aspects of institutional preparation fall short. This adaptation advantage cuts across institutional and programme differences, suggesting that trainer competence and preparedness transcend curriculum limitations and equipment gaps. Investments in continuous professional development for trainers yield universal returns across the TVET system, regardless of institutional resource constraints. The confidence graduates place in their trainers' guidance indicates that human capital within institutions may be a more critical factor than physical infrastructure in facilitating workplace transitions.

External validation from industry supervisors consistently affirms the relevance of institutional preparation, providing objective confirmation beyond graduate self-perception that training aligns with workplace needs. The near-universal recognition of training relevance by employers indicates that the gap between institutional output and industry input is narrower than often assumed. However, the inconsistent implementation of feedback into curriculum changes points to a systemic weakness in translating industry input into tangible improvements, highlighting the need for institutional mandates and resources to close the feedback loop.

5.2 Recommendations

The study underscores the urgent need for the Ministry of Education and Sports to establish a mandatory curriculum review cycle of no more than three years for all TVET programmes, with provisions for accelerated reviews in fast-evolving sectors such as automotive, electrical, and ICT. A standardized curriculum review framework should be developed, mandating industry validation of all proposed curriculum changes before implementation, ensuring that content relevance is systematically verified by employer representatives. This framework must also require the inclusion of emerging technologies and digital literacy components in every curriculum review cycle.

The Ministry of Education and Sports, in collaboration with development partners, should establish a centralized equipment modernization fund that provides matching grants to TVET institutions for upgrading training equipment to industry standards. A regional equipment sharing scheme should be piloted, where institutions within geographic clusters share access to expensive, specialized equipment such as CNC machines, thus reducing per-institution costs while expanding trainee access. Institutions receiving equipment grants must demonstrate sustained industry partnerships and maintenance capacity as conditions for funding.

The Uganda TVET Council (UVTAB) should develop and mandate a formal Industry Partnership Framework that requires every TVET institution to establish and maintain active Industry Advisory Committees for each trade programme offered. These committees must meet at least twice annually and include employers, industry experts, and professional association representatives who review curriculum relevance, equipment needs, and emerging skill requirements. The framework should further require documented evidence of industry input into training delivery, including guest lectures, site visits, and joint curriculum development sessions.

UVTAB, in consultation with the Ministry of Education and Sports, should develop and implement a national Dual Training Framework that mandates alternating periods of institutional learning and workplace training throughout TVET programmes, moving beyond the current end-of-year attachment model. This framework should specify minimum ratios of workplace to institutional hours by trade, define the roles and responsibilities of industry supervisors and institutional trainers, and establish quality assurance mechanisms for monitoring dual training delivery. A pilot dual training programme should be rolled out across high-demand trades before national scaling. TVET institutions should establish structured, documented systems for collecting, analyzing, and acting upon industry feedback received through supervision forms, PPP working group meetings, and trainee presentations. Each institution must create a feedback implementation committee that meets quarterly to review industry input, document curriculum adjustments made in response to feedback, and report annually to UVTAB on changes implemented. Institutions should also establish formal mechanisms for communicating back to industry partners how their feedback has influenced training improvements, closing the feedback loop and strengthening industry engagement.

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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