

Technical and Vocational Education and Training Programmes Alignment with Labour Market and Institutional Challenges in Selected Districts in Sierra Leone

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Received July 15, 2026; Revised August 17, 2026; Accepted August 24, 2026

Abstract This study examined the extent to which Technical and Vocational Education and Training (TVET) programmes align with current labour market needs and identified the institutional factors influencing quality training delivery and the transition of youth into employment. A descriptive survey design employing a mixed-methods approach was adopted. Data were collected from 278 respondents comprising TVET students, graduates, tutors, employers, institutional staff, and other stakeholders selected through multi-stage sampling across four districts of Sierra Leone. Quantitative data were analysed using frequencies, percentages, mean scores, and Chi-square (χ^2) tests, while qualitative data were analysed thematically. The findings revealed weak-to-moderate alignment between TVET programmes and labour market needs, with mean scores ranging from 2.74 to 3.12. The highest-rated indicators were TVET programmes preparing students for employment ($M = 3.12$) and improving income and career progression ($M = 3.12$), whereas alignment with local labour market needs ($M = 2.74$) and adequacy of training facilities ($M = 2.76$) received the lowest ratings. Significant associations were observed between industry involvement and curriculum alignment ($\chi^2 = 158.58$, $p < .001$), curriculum satisfaction and teaching methods ($\chi^2 = 126.22$, $p < .001$), and facilities adequacy and skill acquisition ($\chi^2 = 17.28$, $p < .001$). Furthermore, the major challenge affecting graduates' transition to employment was limited employment opportunities and high unemployment (62.4%), while inadequate equipment and learning resources (69.0%) emerged as the leading institutional constraint. Institutional quality was significantly influenced by industry partnership and quality delivery ($\chi^2 = 139.86$, $p < .001$), instructor qualification and professional development ($\chi^2 = 134.97$, $p < .001$), and funding and institutional challenges ($\chi^2 = 128.53$, $p < .001$). The study concludes that TVET enhances employability and livelihoods in Sierra Leone but is hindered by weak labour market linkages, inadequate resources, and limited industry support. It recommends stronger partnerships, improved investment, and increased youth participation to enhance programme effectiveness.

Keywords: TVET, labour-market alignment, youth participation, quality training, skills mismatch, work-based learning, Sierra Leone

Cite This Article: Karim Theodore Bostock Mansaray, Joseph James Mbavai, Samuel Joseph Bebeley, and Prince Tongor Mabey, "Technical and Vocational Education and Training Programmes Alignment with Labour Market and Institutional Challenges in Selected Districts in Sierra Leone." *American Journal of Educational Research*, vol. 14, no. 8 (2026): 282-288. doi: 10.12691/education-14-8-3.

1. Introduction

Technical and Vocational Education and Training (TVET) is globally recognized as an important strategy for reducing youth unemployment, improving workforce productivity, and promoting inclusive economic development [1,2,3]. By providing practical skills, technical competencies, and entrepreneurial abilities, TVET serves as a link between education and employment,

particularly in sectors such as agriculture, construction, manufacturing, technology, and services [4,5]. However, many TVET systems continue to face challenges related to curriculum relevance, labour market alignment, inadequate infrastructure, limited industry collaboration, and weak institutional capacity, resulting in skills gaps between graduates and employer expectations [6,7].

Despite the growing recognition of TVET as a pathway for employment creation and skills development, many systems globally and in sub-Saharan Africa continue to face challenges related to labour market alignment,

curriculum relevance, training quality, institutional capacity, and public perception [8,9]. Rapid technological changes, globalization, and evolving occupational demands have widened the gap between skills provided by training institutions and those required by employers [10]. This challenge is compounded by outdated curricula, limited industry partnerships, inadequate training facilities, insufficient workplace learning opportunities, weak financing, and shortages of qualified instructors [7,11]. In sub-Saharan Africa, these constraints, alongside negative perceptions of vocational education as a less preferred alternative to academic pathways, have contributed to low enrolment, limited youth participation, and reduced employability of graduates [12,13]. Strengthening TVET therefore requires improved collaboration among training institutions, industries, governments, and other stakeholders to ensure demand-driven, inclusive, and quality skills development [14,15].

Sierra Leone experiences similar challenges, despite recognizing TVET as a key component of economic growth, poverty reduction, and youth empowerment [16]. Although national policies emphasize expanding skills development, improving training quality, and strengthening partnerships with employers, TVET programmes continue to face difficulties in aligning with labour market demands [17]. Limited industry engagement, outdated curricula, inadequate workplace learning opportunities, and weak labour market information systems contribute to gaps between training outcomes and employment requirements [18]. Institutional constraints, including insufficient equipment, limited resources, inadequate instructor capacity, and weak accreditation and quality assurance mechanisms, further affect the delivery of competency-based training [19,20]. Additionally, youth participation is influenced by factors such as negative perceptions of vocational careers, affordability barriers, gender inequalities, and uncertainty about employment prospects after training [21,22]. This study therefore examines the alignment of TVET programmes with labour market needs and investigates institutional challenges affecting training quality and youth participation in Sierra Leone. The findings aim to provide evidence for strengthening TVET policies, improving institutional performance, enhancing graduate employability, and promoting inclusive skills development.

2. Research Methodology

This section explains the methodological procedures used to examine labour-market alignment and the challenges affecting quality TVET delivery and youth participation in Sierra Leone. The methodology was designed to address two integrated objectives: first, to examine the extent to which TVET programmes are aligned with current labour-market needs; and second, to identify the institutional, instructional and labour-market challenges affecting quality training, delivery and youth transition to employment. A mixed-methods approach was adopted because the study required both numerical evidence and qualitative explanations of respondents' experiences, perceptions and institutional realities. Mixed-method research is useful where a study seeks to combine measurable patterns with deeper contextual

explanations of social and educational issues (Creswell & Creswell, 2018).

2.1. Research Design

The study adopted a descriptive survey design supported by a mixed-methods approach. The descriptive survey design was appropriate because the study sought to describe respondents' perceptions of TVET alignment, curriculum relevance, facilities, instructor competence, industry involvement, quality training delivery and youth participation. It also enabled the researcher to collect data from different categories of respondents and analyse response patterns using frequencies, percentages, mean scores and chi-square tests. The mixed-methods approach was necessary because the challenges affecting TVET cannot be fully understood through quantitative data alone. Quantitative data helped to measure the level of agreement, disagreement and statistical association among key variables, while qualitative data helped to explain why respondents perceived TVET alignment and quality delivery as strong, moderate or weak. This approach is consistent with recent TVET literature which argues that vocational education should be assessed not only through enrolment or certification, but through curriculum relevance, work-based learning, institutional capacity, employer participation and livelihood outcomes (McGrath et al., 2022; UNESCO, 2022).

The research design was also informed by Human Capital Theory, Empowerment Theory and the Sustainable Livelihoods Framework. Human Capital Theory explains how relevant training can improve skills, productivity and income potential (Becker, 1964). Empowerment Theory explains how practical skills can strengthen confidence, self-reliance and economic agency among youth (Zimmerman, 1995). The Sustainable Livelihoods Framework explains why skills must be supported by tools, finance, markets, institutions and social networks before they can produce sustainable livelihood outcomes (Department for International Development, 1999).

2.2. Description of Study Area

The study was conducted in selected chiefdoms across four districts in Sierra Leone: Bombali (9.24° N, 12.11° W), Koinadugu (9.37° N, 11.33° W), Kenema (7.89° N, 11.19° W), and Kailahun (8.11° N, 10.75° W). These districts were selected because they represent different geographical, social and economic contexts in which youth and young adults participate in TVET and livelihood-related activities. The selected chiefdoms reflect both rural and semi-urban communities where young people depend on agriculture, construction, trading, mechanics, tailoring, carpentry, ICT-related services, transport and small-scale enterprise. The study area was relevant because TVET in Sierra Leone is expected to respond to both formal and informal labour-market needs. In many communities, formal wage employment is limited; therefore, self-employment, apprenticeship, informal enterprise and small-scale livelihood activities are important pathways for TVET graduates. This agrees with the International Labour Organization (2024), which

emphasizes that youth employment policies should address informality, underemployment and weak school-to-work transition systems. It also supports UNESCO (2022), which presents TVET as a pathway for employability, entrepreneurship, lifelong learning and socio-economic participation.

2.3. Sampling and Sampling Techniques

The study involved respondents drawn from categories directly connected to TVET delivery, participation and labour-market outcomes. These included TVET students, graduates, tutors, employers, institutional staff and other relevant stakeholders. The inclusion of different stakeholder groups was important because labour-market alignment and quality delivery cannot be assessed from one perspective only. Students and graduates provide evidence on training experience and transition challenges; tutors and institutional staff provide evidence on delivery capacity; while employers provide evidence on graduate relevance, workplace readiness and skills mismatch.

A multi-stage sampling approach was used. Purposive sampling was used to select the study districts, chiefdoms and stakeholder categories because they were directly relevant to TVET and youth livelihood issues. Stratified sampling was used to ensure that different respondent categories were represented. Simple random sampling was applied where accessible lists or groups of respondents were available, particularly among students and graduates. This combination of sampling techniques helped to improve representativeness while ensuring that respondents had direct knowledge of TVET delivery, participation and labour-market realities. The use of multiple respondent categories strengthened the credibility of the study because TVET effectiveness was assessed from the perspectives of those receiving training, those delivering training and those evaluating graduates in the labour market. This approach is consistent with the skills-ecosystem perspective, which argues that effective TVET depends on the interaction among learners, institutions, employers, communities and public agencies (McGrath et al., 2022).

2.4. Sources of Data Collection

Data were obtained from both primary and secondary sources. Primary data were collected through structured questionnaires, open-ended questionnaire items and interviews. The structured questionnaire included Likert-scale items on curriculum relevance, labour-market alignment, industry demand, employment preparation, instructor expertise, facilities, government youth-employment strategies, entrepreneurship, digital and green skills, and graduate perception of job relevance.

The questionnaire also collected data on challenges affecting TVET delivery and youth participation, including limited employment opportunities, inadequate equipment, funding constraints, theory-practice gaps, weak industry collaboration, instructor qualification gaps and lack of start-up support. These items were important because the literature shows that TVET outcomes depend on the quality of training, employer involvement, facilities, practical exposure and post-training support (Billett, 2020; ILO, 2021; UNESCO-UNEVOC, 2020).

2.5. Data Analysis

Quantitative data were analysed using descriptive and inferential statistics. Descriptive statistics included frequencies, percentages and mean scores. These were used to describe respondents' views on labour-market alignment, curriculum relevance, skills relevance, instructor competence, facilities, employment preparation, entrepreneurship, graduate transition challenges and quality training constraints.

Chi-square tests were used to examine relationships among key categorical variables. Specifically, chi-square analysis tested the relationship between industry involvement and curriculum alignment, facilities adequacy and skills acquisition, curriculum satisfaction and teaching methods, funding and institutional challenges, instructor qualification and professional development, and industry partnership and quality delivery. The use of chi-square was appropriate because the study examined associations between categorical variables related to TVET alignment and institutional quality.

2.6. Ethical Consideration

Ethical issues were observed throughout the study. Respondents were informed about the purpose of the research and their participation was voluntary. They were assured that the information provided would be used only for academic purposes. Confidentiality and anonymity were maintained to protect respondents' identities, especially because the study involved personal views on training quality, institutional weaknesses, unemployment, employer perceptions and graduate competence. Permission was sought from relevant authorities before data collection. Respondents were not forced to participate, and they had the right to decline any question they were uncomfortable answering. The researcher also ensured that the data were presented honestly and without manipulation. This was important because the study examined institutional challenges and labour-market weaknesses that could affect the reputation of TVET institutions, tutors, employers and stakeholders. Ethical consideration was particularly important because the study involved youth, students, graduates, tutors, employers and institutional stakeholders. Some responses contained sensitive views about poor facilities, weak practical training, limited employment opportunities and institutional support. Maintaining confidentiality helped respondents to provide honest information and strengthened the credibility of the findings.

3. Results and Discussion

3.1. Demographic Characteristics of Respondents

Table 1 presents the demographic characteristics of the 278 respondents. The findings show that respondents were predominantly from the Eastern Region (52.2%), followed by the Northern Region (45.3%), with the North East Region (2.5%) contributing the fewest participants. At the district level, Bombali (26.6%) had the highest

representation, while Koinadugu (21.2%) had the lowest. The sample was largely male (70.5%), with females accounting for 29.1%, indicating greater male participation in TVET programmes. Most respondents were young adults aged 18–25 years (37.4%), followed by those aged 26–30 years (22.7%), while respondents aged 41 years and above (9.4%) formed the smallest group. Regarding educational background, certificate holders (38.5%) constituted the largest proportion, followed by respondents with other qualifications (28.1%), diplomas (19.8%), degrees (7.9%), and master's degrees (5.8%).

Table 1. Demographic characteristics of respondents (N = 278)

Variables	Responses	Frequency (n)	Percentage (%)
Region	Eastern	145	52.2
	Northern	126	45.3
	North East	7	2.5
District	Bombali	74	26.6
	Kailahun	73	26.3
	Kenema	72	25.9
	Koinadugu	59	21.2
Sex	Male	196	70.5
	Female	81	29.1
	Missing	1	0.4
Age	18-25 Years	104	37.4
	26-30 Years	63	22.7
	31-35 Years	43	15.5
	36-40 Years	42	15.1
	41 Years and Above	26	9.4
Educational Background	Certificate	107	38.5
	Others	78	28.1
	Diploma	55	19.8
	Degree	22	7.9
	Master	16	5.8

3.2. TVET Alignment with Current Labour-Market Needs

Table 2 indicates a weak-to-moderate alignment between TVET programmes and labour-market needs, with mean scores ranging from 2.74 to 3.12. The highest mean scores were recorded for TVET programmes preparing students for employment and influencing income and career progression (both $M = 3.12$), suggesting that respondents generally recognized TVET's contribution to employability and improved livelihoods, although these benefits remain moderate [23,24]. In contrast, the lowest mean score was for alignment of TVET programmes with local labour-market needs ($M = 2.74$), followed by adequacy of training facilities and resources ($M = 2.76$), indicating concerns about skills mismatch and inadequate practical training infrastructure [25,26]. The findings suggest that while TVET has the potential to enhance employment and career opportunities, its effectiveness is constrained by weak labour-market alignment and insufficient training resources, highlighting the need for curriculum reforms, stronger industry partnerships, and greater investment in modern training facilities [27,28].

Table 2. Respondents' Views on TVET Alignment with Local Labour-Market Needs

Indicators on TVET Alignment	Likert Scale of Respondents					
	SA	A	N	DA	SDA	Mean
TVET programmes are aligned with the needs of the local labour market	8.30	26.70	12.60	35.70	16.60	2.74
Skills taught in TVET programmes are relevant to industry demands in the local area	5.80	38.10	16.50	25.20	14.40	2.96
TVET programmes adequately prepare students for employment in the local labour market	7.20	40.30	23.00	16.20	13.30	3.12
Instructors have the necessary expertise and experience to deliver quality TVET training	6.80	35.60	16.90	23.70	16.90	2.92
Facilities and resources are available to support effective TVET training	5.00	27.70	22.30	27.70	17.30	2.76
Government youth employment strategies are integrated with TVET initiatives	6.10	30.60	24.50	18.00	20.90	2.83
TVET curricula reflect emerging labour market trends such as digital economy and green jobs	6.50	36.70	25.20	17.60	14.00	3.04
Entrepreneurial skills are incorporated into TVET training	5.80	42.40	21.90	15.50	14.40	3.1
TVET institutions adapt curricula to regional labour market variations across Sierra Leone	7.20	34.20	17.60	25.20	15.80	2.92
TVET graduates perceive the relevance of their training to job opportunities	8.60	35.60	19.40	22.70	13.70	3.03
TVET programmes influence graduates' income levels and career progression	6.10	45.70	16.90	16.20	15.10	3.12

3.3. Chi-Square Test on TVET Alignment with Labour-Market Needs

Table 3 presents the Chi-square analysis examining the relationships between key aspects of TVET programmes and labour-market alignment. The strongest association was observed between industry involvement and curriculum alignment ($\chi^2 = 158.58$, $p < .001$). This high Chi-square value indicates a strong relationship between employer participation and the extent to which TVET curricula align with labour-market needs [29,30]. The finding suggests that active engagement of industries in curriculum design, review, and implementation is essential

for ensuring that training programmes produce graduates with skills that meet current labour-market demands [31,32]. Greater collaboration between TVET institutions and employers can therefore improve curriculum relevance and graduate employability.

Similarly, the relationship between curriculum satisfaction and teaching methods was highly significant ($\chi^2 = 126.22$, $p < .001$). This result indicates that respondents' satisfaction with TVET curricula is closely associated with the teaching methods used during training. Practical, competency-based, and learner-centred instructional approaches are likely to enhance curriculum effectiveness and improve students' acquisition of industry-relevant skills [33,34]. The least Chi-square value was recorded for the relationship between facilities adequacy and skill acquisition ($\chi^2 = 17.28$, $p < .001$). Although this association was the weakest among the three, it remained statistically significant, demonstrating that the availability of adequate workshops, equipment, tools, and instructional resources significantly influences learners' ability to acquire practical skills. The comparatively lower Chi-square value suggests that, while facilities are important, other factors such as curriculum quality, industry engagement, and teaching methods may have a stronger influence on labour-market alignment [35,36].

Table 3. Chi-Square Results on TVET Alignment with Labour-Market Needs

Relationship Tested on TVET Alignment	Chi-Square Analysis		
	χ^2	<i>p</i> -value	Interpretation
Industry involvement $\times$ curriculum alignment	158.58	< .001	Significant
Facilities adequacy $\times$ skill acquisition	17.28	< .001	Significant
Curriculum satisfaction $\times$ teaching method	126.22	< .001	Significant

3.4. Challenges Faced by TVET Graduates in Transitioning from Training to Employment

Table 4 shows that limited employment opportunities and high unemployment were the greatest challenges facing TVET graduates, reported by 62.4% of respondents, indicating that labour-market constraints remain the primary barrier to employment despite skills acquisition [37]. The second most common challenge was social, personal, and institutional barriers (16.0%), followed by financial constraints and lack of start-up support (8.0%) and inadequate tools, equipment, and training materials (7.2%), highlighting the importance of financial and resource support for successful school-to-work transition [38]. The least reported challenge was weak employer linkage and industry collaboration (0.8%), while limited practical experience and workplace readiness accounted for 5.7%. The findings suggest that graduate employment is constrained mainly by limited labour-market opportunities, supported by financial, institutional, and resource-related challenges, emphasizing the need for job creation, entrepreneurship support, improved training

resources, and stronger collaboration between TVET institutions, employers, and government [39,40].

Entrepreneurship and innovation can significantly influence policy decisions on Technical and Vocational Education and Training (TVET) by shifting the focus from preparing learners solely for wage employment to equipping them with the skills needed for enterprise creation, innovation, and economic resilience [41,42,43]. Policies informed by entrepreneurship encourage the integration of entrepreneurial competencies, digital skills, creativity, and problem-solving into TVET curricula while promoting stronger partnerships between training institutions and industry. [44,45,46]. They also support increased investment in modern training facilities, instructor capacity development, business incubation, and access to start-up financing. As a result, entrepreneurship- and innovation-driven TVET policies enhance labour market responsiveness, improve graduate employability and self-employment, and contribute to sustainable economic growth and national development [47,48].

Table 4. Challenges Faced by TVET Graduates in Transitioning from Training to Employment

Category of Responses by TVET Graduates	Frequency (<i>n</i>)	Percentage (%)
Limited employment opportunities and high unemployment	164	62.40
Other social, personal, or institutional barriers	42	16.00
Financial constraints and lack of start-up support	21	8.00
Inadequate tools, equipment, and training materials	19	7.20
Limited practical experience and workplace readiness	15	5.70
Weak employer linkage and industry collaboration	2	0.80
Inadequate equipment, facilities and learning resources	184	69.0
Weak industry collaboration and labour market alignment	13	5.0
Instructor qualification and competence gaps	13	5.0
Curriculum and practical training gaps	5	2.0
Funding and financial constraints	17	6.0
Other institutional and management challenges	36	13.0

3.5. Chi-Square Results for Institutional Challenges

Table 5 presents chi-square test results on institutional factors affecting the quality of TVET delivery. The findings reveal statistically significant relationships across all variables ($p < .001$). Funding is significantly associated with institutional challenges ($\chi^2 = 128.53$), indicating that inadequate financial resources negatively affect training quality. Instructor qualification is also significantly linked to professional development ($\chi^2 = 134.97$), suggesting that the quality of trainers directly influences capacity-building outcomes [49,50]. Additionally, industry partnership shows a strong relationship with quality delivery ($\chi^2 = 139.86$), emphasizing the importance of collaboration between training institutions and employers [51,52].

Table 5. Institutional Challenges (Chi-Square Results)

Relationship Tested	Chi-Square Analysis		
	χ^2	P-value	Decision
Funding × institutional challenges	128.53	< .001	Significant
Instructor qualification × professional development	134.97	< .001	Significant
Industry partnership × quality delivery	139.86	< .001	Significant

4. Conclusion

The study found that although TVET plays an important role in preparing youth for employment, entrepreneurship, and career advancement, its alignment with labour market needs in Sierra Leone remains weak to moderate. The findings revealed that curriculum relevance, industry involvement, and training quality are significantly associated with labour market alignment, while inadequate facilities, funding constraints, instructor competency gaps, and weak industry partnerships continue to limit the quality and effectiveness of TVET delivery. Graduates also face major barriers in transitioning to employment, particularly limited job opportunities, insufficient practical experience, and inadequate start-up support. Overall, the study concludes that improving the effectiveness of TVET requires stronger labour market responsiveness, enhanced institutional capacity, and sustained collaboration between training institutions, employers, and government.

5. Recommendations

The study recommends strengthening TVET by regularly aligning curricula with labour market needs through industry collaboration, increasing investment in training facilities, equipment, funding, and quality assurance, enhancing instructor capacity and work-based learning opportunities, promoting entrepreneurship and graduate support, encouraging inclusive youth participation, and establishing a coordinated national TVET governance framework to improve training quality and graduate employability.

Conflict of Interest; The authors declare no conflicts of interest.

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