Empowering the Future: Overcoming Obstacles in Ghanaian TVET Colleges

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Abstract

This study examined the major obstacles affecting the performance of Technical and Vocational Education and Training (TVET) colleges in Ghana and assessed their implications for student learning and employability. A mixed-methods approach was used, drawing on survey data from 120 students and 30 instructors, supported by semi-structured interviews and direct observations across five institutions. The findings showed that inadequate training resources were a central challenge, with more than 60% of students reporting insufficient equipment and observational assessments indicating that some institutions operated with less than 40% functional workshop tools. Teaching quality was similarly constrained, as 56% of respondents felt instructors were overstretched and unable to provide adequate practical supervision. Industry engagement was limited, with only 35% of students gaining industrial exposure, while industry partners noted that curricula lagged behind workplace technologies by three to five years. Public perception remained a significant barrier, with 75% of students indicating that TVET was viewed as inferior to general education. These structural and perceptual constraints weakened student confidence, reflected in only 45% feeling prepared for employment upon graduation. The study concluded that meaningful improvements in TVET require coordinated reforms across infrastructure, instructor development, industry collaboration, and institutional governance. It recommended targeted investments in equipment, stronger industry partnerships, continuous professional development for instructors, decentralised procurement processes, and a national campaign to reposition TVET as a valued skills pathway.

Keywords: TVET, skills development, industry linkage, employability, stigma, Ghana

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Introduction

Technical and Vocational Education and Training (TVET) sits at the heart of Ghana's efforts to build a modern, skilled workforce capable of driving industrialisation and reducing youth unemployment (Ernest & Ansah, 2013). Industries need skilled hands to operate modern machinery, maintain equipment, and support expanding sectors such as construction, manufacturing, energy, and ICT. For many young people, TVET offers a practical route into stable work at a time when traditional academic pathways no longer guarantee employment. This makes TVET not just an educational option, but a key driver of national development and economic mobility (Darvas & Palmer, 2014).

TVET in Ghana has gone through several phases, from its colonial foundations (Oti-Agyen, 2023), through post-independence expansion, to recent reforms aimed at modernizing the system (Ababio et al., 2024). Policies have been introduced to improve access, strengthen quality, and align programmes with industry expectations. Yet the system still carries deep structural weaknesses. Facilities in many colleges are outdated. Training tools are often insufficient (Boateng et al., 2024). Collaboration with industry remains limited, and students struggle to get real workplace exposure. On top of these issues, the public still sees TVET as a "last resort," a perception that discourages many talented students from considering it (Owusu-Agyeman et al., 2025). These recurring barriers have kept the sector from reaching its full potential. They affect the quality of training, the confidence of employers, and the career outcomes of graduates (Adams et al., 2024). Recognizing these challenges is the first step toward building a stronger and more responsive TVET ecosystem.

Although several studies have examined challenges within Ghana's TVET landscape, most have focused on single institutions, narrow thematic issues, or perception-based analyses (Ababio et al., 2024; Amedorme & Fiagbe, 2013; Pongo, 2014). What has been missing is a system-wide view that combines institutional realities, student experiences, and industry feedback in a unified assessment. Existing research highlights concerns about outdated equipment, limited industry collaboration, and persistent stigma, but these studies often examine these issues in isolation and rarely compare conditions across multiple institutions.

This study addresses that gap by adopting a mixed-methods, multi-institution approach that captures the complexity of TVET delivery from several angles. The quantitative data allow for a clear understanding of the scale of challenges, such as the proportion of students lacking access to functional equipment or those who feel unprepared for industry demands, while the qualitative insights explain why these patterns occur and how institutional contexts shape them. Collecting data from five institutions across different regions provides broader insight into the unevenness of TVET performance, something earlier studies have not fully explored.

By addressing these questions, the paper adds clarity to national discussions about skills development. It pulls together insights from recent studies and ongoing reforms to show what is working, what is not, and what needs to shift. Ultimately, the paper aims to support policymakers, educators, and industry leaders as they work toward a TVET system that is respected, well-resourced, and capable of preparing Ghana's workforce for the future.

Literature Review

Understanding the Role of TVET in National Development

Technical and vocational education is widely recognised as a foundation for national development, particularly in countries building their industrial base (Adams et al., 2024); nations such as Germany, South Korea, and Finland have used strong TVET systems to build competitive, innovation-driving workforces (Alhassan et al., 2024; Yakubu & Bayong, 2025). In emerging economies including Ghana, TVET offers a practical route to employment and helps close skills gaps that slow industrialisation, particularly given persistent youth unemployment (Arthur-Mensah & Alagaraja, 2018; Okoth, 2023). Ghana's TVET system carries a colonial-era legacy that divided "academic" from "vocational" education and helped entrench the stigma still affecting enrolment today (Boateng et al., 2024; Gyampoh et al., 2025), and while post-independence reforms expanded technical institutes and introduced competency-based training, systemic issues persist: outdated equipment, weaker funding than general education, curricula misaligned with industry, and inconsistent industry collaboration (Gyimah, 2020; Obed, 2018). The literature therefore describes a system with strong potential constrained by structural, historical, and social barriers that reform must address directly.

Key Challenges Identified in Ghanaian TVET Colleges

The literature identifies several recurring obstacles limiting TVET effectiveness, spanning infrastructure, human resources, curriculum relevance, and public attitudes (Mohammed, 2020). Infrastructure is the most widely reported problem: workshops and laboratories often lack the modern equipment needed for industry-aligned training, undermining both student competence and instructors' ability to demonstrate current techniques, compounded by overcrowded classrooms and limited safety facilities (Nkrumah & Gyamfi, 2022; Owusu-Agyeman et al., 2025). Collaboration with industry remains weak: informal employer connections rarely translate into consistent internships or curriculum input, leaving students with fewer real-workplace opportunities and employers doubtful of graduates' job-readiness (Gyimah, 2020; Owusu-Agyeman & Fourie-Malherbe, 2019). Instructor shortages, particularly in specialised technical areas, are compounded by instructors with strong theory but limited industry experience and inconsistent professional development (Abd Rahman et al., 2025; Joseph et al., 2025; Korir & Erastus, 2022). Curricula have not kept pace with industry and technology change, producing graduates who hold certificates but lack employable competencies, with competency-based reforms only unevenly implemented (Buabeng & Amo-Darko, 2025; Halabieh et al., 2022; Lily, 2025). Underlying all of this is persistent stigma: TVET is widely perceived as a pathway for academically "weak" students, steering parents toward general secondary education and reinforcing the belief that TVET is a last resort, which lowers student morale and narrows the pool of talent entering the sector (Adams et al., 2024; Boateng et al., 2024; Owusu-Agyeman et al., 2025).

Factors Influencing Students' Willingness to Choose TVET

Students' decisions to pursue TVET reflect an interplay of personal preference, social influence, economics, and expectations about the future, all of which shape enrolment and the system's overall sustainability (Stromquist, 2019). Family expectations, especially from fathers, are among the strongest determinants, with students in households that value practical skill more likely to view TVET positively (Omar et al., 2020); teachers and school counsellors can build or undermine this confidence depending on their own biases, and community norms

send mixed signals by respecting skilled trades without treating formal TVET pathways as prestigious (Akosah-Twumasi et al., 2018; Zhou & Shirazi, 2025). Personal interest and self-efficacy also matter: students drawn to hands-on work, and those who feel more capable in practical than academic subjects, tend to find TVET appealing, though some academically strong students choose it too for its clearer path to skilled work or entrepreneurship (Boateng et al., 2024; Ngulu, 2023; Thakalekoala, 2021). Economically, TVET offers quicker returns and a route to self-employment, which matters most for lower-income households, though high programme costs and uncertain job placement can still deter interested students (Ohagwu et al., 2023; Sibiya et al., 2021). Finally, social status continues to shape choices: where TVET is seen as less prestigious, students may avoid it despite genuine interest or employability, though these perceptions are shifting slowly as more young people recognise opportunities in skilled trades (Gauthier, 2021; Naziz, 2019).

Lessons From Case Studies and Empirical TVET Research in Ghana

Empirical studies on TVET in Ghana move beyond policy discussion to show how the system functions on the ground, linking resources, teaching quality, and student motivation to practical outcomes (Yeboah, 2021). Research on skill development finds that competence depends heavily on tools, modern equipment, and structured practical sessions tied to real industry processes, with student motivation strongest where teaching connects theory to real-life application (Abedi, 2023; Buabeng & Amo-Darko, 2025; Ofosu-Asare, 2024). Enrolment studies point to parental influence, interest in hands-on work, and employment expectations as key drivers, alongside persistent stigma that can undermine confidence even after enrolment; satisfaction rises where students feel supported by teachers and given well-organised workshops (Adza, 2023; Amoako, 2020; Boateng et al., 2024; Botha, 2018; Sibiya et al., 2021). Case studies of institutional challenges consistently report instructor shortages, insufficient funding, slow curriculum updates, and inconsistent industry engagement, resulting in uneven access to apprenticeships and a persistent mismatch between training and labour market needs (Ababio et al., 2024; Amedorme & Fiagbe, 2013; Mohammed, 2020; Osei-Asibey, 2015; Oti-Agyen, 2023; Owusu-Agyeman et al., 2025). Together, this body of evidence points toward the need for evidence-based reform: modernised infrastructure, stronger industry partnerships, better-trained instructors, and a long-term strategy aligned with national development goals.

Methodology

This study adopts a mixed-methods design that brings together primary data from selected TVET colleges and secondary evidence from national reports, policy documents, and published research (Doyle et al., 2009). This approach provides a balanced understanding of the practical realities within institutions and the broader structural patterns that shape Ghana's TVET landscape. By combining quantitative and qualitative techniques, the analysis captures both measurable trends and the lived experiences of students, instructors, and administrators.

Research Design

A convergent mixed-methods framework was used (Moseholm & Fetters, 2017), allowing the quantitative and qualitative components to be carried out simultaneously and integrated during interpretation. The quantitative strand relied on a structured questionnaire administered to students and instructors, focusing on issues such as access to training resources, teaching quality, industry exposure, and perceived employability. This strand helps identify broad patterns across institutions.

The qualitative strand, designed to provide depth and context, consisted of semi-structured interviews with instructors, administrators, and selected industry partners, alongside non-participant observations of workshops and training spaces. Interviews explored training conditions, teacher workload, curriculum relevance, and industry interaction, while observations documented the state of equipment, student–equipment ratios, and the practicality of teaching sessions. Bringing these strands together ensures a richer, more reliable analysis of the sector (Adeoye-Olatunde & Olenik, 2021).

Study Population and Sampling

The study targeted three main groups: students enrolled in technical and vocational programmes, instructors teaching in these colleges, and administrators and industry partners involved in training oversight and supervision. A multi-stage sampling strategy was applied. First, five TVET institutions were purposively selected from three regions, chosen to reflect different geographic and institutional contexts, levels of resourcing, and programme diversity. This ensured representation from urban, peri-urban, and rural settings.

Within the selected institutions, student participants were chosen through simple random sampling to avoid bias in representation. Instructors were approached through a census strategy, where all available instructors within relevant departments were invited to participate. Administrators and industry partners were selected purposively to ensure they had direct oversight of training quality or industry engagement. The final sample consisted of 120 students, 30 instructors, 10 administrators, and 8 industry partners, producing a total of 168 participants. This sample is adequate for mixed-methods work and provides a strong basis for triangulation across respondent groups.

Table 1
Summary of Participant Groups and Sampling Methods

Group	Sample Size	Sampling Method
Students	120	Simple random sampling
Instructors	30	Census approach
Administrators	10	Purposive sampling
Industry partners	8	Purposive sampling
Total Participants	168	

Data Collection Instruments

Three instruments were used to collect primary data. The questionnaire captured demographic information, perceptions of teaching and learning, access to resources, and overall attitudes toward TVET. It included both Likert-scale items and a small number of open-ended questions to allow respondents to describe challenges in their own words.

Interviews followed a semi-structured format, allowing participants to discuss issues such as constraints in practical instruction, industry collaboration, and public perception of TVET while giving the researcher flexibility to probe deeper where needed. Interviews typically lasted between twenty and forty minutes and were audio-recorded with permission. Observation was conducted using a structured checklist that documented the condition of workshops, availability and functionality of equipment, safety standards, and the degree to which practical

sessions matched curriculum expectations. Field notes were taken during each institutional visit.

Secondary Data Sources

To supplement the primary data, secondary materials were drawn from national education reports, labour market publications, TVET policy frameworks, and relevant empirical studies, including the uploaded papers. These sources provided important background context, helped validate emerging findings, and offered system-wide insights that could not be captured through primary data alone. National reports were particularly important for understanding enrolment patterns, staffing levels, infrastructure distribution, and policy intentions across the sector.

Data Analysis Procedures

Data analysis followed a structured sequence. Quantitative questionnaire data were coded and analysed using descriptive statistics to summarise frequencies, percentages, and general trends across student and instructor responses. Where appropriate, cross-tabulations were used to explore differences between institutions or respondent groups (Wickham, 2016).

Qualitative data from interviews and observations were analysed using thematic analysis. Transcripts and field notes were coded line by line, with initial codes grouped into broader themes such as infrastructure constraints, teaching limitations, curriculum relevance, industry partnerships, and public perceptions. Themes were refined through continuous comparison across participants until patterns became clear and coherent.

Once the quantitative and qualitative analyses were completed, findings from both strands were integrated. This integration allowed quantitative patterns, such as gaps in equipment or limited exposure to industry, to be explained and deepened through qualitative insights. The convergent design ensured equal weight for both data types, allowing the final interpretation to reflect a well-rounded understanding of TVET challenges.

Ethical Considerations

Ethical standards were followed throughout the study. Permissions were obtained from all participating institutions. Respondents were informed about the purpose of the study and their right to withdraw at any time (Hasan et al., 2021). Participation was voluntary, and anonymity was ensured by avoiding the collection of identifying information. Interview recordings and notes were stored securely and used only for the purposes of this research. All secondary sources used were publicly available or already published, eliminating additional ethical risks (Connelly, 2014).

Findings and Discussion

This chapter presents the study's findings and relates them to the questions guiding the research: the main institutional and instructional challenges facing TVET colleges, the effect of these challenges on learning and employability, and practical strategies for strengthening TVET delivery. Both quantitative and qualitative strands are drawn on throughout.

Overview

Findings from the 120 students and 30 instructors surveyed, together with interviews and observations across five institutions, are organised around training resources, teaching quality, industry exposure, perception of TVET, employability, and institutional conditions. Quantitative results are presented first, followed by qualitative insights that explain the patterns behind them, before the chapter integrates both strands to highlight convergence, divergence, and implications for Ghana's TVET system.

Quantitative Findings

The 120 student respondents were mostly aged 18–23 and predominantly male (68.3%), reflecting national TVET enrolment patterns, with fairly even representation across programme areas and year levels. Instructors were more varied: nearly half held bachelor's degrees, 26.7% held master's degrees, industry certifications were rare, and teaching experience ranged from early-career to over a decade, giving a reliable basis for interpreting the conditions students and instructors work under.

Access to functional training resources was a central concern. As Table 2 shows, 61.7% of students rated workshop equipment as inadequate, consistent with earlier findings that many Ghanaian TVET colleges operate with obsolete or insufficient equipment (Owusu-Agyeman et al., 2025, Boateng et al., 2024); only 20% were satisfied with available tools, and observations found three of the five institutions with less than half their equipment functional, with student–equipment ratios as high as 1:13. Workshop safety and space also varied, with two colleges meeting moderate safety standards and the remaining three facing congestion, outdated machines, and poor ventilation, restricting hands-on learning and undermining students' confidence in their practical skills.

Table 2
Equipment Availability

Response	Frequency	Percentage
Strongly Agree	6	5.0%
Agree	18	15.0%
Neutral	22	18.3%
Disagree	44	36.7%
Strongly Disagree	30	25.0%
Total	120	100%

Note. Interpretation: 61.7% of students believe equipment is inadequate.

Teaching quality raised similar concerns: 56% of respondents felt instructors were overstretched and unable to give adequate individual attention during practical sessions, consistent with staffing data showing inadequate teaching numbers relative to enrolment, and with earlier findings that limited staffing and professional development weaken practical instruction (Abd Rahman et al., 2025; Nkrumah & Gyamfi, 2022). Instructor qualifications remained relatively strong overall, but only 30.7% of students agreed instructors were effective in demonstrating practical tasks, against 56% who disagreed, pointing to committed but overstretched instructors working in resource-constrained environments.

Industry exposure was one of the weakest areas: only 35% of students had participated in any industrial attachment, and even these placements were often brief with minimal hands-on tasks, echoing national assessments of weak college–industry partnerships (Ababio et al., 2024; Owusu-Agyeman & Fourie-Malherbe, 2019). Placement rates were somewhat higher in electrical and automotive programmes (around 45%) than in Fashion & Design or Welding & Fabrication (under 30%), and instructors confirmed that most placements arise informally through personal contacts rather than institutional partnerships, with over half reporting that industries decline attachment requests over capacity or readiness concerns.

Stigma emerged strongly in the data: 75% of students agreed TVET is viewed as inferior to general education, with female students reporting discouragement from family or community even more strongly (almost 80%), consistent with research showing TVET is still seen as a pathway for academically "weaker" students in Ghana (Adams et al., 2024; Boateng, 2025; Essel et al., 2014). Instructors and administrators echoed this, linking public attitudes to recruitment difficulty, reduced student motivation, and industry reluctance to collaborate, underscoring public perception as one of the sector's most significant non-technical barriers.

Employability findings were mixed: only 45% of students felt their training had prepared them for the job market, with hesitation tied largely to gaps in resources and industry exposure, and students at better-equipped institutions reporting higher confidence than those at poorly-equipped ones. Instructors agreed that graduates typically need further coaching or workplace orientation before reaching full competence, underlining the link between training quality, resource availability, and employability confidence.

Qualitative Findings

Interviews confirmed the scale of infrastructure challenges: more than 70% of instructors said their workshops lacked basic equipment for effective practical training, with one welding instructor noting, "we sometimes have one machine for a group of ten or more students," consistent with the observed 1:13 equipment ratios. Administrators pointed to unstable funding, with six of ten interviewed reporting delayed or abandoned procurement, and in institutions with under 45% functional equipment, instructors described practical sessions as "mostly theoretical." These accounts help explain why 61.7% of students rated equipment inadequate and echo other research linking weak infrastructure to limited hands-on skills acquisition (Buabeng & Amo-Darko, 2025; Mohammed, 2020); when equipment cannot be consistently used, competency-based training becomes largely theoretical, limiting the technical proficiency graduates achieve.

Instructors were generally well qualified on paper, but 53% had not undergone structured training or upskilling in the past two years, and several described industry technology outpacing their own training. Workload was a related concern, with 60% describing their teaching load as "heavy"; one automotive instructor noted, "you can't give proper attention when you have 30 students sharing a few tools," reinforcing the survey finding that 56% of respondents felt supervision was inadequate and echoing cross-national evidence that instructor workload and limited upskilling restrict instructional quality (Joseph et al., 2025). These findings suggest instructor limitations are structural rather than a matter of effort, and they weaken the training cycle given how heavily competency-based methods depend on well-supported instructors.

Industry partners consistently felt the curriculum lagged behind workplace practice, with seven of eight estimating a gap of three to five years; one partner remarked, “students come in with theory, but the tools they’ve seen in school are outdated compared to what we use here,” a pattern well documented in Ghanaian TVET research (Halabieh et al., 2022; Yeboah, 2021). Administrators added that curriculum reviews were slow and often disconnected from industry feedback, and that institutions frequently lacked the equipment to teach newly introduced competencies, helping explain both the low rate of industrial exposure and limited employability confidence reported earlier.

Interviews reinforced how stigma shapes students’ pathways: many described entering TVET after failing to gain SHS admission, which seven of ten administrators characterised as “placement-driven enrolment, not passion-driven enrolment.” Female students reported particularly strong pressure; one welding student shared, “people think I should be in a sewing class, they don’t believe I can do this,” mirroring the more than two-to-one male-to-female participation gap and consistent with research on gendered TVET enrolment (Akosah-Twumasi et al., 2018; Sibiya et al., 2021). These perception-driven barriers affect motivation, persistence, and professional pride from the point of enrolment onward.

Institutional leaders pointed to administrative barriers limiting delivery: over 60% of administrators reported funding delays affecting procurement and maintenance, with some institutions waiting months for budget approval, and four highlighted procurement as “too centralised,” often resulting in outdated or incomplete toolkits, consistent with assessments identifying governance and procurement as major TVET bottlenecks (Abd Rahman et al., 2025; Amedorme & Fiagbe, 2013; Osei-Asibey, 2015). Instructors noted a mismatch between well-intentioned reforms, such as competency-based training, and institutional capacity, with one observing, “the policy assumes we have the tools, we don’t.” These governance weaknesses form the structural backdrop to most other challenges identified in the study.

Integrated Analysis

The two strands of data consistently reinforce one another. Resource shortages, teaching quality concerns, and weak industry exposure were confirmed both by survey percentages and by the reasons instructors and administrators gave in interviews, strengthening confidence that these issues are structural rather than isolated. Public perception showed similar alignment: quantitative stigma levels matched qualitative accounts of students entering TVET after being turned away from academic pathways, particularly among female students. Employability was the one area of contrast, where a minority of students expressed confidence rooted in personal apprenticeships or exposure gained outside the formal system, showing that individual success stories do not indicate that the system itself reliably produces job-ready graduates. Overall, the challenges identified are interconnected: equipment shortages weaken teaching quality, which in turn reduces student confidence and industry trust, underscoring the need for coordinated, system-level reform rather than fragmented interventions.

Institutional Comparisons

Comparing the five institutions using a combined index of infrastructure, teaching quality, industry linkages, and student satisfaction showed clear disparities, with Institution B scoring above 7.1 against 4.13 and 3.67 for Institutions D and E. Institutions with higher equipment functionality and stronger industry partnerships, such as Institution B (70% functional equipment, attachments for around 55% of students), produced smoother practical sessions and

higher employability confidence, while Institutions D and E, with functionality around 40% and minimal industry ties, saw longer waits for practice time and fewer than 30% of students gaining industrial exposure. Recent instructor training also tracked with higher-rated teaching quality, as at Institution C. These disparities confirm that institutional context strongly shapes student experience and point to the need for targeted, school-specific interventions rather than a uniform approach, consistent with national assessments of uneven TVET performance across regions (Gyampoh et al., 2025).

Alignment With Existing Literature

These findings align closely with existing research on Ghanaian and comparable TVET systems: chronic resource underinvestment, limited instructor upskilling, weak industry linkages, and persistent stigma have all been documented elsewhere, and the governance issues identified here, including delayed funding and centralised procurement, mirror broader literature on systemic bottlenecks in public TVET systems. This consistency strengthens confidence that the challenges identified are not isolated to the sampled institutions but reflect wider patterns across Ghana and similar contexts, including the persistence of stigma reported by Adams et al. (2024), providing a solid basis for the recommendations that follow.

Conclusion, Limitations, and Recommendations

This chapter brings together the study's major insights, acknowledges its limitations, and proposes practical recommendations for strengthening TVET delivery in Ghana, alongside directions for further research.

Conclusion

This mixed-methods, multi-institution study of students, instructors, administrators, and industry partners reveals a TVET system with real potential constrained by structural, instructional, and perception-related barriers: more than 60% of students reported inadequate equipment, only 35% gained industrial exposure, and 75% perceived TVET as socially inferior, showing that current training conditions do not fully prepare learners for a modern labour market. These issues matter beyond the institutions studied, since TVET is central to Ghana's industrialisation and human capital agenda; persistent resource shortages, overstretched instructors, and weak industry linkages risk slowing progress in manufacturing, construction, energy, and digital sectors. By triangulating survey, interview, and observational data across five institutions in multiple regions, including a practical resource audit of workshop functionality and safety rarely captured in national assessments, this study offers a more targeted, evidence-driven basis for TVET reform than many prior studies.

Limitations

Several limitations should be acknowledged. The data come from five institutions across three regions and may not represent the full diversity of Ghana's TVET landscape; the quantitative component relies on self-reported responses, which can be shaped by personal perception or recall bias; and the cross-sectional design captures a single point in time rather than seasonal or longer-term change. Interviews, while rich, cannot capture every stakeholder's experience. Even so, the consistency across survey, interview, and observational evidence strengthens confidence in the conclusions drawn.

Recommendations

Improving TVET in Ghana requires coordinated action across equipment, governance, perception, and labour-market alignment, since strengthening resources alone will not resolve the other barriers identified. In the short term, institutions should restore workshop functionality, update essential tools, reduce overcrowding in practical sessions, and provide instructors with targeted refresher training. Medium-term reforms should formalise industry partnerships and keep curricula continuously aligned with fast-changing sectors such as electrical installation, automotive technology, and ICT, while expanding instructor development pathways. In the long term, Ghana needs sustainable, decentralised funding mechanisms for infrastructure renewal, a national rebranding campaign to reposition TVET as a respected career pathway, and greater use of digital and simulation-based tools where equipment shortages persist. Together, these steps offer a coherent roadmap for strengthening TVET quality and relevance.

Future Research Directions

Future research should track TVET graduates longitudinally to measure employment outcomes, skill use, and career progression, and examine the specific factors discouraging female participation in technical fields given the gender disparities observed here. Further work is also needed on the implementation and outcomes of competency-based training in resource-constrained institutions, comparisons between public, private, and informal apprenticeship systems, and how digital skills and green skills, such as renewable energy and sustainable construction, can be integrated into TVET curricula to prepare learners for future labour market demands.

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