



# **The Influence of Interdisciplinary Teaching Approaches on Graduate Employability: Evidence from Electrical Installation Programmes in TVET Institutions, Kisumu County, Kenya**

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**Abstract:** *As automation, renewable energy and other rapidly moving technological changes deliver unprecedented pressure on technical and vocational education and training (TVET) systems to produce graduates that are able to deal with automation. However, rapid technological changes in automation, renewable energy, and related fields are placing unprecedented pressure on TVET systems to equip graduates with the interdisciplinary skills required to adapt to evolving workplace demands. This study examined the influence of interdisciplinary teaching approaches on graduate employability among electrical installation graduates in TVET institutions in Kisumu County, Kenya. The study was anchored on human capital theory and employed pragmatic paradigm and descriptive research design. Data was collected using questionnaires distributed to 391 trainees and 21 trainers 4 principals and twelve technicians were interviewed. Linear regression was employed to analyse the relationship between interdisciplinary learning and employability. The findings revealed statistically significant positive relationship where interdisciplinary learning had 41.1% of variability of employability perception among trainers ( $\beta = .641, p = .002$ ) and 39.6% among trainees ( $\beta = .629, p < .001$ ). Qualitative data confirmed these results where respondents emphasized flexibility, problem-solving competencies, ability to communicate and readiness to learn new technologies as the advantages gained by graduates due to the exposure to multiple fields of study. The study concluded that interdisciplinary learning has a measurable impact on graduates' perceptions of their preparedness for the job market unlike its benefits being moderated by practical experience and resources that institutions have at disposal. This paper recommended that institutions should strengthen interdisciplinary learning approaches, enhance collaboration with industry, and establish mechanisms for tracking graduates' progress to improve their preparedness for the job market.*

**Keywords:** *Interdisciplinary Teaching; Graduate employability; TVET; electrical installation; Kenya*

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## **1. Introduction**

The employers in the world have argued that the technical professionals are good at handling the limited tasks and jobs but lack the knowledge that is needed in the modern workplace (OECD, 2023). This is even more of a concern in the area such as electrical installation where the demand for a good technician has changed significantly due to

innovations like automation. A degree holder whose training is focused exclusively on traditional wiring skills and maintenance skills is becoming less competitive than someone who is also able to apply mathematical reasoning, effectively utilize digital tools, communicate with clients, and think entrepreneurially. To narrow this gap, the idea of interdisciplinary education (that can be defined as the intentional blending of knowledge and expertise obtained

from different subject areas within one study programme) has been proposed (UNESCO, 2022).

The move towards Competency-Based Education and Training (CBET) in Kenya has resulted in further focus on the production of graduates whose competences are in line with the requirements of the modern labour market rather than with examination curriculum. However, the issue of if and how interdisciplinary teaching is utilized in Technical and Vocational Education and Training institutions and whether students contemplate themselves as employable graduates remains a largely unresearched issue in this context. This paper addresses that gap by reporting on the objective of a wider study that examined how interdisciplinary teaching approaches used in Electrical Installation programmes influence graduate employability in TVET institutions in Kisumu County.

Kenyan TVET institutions have historically organised instruction around discrete subject silos, with electrical installation trainers rarely collaborating with colleagues in mathematics, ICT or entrepreneurship departments. At the same time, industry actors continue to report that graduates struggle with tasks that require combining technical knowledge with digital literacy, communication and business sense (Muchira et al., 2023). While a growing body of literature discusses interdisciplinary learning in general education and in higher education abroad, comparatively little empirical work has examined whether interdisciplinary teaching is associated with graduates' own sense of readiness for employment within a specific technical trade in a Kenyan county context. This gap motivated an investigation into whether, and to what extent, interdisciplinary teaching approaches used in Electrical Installation programmes are related to perceived graduate employability. This paper is therefore drawn to assess the influence of interdisciplinary teaching approaches on graduate employability in Electrical Installation programmes in TVET institutions in Kisumu County. The associated null hypothesis stated that interdisciplinary teaching approaches have no statistically significant relationship with perceived graduate employability in these programmes.

## 1.1 Research Objective

The objective of this study was to examine the influence of interdisciplinary teaching approaches on graduate employability among electrical installation graduates in TVET institutions in Kisumu County, Kenya.

## 1.2 Research Question

What is the influence of interdisciplinary teaching approaches on graduate employability among electrical installation graduates in TVET institutions in Kisumu County, Kenya?

# 2. Literature Review

## 2.1 Interdisciplinary Teaching and Employability: Empirical Evidence

The increasing complexity of the contemporary labour market has created a need for graduates who possess not only occupation-specific technical knowledge but also the capacity to communicate, collaborate, solve unfamiliar problems, adapt to technological change and apply knowledge across different contexts. Consequently, employability has increasingly been viewed as a multidimensional outcome of education that combines technical competencies with transferable, interpersonal, cognitive and adaptive skills. This development is particularly important in Technical and Vocational Education and Training (TVET), where the primary purpose of training is to prepare learners for participation in the world of work. UNESCO-UNEVOC (2023) observes that responsive skills-development programmes need to combine occupational competencies with transversal skills that enable young people to respond to changing industry requirements.

Interdisciplinary teaching provides one possible pedagogical response to these changing requirements. It involves connecting knowledge, concepts, methods and skills from two or more disciplines to address a problem, task or learning activity that cannot be adequately understood from a single disciplinary perspective. In an electrical installation programme, for example, learners may need to combine electrical theory and practical installation skills with mathematics, occupational safety, ICT, communication, entrepreneurship and environmental knowledge. Such integration can expose learners to the type of multidimensional problem-solving required in contemporary workplaces. Recent evidence indicates that interdisciplinary learning can contribute to academic engagement, metacognitive development and perspective-taking, although the empirical evidence remains relatively young and varies according to how interdisciplinary learning is designed and measured (Oudenampsen et al., 2024).

The relationship between interdisciplinary learning and employability is therefore based on the premise that employment requires graduates to transfer knowledge beyond the boundaries of a single subject. Traditional disciplinary training may provide depth in a particular occupational area, whereas interdisciplinary learning can complement this depth by helping learners connect technical knowledge with communication, teamwork, problem-solving and other competencies required in actual work situations. The relevance of this approach is particularly evident in electrical installation, where technological developments, renewable-energy systems, digital technologies, energy efficiency and smart systems increasingly require technicians to integrate knowledge from several technical and non-technical areas.

Globally, interdisciplinary learning has been associated with the development of skills relevant to employment. Earlier studies established that interdisciplinary and integrated learning can facilitate problem-solving and the application of knowledge across contexts (Fortus et al., 2004; Honey et al., 2014). More recent evidence has strengthened this argument while also demonstrating that the relationship is not necessarily uniform across disciplines or employment outcomes. Oudenampsen et al. (2024), in a systematic review of empirical studies of interdisciplinary learning in higher education, identified three broad categories of outcomes: academic and disciplinary engagement, metacognitive skills, and perspective-taking skills. These outcomes are relevant to employability because graduates entering contemporary workplaces are expected to understand problems from different perspectives, reflect on their own learning and adapt their knowledge to changing circumstances. However, the review also cautioned that empirical evidence concerning interdisciplinary learning outcomes is still developing, suggesting the need for further context-specific research.

More direct evidence of the relationship between interdisciplinary education and labour-market outcomes is provided by a recent study of graduates in Taiwan. The study found that greater engagement in interdisciplinary learning was associated with graduates pursuing employment or further study in fields different from their original degree area and, in some contexts, with greater likelihood of entering the workforce (Pattison et al., 2024). Importantly, the findings also showed that the effects differed according to programme type and career stage. The relationship between interdisciplinary learning and employment was not consistently positive during the first years after graduation, while more favourable associations appeared in later post-graduation periods. This suggests that the value of interdisciplinary learning may emerge gradually as graduates encounter work environments that require them to transfer knowledge across professional boundaries.

Interdisciplinary project-based learning provides another mechanism through which employability competencies can be developed. McGowan et al. (2023) found that interdisciplinary projects were associated with perceived gains in communication, teamwork and interdisciplinary effectiveness, with wider interdisciplinary project experiences particularly associated with perceived employability-skill development. Such approaches are relevant to vocational education because projects can simulate workplace conditions in which learners must combine technical knowledge with planning, communication, collaboration and problem-solving.

Similarly, a study of an interdisciplinary problem-based learning activity involving architecture, engineering and construction students demonstrated the potential of realistic, industry-oriented tasks to develop employability competencies. Students worked in interdisciplinary teams on an authentic problem, while industry representatives participated as consultants and teachers acted as

supervisors. The experience required students to apply disciplinary knowledge while developing project management, communication and collaboration skills. The researchers interpreted the activity as a transitional learning experience between formal education and the workplace, illustrating how interdisciplinary learning can connect academic knowledge with occupational practice (Gustafsson et al., 2022).

The global literature also indicates that interdisciplinary learning does not necessarily imply reducing specialist technical knowledge. Rather, it can complement disciplinary depth by enabling learners to integrate knowledge from different fields. Evidence from the study of post-graduation outcomes suggests that institutions need to balance breadth with specialist depth because excessive interdisciplinarity may create a trade-off with disciplinary expertise (Pattison et al., 2024). This observation is particularly important for electrical installation programmes because graduates must retain strong occupational competence while simultaneously developing transferable skills needed to work with clients, engineers, contractors, suppliers and other professionals.

Industry collaboration further strengthens the employability value of interdisciplinary learning. Employer engagement exposes learners to actual workplace expectations and provides opportunities to connect classroom knowledge with occupational practice. A study by McGowan et al. (2023) found that collaboration with employers in the development and delivery of graduate employability workshops contributed to students' work-readiness development, particularly in socio-emotional skills. Similarly, a 2024 review of technical and vocational training in Ethiopia found that skills mismatch remains a major concern internationally and argued for stronger collaboration between training institutions and industries to ensure that curricula reflect changing labour-market requirements.

These findings suggest that interdisciplinary teaching can contribute to employability through several pathways. First, it enables learners to integrate knowledge from different subject areas. Second, interdisciplinary tasks encourage problem-solving and critical thinking. Third, collaborative projects develop communication and teamwork. Fourth, authentic or industry-linked tasks provide opportunities for learners to transfer knowledge into practical situations. Finally, exposure to multiple disciplinary perspectives may strengthen adaptability when graduates encounter unfamiliar technologies and workplace problems. Nevertheless, the global evidence also indicates that interdisciplinary learning should be deliberately designed, adequately resourced and appropriately connected to occupational requirements rather than treated simply as the combination of different subjects.

The need for interdisciplinary and employability-oriented learning is particularly significant in Africa because TVET systems are expected to address youth unemployment, skills shortages and changing labour-market demands. The

International Labour Organization (ILO) and African Development Bank reported that African TVET systems have substantial potential to support productive employment and structural transformation but continue to experience challenges in aligning training with labour-market requirements. Their analysis, covering 16 African countries including Kenya, identified weak linkages between TVET institutions, industries and other social partners as an important challenge to the effectiveness of skills development.

UNESCO's analysis of TVET in Africa similarly identifies employability and quality as central concerns. The transition from education to vocational training and ultimately to employment requires learners to possess foundational, technical and life skills. The organisation argues that strengthening the education training employment continuum is essential if vocational education is to respond effectively to labour-market needs (IIEP-UNESCO, 2023). This perspective supports interdisciplinary teaching because effective workplace performance frequently requires the integration of technical competencies with communication, numeracy, digital literacy, entrepreneurship and interpersonal skills.

African evidence also points to the continuing gap between occupational training and transferable skills. UNESCO-UNEVOC reports that emerging workplace demands increasingly require transversal competencies, including ICT, entrepreneurial and life skills, while many African TVET systems continue to emphasise theoretical or narrowly occupational training. The organisation further notes limitations in teachers' access to industry experience and professional development, which can constrain their ability to incorporate new workplace practices and technologies into teaching. These challenges are directly relevant to interdisciplinary teaching because successful integration requires trainers who can connect different knowledge domains and relate classroom learning to evolving workplace practices.

A 2024 African review of employment-oriented skills development similarly emphasised the importance of transferable skills such as leadership, creativity, critical thinking, problem-solving, decision-making, teamwork and communication. The review notes that employers increasingly value these competencies because they enable workers to adapt to changing work environments, while also observing that many African TVET curricula do not sufficiently provide for their systematic teaching and assessment. Thus, interdisciplinary approaches may offer a pedagogical mechanism for embedding such competencies within technical training rather than teaching them as completely separate subjects.

Evidence from South Africa provides further support for the need to rethink TVET curricula in response to changing employment requirements. Kana and Letaba (2024), examining South African TVET colleges in the context of the Fourth Industrial Revolution, found that curriculum transformation needs to address contemporary skills

requirements and employment prospects. Their study also highlighted limitations associated with the participation of lecturers in curriculum development, pointing to the importance of greater responsiveness to industry and technological change. For electrical installation programmes, this issue is particularly significant because technological developments in renewable energy, automation, digital control and smart systems increasingly require technicians to work across conventional occupational boundaries.

In Kenya, the employability of TVET graduates has similarly been linked to curriculum relevance, practical training, industry engagement and the development of transferable skills. Muchira et al. (2023) examined TVET curricula in Kenya and assessed their relevance to labour-market requirements and the capacity of institutions to implement practical and demand-driven curricula. Their study reinforces the importance of ensuring that training programmes respond to employment realities rather than concentrating exclusively on theoretical content.

Kenyan studies also demonstrate the importance of transferable skills in TVET. Mutungi et al. (2023), in a study of public TVET institutions in Nairobi County, identified curriculum revision, technology integration, modern training equipment and industry partnerships as important measures for ensuring that trainees acquire skills relevant to the labour market. More specifically, Mutembei et al. (2024) found a significant relationship between industrial engagement and the development of employability skills among TVET trainees and graduates in Meru County. The study highlights the contribution of interactions between TVET institutions and industry to the development of competencies required beyond technical knowledge.

The availability of appropriate teaching and learning resources is another factor affecting the ability of TVET institutions to provide employment-oriented training. Mutembei et al. (2024) report that adequate and modern teaching-learning resources are important for preparing graduates whose competencies correspond with industry requirements. This finding is relevant to interdisciplinary electrical installation training because integration of electrical theory, practical installation, ICT, renewable energy, safety and entrepreneurship may require workshops, laboratories, digital equipment and other resources that enable learners to undertake authentic tasks.

Literature therefore demonstrates that interdisciplinary learning has potential to strengthen graduate employability by integrating technical knowledge with problem-solving, communication, teamwork, adaptability and other transferable competencies. However, existing studies have largely concentrated on higher education, general TVET employability, industry engagement and curriculum relevance, with comparatively limited empirical attention to the specific influence of interdisciplinary teaching on employability within electrical installation programmes in Kenyan TVET institutions. This represents an important contextual and empirical gap. The present study therefore

focuses specifically on electrical installation programmes in TVET institutions in Kisumu County, Kenya, examining whether the use of interdisciplinary teaching approaches contributes to graduates' perceived preparedness and employability in the labour market.

## 2.2 Theoretical Underpinning

The study relied on Human Capital Theory (Becker, 1964), which views education and learning as an investment that increases a person's productivity and hence their worth in the job market. In the case of Electrical Installation training, Human Capital Theory implies that a student exposed to mathematics, IT, engineering graphics, business and communication courses acquires more competencies than someone who studied electrical subjects only. Such broad competencies would create a more appealing profile for potential employers and boost self-employment opportunities of the graduate. While Connectivism (Siemens, 2005) is useful for explaining how learners construct knowledge across interconnected fields, it says comparatively little about the economic value of that learning. Human Capital Theory fills this gap by linking the acquisition of multi-faceted skills to labour-market outcomes, and it is therefore the framework most directly relevant to the employability objective addressed in this paper.

## 3. Methodology

The study adopted a pragmatic research paradigm and a descriptive research design, which allowed for the collection and integration of quantitative and qualitative data on the current state of interdisciplinary teaching and its relationship with graduate employability. The study was conducted in Kisumu County among four TVET institutions offering Electrical Installation programmes at artisan, craft and diploma levels, namely Kisumu National Polytechnic, Nyakach Technical and Vocational College, Seme Technical and Vocational College and Ramogi Institute of Advanced Technology. The target population comprised 1,510 trainees, 150 trainers, 12 technicians and 4 principals drawn from the four institutions.

Stratified sampling was used to select trainees and trainers, with 30% of the trainee and trainer populations sampled, resulting in 453 trainees and 45 trainers. A census approach was used for the smaller populations of technicians and principals, resulting in all 12 technicians and 4 principals being included in the study. In the final analysis, 391 trainee questionnaires and 21 trainer questionnaires were usable, while 16 interviews comprising 12 technicians and 4 principals were completed. The final sample therefore consisted of 428 respondents whose data were included in the analysis. The response rate was calculated based on the number of questionnaires and interviews successfully completed and returned relative to the instruments administered.

Data were collected using structured questionnaires and interview schedules. Separate structured questionnaires were administered to trainees and trainers to collect quantitative data on interdisciplinary teaching and perceived employability. An interview schedule was used to obtain qualitative data from principals and technicians regarding their perspectives on interdisciplinary teaching practices and graduate employability outcomes. The questionnaires were structured around the study variables and used appropriate response scales to facilitate quantitative analysis. Content validity of the instruments was established through expert review, while piloting was conducted at Sigalagala National Polytechnic in Kakamega County, which was not included in the main study. The pilot exercise helped assess the clarity, relevance and suitability of the questionnaire items and interview questions. Reliability of the quantitative instruments was assessed using Cronbach's alpha. The trainee scales for interdisciplinary teaching ( $\alpha = .850$ ) and employability ( $\alpha = .941$ ) demonstrated good to very high internal consistency, while the trainer employability scale returned a lower coefficient ( $\alpha = .567$ ). The lower reliability coefficient was considered when interpreting the trainer-based employability findings.

Data collection followed a systematic procedure. The researcher obtained the necessary institutional permissions and research authorization before commencing fieldwork. The researcher then contacted the selected TVET institutions and sought permission from the relevant institutional authorities to access the participants. The purpose of the study and the procedures for participation were explained to the respondents before data collection. Questionnaires were administered to the selected trainees and trainers, and adequate time was provided for their completion. Interviews were conducted with the selected principals and technicians using the interview schedule, with responses recorded and documented for subsequent analysis. Completed questionnaires were checked for completeness before being prepared for analysis, while interview responses were transcribed and organized for qualitative analysis.

Ethical considerations were observed throughout the study. Participation was voluntary, and respondents were informed about the purpose of the study, the nature of their participation and their right to decline participation or withdraw without penalty. Informed consent was obtained from the participants before data collection. Confidentiality and privacy of the respondents were maintained by avoiding unnecessary disclosure of personal identifying information and restricting access to the collected data. The information obtained from participants was used strictly for academic purposes, and respondents were assured that their individual responses would not be disclosed in a manner that could identify them. The researcher also observed the relevant institutional and research authorization requirements before undertaking the fieldwork.

Quantitative data were coded and analysed using the Statistical Package for the Social Sciences (SPSS).

Descriptive statistics were used to summarize the characteristics of the respondents and the study variables. Pearson correlation analysis was used to establish the association between interdisciplinary teaching approaches and graduate employability, while simple linear regression was used to examine the relationship between the two variables. The analyses were conducted separately for trainers and trainees because the two groups provided different perspectives on the training process. Qualitative interview data were transcribed, coded and organized using NVivo software and analysed thematically. The qualitative findings were used to complement and provide contextual explanations for the quantitative results.

## 4. Results and Discussions

### 4.1.1 Descriptive Picture of Perceived Employability

Among trainers, employer satisfaction with graduates' problem-solving ability and their capacity to adjust to workplace changes recorded the highest mean ratings ( $4.57 \pm 0.978$  each), followed by the alignment of acquired skills with industry requirements ( $4.52 \pm 0.873$ ) and faster access to employment ( $4.48 \pm 1.078$ ). Self-employment and entrepreneurship recorded the lowest, though still high, mean ( $4.19 \pm 0.402$ ). Among trainees, all six employability indicators averaged above 4.00 on a five-point scale. The highest-rated item was the ability to continue learning and

improve skills at work ( $4.33 \pm 0.998$ ), followed by preparedness to adapt to new technologies ( $4.22 \pm 0.947$ ), the ability to work with people from different backgrounds ( $4.20 \pm 1.051$ ) and confidence in meeting employer expectations ( $4.20 \pm 1.072$ ). Confidence in starting an electrical business ( $4.15 \pm 1.003$ ) and confidence in securing employment after graduation ( $4.12 \pm 1.125$ ) were rated slightly lower. This pattern suggests that both groups associate employability less with a single technical skill and more with adaptability, continuous learning and the capacity to work across contexts the very capabilities interdisciplinary teaching is intended to build.

### 4.1.2 Regression Results: Trainers

A simple linear regression of interdisciplinary teaching on perceived graduate employability among trainers produced a statistically significant model,  $R = .641$ ,  $R^2 = .411$ , adjusted  $R^2 = .380$ ,  $F(1, 19) = 13.268$ ,  $p = .002$ . Interdisciplinary teaching was a positive and significant predictor ( $B = .343$ ,  $\beta = .641$ ,  $t = 3.643$ ,  $p = .002$ , 95% CI [0.146, 0.540]), meaning that a one-unit increase in reported interdisciplinary teaching was associated with an estimated 0.343-unit increase in perceived graduate employability. Interdisciplinary teaching alone accounted for 41.1% of the variance in trainers' assessment of graduate employability as indicated in table 1

**Table 1: Regression Results for Trainers' Perceived Employability**

| Predictor                              | B     | Std. Error | $\beta$ | t     | p     | 95% CI      |
|----------------------------------------|-------|------------|---------|-------|-------|-------------|
| Constant                               | 3.156 | 0.365      | —       | 8.655 | <.001 | 2.393–3.920 |
| Interdisciplinary teaching integration | 0.343 | 0.094      | 0.641   | 3.643 | .002  | 0.146–0.540 |

Note. Dependent variable: Employability\_Comp; N = 21. B = unstandardised coefficient;  $\beta$  = standardised coefficient; CI = confidence interval.

### 4.1.3 Regression Results: Trainees

The equivalent model for trainees was likewise significant,  $R = .629$ ,  $R^2 = .396$ , adjusted  $R^2 = .394$ ,  $F(1, 389) = 254.940$ ,  $p < .001$ . Interdisciplinary teaching was again a positive and significant predictor ( $B = .673$ ,  $\beta = .629$ ,  $t = 15.967$ ,  $p <$

.001, 95% CI [0.590, 0.756]), such that a one-unit increase in reported interdisciplinary teaching was associated with an estimated 0.673-unit increase in perceived employability, and interdisciplinary teaching explained 39.6% of the variance in trainees' perceived employability as shown in table 2.

**Table 2: Regression Results for Trainees' Perceived Employability**

| Predictor                              | B     | Std. Error | $\beta$ | t      | P     | 95% CI      |
|----------------------------------------|-------|------------|---------|--------|-------|-------------|
| Constant                               | 1.537 | 0.171      | —       | 8.999  | <.001 | 1.201–1.873 |
| Interdisciplinary teaching integration | 0.673 | 0.042      | 0.629   | 15.967 | <.001 | 0.590–0.756 |

Note. Dependent variable: Employability\_Comp; N = 391. B = unstandardised coefficient;  $\beta$  = standardised coefficient; CI = confidence interval.

## 4.2 Correlation Between Interdisciplinary Teaching, Skills and Employability

Pearson correlation analysis reinforced the regression findings. Among trainers, interdisciplinary teaching was positively correlated with graduate employability, and skills development showed an even stronger association with employability. A similar pattern held among trainees, where

skills development again showed the strongest relationship with employability of all the variables examined. This consistent ordering interdisciplinary teaching related to employability, and skills development even more strongly

related to employability suggests that interdisciplinary teaching operates partly through its effect on skills development on its way to shaping graduates' sense of readiness for work as indicated in table 3.

**Table 3: Correlations Between Teaching, Skills and Employability**

| Variable pair                                       | Respondent group   | R    | p     |
|-----------------------------------------------------|--------------------|------|-------|
| Interdisciplinary teaching → Graduate employability | Trainers (N = 21)  | .641 | .002  |
| Interdisciplinary teaching → Graduate employability | Trainees (N = 391) | .629 | <.001 |
| Skills development → Graduate employability         | Trainers (N = 21)  | .852 | <.001 |
| Skills development → Graduate employability         | Trainees (N = 391) | .804 | <.001 |

### 4.3 Hypothesis Testing

The null hypothesis stated that interdisciplinary teaching approaches have no statistically significant relationship with perceived graduate employability in Electrical

Installation programmes. Given the significant positive coefficients obtained for both trainers ( $\beta = .641$ ,  $p = .002$ ) and trainees ( $\beta = .629$ ,  $p < .001$ ), the null hypothesis was rejected in both cases at the 5% significance level. Table 4 shows the results of the relationships.

**Table 4: Hypothesis Testing Results for Graduate Employability**

| Relationship tested                                 | Group    | $\beta$ | p-value | Decision        |
|-----------------------------------------------------|----------|---------|---------|-----------------|
| Interdisciplinary teaching → Graduate employability | Trainers | .641    | .002    | Reject $H_{03}$ |
| Interdisciplinary teaching → Graduate employability | Trainees | .629    | <.001   | Reject $H_{03}$ |

### 4.4 Discussion

The results provide consistent evidence, across two independent respondent groups and both statistical and qualitative methods, that interdisciplinary teaching is positively associated with perceived graduate employability in Electrical Installation programmes. The similarity in effect size between trainers ( $R^2 = .411$ ) and trainees ( $R^2 = .396$ ) is notable: despite occupying different vantage points in the training process, both groups converge on the view that exposing trainees to mathematics, ICT, technical drawing, entrepreneurship and communication alongside core electrical content strengthens their readiness for work.

The interviews helped explain the reasons. According to the interviewees, interdisciplinary training allows the graduates

to “see problems from various perspectives” and “become more adaptable to the work environment.” One of the technicians directly linked the knowledge and experience in different areas to productivity and innovation on the work place while one of the principals pointed out adaptability, creativity, and practical skills as the most important skills that one should acquire to become successful. This message is supported by Ochieng and Ngware (2022), who are saying that the employability of the TVET students in Kenya depends on more general skills rather than on technical ones and by Muchira et al. (2023), who concluded that employability of TVET graduates depends on both technical and soft skills, practical training and relevance of the curriculum.

It has been shown that skills development had an even better correlation with the employability of its recipients

compared to interdisciplinary training ( $r = .852$  for trainers and  $r = .804$  for trainees). This is in accordance with Human Capital Theory, which explains how training is transformed into labour market returns: interdisciplinary training contributes to the growing employability of its participants by helping them acquire a broad set of skills that is believed, by both employers and graduates, to positively influence readiness for employment. This can be confirmed by Jackson (2015), who states that employability depends more on skills developed during training than on technical qualifications.

At the same time, several qualifications are warranted. The employability measures used here capture perceived readiness rather than verified employment outcomes such as job placement rates or employer-confirmed hiring, and the trainer employability scale showed only moderate reliability ( $\alpha = .567$ ), warranting caution in interpreting the trainer-level results. The data were also cross-sectional, so the regression results establish association rather than causation: they show that respondents who reported more interdisciplinary teaching also reported higher perceived employability, not that interdisciplinary teaching directly caused improved employment outcomes. Consistent with Muchira *et al.* (2023) and the qualitative findings of this study, the benefits of interdisciplinary teaching were also described as being constrained by inadequate practical exposure, ageing training equipment and weak institution-industry linkages, meaning that the positive statistical relationship documented here represents a favourable but not yet fully realised potential.

## 5. Conclusion and Recommendations

### 5.1 Conclusions

Interdisciplinary teaching approaches used in Electrical Installation programmes in Kisumu County's TVET institutions are positively and significantly associated with graduates' perceived employability, among both the trainers who deliver the training and the trainees who experience it. Graduates and trainers alike link this benefit less to any single technical skill than to broader capabilities such as adaptability, problem-solving, communication, digital competence and a readiness to keep learning as technology in the electrical trade evolves. These findings support Human Capital Theory's proposition that multi-disciplinary training functions as an investment that raises a graduate's attractiveness to employers and capacity for self-employment. However, since the evidence presented is cross-sectional and relies on perception rather than verified employment statistics, interdisciplinary teaching must be viewed as one of many factors that increase employability rather than as a solution on its own. It certainly brings many advantages, but these advantages would be maximized if it were supported by adequate practical experience and well-resourced workshops as well as by better cooperation between training institutions and the industry.

### 5.2 Recommendations

Based on the findings, this paper made the following recommendations

1. TVET institutions should formalise interdisciplinary collaboration by scheduling joint lessons and practical assignments between Electrical Installation and departments such as ICT, Mathematics and Entrepreneurship, rather than relying on informal cooperation.
2. Institutions should expand project-based and problem-based assignments that deliberately require trainees to combine electrical knowledge with digital, mathematical, communication and entrepreneurial skills, since these were the interdisciplinary activities most strongly associated with positive employability perceptions.
3. Institutional managers and TVET authorities should prioritise upgrading workshops, testing equipment and ICT facilities, as resource limitations were repeatedly identified as constraining the practical exposure needed to convert interdisciplinary teaching into genuine employability gains.
4. Industry actors, including electrical contractors and employers, should be more directly involved in curriculum review, attachments and trainee projects, strengthening the institution-industry linkages that both quantitative and qualitative data suggest are currently weak.
5. Institutions should introduce or strengthen graduate tracer studies that record verified employment outcomes job placement, self-employment status and employer feedback to complement the perception-based employability measures used in this study.

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