Effect of soft skills development during industrial attachment on holistic TVET certificate graduates in Kampala Metropolitan, Uganda

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ABSTRACT

Soft skills are increasingly recognized as critical determinants of employability for Technical and Vocational Education and Training (TVET) graduates, yet evidence on how industrial attachment contributes to their development in Uganda remains limited. This study examined the effect of soft skills development during industrial attachment on holistic TVET certificate graduates in Kampala Metropolitan, Uganda. A convergent parallel mixed-methods design was employed, collecting quantitative data from 375 graduates using structured questionnaires and qualitative data from 10 key informants through interviews. The findings revealed that industrial attachment significantly improved communication skills, teamwork, problem-solving, time management, feedback reception, communication adaptability, patience, emotional control, and conflict resolution. Teamwork and problem-solving showed the highest affirmative responses, while conflict resolution showed the lowest. Correlation analysis revealed a strong positive relationship between soft skills development and holistic graduate outcomes ($r=0.694$, $p<0.001$), with regression analysis showing that soft skills development explains 48.2% of the variance in holistic graduate outcomes ($R^2=0.482$), the highest explanatory power among all predictors. Qualitative findings confirmed that teamwork is developed because technical tasks cannot be completed alone, problem-solving is enhanced through real workplace challenges, and conflict resolution depends on whether conflicts occur during attachment. The study concludes that industrial attachment is highly effective for soft skills development, with teamwork and problem-solving being nearly universal outcomes. It recommends integrating structured soft skills training into TVET curricula, mandating supervisor training on feedback provision, and incorporating conflict resolution scenario training into pre-attachment preparation.

Keywords: Holistic Graduate Outcomes, Industrial Attachment, Soft Skills Development, TVET Certificate Graduates, Uganda

I. INTRODUCTION

Technical and Vocational Education and Training (TVET) is central to equipping learners with practical skills that meet labour market demands in Uganda (Barigye, 2024). The employability of graduates within this sector depends not only on technical competence but also on soft skills including communication, teamwork, problem-solving, time management, and conflict resolution. To maintain relevance in changing workplace contexts, graduates require authentic opportunities to develop these non-technical abilities through industrial attachment, which serves as the primary mechanism for translating classroom learning into professional workplace competence (Niyomushobozi & Kiarie, 2024).

Uganda has introduced several reforms aimed at revitalizing the TVET sector, including the Skilling Uganda Strategy and the TVET Policy (2019), both of which emphasize industrial attachment as a core methodology for producing holistic graduates (Kim, 2021). The TVET Act 2025 further mandates employer representation on governing councils to ensure training alignment with labour market demands (Muhwezi et al., 2025). However, the Industrial Training Act of 1972, which remains the primary legal framework governing industrial attachment, predates the 21st century skills agenda and fails to address soft skills development explicitly (Mugabirwe et al., 2025). Studies have highlighted persistent soft skills gaps among TVET graduates, including poor communication, limited teamwork abilities, and weak conflict resolution skills, yet the role of industrial attachment in developing these competencies remains under-researched (Okware & Ngaka, 2017; Mutebi & Ferej, 2023).

Against this backdrop, assessing the contribution of industrial attachment to soft skills development becomes critical. Understanding how communication, teamwork, problem-solving, time management, feedback reception, communication adaptability, patience, emotional control, and conflict resolution are developed during attachment can provide a clearer picture of both progress and gaps. This study therefore set out to examine the effect of soft skills development during industrial attachment on holistic TVET certificate graduates in selected institutions in Kampala

Metropolitan, Uganda. The findings are expected to inform evidence-based curriculum reforms, strengthen supervisor training programmes, and promote sustainable improvements in graduate employability.

1.2 Research Objective

To determine the effect of soft skills development during industrial attachment on holistic TVET certificate graduates in selected institutions in Kampala Metropolitan, Uganda.

1.3 Research Hypothesis

H_1: Soft skills development during industrial attachment has a significant positive effect on holistic TVET certificate graduates.

II. LITERATURE REVIEW

Empirical evidence shows that communication and teamwork are highly valued by employers yet remain underdeveloped among TVET graduates. In Tanzania, Lyimo and Mwanza (2023) found that 69.2 percent of employers rate effective communication as very important and 80.4 percent rate teamwork as critical for workplace performance, yet the study relies on a purely quantitative design with 112 employers, excludes graduate perspectives, and does not measure actual skill levels or isolate industrial attachment as a mechanism for soft skills development. In Malaysia, Halik Bassah and Mohd Noor (2023) identified communication and teamwork as critical employability skills based on six industry experts, yet the findings lack input from trainers or graduates, and the small sample size limits generalisability to Uganda's evolving TVET context. In Kenya, Murgor (2017) found that communication skills significantly influence self-employment (β=0.481, p=0.000), yet less than half of graduates rate their communication and problem-solving skills as good, and the study does not isolate industrial attachment as a contributing factor. In Sweden, Jäger Röding and Strand (2024) found that internships improve teamwork skills, yet the study is based on only seven university alumni and does not represent TVET contexts. In Kenya, Otieno et al. (2024) found that over 80 percent of participants demonstrate teamwork and communication after training, yet the study focuses on an NGO programme with specific selection criteria and does not isolate industrial attachment effects.

Problem-solving abilities are widely recognised as a core competence for TVET graduates, though evidence on their development through industrial attachment remains fragmented. In a systematic review of 39 studies, Puji Hartini et al. (2025) identified problem-solving as one of the six dominant employability skills alongside creativity and critical thinking, yet the review does not distinguish between classroom-based and workplace-based development, excludes non-English sources, and relies on studies from high-income countries with limited applicability to Sub-Saharan Africa. In Malaysia, Abu Kasim, Mohd Puad, and Abdullah (2024) found that employers observe problem-solving improvement during internships but note gaps in confidence and creativity, yet the study is based on only three employers from one Malaysian state, lacks triangulation with graduates or trainers, and does not quantify the extent of improvement. In Kenya, Murgor (2017) found that problem-solving significantly influences self-employment (β=0.112, p=0.034), yet over 38 percent of graduates still rate their problem-solving skills as weak, and the study does not examine whether problem-solving varies by attachment duration, supervision quality, or industry sector. In Kenya, Kogo, Kapkiai, and Chumba (2025) found a significant relationship between workplace experience and CBET integration (r=0.638, p<0.001), yet the study uses a descriptive design, and excludes graduates already in employment.

Time management, feedback reception, communication adaptability, patience, emotional control, and conflict resolution receive less research attention despite their critical importance for workplace success. In Kenya, Wahungu (2021) examined soft skills gaps among automotive engineering trainees and found that employers value problem-solving highly, yet the study is limited to one institution and one trade, lacks industrial partner inclusion in the quantitative component, and does not examine how industrial attachment contributes to developing time management or conflict resolution. In Saudi Arabia, Hussein (2024) found a strong link between soft skills and employability (p<0.001) with communication scoring highly, yet the study focuses on postgraduate students in a different economic and cultural context, limiting transferability to Uganda. Across these studies, industrial attachment is rarely examined using integrated designs that include graduates, institutions, and industry perspectives with sufficient sample sizes for regression analysis. These limitations reveal a clear gap. The current mixed-method study addressed this gap by examining Uganda's TVET certificate graduates, using mixed methods to quantitatively assess soft skills development across eight dimensions, incorporating perspectives from graduates, institutional leaders, and industrial partners, and performing regression analysis to establish the explanatory power of soft skills for holistic graduate outcomes.

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 soft skills development 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 communication improvement, teamwork development, problem-solving enhancement, time management, feedback reception, communication adaptability, patience and emotional control, and conflict resolution. 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 .783. Reliability was established through Cronbach's alpha, with all coefficients above 0.70.

Quantitative data from questionnaires were analysed 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 analysed 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 presents the descriptive statistics on the development of soft skills during industrial attachment, highlighting respondents' levels of agreement with various statements related to their skill enhancement.

Table 1

Descriptive statistics on soft skills development during industrial attachment

	Statement	***SD (%)***	***D (%)***	***NS (%)***	***A (%)***	***SA (%)***	***Mean***	***σ***
1	Industrial Attachment improved my ability to communicate effectively with supervisors, colleagues, and clients in a professional setting.	2 (0.5)	0 (0)	17 (4.7)	204 (55.9)	142 (38.9)	4.33	.616
2	Through Industrial Attachment, I learned to work collaboratively as part of a team to achieve common goals.	2 (0.5)	0 (0)	8 (2.2)	187 (51.2)	168 (46.0)	4.42	.595
3	Industrial Attachment enhanced my problem-solving skills by exposing me to real workplace challenges that required practical solutions.	4 (1.1)	0 (0)	8 (2.2)	180 (49.3)	173 (47.4)	4.42	.648
4	During Industrial Attachment, I developed better time management skills by handling multiple tasks and meeting deadlines.	2 (0.5)	2 (0.5)	22 (6.0)	206 (56.4)	133 (36.4)	4.28	.648
5	Industrial Attachment taught me how to receive and act upon constructive feedback from supervisors.	4 (1.1)	4 (1.1)	24 (6.6)	217 (59.5)	116 (31.8)	4.20	.699
6	I learned to adapt my communication style to suit different people and situations during Industrial Attachment.	4 (1.1)	2 (0.5)	27 (7.4)	208 (57.0)	124 (34.0)	4.22	.697
7	Industrial Attachment helped me to develop patience and emotional control when dealing with difficult workplace situations.	4 (1.1)	0 (0)	24 (6.6)	196 (53.7)	141 (38.6)	4.29	.685
8	My experience during Industrial Attachment improved my ability to resolve conflicts professionally.	4 (1.1)	2 (0.5)	30 (8.2)	207 (56.7)	122 (33.4)	4.21	.704

The results reveal that industrial attachment significantly improved communication skills, with 94.8% of respondents agreeing or strongly agreeing (Mean=4.33, SD=0.616). The complete absence of disagreement and very low standard deviation indicate that regardless of industry sector or attachment placement, all graduates experienced improvement in professional communication abilities. Through industrial attachment, graduates learned to work collaboratively as part of a team (97.2% affirmative, Mean=4.42, SD=0.595), representing the highest affirmative response among all soft skills items, with only 0.5% strong disagreement and 2.2% neutral, indicating that teamwork development is nearly universal across all attachment placements. Industrial attachment enhanced problem-solving skills through exposure to real workplace challenges (96.7% affirmative, Mean=4.42, SD=0.648), with complete absence of disagreement and only 2.2% neutral, demonstrating that problem-solving enhancement is consistently reported across all attachment placements. Graduates developed better time management skills during attachment (92.8% affirmative, Mean=4.28, SD=0.648), with 6.0% neutral responses, indicating that while most graduates experienced time management improvement, a small minority were uncertain about this development.

Industrial attachment taught graduates how to receive and act upon constructive feedback (91.3% affirmative, Mean=4.20, SD=0.699), with 6.6% neutral and 2.2% disagreement, showing that while most graduates learned feedback reception, this competency is slightly less universal than teamwork and problem-solving. Graduates learned to adapt their communication style to suit different people and situations (91.0% affirmative, Mean=4.22, SD=0.697), with 7.4% neutral, the highest neutral percentage among soft skills items except conflict resolution, indicating that communication adaptability depends on exposure to diverse workplace populations.

Industrial attachment helped graduates develop patience and emotional control when dealing with difficult workplace situations (92.3% affirmative, Mean=4.29, SD=0.685), with complete absence of disagreement, demonstrating that regardless of specific challenges faced, all graduates experienced improvement in emotional regulation. Industrial attachment improved graduates' ability to resolve conflicts professionally (90.1% affirmative, Mean=4.21, SD=0.704), representing the lowest affirmative response among soft skills with the highest neutral percentage (8.2%), indicating that conflict resolution is the soft skill most dependent on specific attachment conditions such as whether conflicts actually occur and how supervisors model resolution strategies.

Table 2

Thematic matrix of key informant perspectives on soft skills development during industrial attachment

Theme	Key Finding	Representative Quote	Frequency
Communication Skills Development	Industrial attachment exposes trainees to diverse communication situations with supervisors, colleagues, and clients, helping them overcome shyness and inferiority complex.	*"When they go for IA, they learn to communicate with harsh bosses... The inferiority complex, as trainees may do the work properly but majority fail to explain the procedure, but when they go for IA and write reports, that is when they start to realize their ability to communicate."* (KI1)	9/10
Teamwork and Collaboration	The inherently collaborative nature of industrial work requires trainees to work in teams, as most technical tasks cannot be completed alone.	*"In industry it is all about teamwork and whatever they do they are expected to do it as a team. In electrical, installing a pole you cannot do it alone. In building, raising scaffolds cannot be done alone."* (KI8)	10/10
Problem-Solving Enhancement	Exposure to real workplace challenges that are production-based and time-sensitive enhances trainees' ability to solve problems independently and creatively.	*"When they see what happens there, when they use a certain method to solve a problem during IA, they will use the same method elsewhere when such a problem occurs again."* (KI3)	10/10
Time Management Development	The profit-driven nature of industry with fixed schedules, production targets, and deadlines teaches trainees efficiency, prioritization, and deadline adherence.	*"In industry employees are given timelines for every task, so due to those timelines, it has helped trainees to develop better time management skills."* (KI10)	10/10
Receiving and Acting on Feedback	Trainees learn to receive constructive feedback through supervision forms, log books, and daily reporting mechanisms, though responses to criticism vary by individual.	*"Through their log books, when an activity is set, they do it, record it in the log book and the supervisor assesses it. Sometimes trainees keep improving and try to develop a positive attitude."* (KI5)	8/10
Communication Adaptability	Exposure to diverse workplace populations including supervisors, colleagues, clients, and community members helps trainees learn to adjust their communication style to suit different audiences.	*"While in industry, there are different categories of people, therefore you should be multilingual. Trainees come back having learnt other languages like Kiswahili, Luganda because it is necessary in communities where they do IA."* (KI4)	8/10
Patience and Emotional Control	Challenging workplace conditions including long working hours, difficult supervisors, and demanding tasks teach trainees patience, resilience, and emotional regulation.	*"Every work has its own challenges; therefore, it needs patience. Every industry has its own way of handling challenges so trainees have to be flexible to suit the workplace."* (KI7)	9/10
Conflict Resolution Skills	Trainees learn to resolve conflicts professionally by following workplace hierarchies, approaching supervisors, and observing how conflicts are resolved in industry settings.	*"They learn to resolve conflicts among themselves, sometimes while being guided by their supervisor, then they adapt and learn how to solve problems."* (KI3)	7/10

The qualitative results reveal that key informants unanimously affirmed that industrial attachment plays a critical role in soft skills development. All ten informants confirmed that teamwork and collaboration are developed during attachment because industrial work is inherently collaborative. As KI8 explained, installing an electrical pole or raising building scaffolds cannot be done alone, requiring trainees to work in teams. This finding strongly corroborates the quantitative result showing 97.2% affirmative response for teamwork, which had the highest affirmative response and lowest standard deviation (SD=0.595), indicating that teamwork development is nearly universal across all attachment placements.

All ten informants confirmed that problem-solving skills are enhanced through exposure to real workplace challenges. KI1 noted that when trainees encounter and solve problems using specific methods during attachment, they will use those same methods elsewhere when similar problems arise. KI7 added that through the institution's Research and Innovation Unit managed by trainees, students solve real projects that have even attracted external funding of up to 800 million Uganda shillings. This supports the quantitative result showing 96.7% affirmative response for problem-solving enhancement, explaining why problem-solving is consistently reported across graduates. All ten informants also confirmed that time management skills are developed during attachment, with KI10 explaining that industry employees are given timelines for every task, helping trainees develop better time management skills.

Regarding communication skills, nine of ten informants confirmed improvement. KI4 noted that trainees learn to communicate with harsh bosses, including Indian supervisors, thereby overcoming shyness and inferiority complex. KI7 explained that while trainees may do work properly, many fail to explain the procedure followed, but writing reports during attachment helps them realize their communication ability. These findings support the quantitative result showing 94.8% affirmative response for communication skills. Patience and emotional control were confirmed by nine of ten informants, with KI7 noting that every work has its own challenges requiring patience and flexibility.

However, conflict resolution skills showed the lowest endorsement among all soft skills, with only seven of ten informants confirming development. KI3 noted that trainees learn to resolve conflicts by following workplace hierarchies and approaching supervisors. KI6 reported no reports of conflicts, while KI10 noted that reports of sexual harassment, especially of young girls by men, are discussed during Public-Private Partnership working group meetings. This finding explains the quantitative result showing 90.1% affirmative response for conflict resolution, the lowest among soft skills, with the highest neutral percentage (8.2%), indicating that conflict resolution development depends entirely on whether conflicts occur during attachment and how supervisors model resolution strategies.

Table 3

Pearson correlation between soft skills development and holistic TVET certificate graduates

Correlations			
		Soft Skills Development	Holistic TVET certificate graduates
Soft Skills Development	Pearson Correlation	1	.694**
	Sig. (2-tailed)		.000
	N	365	365
Holistic TVET certificate graduates	Pearson Correlation	.694**	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 strong, positive, and statistically significant correlation between soft skills development and holistic graduate outcomes, with a correlation coefficient of r=0.694 ($p<0.001$). This indicates that as graduates' development of soft skills through industrial attachment 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 soft skills development has a significant positive effect on holistic graduate outcomes among TVET certificate graduates in Kampala Metropolitan. These findings support the theoretical proposition that effective communication, teamwork, problem-solving, time management, feedback reception, communication adaptability, patience, emotional control, and conflict resolution abilities enhance graduates' interpersonal effectiveness and workplace integration.

Table 4

Regression Analysis of Soft Skills Development During Industrial Attachment and Holistic TVET Certificate Graduates

Coefficients[a]					
	Unstandardized Coefficients		Standardized Coefficients		
	B	Std. Error	Beta	t	Sig.
(Constant)	1.304	.163		7.984	.000
Soft Skills Development during IA	.694	.038	.694	18.367	.000
a. Dependent Variable: Holistic TVET certificate graduates					
R	R Square	Adjusted R Square	Std. Error	F Statistic	Sig.
.694a	.482	.480	.35684	337.353	.000b

The regression analysis results in Table 6.4 indicate a statistically significant positive relationship between soft skills development during industrial attachment and holistic TVET certificate graduates. The R Square value of 0.482 shows that soft skills development accounts for 48.2% of the variance in holistic graduate outcomes, which is the highest contribution among all predictors in this study, highlighting the critical importance of interpersonal and professional competencies. The overall model is statistically significant, as reflected by the F-statistic of 337.353 with a p-value of 0.000, confirming that soft skills development is a reliable predictor of holistic graduate outcomes.

The unstandardized coefficient (B=0.694) suggests that for every one-unit increase in soft skills development, holistic graduate outcomes increase by 0.694 units. The standardized Beta coefficient (β=0.694) indicates a strong effect

size, reinforcing the importance of communication, teamwork, problem-solving, time management, feedback reception, communication adaptability, patience, emotional control, and conflict resolution skills acquired during attachment. The t-value of 18.367 with a significance level of $p<0.001$ further validates the strength of this relationship. These results highlight that industrial attachment is particularly effective at developing the soft skills that employers consistently rank as essential for workplace success, often placing them above technical competencies in importance. However, with an R Square of 0.482, it is evident that 51.8% of the variance in holistic graduate outcomes is explained by other factors beyond soft skills development, such as pre-existing personality traits, organizational culture of host industries, quality of mentorship, and diversity of workplace situations encountered during attachment.

4.2 Discussion

The finding that industrial attachment improves communication skills demonstrates that workplace exposure is irreplaceable for developing professional communication competence. This finding aligns with Lyimo and Mwanza (2023) in Tanzania, who found that the majority of employers rate effective communication as very important, and extends their work by demonstrating that communication improvement occurs universally across attachment placements regardless of trade or sector. This contradicts Murgor (2017) in Kenya, who found that less than half of graduates rate their communication skills as good, suggesting that without adequate industrial attachment, communication competence remains underdeveloped. The divergence may be explained by the immersive nature of attachment placements where trainees interact daily with supervisors, colleagues, and clients in authentic work contexts (Okware & Ngaka, 2017). The qualitative finding that trainees learn to communicate with harsh supervisors and that report writing helps them realize their communication ability illustrates how workplace demands accelerate skill acquisition beyond classroom instruction. Practically, institutions should strengthen pre-attachment communication training while recognizing that authentic workplace exposure remains irreplaceable for developing this competency.

The finding that teamwork development is nearly universal across attachment placements demonstrates that the inherently collaborative nature of industrial work makes teamwork the most consistently developed soft skill. This finding strongly corroborates Lyimo and Mwanza (2023) who reported that the majority of employers rate teamwork as very important, and aligns with Halik Bassah and Mohd Noor (2023) who identified teamwork as a critical employability skill. The current study extends these findings by demonstrating that teamwork development is the most consistent soft skill outcome of attachment, with trainees across all trades reporting positive experiences. This contradicts the assumption that teamwork can be adequately taught through classroom-based group projects alone, as key informants noted that technical tasks such as installing an electrical pole cannot be done alone, requiring authentic collaboration that cannot be simulated in institutional settings (Kogo et al., 2025). Practically, institutions should design collaborative project-based learning experiences while recognizing that the interdependent nature of workplace teams provides unique developmental opportunities.

The finding that problem-solving enhancement is consistently reported across attachment placements demonstrates that exposure to real workplace challenges fundamentally enhances trainees' problem-solving capabilities. This finding aligns with Puji Hartini et al. (2025), who identified problem-solving as one of the six dominant employability skills across a systematic review of 39 studies, and corroborates Abu Kasim et al. (2024) who reported that employers observe problem-solving improvement during internships. The current study extends these findings by demonstrating that problem-solving enhancement is consistently reported across placements, with qualitative evidence showing that methods learned during attachment are applied elsewhere. The finding that trainees solve real projects attracting substantial funding illustrates how authentic workplace challenges build transferable capabilities (Otieno et al., 2024). Practically, institutions should incorporate authentic, ill-structured problems into curricula while leveraging attachment experiences as the primary vehicle for developing this critical competency.

The finding that conflict resolution development varies significantly across placements demonstrates that this outcome is not guaranteed and depends on specific attachment conditions. This finding extends the work of Halik Bassah and Mohd Noor (2023) who identified communication-related competencies as critical for employability. The current study provides a significant contribution by demonstrating that conflict resolution development varies because it depends on whether conflicts actually occur during attachment, whether trainees witness resolution, and whether supervisors model effective strategies (Jäger Röding & Strand, 2024). The qualitative finding that some institutions report no conflicts while others note serious issues explains why conflict resolution outcomes vary more than other soft skills (Mutebi & Ferej, 2023). Practically, institutions should provide pre-attachment training on conflict resolution principles and workplace hierarchies, host companies should ensure supervisors model constructive conflict resolution, and trainees should observe how experienced professionals handle workplace disagreements.

V. CONCLUSION & RECOMMENDATIONS

5.1 Conclusion

Industrial attachment transforms trainee communication abilities by exposing them to diverse workplace interactions with supervisors, colleagues, and clients. This exposure helps trainees overcome shyness and inferiority complex, developing professional communication competence that classroom settings cannot replicate. The development of communication skills is highly consistent across attachment placements, with report-writing requirements during attachment playing a key role in helping trainees articulate technical procedures clearly. The complete absence of disagreement and very low standard deviation indicate that regardless of industry sector, all graduates experience improvement in professional communication abilities. The inherently collaborative nature of industrial work requires trainees to work in teams, making teamwork development nearly universal across all attachment placements as most technical tasks cannot be completed individually. Installing an electrical pole, raising building scaffolds, and similar trade activities require coordinated effort, forcing trainees to learn cooperation regardless of their institution or trade. This universal exposure positions teamwork as the most consistently developed soft skill emerging from industrial attachment, with the highest affirmative response and lowest standard deviation among all soft skills measured.

Exposure to authentic workplace challenges that are production-based and time-sensitive fundamentally enhances trainee problem-solving capabilities. Unlike classroom exercises with predetermined answers, workplace problems require creative thinking, diagnosis of complex issues, and implementation of practical solutions under pressure. The transferability of problem-solving skills is evident, as methods learned during attachment are applied to similar challenges encountered elsewhere. Problem-solving enhancement is consistently reported across all attachment placements, with complete absence of disagreement and very low neutral responses. Trainees learn to resolve conflicts professionally by following workplace hierarchies, approaching supervisors, and observing how experienced professionals handle disagreements, though this outcome is the most variable among soft skills because it depends on whether conflicts actually arise during the attachment period. The development of conflict resolution skills cannot be guaranteed, as its occurrence depends entirely on the contingent presence of workplace disputes during the placement period. Observational learning from how experienced professionals handle conflicts may be as valuable as direct participation, highlighting the importance of quality supervisor role modeling.

5.2 Recommendations

The Ministry of Education and Sports should mandate the integration of a structured soft skills training module into all TVET curricula, covering communication, teamwork, problem-solving, time management, feedback reception, communication adaptability, emotional control, and conflict resolution. This module should be delivered both pre-attachment and reinforced during attachment through logbook activities that require trainees to document specific soft skills applications in workplace settings. Institutions should assess soft skills development through supervisor evaluations and trainee self-assessments, with results contributing to overall attachment assessment. The Uganda TVET Council (UVTAB), in collaboration with industry associations, should develop and deliver training programmes for attachment supervisors on providing constructive, developmental feedback that builds trainee confidence while addressing performance gaps. This training should cover feedback delivery techniques, documentation requirements, and strategies for encouraging trainee self-reflection and response to feedback. Employers who complete this training should receive recognition as preferred attachment partners, and their trained supervisors should be prioritized for hosting trainees, addressing the finding that feedback reception and conflict resolution show higher variability than other soft skills.

TVET institutions should develop guidelines for attachment placements that ensure trainees are exposed to diverse communication situations, including interactions with supervisors, colleagues, clients, and community members across different cultural and hierarchical contexts. Pre-attachment orientation should explicitly address communication adaptability, including strategies for adjusting language, tone, formality level, and communication channel based on audience. Institutions should seek attachment placements that provide opportunities for trainees to interact with a range of stakeholder groups rather than being confined to single-department experiences.

TVET institutions should incorporate conflict resolution scenario training into pre-attachment preparation, using role-play and case studies based on actual workplace conflicts reported by previous trainees. This training should cover workplace hierarchies, appropriate channels for raising concerns, professional disagreement management, and strategies for seeking supervisor guidance during conflicts. Institutions should also develop a confidential reporting mechanism for trainees to document conflict situations encountered during attachment, using these reports to refine training content and identify employers needing supervisor support. TVET institutions should develop a pre-attachment programme that prepares trainees for challenging workplace conditions, including long working hours, difficult supervision, demanding tasks, and potential lack of basic necessities. This programme should emphasize realistic expectations, coping strategies, resilience building, and the professional value of demonstrating patience and emotional control under pressure.

Institutions should conduct post-attachment debriefing sessions where returning trainees share strategies for managing workplace challenges, building a peer learning repository for subsequent cohorts.

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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