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Influence of Partnering in Capacity Building of Trainers on Industrial Skills Development in Engineering Training in Public Technical and Vocational Education and Training Institutions in Nairobi County

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Abstract

Globally, Technical and Vocational Education and Training (TVET) systems face increasing pressure to address persistent skill gaps while adapting to rapidly changing labor market demands. Despite significant investments in TVET, many countries still face persistent skill mismatches, where graduates lack the technical and soft skills required by industry. This calls for partnerships in capacity building of trainers which is key in equipping learners with industry-relevant competencies. Despite this, there have been limited studies on the influence of partnering in capacity building of trainers on industrial skills development in engineering training in technical vocational education and training institutions in Nairobi County providing a gap for the current study. Thus the study focused on the influence of partnering in capacity building of trainers on industrial skills development in engineering training in technical vocational education and training institutions in Nairobi County. The study adopted a descriptive research design. The target population was 334 HoDs, course tutors and electrical engineering trainers. The study used Slovin's formula to calculate the sample size which is 182. The respondents were selected using a multistage sampling process. Data was collected by use of a questionnaire which was piloted for testing reliability and validity. Data was analyzed by use of descriptive and inferential statistics using Statistical Package for Social Sciences (SPSS) version 26.0 package and presented using tables. From the findings, the coefficient of determination (R square) of 0.215 indicated that the model explained only 21.5% of the variation or change in industrial skills development in engineering training. The study findings indicate that partnering in capacity building of trainers significantly influence industrial skills development in engineering training in technical vocational education and training institutions. Therefore, TVET institutions should consider strengthening partnering in capacity building using a policy framework to enhance their potential industrial skills development in engineering training.

Keywords: Partnering, capacity building, industrial skills development

INTRODUCTION

Globally, technical and vocational education and training (TVET) systems face increasing pressure to address persistent skill gaps while adapting to rapidly changing labor market demands. As economies increasingly adopt digital technologies, automation, and advanced manufacturing systems, the demand for highly skilled engineering graduates capable of meeting evolving industrial needs has intensified (OECD, 2023). Therefore, Technical and Vocational Education and Training (TVET) institutions play a critical role in addressing this demand by equipping learners with industry-relevant skills, particularly in engineering fields where innovation and practical competence are essential. However, despite significant investments in TVET, many countries still face persistent skill mismatches, where graduates lack the technical and soft skills required by industry (UNESCO-UNEVOC, 2022; World Bank, 2024).

Industrial skills development in engineering training is the deliberate, industry-aligned development of technical, digital, and professional competencies delivered through updated curricula, practical training, and industry linkages to ensure graduates meet labor market demands (UNESCO-UNEVOC, 2023; World Bank, 2023). Inadequate exposure of trainers to modern technologies and limited pedagogical innovation,

hinders their ability to transfer industry-relevant skills to learners compromising on industrial skills development in engineering training. Industrial skills development in engineering training exposes the trainees to a broad range of practical skills, problem-solving and production skills and allow skilled workers to find new opportunities for technical self-actualization (McGunagle & Zizka, 2020). However, most TVET institutions responsible for providing the much-needed skills in today's economy are still very traditional which promises to stunt the growth of the entire engineering training (Tom & Norton, 2017). Thus, the impact of TVET training on the acquisition of technical skills is still under debate (Shi & Mukdarut, 2022). Empirical studies demonstrate that when industry engages in curriculum design, shares resources, and co-develops teaching approaches, trainers gain the expertise needed to deliver relevant and up-to-date competencies (Mustapha, Saari, & Jalaludin, 2023). International bodies such as UNESCO-UNEVOC (2022) and the OECD (2023) emphasize that partnerships in capacity building of trainers are critical in equipping learners with industry-relevant competencies. This is because Capacity-building initiatives expose trainers to modern technologies, updated workplace practices, and co-designed curricula, which in turn enhances their ability to deliver practical, hands-on training (McGrath & Powell, 2021). Evidence further shows that when TVET institutions and industries co-invest in trainer development through joint training programs, work placements, and access to up-to-date equipment graduates are more likely to acquire employable skills and transition effectively into the labor market (World Bank, 2024; Okolie et al, 2021). These catalyzes industrial skill development in engineering training. Despite global recognition, gaps remain in how these partnerships are operationalized in developing countries, where trainer development is often underfunded, fragmented, and poorly aligned with specific industrial sectors (Boateng & Essel, 2022; Mutinda *et al.,* 2023). Africa is suffering from a chronic lack of skilled workforces, both quantitatively and qualitatively (Zizzamia, 2020). In Kenya, East Africa Skills for Transformation and Regional Integration Project (EASTRIP), Deutsche Gesellschaft fur Internationale Zusammenarbeit (GIZ), Cooper Motor Corporation (CMC) Motors and ISUZU Kenya have partnered with the TVET institution through skills upgrading for the trainers, training infrastructure, materials and facilities, internship, and attachment placement for trainees (Gacheri, 2022).

Technical and Vocational Education and Training (TVET) is an engine of economic development, international competitiveness in the knowledge-intensive economic sectors (Agole *et al.,* 2022). This calls for ensuring that industrial skills in engineering training in TVET are compatible with the industrial demands. However, the existence of engineering training institutions in Kenya for many years has led to little progress in the acquisition and effective utilization of technology for industrial development. If this trend is allowed to continue, then meeting the goals of Agenda 2063, which requires a robust engineering skill base would be a mirage. This implies that integrating partnering in capacity building of trainers into TVET is not just beneficial but essential for effectively bridging the engineering skills gap. Recent studies highlight that when trainers receive systematic development support through industry partnerships, learners acquire skills that are more applicable to the labor market, thereby reducing the mismatch between graduate competencies and employer expectations (UNESCO-UNEVOC, 2023; Boateng, Essel, & Kusi, 2023). Despite this, there are limited studies on partnering on capacity development of trainers and industrial skills development in engineering training in public TVET institutions in Nairobi County providing a gap for the current study. Hence, this study sort to investigate the influence of partnering in capacity building of trainers on industrial skills development in engineering training in technical vocational education and training institutions in Nairobi County.

EMPIRICAL REVIEW

Development of the TVET workforce has been a focus area for UNESCO and Member States and continues to be a priority given the critical role of skills development for work and life. Trainers have a varied range of qualifications, sometimes with little or no specialist trainer training. The main qualification does not appear to be a (pedagogical) trainer competence, but rather the possession of an academic degree, often in a subject not necessarily related to the one taught (UNESCO., 2019). Thus, there is a significant demand for skilled labour in manufacturing industries and a lack of alignment among stakeholders involved in the process of skills development. In response to this, the proposed Locality-Public-Private Partnership (LPPP) model prioritizes and emphasizes the crucial role of locality in strengthening this relationship. Through this partnership and synergy in capacity building of trainers, it is expected that the competence of trainers will continue to be maintained and in accordance with the needs of industries for effective training. TVET teachers are left unsupported with often inadequate pedagogical skills, lack of industry experience, and poor career prospects (Levin, Indhira, & Weber, 2023).

According to Kipkirui (2021), professional development for trainers is widely recognized as a vital tool for educational reform. Besides, training of in-service trainers should incorporate innovative practices, both in course content, utilization of emerging technologies and instructional pedagogy through Continuous Professional Development (CPD). Continuing TVET teacher education, particularly in the following areas: practical skills to meet the demands of industry and economy; pedagogical skills; didactics, teaching and learning methods; and teaching and learning media (UNESCO.,2009).

Aliemeke, Ehibor, and Omoakhalen (2020) notes that factors as challenges of attaining capacity building in TVET programs: Inadequate funding, poor research attitude, poor training of TVET instructors, poor supervision of teachers, inadequate facilities and poor assessment of TVET students' competency and public and private partnership which requires improvement. Vuyisile (2021) focused on the importance of training and development and its impact on employee performance and organizational effectiveness. Through training and development, new knowledge, skills and changing attitudes are communicated to employees to raise awareness of their current knowledge and skills. Makau (2017) notes that capacity building and employee performance were positively and significantly related. According to Muhammad and Sajjad (2019), capacity building has a positive and significant impact on employee performance. However, it has also been established that training does not always solve job performance problems (Yamoah, 2013). Amdany (2017) notes that there was no significant relationship between career development and employee retention.

METHODOLOGY

A descriptive research design was used to characterize the population, setting, or phenomenon being studied in this study. Surveys acquire data for descriptive research designs on various topics (Rassel, Leland, Mohr, & O'Sullivan, 2020). A total 334 HoDs, Course tutors and electrical engineer trainers were the target population. A sample size refers to the number of participants or observations included in a study (Johannesson & Perjons, 2021). The study used Slovin's formula to calculate the sample size, which is 182. The study collected the primary data utilising questionnaires. The questionnaire was constructed using a 5-point Likert scale and responses ranging from (5 = very high Extent (VGE), 4 = High Level (GE) (3 = moderate level) (ME), 2 = Narrow Range (SE) Character 1 represents Very Small Extent (VSE). The questionnaires were edited and coded to improve the data quality. Data was analyzed using inferential statistical techniques which included Simple linear regressions and correlation using the Statistical Package for Social Sciences version 26.0 package.

The regression model was as follows:

$\mathbf{y = \beta 0 + \beta_1 X_1 + \varepsilon}$…… Equation 1

Where **y** represented industrial skills in engineering training, X_1 represents partnering in capacity building of trainers, **β** is the standardized regression coefficient.

RESULTS AND DISCUSSION

Pearson product moment correlation of Patnering in Capacity building and Industrial Skills development in TVET

The findings are shown in Table 1.

Table 1: Pearson product moment correlation

		Capacity building	Industrial skills
Capacity building	Pearson Correlation	1	
	Sig. (2-tailed)		
Industrial Skills	Pearson Correlation	.463**	1
	Sig. (2-tailed)	.000	
	N	155	155

Results from the Pearson correlation analysis indicate a positive and statistically significant relationship between the two variables ($r = .463$, $p < .001$, $N = 155$). This suggests that as partnerships in capacity building of trainers increase, there is a corresponding improvement in industrial skills among trainees. According to Pallant (2020). a correlation coefficient in the range of .30 to .49 reflects a moderate positive association, meaning that while other factors also influence industrial skills, capacity building of trainers makes a notable contribution. The highly significant p-value ($p < .001$) shows that the relationship is unlikely to have occurred by chance, supporting the view that equipping trainers through industry partnerships has a direct impact on learners' skill acquisition (Field, 2020).

Regression Analysis

The results of simple linear regression analysis shown in Table 2.

Table 2: Model Summary

Model	R	R Square	Adjusted R Square	Std. Error of the Estimate	Durbin-Watson
1	.463[a]	.215	.210	.415	2.407
a. Predictors: (Constant), capacity building					
b. Dependent Variable: Industrial skills development in engineering training					

ANOVA[a]						
Model		Sum of Squares	df	Mean Square	F	Sig.
1	Regression	7.207	1	7.207	41.859	.000[b]

	Residual	26.342	153	.172		
	Total	**33.549**	**154**			
a. Dependent Variable: Industrial skills development in engineering training						
b. Predictors: (Constant), capacity building						

Coefficients[a]						
Model		**Unstandardized Coefficients**		**Standardized Coefficients**	**t**	**Sig.**
		B	**Std. Error**	**Beta**		
1	(Constant)	2.134	.351		6.082	.000
	Capacity building	.519	.080	.463	6.470	.000
a. Dependent Variable: Industrial skills development in engineering training						

From the findings of the study as depicted in Table 2, there is a moderate linear relationship between the public-private partnership in terms of capacity building of trainers with industrial skills development in engineering training in technical vocational education and training institutions in Nairobi County with R of .463[a]. Additionally R^2 is the proportion of the variance in the dependent variable that is predictable from the independent variables. From the findings, there was a moderate amount of variance on industrial skills development in engineering training explained by capacity building of trainers at 21.5% in technical vocational education and training institutions in Nairobi County. From the findings, the F-statistic (41.859) less than 0.05 which is relatively large, indicating the explained variance is significantly greater than the unexplained variance. It indicates that the regression model is statistically significant.

Further, from the findings, a unit increase in partnering in capacity building of trainers would lead to increase in industrial skills development in engineering training in technical vocational education and training institutions by a factor of 0.519 (β_1= 0.519). Besides, partnering in capacity building of trainers has a statistically significant influence on industrial skills development in engineering training in technical vocational education and training institutions (t = 6.470; p-value = 0.000) which is less than α = 0.05). In this regard, there is a statistically significant influence of partnering in capacity building of trainers on industrial skills development in engineering training in technical vocational education and training institutions in Nairobi County. These findings are in line with the findings of Aliemeke, Ehibor, and Omoakhalen (2020) and Kipkirui (2021) who argued that professional development for trainers is widely recognized as a vital tool for enhancing industrial skills development. However, Levin, Indhira and Weber (2023) laments that TVET teachers are left unsupported with often inadequate pedagogical skills, lack of industry experience, and poor career prospects.

This implies that partnerships with industries in capacity building of trainers enable trainers to stay updated with the latest technological advancements and industry practices, ensuring that their teaching is relevant and current. Besides, trainers equipped with industry-specific knowledge can better align the curriculum with industry requirements, ensuring that students acquire the skills needed for the job market. Trainers familiar with the latest equipment and technology can train students on the same, ensuring they are adept at using tools they will encounter in the workplace (Jenny, Krause, & Armstrong, 2021). Trainers with industry experience can provide more practical, hands-on training, which is crucial for developing industrial skills in engineering. Capacity building enables trainers to teach metacognitive strategies, encouraging students to think about their learning processes. Cognitive Learning Theory (CLT) highlights that metacognition thinking about one's own thinking is crucial for mastering complex skills like those needed in engineering. Capacity building often introduces trainers to new, interactive teaching techniques that promote active learning (Nguyen, *et al.,* 2021). CLT posits that learners need to be actively engaged in the learning process, which these methods facilitate, resulting in better comprehension and retention of industrial skills.

CONCLUSION

Industrial skills development in engineering training in technical vocational education and training institutions is influenced by partnering in capacity development. This is confirmed by the findings of this study that a unit increase in partnering in capacity building of trainers would lead to increase in industrial skills development in engineering training in technical vocational education and training institutions. Trainers with industry experience courtesy of partnership in capacity building can provide more practical, hands-on training, which is crucial for developing industrial skills in engineering. These findings are supported by respondents' views, who agreed that training and development improve service delivery to students, expand opportunities for career growth, allow trainers to apply new skills, and ensure that capacity-building sessions are aligned with the specific needs of electrical engineering programs. Moreover, the applicability of skills gained during training to real workplace environments was strongly acknowledged, confirming that capacity building directly enhances employability and workplace readiness. In view of the findings of the study and the guidance from the literature review, it is apparent that strengthening partnering in capacity building of trainers improves industrial skills

development in engineering training in technical vocational education and training institutions.

Recommendations

Based on the findings of this study, the following recommendations are made:

i. Industry Stakeholders should offer apprenticeships and internship programs for TVET trainers to gain practical industry experience.
ii. There is need for TVET institutions and private sector to organize regular forums and workshops for TVET trainers and industry professionals to exchange knowledge and best practices.
iii. TVET institutions should Establish clear metrics for evaluating the impact of PPPs on trainer capacity development and industrial skills enhancement.

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