
IMPLEMENTATION OF TECHNICAL AND VOCATIONAL TRAINING AND SKILLS DEVELOPMENT AMONG YOUNG WOMEN IN GARISSA COUNTY, KENYA

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ABSTRACT

Despite increased policy attention toward Technical and Vocational Education and Training (TVET) in Kenya, young women in Garissa County continue to face challenges in accessing quality training and acquiring market-relevant skills. TVET institutions in the county still experience constraints related to curriculum relevance, instructor preparedness, technological limitations, and weak collaboration with industry, which affect the effectiveness of skills development outcomes. The aim was to examine how curriculum alignment, instructor competence, technological integration, and industrial collaboration influence skills development among young women in Garissa County, Kenya. The study investigated the role of TVET implementation as a strategic pathway for enhancing employability, job readiness, and economic empowerment among female graduates in a marginalized region. The study employed a descriptive research design targeting female graduates from TVET institutions in Garissa County. Simple random sampling was applied to select 194 respondents from a target population of 378 young women who completed their TVET training between 2020 and 2024. Data were collected using structured questionnaires, and the instruments were reviewed for validity and pilot tested in Wajir County to ensure clarity and reliability. Quantitative data were analyzed using descriptive statistics, correlation, and multiple regression, while qualitative data were analyzed thematically to capture participants' perspectives on the implementation of TVET and its contribution to skills development. The findings collectively show that TVET implementation in Garissa County is moderately effective, with curriculum alignment emerging as the strongest predictor of skills development, followed by instructor competence, technological integration, and industrial collaboration. The study contributes new empirical evidence from a marginalized region by demonstrating how these implementation dimensions jointly influence skills development among young women. Strengthening curriculum review, enhancing instructor professional development, improving access to technological infrastructure, and formalizing industry partnerships were identified as key measures necessary to improve skills acquisition, employability, and economic empowerment among young women in Garissa County.

Keywords: Technical and Vocational Education and Training; Skills Development; Curriculum Alignment; Technological Integration; Industrial Collaboration.

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INTRODUCTION

Technical and Vocational Education and Training (TVET) has become an increasingly important global strategy for addressing unemployment, improving productivity, and equipping individuals with practical skills required in modern labor markets (McGrath & Yamada, 2023). As economies evolve due to industrialization, digitalization, and technological transformation, the demand for job-ready skills continues to grow, making TVET a central pillar of human capital development. Globally, TVET systems provide formal, non-formal, and informal learning opportunities that prepare individuals for employment, entrepreneurship, and lifelong learning (Moodie, Wheelahan, & Lavigne, 2022). However, despite its importance, participation in technical education remains uneven, particularly among women who often face social, cultural, and economic barriers that limit their access to training opportunities (Powell, McGrath, & Alla-Mensah, 2022). These challenges hinder skills acquisition and reduce the potential of young women to participate fully in economic development.

Worldwide, countries have adopted different strategies to strengthen TVET systems and improve workforce readiness, including institutional reforms, industry partnerships, and technological integration. Countries such as Germany, Singapore, and Australia have implemented competency-based training systems that closely align vocational education with labor market demands, enabling graduates to acquire practical and market-relevant skills (Pilz & Li, 2021; Rauner & Maclean, 2021; Clarke & Winch, 2020). Technological integration has also become a critical component of modern TVET systems, with digital learning platforms, simulations, and technology-based training tools improving learning effectiveness and preparing learners for technology-driven economies (Gessler & Siemer, 2020). At the policy level, governments in countries such as Finland and South Korea have strengthened collaboration between industries and vocational training institutions to improve employability outcomes and economic competitiveness (Wheelahan & Moodie, 2021).

These global approaches offer valuable lessons for African countries seeking to strengthen their vocational education systems and address youth unemployment. Across Africa, governments have increasingly adopted policies aimed at reforming TVET systems, strengthening industry partnerships, and expanding access to vocational training opportunities (Afeti, 2019; Allais, 2020). Countries such as South Africa, Ghana, and Rwanda have implemented initiatives to improve curriculum relevance, promote technology integration, and enhance the quality of vocational training programs (Alla-Mensah, McGrath, & Lugg, 2020; Kingombe & Palmer, 2023). In East Africa, countries including Uganda and Tanzania have adopted competency-based training frameworks to improve the alignment between education outcomes and labor market demands (Wedekind & Mutereko, 2023; Oketch & Ngware, 2022). However, many African countries continue to face challenges such as underfunding, outdated training equipment, and limited institutional capacity, which hinder the effectiveness of TVET systems (Allais, 2020).

Kenya is no exception. The government has prioritized the development of TVET as part of its strategy to enhance youth employability and support economic growth. Through policy frameworks such as the TVET Act and national development initiatives such as Vision 2030, the government has expanded vocational training institutions and increased enrollment in technical programs (Oketch & Ngware, 2022). Although participation in vocational education has improved in recent years, challenges remain in ensuring equal access, improving training quality, and strengthening collaboration between training institutions and industries (Ngure, 2021). These challenges are particularly pronounced in marginalized regions such as Garissa County, where socio-economic constraints and limited resources affect the implementation of TVET programs (Kinyanjui & McGrath, 2023).

Garissa County represents a unique context for examining the effectiveness of TVET implementation. The county hosts several vocational training institutions that offer courses such as tailoring, electrical installation, motor vehicle mechanics, carpentry, plumbing, and information technology. These programs have the potential to equip young women with practical skills that can improve employment opportunities and

economic independence (Akomaning, Voogt, & Pieters, 2021). However, participation of women in technical training remains relatively low due to persistent cultural perceptions that vocational and technical occupations are predominantly male-oriented (Hendriks & Oketch, 2024). In addition, limited technological infrastructure, insufficient instructor training, and weak collaboration between training institutions and industries continue to affect the quality and relevance of training programs in the region (Wedekind & Lolwana, 2023).

Garissa has received limited attention in research on vocational education and skills development despite facing significant socio-economic challenges and gender disparities in access to education and employment opportunities. Most studies on TVET in Kenya focus on urban centers or economically advanced regions, leaving limited empirical evidence on how vocational training programs operate in arid and semi-arid areas (Mutua & Njeru, 2022).

This study seeks to fill this critical gap by examining the implementation of TVET and its influence on skills development among young women in Garissa County. By focusing on curriculum alignment, instructor competence, technological integration, and industrial collaboration, the study contributes to understanding how vocational education programs can better equip young women with relevant skills for employment and entrepreneurship. The findings provide policy-relevant insights for strengthening TVET implementation, improving institutional capacity, and promoting inclusive skills development in marginalized regions of Kenya.

Statement of the Problem

The expected deliverables of Technical and Vocational Education and Training (TVET) programs in Kenya are to equip young people with skills that are relevant to the labor market and enhance their employability (Oketch & Ngware, 2022). Recent studies emphasize the important role of TVET in addressing skills mismatches between education systems and labor market needs (McGrath & Yamada, 2023). Despite the critical role of these institutions in equipping individuals with market-relevant skills, young women in Garissa County face significant barriers to accessing and benefiting from these programs. Existing literature indicates that many barriers affecting TVET institutions are related to implementation challenges such as alignment of the curriculum with labor market needs, competence of instructors and trainers, levels of technological integration, and the extent of collaboration between TVET institutions and industry (Allais, 2020; Wedekind & Mutereko, 2023). These challenges contribute to unemployment and economic dependency among young women.

While several initiatives have been introduced to improve curriculum alignment with labor market demands and strengthen partnerships between training institutions and industry, there is limited scholarly understanding of whether these efforts adequately address the specific skills development needs of young women. Garissa County also faces shortages of competent instructors, with the available workforce often required to handle excessive training demands (Ngure, 2021). Although many institutions are making efforts to integrate technology into their training practices, significant barriers to effective technological integration remain, particularly in relation to access to technological resources. According to Gessler and Siemer (2020), accessibility to technological resources is a critical factor that influences the effectiveness of educational and training programs.

Despite the growing importance of skills development through vocational education, literature remains limited regarding the specific challenges faced by young women in Garissa County. These challenges relate to curriculum alignment, instructor competence, technological integration, and industry partnerships as factors that may influence the effectiveness of TVET programs in promoting skills development. Consequently, there is limited empirical evidence on how these implementation factors influence the acquisition of practical skills among young women in Garissa County. This study therefore examines how the implementation of TVET programs influences the skills development of young women in Garissa County, Kenya, focusing on

curriculum alignment, instructor competence, technological integration, and collaboration between training institutions and industry.

Research Objectives

The study specifically sought:

- To determine the impact of curriculum alignment in skills development among young women in Garissa County.
- To assess the effect of instructor competence in skills development among young women in Garissa County.
- To scrutinize the impact of technological integration in skills development among young women in Garissa County, Kenya.
- To analyze the effect of industrial collaboration in skills development among young women in Garissa County, Kenya.

LITERATURE REVIEW

This section explains the theoretical foundations guiding the implementation of TVET and its influence on skills development among young women in Garissa County. It highlights how educational alignment, technology adoption, and institutional collaboration theories support improved vocational training outcomes and link curriculum alignment, instructor competence, technological integration, and industrial collaboration to skills development.

Theoretical Framework

This study was anchored on three related theories that help explain the effectiveness of TVET implementation in promoting skills development. Constructive Alignment Theory emphasizes that effective learning occurs when teaching activities, assessment methods, and intended learning outcomes are properly aligned (Biggs, 1996). The theory suggests that students are more likely to acquire relevant skills when learning objectives are clearly defined and supported by appropriate instructional practices and assessments. In the context of this study, the theory highlights the importance of aligning TVET curricula with industry needs to ensure that graduates acquire practical and job-relevant competencies. Studies applying constructive alignment in higher education have shown that proper alignment between learning outcomes and teaching methods improves student engagement and learning performance (Mutweleli and Wambugu, 2020). However, the theory has limitations because it assumes that alignment automatically produces similar learning outcomes among all students, while differences in resources, teaching quality, and institutional environments may influence results.

Technology Acceptance Model (TAM) provides another important perspective for understanding technology integration in education and training institutions. Developed by Davis (1989), the model explains how individuals adopt and use technology based on perceived usefulness and perceived ease of use. According to the model, learners and instructors are more likely to adopt technological tools when they believe that these technologies improve learning efficiency and are easy to operate. In the context of vocational education, technological integration can enhance practical learning through simulations, digital learning platforms, and modern training equipment. Recent studies in educational technology have demonstrated that perceived usefulness and ease of use significantly influence technology adoption among learners and instructors (Al-Hattami, 2021; Teo et al., 2021). Nevertheless, the model has limitations because it does not fully account for external factors such as infrastructure limitations, institutional support, or socio-cultural barriers that may affect technology adoption. These limitations are particularly relevant in regions such as Garissa County, where technological infrastructure and access to digital tools may be constrained.

Systems theory provides a third perspective that explains the importance of collaboration between educational institutions, industries, and other stakeholders in the development of a skilled workforce. The theory

emphasizes that organizations function as interconnected systems whose performance depends on cooperation and coordination among different components. In the context of vocational education, effective collaboration between TVET institutions and industries ensures that training programs are aligned with labor market requirements and that students gain practical exposure through internships, attachments, and industry partnerships. Education research industry collaboration indicates that strong partnerships between training institutions and employers significantly improve graduates' employability and skill relevance (Gibbons et al., 2020; Poon et al., 2021). However, systems theory may overlook structural inequalities or institutional weaknesses that can hinder effective collaboration between stakeholders.

Each of these theories highlights a different aspect of vocational training implementation, yet they complement and reinforce one another. Constructive Alignment Theory focuses on the alignment of curriculum, teaching methods, and learning outcomes to ensure that students acquire relevant competencies. The TAM explains how technological tools can enhance learning and training processes when users perceive them as useful and easy to use. Systems Theory emphasizes the importance of collaboration between training institutions and industries to ensure that education outcomes match labor market needs.

Within the context of Garissa County, where vocational institutions operate under conditions of limited resources, technological constraints, and weak institutional linkages, these theories provide a comprehensive framework for understanding how TVET implementation influences skills development. Constructive alignment guides the design of industry-relevant curricula, technology acceptance explains the adoption of modern training tools, and systems theory highlights the role of industry collaboration in enhancing employability outcomes. Together, these theoretical perspectives offer a holistic explanation of how curriculum alignment, instructor competence, technological integration, and industrial collaboration can improve skills development among young women in vocational training programs.

Empirical Literature

Curriculum Alignment and Skills Development

Pilz and Li (2021) examined competency-based curriculum alignment in vocational education systems in Germany and China using a comparative analysis of vocational training programs. The study found that aligning vocational curricula with industry standards significantly improves students' acquisition of occupational competencies and practical workplace skills. However, the study focused on developed vocational education systems with strong institutional support, which may limit the direct applicability of its findings to developing countries where vocational institutions often face resource constraints.

Wedekind and Mutereko (2023) examined competency-based curriculum reforms in vocational education systems in South Africa using policy analysis and institutional case studies. The findings revealed that aligning vocational curricula with labor market needs improves students' practical skills and employability outcomes. However, the study focused mainly on national education reforms and did not provide detailed insights into how curriculum alignment is implemented at the institutional level.

Oketch and Ngware (2022) examined skills development and youth employability within the education system in Kenya using national survey data and policy analysis. The study found that training programs that incorporate labor market requirements into curricula significantly improve graduates' employment outcomes and skills relevance. However, the study examined skills development broadly and did not specifically focus on curriculum implementation processes within TVET institutions.

Instructor Competence and Skills Development

Antera (2023) examined vocational teacher competence in Finland using survey data collected from vocational teachers and students in vocational education institutions. The study found that teachers with strong pedagogical competence and industry experience significantly improved students' practical learning outcomes

and vocational skill development. However, the study was conducted within a well-resourced vocational education system, which may limit its applicability to vocational institutions in developing countries.

Allais (2020) examined challenges affecting vocational education and training systems in South Africa through policy analysis and institutional review. The study found that shortages of qualified instructors and limited opportunities for professional development significantly affect the quality of vocational training and students' acquisition of practical skills. However, the study focused mainly on national policy challenges rather than examining instructor competence within individual training institutions.

Ngure (2021) examined stakeholders' perceptions of TVET as a pathway to employment in Kenya using survey data collected from students, instructors, and industry stakeholders. The findings showed that instructor competence significantly influences students' acquisition of practical skills and their readiness for employment. However, the study focused primarily on stakeholders' perceptions rather than examining how instructor competence influences skills development across different learner groups, including young women.

Technological Integration and Skills Development

Al-Hattami (2021) examined the adoption of digital learning technologies in higher education institutions in Saudi Arabia using the Technology Acceptance Model. The study found that perceived usefulness and perceived ease of use significantly influence students' adoption of digital learning technologies, which improves learning engagement and academic performance. However, the study focused primarily on university environments rather than vocational training institutions.

Boateng et al. (2021) investigated the integration of information and communication technologies in technical and vocational education institutions in Ghana using survey data collected from instructors and students. The findings showed that technological integration improves teaching effectiveness and enhances students' understanding of technical concepts. However, the study also identified challenges related to inadequate technological infrastructure and limited instructor training in the use of digital tools.

Mungai and Nyaga (2022) examined the use of digital technologies in Kenyan TVET institutions using survey data from instructors and students in technical training centers. The study found that the use of technological tools such as learning management systems and simulation software improved student engagement and learning outcomes. However, the study highlighted challenges related to limited technological infrastructure and technical support in vocational institutions.

Industrial Collaboration and Skills Development

Jackson (2019) examined the role of work-integrated learning programs in improving graduate employability in Australia using survey data collected from graduates and employers. The study found that internships, apprenticeships, and industry placements significantly improved students' employability skills and workplace readiness. However, the study focused mainly on university graduates rather than students enrolled in vocational training institutions.

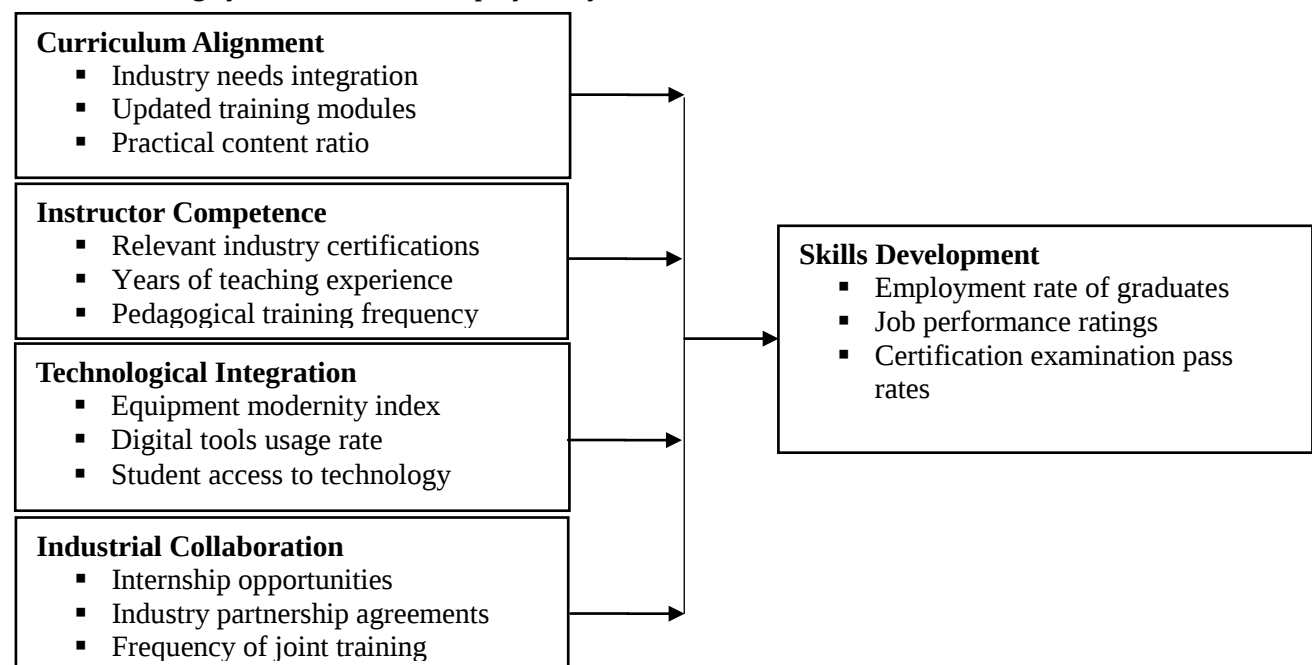
Kingombe and Palmer (2023) examined skills development systems and youth employment in sub-Saharan Africa using policy analysis and institutional case studies. The study found that collaboration between training institutions and industry significantly improves the relevance of training programs and strengthens graduates' employability and practical competencies. However, the study examined skills development systems at a regional level and did not focus specifically on individual vocational training institutions.

Muriuki (2022) examined industry collaboration and skills development among TVET graduates in Kenya using survey data collected from graduates and industry respondents from several vocational training institutions. The study found that internships and industry attachments significantly improved graduates' practical skills and job readiness. However, the study focused mainly on employability outcomes rather than examining the processes through which industry partnerships influence skills acquisition during training.

While existing studies provide valuable insights into curriculum alignment, instructor competence, technological integration, and industrial collaboration in vocational education, several gaps remain. Many empirical studies focus on vocational institutions located in developed countries or urban regions, with limited attention given to marginalized and semi-arid regions such as Garissa County in Kenya. In addition, most studies examine employability outcomes broadly rather than focusing specifically on the skills development of young women in TVET institutions. Furthermore, limited research has examined how implementation factors such as curriculum alignment, instructor competence, technological integration, and industrial collaboration collectively influence skills development outcomes in vocational training institutions within marginalized regions. These gaps highlight the need for further research examining how TVET implementation influences skills development among young women in Garissa County, Kenya.

Conceptual Framework

This study conceptualizes the relationship between the implementation of TVET and skills development among young women in Garissa County. Implementation is captured through curriculum alignment, instructor competence, technological integration, and industrial collaboration, which influence skills development measured through job readiness and employability.



Independent Variables

Dependent Variable

Figure 1: Conceptual Framework. Source: (Researcher, 2026)

METHODOLOGY

The study adopted a descriptive research design because it was suitable for examining the relationship between the implementation of TVET and skills development among young women in Garissa County in a real-life context. This design enabled the systematic collection of both quantitative and qualitative data to provide a comprehensive understanding of the phenomenon without manipulating variables.

The target population consisted of 378 young women who graduated from TVET institutions in Garissa County between 2020 and 2024. Using Yamane's formula at a 95% confidence level, a sample size of 194 respondents was determined. A simple random sampling technique was employed to ensure that all graduates had an equal chance of being selected for the study.

Data collection involved the use of structured questionnaires administered to young women graduates from TVET institutions in Garissa County. The research instrument was validated through expert review, while a

pilot study was conducted in Wajir County to ensure reliability. Cronbach's alpha coefficients for all constructs exceeded 0.7, confirming internal consistency. Quantitative data were coded and analyzed using SPSS software. Descriptive statistics such as means, frequencies, and standard deviations were used to summarize the data. Pearson correlation analysis was applied to test the relationships between curriculum alignment, instructor competence, technological integration, industrial collaboration, and skills development. Multiple regression analysis was conducted to assess the predictive power of the implementation factors on skills development outcomes. Qualitative data were analyzed thematically.

RESULTS AND DISCUSSION

The study assessed four dimensions of TVET implementation curriculum alignment, instructor competence, technological integration, and industrial collaboration and their relationship with skills development among young women in Garissa County. Respondents rated their agreement using a five-point Likert scale (1 = Strongly Disagree, 5 = Strongly Agree).

Curriculum Alignment and Skills Development

The first objective of the study was to examine the effect of curriculum alignment on skills development among young women in Garissa County, Kenya. Respondents were asked to indicate their level of agreement with several statements related to the relevance, currency, balance, and orientation of the TVET skills training curriculum using a five-point Likert scale. The results were presented in Table 1.

Table 1: Descriptive Statistics on Curriculum Alignment (n = 190)

Statement	SD F (%)	D F (%)	N F (%)	A F (%)	SA F (%)	Mean	Std. Dev
The curriculum integrates current industry needs effectively.	0 (0.0%)	8 (4.2%)	77 (40.5%)	85 (44.8%)	20 (10.5%)	3.61	0.73
The training modules in the curriculum are regularly updated.	0 (0.0%)	22 (11.6%)	77 (40.5%)	73 (38.4%)	18 (9.5%)	3.46	0.81
The curriculum provides an appropriate balance between theory and practice.	2 (1.1%)	21 (11.1%)	69 (36.2%)	75 (39.5%)	23 (12.1%)	3.51	0.88
The course content aligns with industry expectations.	1 (0.5%)	17 (8.9%)	75 (39.6%)	77 (40.5%)	20 (10.5%)	3.52	0.82
The curriculum adequately prepares students for the workforce.	2 (1.1%)	21 (11.1%)	72 (37.9%)	75 (39.5%)	20 (10.5%)	3.47	0.86
The practical content is aligned with current industry practices.	3 (1.6%)	21 (11.1%)	74 (38.9%)	74 (38.9%)	18 (9.5%)	3.45	0.87
Mean						3.50	0.83

The findings indicate that curriculum alignment contributes to skills development among young women in Garissa County. Most respondents agreed that the curriculum integrates current industry demands (55.3%, $\bar{x}$ = 3.61), although many remained neutral, suggesting moderate confidence in the relevance of training content. Respondents also moderately agreed that training modules are regularly updated (47.9%, $\bar{x}$ = 3.46), indicating that curriculum revision occurs but may not be consistent across institutions. These findings are consistent with Cattaneo, Antonietti, and Rauseo (2022), who report that vocational education programs that align curriculum content with industry practices improve learners' acquisition of practical competencies and employability skills.

The balance between theoretical knowledge and practical training was also rated positively, with more than half of the respondents agreeing that the curriculum provides an appropriate balance between theory and practice (51.6%, $\bar{x} = 3.51$). Respondents further indicated that course content generally aligns with industry expectations and prepares learners for the workforce. These findings correspond with Colley, James, and Tedder (2021), who found that vocational training programs that combine theoretical instruction with workplace-oriented learning experiences enhance learners' readiness for employment.

Qualitative responses further revealed that participants valued practical courses such as tailoring, electrical installation, entrepreneurship, and ICT because they provide skills that can support employment and self-employment. However, some respondents noted that certain training modules appear outdated and recommended incorporating modern skills such as digital marketing, renewable energy technologies, and mobile financial technologies. These concerns align with Cedefop (2022), which notes that vocational education systems that fail to regularly update curricula in response to technological change risk producing graduates whose skills are less relevant to evolving labour market needs.

Instructor Competence and Skills Development

The second objective of the study was to examine the effect of instructor competence on skills development among young women in Garissa County. Respondents were asked to express their level of agreement with a series of statements related to instructors' qualifications, teaching experience, training methods, and ability to deliver practical skills using a five-point Likert scale. The findings are presented in Table 2.

Table 2: Descriptive Statistics on Instructor Competence (n = 190)

Statement	SD (%)	F D F (%)	N F (%)	A F (%)	SA F (%)	Mean	Std. Dev
Instructors have relevant industry certifications for teaching the subject.	2 (1.1%)	18 (9.5%)	68 (35.8%)	83 (43.7%)	19 (10.0%)	3.53	0.83
Instructors have sufficient teaching experience in their field.	1 (0.5%)	22 (11.6%)	71 (37.4%)	69 (36.3%)	27 (14.2%)	3.53	0.89
Instructors receive regular pedagogical training.	3 (1.6%)	15 (7.9%)	79 (41.6%)	77 (40.5%)	16 (8.4%)	3.46	0.82
The instructors' professional qualifications meet the required standards.	2 (1.1%)	12 (6.3%)	71 (37.4%)	81 (42.6%)	24 (12.6%)	3.60	0.83
Instructors are knowledgeable about current trends in the industry.	1 (0.5%)	16 (8.4%)	84 (44.2%)	69 (36.3%)	20 (10.5%)	3.47	0.81
Mean						3.52	0.84

The findings in Table 2 indicate that instructor competence contributes positively to skills development among young women in Garissa County, though with mixed perceptions. Respondents expressed moderate agreement that trainers are certified professionals, with more than half agreeing or strongly agreeing (53.7%, $\bar{x} = 3.53$), while over one-third remained neutral. A similar pattern was observed regarding instructor experience, where just above half of the respondents confirmed that instructors possess adequate teaching and industry experience (50.5%, $\bar{x} = 3.53$). These responses suggest that while instructors are generally perceived as qualified, many learners remain uncertain about their professional background. These findings are consistent with Misra, Grimes, and Rogers (2021), who found that students' perceptions of instructor expertise and industry experience significantly influence their confidence in vocational training and the effectiveness of practical skills learning.

Professional development and training opportunities for instructors were also assessed. Nearly half of the respondents agreed that instructors participate in regular training programs (48.9%, $\bar{x} = 3.46$), though a large proportion remained neutral, suggesting possible inconsistencies in professional development opportunities across institutions. Respondents also moderately agreed that instructors possess appropriate professional qualifications (55.2%, $\bar{x} = 3.60$), which recorded the highest mean score in the construct. Similarly, respondents moderately agreed that instructors demonstrate awareness of current industry trends (46.8%, $\bar{x} = 3.47$). These findings align with Antera (2023), who found that vocational teachers' pedagogical competence and industry experience significantly influence students' acquisition of practical competencies and learning outcomes in vocational education.

Overall, the instructor competence construct recorded a moderately positive mean score ($\bar{x} = 3.52$), indicating that while TVET institutions in Garissa County demonstrate reasonable levels of instructor qualification and experience, gaps remain in continuous professional development and exposure to evolving industry practices. These findings highlight the importance of strengthening instructor training programs and promoting stronger collaboration between TVET institutions and industry to improve the relevance of skills training.

Qualitative responses supported these findings. Some participants appreciated instructors who demonstrated practical skills and guided learners step-by-step during training sessions. However, others noted that certain teaching approaches and training materials appear outdated, indicating the need for regular instructor training and exposure to modern technologies. These insights align with Gessler and Howe (2022), who show that effective vocational education requires strong integration between workplace practices and classroom learning, with instructors playing a key role in translating real work processes into meaningful learning experiences for students.

Technological Integration and Skills Development

The third objective of the study was to establish the effect of technological integration on skills development among young women in Garissa County. Respondents were asked to rate twelve statements related to the availability, accessibility, and use of modern technology in training using a five-point Likert scale. The findings are shown in Table 3.

Table 3: Descriptive Statistics on Technological Integration (n = 190)

Statement	SD (%)	F D F (%)	N F (%)	A F (%)	SA F (%)	Mean	Std. Dev
The equipment used in the courses is modern and up-to-date.	1 (0.5%)	24 (12.6%)	69 (36.3%)	78 (41.1%)	18 (9.5%)	3.47	0.85
The courses integrate relevant digital tools for learning.	2 (1.1%)	21 (11.1%)	71 (37.4%)	75 (39.5%)	21 (11.1%)	3.48	0.87
Students have adequate access to technological resources during their studies.	2 (1.1%)	12 (6.3%)	80 (42.1%)	79 (41.6%)	17 (8.9%)	3.51	0.78
The learning environment includes technological tools that enhance understanding.	1 (0.5%)	27 (14.2%)	83 (43.7%)	62 (32.6%)	17 (8.9%)	3.35	0.85
Technology is frequently used to support teaching and learning activities.	2 (1.1%)	20 (10.5%)	79 (41.6%)	75 (39.5%)	14 (7.4%)	3.42	0.81
Mean						3.45	0.83

The findings show that technological integration moderately contributes to skills development among young women in Garissa County. Respondents moderately agreed that modern equipment and digital tools are used in their training programs ($\bar{x} = 3.47$ and $\bar{x} = 3.48$ respectively), although many respondents remained neutral,

indicating variability in access to technological resources across institutions. These findings correspond with Mukama (2021), who found that integrating digital technologies and modern training equipment in vocational education enhances learners' acquisition of practical technical skills, although the level of technology integration varies across institutions.

Respondents also indicated that technological resources are moderately available within their training environments, though perceptions of the learning environment's ability to support technological learning were less positive ($\bar{x} = 3.35$). This suggests that while technological resources may exist, their effective integration into teaching practices may still be limited. These findings align with Voogt, Knezek, Christensen, and Lai (2021), who reported that although digital technologies are increasingly present in educational institutions, their effective pedagogical integration into teaching and learning environments remains uneven.

Similarly, respondents moderately agreed that technology is used to support teaching and learning activities ($\bar{x} = 3.42$), though the relatively high number of neutral responses suggests that technology use may vary across instructors or training programs. Overall, the technological integration construct recorded a moderately positive mean score ($\bar{x} = 3.45$). These findings correspond with Castañeda and Selwyn (2021), who argue that although digital technologies are increasingly introduced into educational settings, their integration into instructional practices often remains partial and uneven.

Qualitative responses supported these findings. Some respondents indicated that the use of computers, projectors, and simulation tools enhances their understanding of technical concepts and helps them acquire digital skills. However, others reported challenges such as limited access to functional equipment, outdated technological infrastructure, and insufficient opportunities for hands-on practice. These challenges correspond with Falloon (2020), who found that limited digital skills and inadequate technological infrastructure significantly constrain the effective integration of digital technologies in teaching and learning.

Industrial Collaboration and Skills Development

The fourth objective of the study was to investigate the effect of industrial collaboration on skills development among young women in Garissa County. Respondents rated twelve statements related to partnerships between TVET institutions and industry, including internships, industrial attachments, curriculum consultation, and exposure to workplace practices, using a five-point Likert scale. The results are presented in Table 4.

Table 4: Descriptive Statistics on Industrial Collaboration (n = 190)

Statement	SD	F (%)	D	F (%)	N	F (%)	A	F (%)	S	A	F (%)	Mean	Std. Dev
There are sufficient internship opportunities for students in the curriculum.	0	(0.0%)	18	(9.5%)	85	(44.7%)	76	(40.0%)	11	(5.8%)	3.42	0.74	
The institution has strong industry partnership agreements for student placements.	3	(1.6%)	17	(8.9%)	75	(39.5%)	75	(39.5%)	20	(10.5%)	3.48	0.85	
There is frequent joint training between the institution and industry partners.	0	(0.0%)	24	(12.6%)	65	(34.2%)	77	(40.5%)	24	(12.6%)	3.53	0.88	
Students are actively involved in collaborative projects with industry professionals.	2	(1.1%)	29	(15.3%)	65	(34.2%)	79	(41.6%)	15	(7.9%)	3.40	0.88	
The institution regularly consults industry partners for curriculum development.	2	(1.1%)	20	(10.5%)	76	(40.0%)	72	(37.9%)	20	(10.5%)	3.46	0.85	
Mean											3.46	0.84	

The findings indicate that industrial collaboration moderately contributes to skills development among young women in Garissa County. Respondents moderately agreed that internship opportunities exist within training programs ($\bar{x} = 3.42$) and that institutions maintain partnerships with industry for student placements ($\bar{x} = 3.48$). These findings correspond with Yeong, Kam, Lye, and Boo (2024), who found that collaboration between training institutions and industry partners, particularly through internships and workplace learning, enhances students' acquisition of practical skills and improves employability outcomes.

Respondents also moderately agreed that joint training activities between institutions and industry occur and that students engage with industry professionals through collaborative learning experiences. However, the relatively high number of neutral responses suggests that these collaborations may not be consistently implemented across all institutions. These findings align with Popli and Singh (2024), who found that collaboration between educational institutions and industry partners through curriculum input, professional engagement, and workplace exposure strengthens skills development and professional readiness among learners.

Overall, the industrial collaboration construct recorded a moderately positive mean score ($\bar{x} = 3.46$), indicating that although partnerships exist between TVET institutions and industry, their implementation may remain limited or inconsistent. These findings correspond with Tripney and Hombrados (2023), whose systematic review found that weak or inconsistent linkages between training institutions and industry contribute to skills mismatches among vocational education graduates.

Qualitative responses further supported these findings, with some respondents indicating that internship opportunities were sometimes limited or dependent on personal connections rather than structured institutional arrangements. Participants suggested that stronger formal partnerships between TVET institutions and industry would improve practical exposure and better prepare students for employment. These insights correspond with Musa, Nurhayati, and Boriboon (2025), who found that structured industry partnerships and formalized internship programs significantly enhance learners' employability skills and workplace readiness.

Skills Development

This section presents descriptive findings on the skills development among young women in Garissa County. Respondents were asked to indicate their level of agreement with twelve statements related to the acquisition of practical skills, employability, and job readiness using a five-point Likert scale. The results are detailed in Table 5.

Table 5: Descriptive Statistics on Skills Development (n = 190)

Statement	SD F (%)	D F (%)	N F (%)	A F (%)	SA F (%)	Mean	Std. Dev
The employment rate related to this program is high.	0 (0.0%)	19 (10.0%)	87 (45.8%)	68 (35.8%)	16 (8.4%)	3.42	0.78
I feel that I am currently performing well in my job.	2 (1.1%)	22 (11.6%)	71 (37.4%)	82 (43.2%)	13 (6.8%)	3.44	0.82
Graduates of this program pass certification exams at a high rate.	2 (1.1%)	14 (7.4%)	76 (40.0%)	77 (40.5%)	21 (11.1%)	3.53	0.82
The program enhanced my employability.	2 (1.1%)	15 (7.9%)	81 (42.6%)	66 (34.7%)	26 (13.7%)	3.53	0.86
The TVET well-prepared me for job performance in my field.	0 (0.0%)	23 (12.1%)	74 (38.9%)	74 (38.9%)	19 (10.0%)	3.47	0.83
Mean						3.48	0.82

The findings in Table 5 indicate that skills development among young women in Garissa County is perceived moderately positively, though many respondents expressed neutral views on several indicators. Regarding whether the program leads to high employment rates, most respondents remained neutral (45.8 %, $\bar{x} = 3.42$), while 44.2 % agreed or strongly agreed that the program contributes to employment opportunities. This suggests that while the program is perceived as useful, its direct effect on employment outcomes may not yet be fully clear to all graduates. These findings align with Tripney and Hombrados (2023), whose systematic review found that although vocational education and training programs improve employability-related skills, their impact on actual employment outcomes often depends on broader labour market conditions and institutional contexts.

Respondents also expressed moderate confidence in their personal performance after training. About half of the participants agreed or strongly agreed that they perform well after completing the program (50.0 %, $\bar{x} = 3.44$), while a considerable number remained neutral. Similarly, certification success was viewed positively, with over half of the respondents confirming that they perform well in certification examinations (51.6 %, $\bar{x} = 3.53$), indicating confidence in the competence gained through training. These findings are consistent with Gessler and Howe (2022), who highlight that vocational education programs grounded in authentic work processes and practical learning experiences support the development of occupational competence and professional confidence among learners.

The program's influence on employability was also rated moderately positively, with nearly half of the respondents agreeing or strongly agreeing that the program improves their employability (48.4 %, $\bar{x} = 3.53$). Likewise, respondents moderately agreed that TVET training adequately prepares them to perform job-related tasks (48.9 %, $\bar{x} = 3.47$). These findings indicate that TVET programs contribute to skill acquisition and job readiness, although the high proportion of neutral responses suggests that employment outcomes may vary among graduates. These findings align with Succi and Canovi (2020), who found that the development of employability competencies during training significantly enhances graduates' readiness to enter the labour market.

The skills development construct recorded an average mean score of $\bar{x} = 3.48$ ($\sigma = 0.82$), reflecting a moderately positive perception of the role of TVET programs in enhancing employability, competence, and job readiness among young women in Garissa County. These findings are supported by Pavlova (2021), who emphasizes that vocational education plays a critical role in equipping learners with practical competencies and employability skills required for participation in modern labour markets.

Correlation Analysis

To test the relationships between TVET implementation components and skills development, Pearson correlation analysis was conducted.

Table 6: Correlation Analysis

Variables	1	2	3	4	5
1. Curriculum Alignment	1				
2. Instructor Competence	0.542**	1			
3. Technological Integration	0.485**	0.533**	1		
4. Industrial Collaboration	0.467**	0.511**	0.546**	1	
5. Skills Development	0.588**	0.572**	0.552**	0.523**	1

** Correlation is significant at $p < 0.01$.

Source: Field Data (2025)

The analysis revealed that all TVET implementation dimensions were positively and significantly correlated with skills development. The strongest association was with curriculum alignment ($r = 0.588$, $p < 0.01$), followed by instructor competence ($r = 0.572$, $p < 0.01$). Technological integration and industrial collaboration also showed strong associations with skills development ($r = 0.552$ and $r = 0.523$, respectively). This confirms the constructive alignment theory and systems theory, which posit that alignment of training content, competent instructors, technology use, and collaboration with industry are essential in strengthening vocational skills development and improving employability outcomes.

Multiple Regression Analysis

It was applied to determine the predictive power of each TVET implementation dimension on skills development among young women.

Table 7: Regression Model Summary

Model	R	R ²	Adjusted R ²	Std. Error
TVET Implementation	0.861	0.742	0.698	0.253

Source: Field Data (2025)

The model explained 74.2% of the variance ($R^2 = 0.742$) in skills development.

Analysis of Variance

To assess the overall significance of the regression model, ANOVA was conducted.

Table 8: ANOVA Results for Regression Model

Model		Sum of Squares	df	Mean Square	F	Sig.
1	Regression	58.487	4	14.622	95.282	0.000
	Residual	32.105	379	0.085		
	Total	90.592	383			

The ANOVA confirmed that the model was statistically significant ($F = 95.282$, $p < 0.001$). This indicates that flood disaster preparedness dimensions collectively have a significant effect on safeguarding livelihoods in Garissa County.

Regression Coefficients

The regression coefficients indicate the individual contribution of each independent variable in predicting the dependent variable, skills development.

Table 9: Regression Coefficients

Predictor	B	Std. Error	Beta (β)	t	Sig.
Constant	0.412	0.231	–	1.783	0.082
Curriculum Alignment	0.331	0.096	0.327	3.448	0.001
Instructor Competence	0.294	0.089	0.309	3.303	0.002
Technological Integration	0.267	0.091	0.286	2.934	0.005
Industrial Collaboration	0.243	0.085	0.273	2.859	0.007

Source: Field Data (2024)

The coefficients show that all four predictors were significant ($p < 0.05$). Curriculum alignment ($\beta = 0.327$) had the strongest influence on skills development, followed by instructor competence ($\beta = 0.309$), technological integration ($\beta = 0.286$), and industrial collaboration ($\beta = 0.273$).

FINDINGS, CONCLUSION, AND RECOMMENDATIONS

The study investigated the effect of TVET implementation on skills development among young women in Garissa County. Findings indicated that curriculum alignment was moderately implemented, with respondents noting that although training programs addressed some labor market needs, outdated modules and limited curriculum reviews reduced responsiveness to emerging industry demands. The results showed moderate agreement that curriculum alignment supported skills development ($\bar{x} = 3.50$), with a strong correlation between curriculum alignment and skills development ($r = 0.588$, $p < 0.01$).

Instructor competence was also rated positively, as most respondents acknowledged that trainers possessed adequate knowledge and experience. The descriptive findings showed moderate agreement ($\bar{x} = 3.52$), and correlation analysis confirmed a significant relationship with skills development ($r = 0.572$, $p < 0.01$). However, respondents indicated that limited professional development opportunities for instructors affected training quality.

Technological integration also contributed to skills development, though implementation remained uneven. Respondents moderately agreed that technology supported training ($\bar{x} = 3.45$), and the analysis showed a strong association with skills development ($r = 0.552$, $p < 0.01$). Nevertheless, participants reported challenges such as limited ICT infrastructure and unreliable electricity supply. Industrial collaboration also supported skills development through internships and attachments. Respondents moderately agreed on its effectiveness ($\bar{x} = 3.46$), and correlation results confirmed a significant relationship ($r = 0.523$, $p < 0.01$). However, partnerships were often informal and inconsistent. Regression analysis further showed that all four dimensions significantly predicted skills development. Curriculum alignment had the strongest influence ($\beta = 0.327$, $p < 0.01$), followed by instructor competence ($\beta = 0.309$, $p < 0.01$), technological integration ($\beta = 0.286$, $p < 0.01$), and industrial collaboration ($\beta = 0.273$, $p < 0.01$). The overall model explained 68.4% of the variance ($R^2 = 0.684$, $p < 0.001$), highlighting the importance of effective TVET implementation in improving employability among young women in Garissa County.

The study concluded that TVET implementation significantly influences skills development among young women in Garissa County. Curriculum alignment improves employability by ensuring training reflects labor market needs, instructor competence enhances learning quality, technological integration supports innovation and digital skills, and industrial collaboration strengthens practical exposure through internships and attachments. Collectively, these factors demonstrate that effective TVET implementation improves employability and economic empowerment among young women.

The study recommends regular curriculum reviews to align training with industry needs and emerging technologies. Instructor competence should be strengthened through continuous professional development and industry exposure. Investment in technological infrastructure, such as electricity, internet, and modern equipment, should be increased to support digital learning. TVET institutions should also strengthen partnerships with industries to expand internships and practical training opportunities. Finally, gender inclusion initiatives should be promoted to encourage more young women to participate in diverse technical fields.

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