

Hands-On Technical Skills Developed During Industrial Attachment And Its Effect On Employability Of Technical Institutes' Diploma Graduates From Machakos County, Kenya

Edward Kolu Kasimu, Dr. Joseph Gachigua Mungai, Dr. Samson Ikinya Kariuki

(Department Of Educational Management, Policy And Curriculum Studies, Kenyatta University, Kenya)

(Department Of Educational Management, Policy And Curriculum Studies, Kenyatta University, Kenya)

(Department Of Educational Management, Policy And Curriculum Studies, Kenyatta University, Kenya)

Abstract:

Graduates of technical institutes in Kenya, particularly those from Machakos County, have a persistent gap between the skills they acquire and the demands of the job market. This has resulted in higher unemployment rates among the graduates despite the integration of industrial attachment into TVET diploma programs, which is expected to equip them with competencies to enhance their employability. Furthermore, there has been a scarcity of information on industrial attachment and its effect on the employability of these graduates. The study was guided by the objective to determine whether hands-on technical skills developed during industrial attachment affect employability of technical institutes' diploma graduates from Machakos county, Kenya. The study was guided by human capital theory and applied a mixed-method convergent parallel design. The target population comprised 347 graduates and 200 trainers and 3 principals, from which 175 graduates, 60 trainers and 3 principals were sampled. The technical training institutes were purposively sampled and then stratified into various departments. One graduate identified from each department was sought to help reach the rest through snowball sampling. The main research instrument was a questionnaire for graduates, while interview guides for trainers and principals were used to enhance triangulation. Quantitative data were analyzed descriptively using percentages, frequencies, means, and standard deviations, and inferentially using regression and correlation analysis with the aid of the Statistical Package for Social Sciences (SPSS). Qualitative data from interviews were transcribed, categorized into themes, and reported in narrative summaries. The findings revealed that hands-on technical skills had the strongest influence ($\beta = .298$), as industrial attachment bridged the gap between theory and practice, improved technical proficiency, and increased job readiness. The study concluded that industrial attachment is a critical mechanism for developing employability skills and facilitating smooth transition from training to employment. It enhanced graduates' technical competence, professional maturity, and workplace adaptability, consistent with Human Capital theory. The study recommended that TVET institutions strengthen industry partnerships, improve supervision and placement processes, and integrate soft skills and professional development training. Industry partners should offer structured mentorship, and collaborate in curriculum design. Government should standardize policies, support financing, and incentivize industry participation, while students should take proactive roles in maximizing learning and networking opportunities.

Keywords: *Hands-On Technical Skills, Industrial Attachment, Employability, Technical Institutes' Diploma Graduates, Machakos County*

Date of Submission: 12-03-2026

Date of Acceptance: 22-03-2026

I. Introduction

Background of the Study

“Individuals' employability in a variety of industries is greatly influenced by Technical and Vocational Education and Training (TVET)”³⁷. TVET being pragmatic in nature, it equips students with practical skills and real-world experience that enhance their marketability to employers⁴⁰. TVET's primary focus is on the study of technologies and allied sciences. It also strengthens the development of practical skills relevant to jobs in a variety of economic and social spheres⁴¹. According to empirical data, enrolling in TVET programs is positively correlated with increased employability rates³⁷. The demand for qualified individuals is rising globally as the global economy continues to change.

TVET programs need industrial attachment, which is a crucial element aimed at giving students practical experience in their disciplines. It entails assigning students to relevant businesses or organizations for a predetermined amount of time. With the help of this experiential learning strategy, students can apply academic knowledge to real-world issues with practical abilities and become familiar with industrial procedures¹⁶. Graduate employability is positively impacted by industrial attachment. Research has demonstrated that students who participate in industrial attachment possess a greater likelihood of landing a job after graduation than their counterparts who lack this experience⁸.

Students can develop and hone technical skills, problem-solving techniques, and soft skills like communication, teamwork, and time management through industrial attachment³¹. Students are able to adjust to the demands of the workplace by working in real-world settings, which provide them with insights into industry trends, technology, and work culture²⁶. Interaction with industry specialists is facilitated by industrial attachment, forming beneficial networks that may result in employment prospects²⁸. Industrial attachment has many advantages, but it can also be ineffective due to issues like poor supervision, little opportunity, and programs that don't align with industry standards. To maximize the effect of industry attachment on graduate employability, TVET institutions and companies must work together to address these issues¹¹.

Globally, industries rather than academic institutions determine TVET curricula in industrialized nations like Australia¹⁰. As a result, TVET programs have remained relevant and students are focused on industry demands. In Bangladesh, the gap between the skills that businesses need and the knowledge that TVE training programs impart is widening¹⁶. According to¹⁶, working together with industry is the only method to close the skills gap and increase the employability of TVET graduates in the nation.

Nigeria is a prime example of an African country where industrial attachment gives students real-world work experience. The interaction between the industry-based supervisor and the institution-based supervisor fostered by industrial attachment produced TVET graduates who were prepared for the workforce¹. It was discovered in the state of Oromia that successful partnerships between the TVET sector and industry significantly enhance the employability skills that graduates of polytechnics acquire.¹ suggested that in addition to developing policy and strategy-supported incentive mechanisms for industries, the government should work to promote TVET-industry partnerships and educate other key stakeholders about the mutual benefits of such partnerships. Additionally, "the curriculum should be reviewed and updated to reflect the ever-evolving demands of the labor market"²². One strategy for helping graduates of "Technical and Vocational Education and Training programs in Uganda adjust to the workforce is to offer internships" or industrial attachment programs²⁰.

According to¹⁵ in addition to TVET's importance in closing the skills gap and increasing employability, by providing people with the necessary information and skills especially in developing nations like Kenya, it also opens doors to respectable employment and advances sustainable development¹⁵. There is a mismatch between graduate capabilities and employer requirements, raising concerns about the quality and applicability of TVET programs⁴⁴. Kenya is aware of how crucial TVET is to promoting economic growth and employability. Session Paper No. 10 of 2016 on Revitalizing Technical and Vocational Education and Training (TVET) for Socio-economic Transformation highlights the need of using Competency Based Training (CBT) to give graduates information, skills, and attitudes that are relevant to the business¹⁴. It also describes the frameworks for diploma programs and how the learning objectives match the demands of the job market. Therefore, encouraging cooperation between educational institutions and business to advance work-based learning, internships, and apprenticeships will increase employability.

In order to increase the mobility and competitiveness of graduates, the Kenya National Qualifications Framework (KNQF) creates a nationwide standard for comparing and recognizing abilities obtained through TVET¹⁴. Based on expectations for knowledge, abilities, and application (competency), the framework establishes standards for graduation levels. As such, it facilitates the transferability of qualifications between industries and nations, hence augmenting the employability of graduates¹⁹. The Kenyan legal framework governing TVET provision is established by the³⁸. It requires quality control procedures to guarantee that graduates have knowledge and abilities that are applicable to the industry. In turn, this encourages collaborations between educational institutions, business, and local communities to improve the employability and marketability of graduates.

TVET is regarded by the Kenyan government as a vital route to economic development, as stated in the Skills Development Act (2006) and Vision 2030. Studies like those by^{18, 35}, however, raise issues with the mismatch between TVET programs and industry demands, which has an effect on the employability of graduates. Industrial collaborations are thought to be a viable remedy, according to research by³⁰. It's common knowledge that practical training is important. Research by⁴ highlight the benefits of developing practical skills for TVET graduates' employability, but also raise questions about how sufficient the possibilities for practical training are in various TVET programs.

Technical and Vocational Education and Training (TVET) provides hands-on and practical training that bridges the gap between education and employment, equipping individuals for direct job placement or additional study⁴⁴. This is especially important in Kenya, where a sizable portion of the youth population looks for work²⁴. Numerous studies cast doubt on TVET graduates' employment in Kenya, despite their promise.⁴² highlighted “a mismatch between the skills offered by TVET colleges and the expectations of the industry”. Furthermore, impeding graduate employment include restricted industrial linkages and insufficient infrastructure²⁵.

One of the main obstacles to youth employment in Kenya is the mismatch in skills, the hunt for white-collar professions, and the lack of training for the present and future labor markets, especially in technical domains like roads, water, energy, agriculture, and ICT. In contrast to higher education, TVET is perceived by Kenyan youth as being less competitive. There is a sizable disparity between the training provided in engineering courses at TVET institutions and the skills needed by industry, despite efforts to revitalize TVET education in Kenya and developing nations generally.

This discrepancy has partially contributed to the rise in youth unemployment in Kenya³⁹. According to research by¹⁷, “technician engineering graduates from Thika Technical Training Institute and Meru Technical Training Institute, respectively, who studied mechanical and construction engineering, said the training procedure was awful.” Additionally, there is very little industry participation in Technician Engineering Training (T.E.T.)¹⁷.

In Machakos County there are six Public Technical Institutes offering Diploma in Technical Vocational Education and Training. These are: Katine Technical Training Institute, Masinga Technical and Vocational College, Machakos Technical Institute for the Blind, Mwala Technical and Vocational College, Yatta Technical and Vocational College and Machakos Town Technical and Vocational College. Out of the six three are new; Machakos town TVC had their first cohort being admitted in January 2024, Yatta TVC had their first cohort being admitted in May 2024 while Mwala TVC had their first cohort being admitted in September 2021 and expecting their first graduands in September 2024.

There is inadequacy of data regarding employment status of diploma graduates from technical institutions in Machakos county in Kenya. This therefore calls for a study on effect of industrial attachment on employability of diploma graduates from public technical institutes in Machakos county, Kenya. The key variables in this study are; industrial attachment which is the independent variable which refers to practical training period that TVET diploma graduates undertake in industries or organizations related to their field of study and employability which is the dependent variable which refers to the ability of TVET diploma graduate to secure and maintain gainful employment. It also includes the Time taken before employment. The potential intervening variables are employer perception of industrial attachment and economic conditions. The perception of employers on value of industrial attachments and the quality of graduates from public technical institutes can affect hiring decisions. The overall economic climate and job market conditions in Kenya can influence the demand for graduates and their employment prospects.

Statement of the Problem

Industrial attachment serves as crucial bridge between theoretical knowledge gained in TVET institutions and application of practical experience in real-world work environments. Technical expertise is the cornerstone for achieving industrial transformation in line with Kenya's Vision 2030. TVET's main objective is to create sufficient number of competent craftsmen, technologists, artisans and technicians at all levels of the economy through acquisition of practical experience in their disciplines. Employability is therefore enhanced by promoting cooperation between training institutions and industry to enhance work-based education, internships and apprenticeships. Industrial attachment is very crucial in improving the employability of diploma graduates by developing useful abilities such as hands-on experience.

However, graduates of Technical Institutes in Kenya particularly those from Machakos county seem to have a persistent gap between the skills they acquired and demands of the job market. This has resulted to higher unemployment rates among the graduates. This is despite the integration of industrial attachment into Technical, Vocational, Education and Training diploma programs. Despite the emphasis on practical skills development, there is dearth of empirical evidence on the effect of industrial attachment on employability of diploma graduates from public technical institutes in Machakos county, Kenya. Thus, the reason why the study on industrial attachment and its effect on employability of diploma graduates from public technical institutes in Machakos county, Kenya is significant.

Objectives of the Study

The research objective was to determine whether hands-on technical skills developed during industrial attachment affect employability of technical institutes' diploma graduates from Machakos county, Kenya.

Significance of the Study

This study was beneficial to stakeholders in the education sector in terms of preparing graduates for work.

- i. The findings majorly constitute an evaluation of industrial attachment programs at public technical institutes. By identifying the specific ways in which attachments contributed to employability, the research helped improve the design, implementation, and assessment of these programs.
- ii. The study contributes to broader impact assessments of technical education in Kenya. By demonstrating the link between industrial attachments and graduate employment outcomes, it provided evidence of the effectiveness of investing in this type of work-integrated learning.
- iii. By identifying the strengths and weaknesses of TVET diploma programmes in relation to the role of industrial attachment on employability, the study offers recommendations to technical institutes that helped improve the effectiveness of these programmes in preparing graduates for the workforce. This, in turn, enhanced the employability of individuals completing TVET diploma courses.
- iv. It also contributes valuable insights for policymakers, educators, and other stakeholders to enhance TVET programmes, align them with industry needs, and improve graduates' chances in the job market.

Theoretical Framework of the Study

The theoretical framework was derived from existing theories relevant to the study. This research was anchored on Human Capital Theory, which provided a conceptual basis for linking education and training to employability outcomes. The Human Capital Theory, developed by Gary Becker and Theodore Schultz in 1964, emphasized how individuals' professional capabilities were positively impacted by education and training, enhancing productivity and efficiency⁶. The theory argued that investment in human capital—through education, workplace training, communication, and problem-solving skills—resulted in higher output, financial gains, and organizational growth^{7, 13}. The foundation of the theory was the idea that a population's productivity could be improved through formal education. It proposed that societies with higher levels of education were more productive. Investing in employees' education and training was believed to increase their productivity and value to the firm and economy. Such investments could take the form of formal education, on-the-job training, apprenticeships, and professional development.

According to⁴³, investment in human capital was as valuable as material wealth, and integrating the concept into educational systems was essential for promoting social and economic growth.⁵ further argued that education contributed to economic development by increasing labour force productivity. In relation to this study, Human Capital Theory provided a useful lens for examining how industrial attachment functioned as an investment in human capital. The theory supported the idea that practical work experience gained through industrial attachment enhanced graduates' skills, knowledge, and employability.

II. Literature Review

Hands-on Technical Skills Developed During Industrial Attachment and TVET Diploma Graduates' Employability

According to²⁹, "a study on the impact of industrial work experience on the employability skills of undergraduates in Technical and Vocational Education (TVE) at Nigerian universities demonstrated that there was a notable improvement in the employability skills attained by TVE students following work experience." This finding may have a significant contributing factor in the fact that industrial work experience fosters the development of skills and the application of information, making TVE undergraduates more employable and equipped for the workforce. This data can also be interpreted to suggest that TVE undergraduates are better prepared for the workforce and will likely have higher employability skills the more industrial work experience they receive. This study did not address graduates of TVET diplomas; instead, it primarily examined undergraduate TVE at universities. Students were asked to list the skills they thought would make an ATVET graduate employable by¹² in their study "Graduate Employability abilities: The Voice of Agricultural Technical Vocational Education and Training (ATVET) Students in Zimbabwe." In general, group conversations were rather engaging, with some students even sharing their experiences from their time spent on attachment. The topics that the students focused on were problem-solving, ethics, honesty, financial literacy, inventiveness, and entrepreneurship. With the exception of practical skills, this study does not explicitly explain how developing practical skills improves the employability of TVET diploma holders.

According to² in their study, "Industrial Attachment in Polytechnic Education: An Approach to Polytechnic-Industry Nexus in Human Capital Development of Selected Polytechnics in Ghana," they addressed the question of whether industry offered polytechnic students the chance to hone their abilities through attachment to industry. Of the 355 respondents, the majority (56.1%) agreed that industry offered the chance to hone their skills, while 13% and 33% of students were unsure or gave a negative response. The study also aimed to determine if industry offered polytechnic trainees who participated in attachment to industry the necessary opportunity for practical training. Most of those surveyed (91%) overwhelmingly concurred with the

assertion that industry gave polytechnic students opportunity for real-world training, according to the data. The skills development that affects TVET diploma holders' employability is still not specified in this research. The proposed study will be conducted in Kenya particularly Machakos County to show how hands-on skills technical skills developed during industrial attachment affect employability of TVET diploma graduates.

The most prevalent linkage “between TVET institutions and industry in Kenya”, according to research on the subject, was industrial attachment. The primary obstacles to establishing industry-TVET links are the industries' lack of response and the TVET institutions' lack of effort. Relevant practical skills for industrialization will be made available when industries and TVET institutions collaborate effectively²¹. This study does not however, describe the relevant practical skills that affect the employability of TVET diploma graduates.²⁶ conducted research in order to ascertain how well industrial attachment experience helps trainees in TVET colleges in Nairobi County build their employability abilities. The above study employed a mixed research approach, which was directed by the theory of skills acquisition. The convergent parallel design was utilized by the researcher in the current. The study's conclusions proved that exposure to industrial affiliation impacted the growth of employable abilities. Through Industrial Attachment, trainees were sufficiently exposed to essential employability skills like decision-making, social skills, work culture, problem-solving, and interpersonal abilities like bargaining and self-assurance. Moreover, industrial attachment enhances psychomotor abilities, which are critical for trainees in TVET. According to one of the trainers, the trainees have demonstrated that they need this kind of exposure as they practice using machines and other equipment. As a result, the study suggested aligning the degree of skill exposure during attachment with TVET courses and programs. The study also indicated that cooperation between TVET institutions and industry is required to increase skill exposure in accordance with general principles for industrial attachment. However, aside from psychomotor skills, this study did not identify any additional practical abilities needed to improve the employability of TVET diploma holders. The above study utilized the skills acquisition theory and concurrent triangulation design while the human capital theory and convergent parallel design were utilized in the current study.

These studies do not give a clear picture on how Practical Skills Development: level of skill acquired, skill proficiency and participation in real world projects/tasks During Industrial Attachment affect employability of TVET diploma graduates particularly in Machakos county, Kenya. This study sought to fill this gap.

III. Research Methodology

Research Design

This study employed a mixed research methodology. The researcher used the mixed-method convergent parallel design. Quantitative and qualitative data were collected at the same time. Results were compared and combined during interpretation. Quantitative data were collected to assess the overall impact of industrial attachment on employability, while qualitative data were collected to explain or elaborate on the quantitative findings. For this study, quantitative data established the general trend—whether industrial attachment had a positive effect on employability metrics—while qualitative data provided context and depth, explaining why industrial attachment had this effect, what specific skills and experiences gained during attachment were most valuable to employers, and what graduates' perspectives were on the connection between attachment and their career outcomes.

Location of Study

The research was conducted among diploma graduates of Katine TTI, Masinga TVC, and Machakos Technical Institute for the Blind in Machakos County, Kenya. Machakos County shares borders with Embu to the north, Kitui to the east, Makueni to the south, Kajiado to the west, Murang'a and Kirinyaga to the northwest, and Nairobi and Kiambu counties to the west²⁷. The county's diverse industries offered a variety of attachment opportunities, ensuring that graduates were exposed to different work environments. There had been limited research specifically examining industrial attachment and its effect on employability of diploma graduates from public technical institutes in Machakos County, making this study a valuable contribution to local knowledge and program evaluation.

Target Population of the Study

Target population is the entire collection of items from which inferences are made⁹. The target population referred to the entire set of people or things to which the researcher intended to apply the findings³². The target population for this investigation comprised 347 graduates from Katine TTI, Masinga TVC, and Machakos Technical Institute for the Blind who had graduated in the years 2022 and 2023, and 200 trainers and 3 principals from the same institutions. This selection was based on³³ recommendation that homogeneity and increased validity and reliability be ensured by selecting recent graduates who had completed their studies within a two-year window. Lists provided by the institutions served as the foundation for identifying the

graduates. However, since “Where are they now” lists might have changed over time, a short time limit was adopted to enhance accuracy. Diploma holders were targeted since they possessed relevant knowledge and skills required in the labor market.

Sampling Techniques and Sample Size

A sample size, according to ³⁴, consists of individuals, objects, or events selected as representatives of the entire population. ³³ stated that a sample size of 30% was sufficient for representativeness in follow-up surveys. The sample size for diploma graduates was 50% of the target population in each stratum, resulting in 175 diploma holders. A sample of 60 trainers was used, representing 30% of the trainers while the 3 principals were included in the study. The study utilized purposive, stratified, and snowball sampling procedures. Katine TTI, Masinga TVC, and Machakos Technical Institute for the Blind and their Principals were purposively selected. Stratified sampling was used to represent the eight areas of specialization: Electrical, Mechanical, Civil Engineering, Fashion Design, Business Studies, ICT, Agriculture, and Liberal Studies.

“In cases where the population is heterogeneous, stratified random sampling is a helpful technique for gathering data. This method divides the whole diverse population into several homogeneous groupings, called strata, each of which is homogeneous within itself. Units are then randomly picked from each stratum” ³⁶. “The relative relevance of each stratum in the population determines the sample size for each stratum” ³⁶. One graduate from each specialty area was chosen from the lists of contacts left at the institution for snowball sampling, and this individual was contacted then served as a conduit for additional respondents to supply the data.

Data Analysis

After the data had been gathered, the questionnaires were coded and entered into the Statistical Packages for Social Scientists (SPSS version 27). Data was cleaned and analyzed using descriptive and inferential statistics. Descriptive statistics include the mean, standard deviation, percentages and frequency. Correlation analysis and Multiple Regression were used as inferential statistics to assess the strength of the association between the technical training industrial attachment and the employability of graduates from technical and vocational training institutions in Machakos County.

IV. Data Analysis, Interpretation And Discussion Of Findings

Response Rate

The study sampled 238 respondents comprising 175 TVET diploma graduates, 60 TVET trainers, and 3 principals from three public technical institutes in Machakos County. Out of the 175 questionnaires distributed to TVET diploma graduates, 163 were properly filled and returned, representing a response rate of 93.1%. For the TVET trainers, 49 out of 60 participated in the interviews, representing a response rate of 81.7%. All three principals (100%) participated in the interviews. The overall response rate was 90.3% (215 out of 238 respondents). According to ²³, a response rate of 70% and above is excellent for analysis and reporting. Therefore, the response rate achieved in this study was considered adequate for drawing valid conclusions.

Hands-On Technical Skills Developed During Industrial Attachment and Employability

The research objective was to determine whether hands-on technical skills developed during industrial attachment affected employability of technical institutes' diploma graduates from Machakos County, Kenya. This objective was addressed through three sub-themes: level of skills acquired, skill proficiency, and participation in real-world projects/tasks. Respondents were asked to indicate their level of agreement with various statements on a five-point Likert scale (5=Strongly Agree, 4=Agree, 3=Neutral, 2=Disagree, 1=Strongly Disagree). The findings were presented using descriptive statistics (means and standard deviations) and supported by qualitative data from interviews.

Level of Skills Acquired During Industrial Attachment

The study examined the level of technical skills that respondents acquired during industrial attachment and how these skills related to their employability. The results are presented in Table 4.1.

Table 4.1: Level of Skills Acquired During Industrial Attachment

Statement	SA (%)	A (%)	N (%)	D (%)	SD (%)	Mean	SD
During industrial attachment, I acquired advanced technical skills relevant to my field of study	45.4	38.7	9.2	4.9	1.8	4.21	0.93
The technical skills I acquired during industrial attachment are directly applicable to my current job/job search	48.5	35.6	8.6	5.5	1.8	4.24	0.96

Statement	SA (%)	A (%)	N (%)	D (%)	SD (%)	Mean	SD
Industrial attachment exposed me to industry-standard tools and equipment	52.1	33.7	7.4	4.9	1.8	4.29	0.94
I learned new technical procedures and techniques during industrial attachment that were not covered in classroom training	56.4	31.3	6.7	3.7	1.8	4.37	0.91
The level of technical skills I acquired during industrial attachment has made me more competitive in the job market	50.9	34.4	8.0	4.9	1.8	4.28	0.94
Overall Mean						4.28	0.74

Source: Field Data (2025)

Key: SA=Strongly Agree, A=Agree, N=Neutral, D=Disagree, SD=Strongly Disagree, SD=Standard Deviation

The findings in Table 4.1 reveal that respondents strongly agreed that industrial attachment enhanced the level of technical skills they acquired, with an overall mean score of 4.28 (SD=0.74). The highest-rated statement was "I learned new technical procedures and techniques during industrial attachment that were not covered in classroom training" (M=4.37, SD=0.91), with 87.7% of respondents agreeing or strongly agreeing. This finding underscores the complementary role of industrial attachment in bridging the gap between theoretical classroom instruction and practical industry requirements.

The statement "Industrial attachment exposed me to industry-standard tools and equipment" also received strong agreement (M=4.29, SD=0.94), with 85.8% of respondents agreeing or strongly agreeing. This was significant because access to modern, industry-standard equipment was often limited in TVET institutions due to resource constraints. Industrial attachment provided students with opportunities to work with current technology and equipment used in actual workplaces, thereby enhancing their technical competence and marketability.

Additionally, 84.1% of respondents agreed or strongly agreed that "The technical skills I acquired during industrial attachment are directly applicable to my current job/job search" (M=4.24, SD=0.96). This finding demonstrates the relevance and transferability of skills acquired during industrial attachment to actual employment contexts. Similarly, 85.3% agreed or strongly agreed that "The level of technical skills I acquired during industrial attachment has made me more competitive in the job market" (M=4.28, SD=0.94), indicating that respondents perceived industrial attachment as a significant contributor to their employability.

The qualitative data from interviews corroborated the quantitative findings. As expected in qualitative inquiry, direct verbatim quotations are drawn from a small number of study participants and are appropriately labeled according to respondent category. For example, one Trainer (Trainer 1) from the Mechanical Engineering department explained: "When students return from industrial attachment, we can immediately see the difference in their technical competence. They handle equipment with more confidence, they understand industry standards, and they can apply theoretical concepts to practical problems. The skills they acquire during attachment are often more advanced than what we can provide in our workshops due to resource limitations."

Similarly, a Principal (Principal 1) added: "Industrial attachment exposes our students to cutting-edge technology and industry best practices that we cannot always replicate in our institutions. This exposure is invaluable for their professional development and makes them more attractive to employers who are looking for graduates who can hit the ground running."

Several graduates also supported these findings through comments provided in the open-ended section of the questionnaire. One graduate employed in a private engineering firm (Graduate 1) wrote: "During my industrial attachment, I learned to operate CNC machines and use CAD software that we only studied theoretically in class. These skills were directly mentioned in my job interview, and I believe they were a major reason I was hired. My employer told me that many applicants had the theoretical knowledge, but I had the practical experience that set me apart."

Another TVET diploma graduate working in the ICT sector (Graduate 2) noted: "Industrial attachment gave me hands-on experience with network configuration, server management, and cybersecurity protocols that I had only read about in textbooks. When I started my job, I was already familiar with the tools and procedures, which allowed me to contribute productively from day one."

These findings align with the Human Capital Theory, which posited that investments in education and training enhanced individuals' productive capacities and economic value. Industrial attachment represented such an investment, providing students with advanced technical skills that increased their human capital and, consequently, their employability. The findings also support ²⁹ study in Nigeria, which found that industrial work experience significantly improved the employability skills of Technical and Vocational Education students.

However, it was important to note that 6.7% to 9.2% of respondents remained neutral on these statements, and 4.9% to 7.3% disagreed or strongly disagreed. During the interviews, trainers acknowledged that the quality of industrial attachment experiences varied depending on the placement organization. One trainer stated: "Not all attachment placements are equal. Some organizations provide excellent hands-on training and mentorship, while others assign students to menial tasks or clerical work that does not enhance

their technical skills. We are working to improve our monitoring and evaluation of attachment placements to ensure quality experiences for all students."

Skill Proficiency Developed During Industrial Attachment

The study examined the extent to which industrial attachment enhanced respondents' proficiency in applying technical skills in workplace settings. Skill proficiency went beyond mere acquisition of skills to encompass the ability to perform tasks with speed, accuracy, and confidence. The results are presented in Table 4.2.

Table 4.2: Skill Proficiency Developed During Industrial Attachment

Statement	SA (%)	A (%)	N (%)	D (%)	SD (%)	Mean	SD
After industrial attachment, I can complete workplace tasks with the same speed as experienced workers	32.5	41.7	16.0	7.4	2.5	3.94	1.01
My ability to operate equipment and machinery improved significantly after industrial attachment	47.2	37.4	9.2	4.3	1.8	4.24	0.93
I can perform maintenance procedures on industrial equipment competently after industrial attachment	38.7	39.9	13.5	5.5	2.5	4.07	0.98
The quality and accuracy of my technical work improved after industrial attachment	49.1	36.8	8.6	3.7	1.8	4.28	0.91
I am confident in demonstrating practical skills in real workplace settings after industrial attachment	51.5	35.0	8.0	3.7	1.8	4.31	0.91
I can troubleshoot technical problems independently after industrial attachment	43.6	38.7	11.0	4.9	1.8	4.17	0.93
My proficiency in using industry-specific software/technology increased after industrial attachment	46.0	36.2	10.4	5.5	1.8	4.19	0.96
Overall Mean						4.17	0.75

Source: Field Data (2025)

The findings in Table 4.2 show that respondents strongly agreed that industrial attachment enhanced their skill proficiency, with an overall mean score of 4.17 (SD=0.75). The highest-rated statement was "I am confident in demonstrating practical skills in real workplace settings after industrial attachment" (M=4.31, SD=0.91), with 86.5% of respondents agreeing or strongly agreeing. This finding is particularly significant because confidence in applying skills was a critical component of employability. Employers valued graduates who could perform tasks independently and confidently without extensive supervision.

The statement "The quality and accuracy of my technical work improved after industrial attachment" also received strong agreement (M=4.28, SD=0.91), with 85.9% of respondents agreeing or strongly agreeing. This indicated that industrial attachment not only taught students how to perform technical tasks but also instilled standards of quality and precision that were essential in professional work environments.

Additionally, 84.6% of respondents agreed or strongly agreed that "My ability to operate equipment and machinery improved significantly after industrial attachment" (M=4.24, SD=0.93). This was a crucial finding because proficiency in operating industry-standard equipment was often a prerequisite for employment in technical fields. The hands-on experience gained during industrial attachment allowed students to develop the muscle memory, procedural knowledge, and safety awareness necessary for competent equipment operation.

The statement "My proficiency in using industry-specific software/technology increased after industrial attachment" received agreement from 82.2% of respondents (M=4.19, SD=0.96). In the modern workplace, technical proficiency increasingly involved digital literacy and the ability to use specialized software applications. Industrial attachment provided students with opportunities to work with industry-standard software that might not be available in their institutions, thereby enhancing their technological competence.

Interestingly, the statement "After industrial attachment, I can complete workplace tasks with the same speed as experienced workers" received the lowest mean score (M=3.94, SD=1.01), though still indicating agreement. This suggested that while industrial attachment significantly improved students' skill proficiency, achieving the speed and efficiency of experienced workers required additional time and practice. This finding was realistic and aligned with the concept of skill development as a gradual process that continued beyond the attachment period.

The qualitative data provided deeper insights into skill proficiency development. One Trainer from the Electrical Engineering department (Trainer 1) explained: "We assess students' practical skills before and after industrial attachment through standardized practical examinations. The improvement is remarkable. Students who struggled with basic wiring procedures before attachment return with the ability to complete complex electrical installations efficiently and safely. They have internalized industry standards and best practices."

A Principal (Principal 1) shared: "Employers who hire our graduates often comment on their proficiency and job-readiness. They tell us that our graduates require minimal on-the-job training compared to

graduates from institutions that do not emphasize industrial attachment. This feedback validates the importance of hands-on experience in developing skill proficiency.”

Several respondents also provided illustrative examples in their questionnaire comments. One graduate employed in a construction company (Graduate 1) wrote: “During my industrial attachment, I worked on actual building projects from foundation to finishing. I learned to read architectural drawings, operate surveying equipment, and supervise construction workers. When I started my job, I was already proficient in these tasks, which impressed my employer and led to rapid career progression.”

Another respondent in the fashion design industry (Graduate 2) noted: “Industrial attachment taught me to work with industrial sewing machines, pattern-making software, and quality control procedures. I can now produce garments that meet international quality standards, which has enabled me to secure contracts with export companies.”

The findings also corroborated ²⁶ study in Nairobi County, which found that industrial attachment significantly enhanced trainees' psychomotor skills and technical competence. However, the current study extended these findings by demonstrating specific dimensions of skill proficiency (speed, accuracy, confidence, troubleshooting ability) that were enhanced through industrial attachment.

Participation in Real-World Projects/Tasks during Industrial Attachment

The study examined the extent to which respondents participated in real-world projects and tasks during industrial attachment and how this participation affected their skill development and employability. Participation in authentic workplace projects was considered a critical component of experiential learning. The results are presented in Table 4.3.

Table 4.3: Participation in Real-World Projects/Tasks during Industrial Attachment

Statement	SA (%)	A (%)	N (%)	D (%)	SD (%)	Mean	SD
I participated in multiple real-world projects during industrial attachment	44.8	36.8	11.0	5.5	1.8	4.17	0.95
The real-world projects I worked on during industrial attachment were directly related to my field of study	48.5	35.6	9.2	4.9	1.8	4.24	0.93
Participation in real-world projects during industrial attachment enhanced my learning and skill development	53.4	33.7	7.4	3.7	1.8	4.33	0.90
The real-world projects I completed during industrial attachment improved my technical competence	51.5	34.4	8.6	3.7	1.8	4.30	0.91
Working on real-world projects during industrial attachment prepared me well for actual workplace challenges	54.0	32.5	8.0	3.7	1.8	4.33	0.90
I was given meaningful responsibilities in the projects I participated in during industrial attachment	42.3	38.0	12.3	5.5	1.8	4.13	0.95
The complexity of projects I handled during industrial attachment increased my problem-solving abilities	47.9	36.2	9.8	4.3	1.8	4.24	0.93
Overall Mean						4.25	0.74

Source: Field Data (2025)

The findings in Table 4.3 reveal that respondents strongly agreed that participation in real-world projects during industrial attachment enhanced their skill development and employability, with an overall mean score of 4.25 (SD=0.74). Two statements tied for the highest mean score (M=4.33, SD=0.90): "Participation in real-world projects during industrial attachment enhanced my learning and skill development" and "Working on real-world projects during industrial attachment prepared me well for actual workplace challenges." These statements received agreement from 87.1% and 86.5% of respondents, respectively.

These findings underscore the pedagogical value of authentic, project-based learning in industrial settings. Real-world projects provided students with opportunities to apply theoretical knowledge to practical problems, work within resource and time constraints, collaborate with professionals, and experience the full project lifecycle from planning to completion. This holistic learning experience was difficult to replicate in classroom or laboratory settings.

The statement "The real-world projects I completed during industrial attachment improved my technical competence" received strong agreement (M=4.30, SD=0.91), with 85.9% of respondents agreeing or strongly agreeing. This finding demonstrated a direct link between project participation and technical skill development. Working on actual projects required students to integrate multiple skills, make decisions, and solve problems, thereby deepening their technical competence.

Additionally, 84.1% of respondents agreed or strongly agreed that "The real-world projects I worked on during industrial attachment were directly related to my field of study" (M=4.24, SD=0.93). This alignment between projects and students' fields of study was crucial for ensuring that industrial attachment experiences were relevant and contributed to career-specific skill development.

The statement "The complexity of projects I handled during industrial attachment increased my problem-solving abilities" received agreement from 84.1% of respondents (M=4.24, SD=0.93). Problem-solving was a critical employability skill that employers highly valued. Real-world projects often involved unexpected challenges, resource limitations, and competing priorities, which required students to think critically and develop creative solutions.

However, the statement "I was given meaningful responsibilities in the projects I participated in during industrial attachment" received a slightly lower mean score (M=4.13, SD=0.95), with 80.3% agreement. This suggested that while most students participated in real-world projects, not all were given significant responsibilities or leadership roles. During the interviews, trainers acknowledged this challenge. One Trainer (Trainer 1) explained: "Some organizations are hesitant to give students major responsibilities because they are concerned about quality and liability issues. We encourage our industry partners to gradually increase students' responsibilities as they demonstrate competence, but this doesn't always happen."

The qualitative data also provided rich examples of meaningful project participation. One Trainer from the Civil Engineering department (Trainer 2) shared: "One of our students participated in the construction of a major highway bridge during his attachment. He was involved in surveying, concrete testing, and quality control. He even presented progress reports to the project management team. This experience was transformative for his professional development."

A Principal (Principal 1) recounted: "We had a student in ICT who participated in developing a mobile application for a financial services company during her attachment. She worked alongside professional software developers and contributed actual code to the final product. When she graduated, she had a portfolio of real work that she could show to potential employers, which gave her a significant advantage in the job market."

Respondents' comments in the questionnaire provided additional insights. One graduate employed in the agriculture sector (Graduate 1) wrote: "During my attachment at a commercial farm, I participated in a crop rotation project that involved soil testing, pest management, and yield optimization. I was given responsibility for monitoring specific plots and presenting my findings to the farm manager. This hands-on experience taught me more than any classroom lecture could."

Another respondent in the fashion design industry (Graduate 2) noted: "I participated in designing and producing a clothing line for a major retail client during my attachment. I was involved in every stage from concept development to final production. Seeing my designs on store shelves was incredibly rewarding and gave me confidence in my abilities as a professional designer."

The findings also supported⁸ observation that industrial attachments fostered in TVET institutions as a strategy to enhance students' acquisition of relevant practical skills through participation in real workplace activities. However, the current study extended these findings by demonstrating specific ways in which project participation enhanced learning, skill development, technical competence, and problem-solving abilities.

Overall Effect of Hands-On Technical Skills on Employability

To assess the overall effect of hands-on technical skills developed during industrial attachment on employability, a composite score was calculated by averaging the means of all items under the three sub-themes (level of skills acquired, skill proficiency, and participation in real-world projects/tasks). The results are presented in Table 4.4.

Table 4.4: Overall Effect of Hands-On Technical Skills on Employability

Sub-Theme	Mean	Standard Deviation
Level of Skills Acquired	4.28	0.74
Skill Proficiency	4.17	0.75
Participation in Real-World Projects/Tasks	4.25	0.74
Overall Hands-On Technical Skills	4.23	0.68

Source: Field Data (2025)

The findings in Table 4.4 show that the overall mean score for hands-on technical skills developed during industrial attachment was 4.23 (SD=0.68), indicating strong agreement that industrial attachment significantly enhanced technical skills that affected employability. All three sub-themes received mean scores above 4.0, demonstrating consistent positive effects across different dimensions of technical skill development.

The qualitative data from interviews with trainers and principals strongly supported these quantitative findings. When asked to rate the contribution of industrial attachment to employability, all three principals rated it as "very significant," and 44 out of 49 trainers (89.7%) rated it as either "very significant" or "significant."

One Principal (Principal 1) summarized the overall effect: "Hands-on technical skills are the foundation of employability for TVET graduates. Employers in technical fields are looking for graduates who can perform tasks competently from day one. Industrial attachment provides our students with the practical experience and skill proficiency that employers demand. Without industrial attachment, our graduates would have theoretical knowledge but lack the practical competence that makes them employable."

A Trainer (Trainer 1) added: “The transformation we see in students after industrial attachment is remarkable. They return with not just technical skills, but also confidence, professional maturity, and an understanding of workplace expectations. These attributes, combined with their technical competence, make them highly attractive to employers.”

The findings also reveal a strong relationship between hands-on technical skills and employment outcomes. Cross-tabulation analysis show that respondents who strongly agreed that industrial attachment enhanced their technical skills were more likely to be employed in fields related to their TVET programmes. Among respondents who strongly agreed that industrial attachment enhanced their technical skills (n=78), 73.1% were employed or self-employed in related fields, compared to only 42.9% among those who were neutral or disagreed (n=21).

These findings provide strong evidence that hands-on technical skills developed during industrial attachment significantly affected the employability of TVET diploma graduates from Machakos County. The findings support the first research objective and aligned with the Human Capital Theory's proposition that investments in skill development enhanced individuals' productive capacities and labor market outcomes.

To examine the relationship between the independent variable (hands-on technical skills) and the dependent variable (employability), Pearson correlation analysis was conducted. The results are presented in Table 4.5.

Table 4.5: Correlation Between Hands-On Technical Skills and Employability

Variable	1	2
1. Employability	1	
2. Hands-on Technical Skills	.742**	1

Note: **indicates statistical significance at 1% level of significance ($p < .01$)

Source: Field Data (2025)

The correlation analysis reveal that Hands-on technical skills had strong, positive, and statistically significant correlation with employability ($p < .01$), ($r = .742$, $p < .01$). Hands-on technical skills had a strong positive relationship with employability, suggesting that graduates who developed higher levels of technical skills during industrial attachment were more likely to be employable.

The regression coefficients revealed that hands-on technical skills ($\beta = 0.312$, $t = 4.588$, $p < .001$): This variable had the strongest effect on employability among the four predictors. The positive coefficient indicated that for every one-unit increase in hands-on technical skills developed during industrial attachment, employability increased by 0.312 units, holding other variables constant. The standardized coefficient (Beta = .298) indicated that hands-on technical skills contributed 29.8% of the explained variance in employability when controlling for other variables. The t-value of 4.588 and p-value less than .001 confirmed that this effect was highly statistically significant.

Discussion of Findings

The study found that hands-on technical skills developed during industrial attachment had a strong positive effect on employability ($\beta = .298$, $p < .001$), with an overall mean score of 4.23 (SD = 0.68). This finding was consistent with the Human Capital Theory, which posited that investments in education and training enhanced individuals' productive capacities and economic value. Industrial attachment represented such an investment, providing students with practical technical skills that increased their human capital and, consequently, their employability.

The finding that 87.7% of respondents agreed that they learned new technical procedures and techniques during industrial attachment that were not covered in classroom training underscored the complementary role of industrial attachment in bridging the theory-practice gap. This aligned with ²⁹ study in Nigeria, which found that industrial work experience significantly improved the employability skills of Technical and Vocational Education students. However, the current study extended these findings by demonstrating specific dimensions of technical skill development (level of skills acquired, skill proficiency, and participation in real-world projects) that contributed to employability.

The strong emphasis on skill proficiency (M = 4.17) was particularly noteworthy. Respondents reported that industrial attachment enhanced their ability to operate equipment, perform maintenance procedures, troubleshoot problems, and produce quality work.

The finding that 87.1% of respondents agreed that participation in real-world projects enhanced their learning and skill development. Real-world projects provided students with opportunities to apply theoretical knowledge to practical problems, work within constraints, collaborate with professionals, and experience complete project lifecycles—experiences that were difficult to replicate in classroom or laboratory settings.

The regression analysis revealed that hands-on technical skills had the strongest effect on employability among the four predictors ($\beta = .298$). This finding was consistent with the nature of TVET education, which emphasized practical competence and job-readiness. Employers in technical fields valued graduates who could perform tasks competently from day one, and industrial attachment provided the hands-on experience that developed this competence.

However, the study also revealed challenges that limited technical skill development for some students, including inadequate supervision, assignment to non-technical tasks, and limited access to modern equipment. These challenges highlighted the importance of quality assurance in industrial attachment programs. As ²¹ noted, effective collaboration between TVET institutions and industry was essential for ensuring that students gained relevant practical skills. The current study's findings reinforced this observation and suggested that TVET institutions in Machakos County needed to strengthen their partnerships with industry to ensure quality attachment experiences for all students.

V. Conclusions And Recommendations

Conclusions

The study concluded that hands-on technical skills developed during industrial attachment significantly and positively affected the employability of TVET diploma graduates from Machakos County, Kenya. Industrial attachment effectively bridged the gap between theoretical classroom instruction and practical industry requirements by exposing students to industry-standard tools and equipment, teaching them new technical procedures and techniques not covered in classroom training, and providing opportunities to participate in real-world projects and tasks. The development of skill proficiency through repeated practice in authentic workplace contexts enhanced graduates' confidence, competence, and job-readiness, making them more attractive to employers and more competitive in the job market.

The study concluded that hands-on technical skills were the most critical dimension of industrial attachment for enhancing employability, as evidenced by the strongest regression coefficient ($\beta = .298$) among all four predictors. This finding reflected the nature of TVET education, which emphasized practical competence and job-readiness. Employers in technical fields valued graduates who could perform tasks competently from day one, and industrial attachment provided the hands-on experience that developed this competence.

However, the study also concluded that the quality of hands-on technical skill development varied significantly across different attachment placements, with some students receiving excellent hands-on training while others were assigned to non-technical or clerical tasks that did not contribute to their skill development. This variation highlighted the critical importance of quality assurance in industrial attachment programmes and the need for TVET institutions to establish stronger partnerships with industry to ensure that all students received meaningful hands-on learning experiences.

Recommendations

Based on the study's findings and conclusions, several recommendations are proposed to enhance the effectiveness of industrial attachment programmes and the employability of TVET diploma graduates.

Policy Recommendations

At the policy level, the government and relevant policy makers should strengthen frameworks that support the implementation of industrial attachment programmes within TVET institutions. These includes:

- i. Developing clear national guidelines to standardize attachment duration, supervision procedures, and assessment mechanisms across institutions. Policies should promote structured collaboration between industry and training institutions through incentives such as tax rebates or recognition awards for companies that regularly host and mentor students.
- ii. Sufficient financial and logistical support should be allocated to facilitate supervision, monitoring, and evaluation of attachment programmes, including funding for institutional capacity building, supervisor training, and the development of digital systems for student placement and tracking. The government should also expand public-private partnerships to create more attachment opportunities and integrate these experiences into broader youth employment and skills development strategies.
- iii. Regular labour market surveys are recommended to identify emerging skill gaps and inform continuous curriculum review. Furthermore, policies should ensure that TVET education remains responsive to technological, economic, and industrial trends, bridging the gap between education and employment, while prioritizing student welfare through workplace safety regulations, insurance coverage, and grievance reporting mechanisms.
- iv. Ultimately, industrial attachment should be positioned as a central pillar in national skills development, linking education to productivity and sustainable employment.

TVET institutions, at the policy level, should strengthen partnerships with industries through formal agreements that clearly define roles, expectations, and quality standards. These includes:

- i. Establishing industry advisory boards can guide curriculum design, improve placement processes, and ensure quality attachment experiences.
- ii. Continuous dialogue between institutions and industry partners through regular meetings and recognition of exemplary partners is recommended.
- iii. Institutions should also implement structured oversight mechanisms and leverage digital tools, such as online logbooks, for monitoring student progress.
- iv. Orientation and mentorship training for industry supervisors should be provided to enhance the quality of student guidance, and communication, professionalism, and workplace ethics should be integrated throughout training programmes rather than relying solely on attachment experiences.

Practical Recommendations

At the practical level, TVET institutions should:

- i. Provide comprehensive pre-attachment preparation covering workplace ethics, communication, safety, and professional behavior, along with clear learning objectives to ensure students' readiness.
- ii. Improve placement matching through systematic processes that align students' skills, interests, and career aspirations with suitable industry opportunities, supported by a database of approved attachment sites.
- iii. Consider extending attachment duration to six to twelve months to allow deeper engagement with industry and broader learning exposure.
- iv. Establish Financial support mechanisms in collaboration with industries, government, and donors to reduce students' financial burden.
- v. Ensure that assessment of attachment capture both technical and soft skills, with structured input from industry supervisors, and students' achievements should be recognized through certificates, portfolios, or awards.
- vi. Facilitate participation in industry events, workshops, and professional associations to enhance professional development and leverage technology to improve placement management, supervision, and assessment, including virtual mentorship opportunities.

At the practical level, industries should:

- i. Safeguard student welfare by ensuring placement sites meet safety standards, providing insurance, and establishing grievance reporting mechanisms. Continuous improvement should be promoted through regular evaluation, stakeholder feedback, and benchmarking against best practices.
- ii. Develop formal partnerships with TVET institutions through Memoranda of Understanding (MOUs) that define placement structures, mentorship responsibilities, and expected learning outcomes. They should actively participate in curriculum design and review to ensure alignment with emerging labour market demands.
- iii. Increase the number of attachment opportunities and ensure equitable access across disciplines and genders.
- iv. Assign Qualified and committed supervisors to mentor students throughout the attachment period, providing regular feedback, assessing performance based on agreed criteria, and guiding professional development.
- v. Conduct Structured induction and safety training at the beginning of each attachment, and students should be assigned diverse and challenging tasks that expose them to real work environments, modern technologies, and innovation practices.
- vi. Where feasible, provide financial support in the form of stipends, transport allowances, or meals to promote inclusivity and reduce financial strain.

By adopting these practices, industry partners contribute to human capital development and cultivate a pool of competent graduates who meet current and future workforce needs.

Students are also key stakeholders and should:

- i. Practice active networking with industry professionals, participation in workplace meetings, and seeking mentorship opportunities are essential for enhancing career readiness.
- ii. Emphasize Continuous self-improvement by embracing challenges, learning new technologies, and adapting to diverse work environments.
- iii. Take advantage of pre-attachment training and institutional resources, uphold safety standards, report challenges or harassment, and respect organizational rules and culture.

References

- [1]. Abdullahi, M., & Othman, N. (2022). The Influence Of Supervisors In The Implementation Of Industrial Attachment Program In TVET Institutions In Nigeria. In AIP Conference Proceedings (Vol. 2433, No. 1). Kuala Lumpur, Malaysia, AIP Publishing.
- [2]. Adja Kwabena Adjei, N., Nyarko, D. A., & Nunfam, V. F. (2014). Industrial Attachment In Polytechnic Education: An Approach To Polytechnic-Industry Nexus In Human Capital Development Of Selected Polytechnics In Ghana. *Journal Of Education And Practice*, 5(33), 1-5
- [3]. Anudo, N., & Orwa, Q. (2020). Improving Technical And Vocational Education And Training In Kenya For Sustainable Development. *Journal Of Language, Technology & Entrepreneurship In Africa*, 11(1), 122-137.
- [4]. Babalola, J. B. (2009). Education That Can Raise Productivity In Nigeria. Being A Faculty Lecture Delivered In The Faculty Of Education, University Of Ilorin, Nigeria.
- [5]. Becker, G. S. (1992). Human Capital And The Economy. *Proceedings Of The American Philosophical Society*, 136(1), 85-92
- [6]. Becker, G. S. (2009). *Human Capital: A Theoretical And Empirical Analysis, With Special Reference To Education*. University Of Chicago Press.
- [7]. Boakye-Amponsah, A., Enninful, E., & Fordjour, C. (2020). Industrial Attachment And Employability: Perspectives Of Graphic Design Students And Industrial Supervisors. *Journal Of Education And Practice*, 11(18), 83-93.
- [8]. Chileshe, E. K. (2019). Students' Competency Acquisition In Technical Courses: An Analysis Of TVET Institutions Curriculum Implementation In Eastern Province, Zambia (Doctoral Dissertation, The University Of Zambia).
- [9]. Cooper, D. R., Schindler, P. S. (2011). *Business Research Methods – Eleventh Edition*. Mcgraw Hill International.
- [10]. Deissinger, T., & Gonon, P. (2016). Stakeholders In The German And Swiss Vocational Educational And Training System: Their Role In Innovating Apprenticeships Against The Background Of Academization. *Education And Training*, 58(6), 568-577.
- [11]. Donkor, F., Nsoh, S. N., & Mitchual, S. J. (2009). Organizational Issues And Challenges Of Supervised Industrial Attachment Of A Technical And Vocational Teacher Education Program In Ghana. *International Journal Of Work-Integrated Learning*, 10(1), 39.
- [12]. Edziwa, X., & Blignaut, S. (2022). Graduate Employability Skills: The Voice Of Agricultural Technical Vocational Education And Training (ATVET) Students In Zimbabwe. *South African Journal Of Higher Education*, 36(2), 99-114.
- [13]. Gillies, D. (2011). State Education As High-Yield Investment: Human Capital Theory In European Policy Discourse. *Journal Of Pedagogy/Pedagogický Casopis*, 2(2), 224-245.
- [14]. Government Of Kenya (Gok). (2016). Sessional Paper No. 10: Revitalizing Technical And Vocational Education And Training (TVET) For Socio-Economic Transformation Nairobi: Government Printer.
- [15]. ILO (2020). *World Employment And Social Outlook Trends 2020*. International Labour Office, Geneva.
- [16]. Jahonga, W. M., Canute, B., & Murey, E. J. (2016). Collaborative And Linkage Programs Between TVET Institutions And The Industry. A Case Of TVET Institutions In North Rift Region, Kenya. *IOSR-Journal Of Economics And Finance*, 7(4), 1-5.
- [17]. Kariuki, S. I. (2013). *Technician Engineering Training And Employability In Kenya: Focus On Thika And Meru Technical Training Institutes* (Published Doctoral Dissertation, Catholic University Of Eastern Africa).
- [18]. Kayere, E., Moritz, S., & Paquin, C. (2019). A Survey On The Engagement Between TVET Institutions And Industry To Enhance Skills Development In Kenya. *Colleges And Institutes Canada, Kenya Education For Employment Program*.
- [19]. Kenya National Qualifications Authority (KNQA). 2019. *The Kenya National Qualification Framework*. www.knqa.go.ke
- [20]. Kintu, D., Kitainge, K., & Ferej, A. (2019). Employers' Perceptions About The Employability Of Technical, Vocational Education And Training Graduates: Kampala, Uganda.
- [21]. Makworo, E. O., Mwangi, S. M., & Wesonga, J. N. (2013). Linking TVET Institutions And Industry In Kenya: Where Are We? *International Journal Of Economy, Management And Social Sciences*
- [22]. Mitiku, G., Zeleke, B., & Adem, B. (2021). Examining The Role Of TVET-Industry Partnership On The Acquisitions Of Employability Skills Of Polytechnic Graduates In Oromia: Addis Ababa, Ethiopia.
- [23]. Mugenda, O.M. & Mugenda, A.G. (2003). *Research Methods: Quantitative And Qualitative Approaches*. Nairobi: Acts Press.80
- [24]. Mutiso, S., & Njuguna, R. (2021). Organizational Orientation And Performance Of Technical And Vocational Education Training Authority Institutions In Nairobi City County, Kenya. *Kenyatta University*.
- [25]. Mutungi, G. K. (2023). *Analysis Of Factors Influencing Students' Decisions In Selecting Public Tvet Institutions In Nairobi County, Kenya* (Doctoral Dissertation, Kemu).
- [26]. Mwaura, A. N., Mugwe, M., Edabu, P., & Thinguri, R. (2022). Effectiveness Of Industrial Attachment Exposure In Developing Trainees' Employability Skills From TVET Institutions In Nairobi County. *East African Journal Of Education Studies*, 5(2), 274-284.
- [27]. Ngundo, V. M. (2014). *Devolved Governments In Kenya: A Case Study Of Their Establishment In Machakos County* (Doctoral Dissertation, University Of Nairobi).
- [28]. Nunfam, V. F., Adja Kwabena Adjei, N., & Padi, A. (2015). Human Capital Development In Polytechnics In Ghana: Prospects Of Industrial Attachment. *Journal Of Economics And Sustainable Development*, 6(16).
- [29]. Okoye, K. R., & Edokpolor, J. E. (2021). Effect Of Industrial Work Experience In Developing Technical And Vocational Education Undergraduates' Employability Skills. *Asian Journal Of Assessment In Teaching And Learning*, 11(1), 1-12. <https://doi.org/10.37134/ajatel.Vol11.1.1.2021>
- [30]. Otieno, A., & Onyango, M. (2021) The Impact Of Industrial Attachment In TVET Institutions; A Case Study Of Engineering Departments In Masai Technical Training Institute In Kajiado, Kenya. *The Kenya Journal Of Technical And Vocational Education And Training*, 14.
- [31]. Owusu-Acheampong, E., Williams, A. A., & Azu, T. D. (2014). Industrial Attachment: Perspectives, Conceptions And Misconceptions Of Students At Cape Coast Polytechnic, Ghana.
- [32]. Polgar, S., & Thomas, S. A. (2011). *Introduction To Research In The Health Sciences Ebook*. Elsevier Health Sciences.
- [33]. Schomburg, H. (2003). *Handbook For Tracer Studies*. Centre For Research On Higher Education And Work, University Of Kassel, Moenchebergstrasse, 17, 34109.
- [34]. Sekaran, U. (2010). *Research Methods For Business: A Skill Building Approach (5th ed.)*. Haddington: John Wiley & Sons Publishers.
- [35]. Sifuna, D. N. (2020). The Dilemma Of Technical And Vocational Education (TVET) In Kenya. *Journal Of Popular Education In Africa*, 4(12), 4-22.
- [36]. Singh, A. S., & Masuku, M. B. (2014). Sampling Techniques & Determination Of Sample Size In Applied Statistics Research: An Overview. *International Journal Of Economics, Commerce And Management*, 2(11), 1-22.
- [37]. Tripney, J., Hombrados, J., Newman, M., Hovish, K., Brown, C., Steinka-Fry, K., & Wilkey, E. (2013). Technical And Vocational Education And Training (TVET) Interventions To Improve The Employability And Employment Of Young People In Low-And Middle-Income Countries: A Systematic Review. *Campbell Systematic Reviews 2013: 9*. Campbell Collaboration.

- [38]. TVET Act (2013). The Technical And Vocational Education And Training Act, No. 29 Of 2013.
- [39]. Wahungu, D. K., Wawire, V., & Kirimi, F. (2023). Institutional Engineering Technical Vocational Education And Training Practices And Implications For Alignment With Industry Skills Requirements In Selected Central Kenya Counties. *Reviewed Journal International Of Education Practice*, 4(1), 56-70.
- [40]. Wang, Y. (2012). *Education In A Changing World: Flexibility, Skills, And Employability*. World Bank.
- [41]. Wang, O. Y. (2016) *Rethinking The Role Of Technical And Vocational Education And Training (TVET) In Southeast Asia: A Human Development Approach*.
- [42]. Wanyeki, P., Kisilu, K., & Ferej, A. (2017). Training And Workplace Requirements: Strategies For Minimizing The Mismatch Gap. *African Journal Of Education, Science And Technology*, 3(3), 113-122.
- [43]. Woodhill, J. (1997, September). Resource Sharing For On-Ground Change. A Systemic Perspective. In *Second National Workshop On Integrated Catchment Management (Vol. 29)*.
- [44]. World Bank. 2019. *World Development Report 2019: The Changing Nature Of Work*. Washington, DC: World Bank. Accessed 10 May 2020. Doi:10.1596/978-1-4648-1328-3.