



Management of Technical and Vocational Education Skills and Job Creation among University Students in North-Eastern Nigeria

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Abstract

This study explores the relationship between the management of technical and vocational education skills and job creation among university students in North-Eastern Nigeria. It employed a quantitative survey design using a correlational approach. The population consisted of 10,313 staff members from 11 public universities in North-eastern Nigeria. The study sample comprised 397 staff members from 11 entrepreneurship centres at universities in North-eastern Nigeria, determined using Slavin's (1960) sample size formula. The study employed a multi-stage sampling procedure. The instrument used for data collection was a structured questionnaire titled "Technical and Vocational Education Skills Questionnaire (TVESQ) and Job Creation Questionnaire (JCQ)", validated by five experts with a Content Validity Index (CVI) of 1.00. Cronbach's Alpha Reliability Coefficient was used to analyse the reliability of the instrument, with reliability coefficients of .80 for management of electrical installation and maintenance, .83 for welding and fabrication skills, and .97 for the job creation questionnaire. The Pearson Product-Moment Correlation (PPMC) was used to test hypotheses at the 0.05 significance level. The findings show a significant positive relationship between the management of electrical installations and maintenance skills, welding and fabrication skills; and job creation among university students. In conclusion, effective and efficient management of technical and vocational education skills (TVE), such as electrical installation and maintenance and welding and fabrication, enhances job-creation opportunities for university students, thereby promoting self-reliance and contributing to poverty reduction in Nigeria.

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Introduction

The issue of graduate unemployment is a global challenge that has been galvanising the world, especially in developing economies, where universities are striving to produce students with relevant, practical skills that can help them secure decent jobs (Peter & Ahon, 2020). In many countries worldwide, ineffective management of technical and vocational education (TVEs) has been identified as a factor hindering the effective acquisition of practical skills that lead to employability (Mokgatle et al., 2025). However, advanced countries like China, Japan, Germany, the United Kingdom, and the United States of America (USA), as well as Russia, have demonstrated the skills to manage the

TVE system, which has significantly enhanced job creation. At the same time, many developing nations continue to face gaps in program management, resources, and quality education (Hartmann et al., 2021).

Management can be defined as the art and science of efficiently accomplishing tasks through effective decision-making, with greater emphasis on the organisation's or institution's input resources (Ogbu, 2016). Management of Technical and Vocational Education (TVE) is, therefore, the science and art of systematically arranging and coordinating human and material resources for effective, efficient, and functional teaching and learning of technology and vocational education course offerings in the formal education system. The manager's ability to perform this administrative function ensures that technical and vocational education functions effectively, which defines their competency level on the job. Hence, Hornby (2015) simply asserted that a critical factor is one viewed as of extreme importance, as several future situations will be significantly affected by its crucial significance or great value. The management of technical and vocational education (TVE) involves discrete elements: intentions, propositions, and actual activities, involved in the day-to-day planning, organising, and running of TVE programmes. Effective management of technical and vocational education could help create jobs for students and reduce poverty in Africa.

In Africa, several challenges to the effective management of TVEs include inadequate funding, poor-quality instructors, inadequate metal workshops, and poor partnerships with industry (Beharry-Ramraj, 2016). These factors weakened students' abilities and their capacity to acquire the competencies needed to secure jobs in the labour market and integrate into the modern market. For example, studies in Rwanda, Kenya, and South Africa, such as those by Nyataya (2019), Inyiagu (2019), and Muriuki and Dominic (2022), have shown that the effectiveness of technical and vocational education skills depends on the effectiveness and efficiency of management. This demonstrates the significance of managing technical and vocational education skills for job creation.

A job means devoting one's time to achieving economic tasks. According to Ado (2016), a job represents how individuals gain a sense of personal purpose and satisfaction; support themselves and their families and contribute to the productivity and development of local and national economies. According to Swier (2010), job creation is a model for starting ventures and bridging the gap between an idea and a capitalised business. It is a process much like manufacturing, where raw materials (technologies) are turned into finished products (fundable ventures). The author notes that job-creation programs at the university are designed to support students in transforming a gold nugget of an idea into a commercial success with minimal financial investment, while providing extensive monitoring and expert guidance. A job can be created when the technical and vocational education process is effectively managed in Nigeria.

Previous governments in Nigeria had attempted to address these issues in the past through various programs, including Better Life for Rural Women (BLRW) in 1987, Operation Feed the Nation (OFN) in 1976, the Green Revolution in 1980, and Mass Mobilisation for Rural Women in 1987 (Onah et al., 2019). However, these efforts have not yielded satisfactory results, as job creation has been growing more slowly, while the number of graduates emerging from universities is increasing (Chiekezie et al., 2021). It

is in this regard that Chiekezie et al. (2016) advocate for the development of technical and vocational education (TVE) as a significant pathway to creating sufficient job opportunities for the growing number of youths and graduates, particularly in countries with abundant natural resources and talent.

The significance of technical and vocational education skills for creation cannot be overemphasised. This explains why the present study is needed, as it advocates that students acquire the necessary skills to secure jobs in the labour market. It is in this regard that Umundi (2013) examined entrepreneurial, technical, and vocational skills required for self-reliance and job creation in Nigeria, while Gupta (2014), examined the electrical power, concept and principles. Onyebuanyi and Mbah (2018) examined air conditioner maintenance skill training needs by technical college students for job security, Dauda et al. (2017) explored levels of skills acquired and job performance of graduates of electrical installation and maintenance work (EIM) trade of technical colleges in industrial installation in North Eastern Nigeria, and Tumba and Shuaibu (2016) investigated strategies for improving students' acquisition of practical skills in electrical installation and maintenance work trade in technical colleges in Kano State. All these studies identify technical and vocational education skills, such as electrical installation and maintenance. These are skills that encompass battery charging, domestic installation, industrial installation, cable joining, and winding of electrical machines. According to the researchers, graduates who possess such capacities and competencies are better positioned to secure a job or establish their own business, particularly in areas such as duct installation and trucking task clusters. Industrial installation enables students to become self-employed. Since electricity is the lifeblood of any business or entrepreneurial activity. Through training organised by lecturers, students acquire the knowledge and skills to properly identify electrical faults in buildings and machines, thereby equipping them with valuable problem-solving and technical abilities.

Studies by Peter (2021), Peter and Ahon (2020), Sati (2017), and Degarmo et al. (2013) emphasise the need for students in Nigeria to acquire welding and fabrication skills. These competencies create valuable opportunities for them to create jobs and become self-reliant. Welding and fabrication are technical skills that involve forming and bonding metals to create usable objects or structures. Through training and guidance, students learn how to interpret engineering specifications and design, manufacture, or produce metal works and products. These skills enable students to produce products such as chairs, sewing machines, wardrobes, and standing mirrors, which are essential to the smooth operation of fashion design shops. In a related study, Sati (2017) and Eteh (2013) report that welding skills, such as resistance and arc welding, provide individuals with job opportunities in companies or as self-employed individuals.

Consequently, unemployment and poverty increased by 23.1% in the first Quarter (Q1) and 55.4% in the second quarter (Q2) in 2018 among graduates in Nigeria. Several factors contribute to these challenges, including inadequate and unqualified training personnel, limited market knowledge, poor infrastructure, an unstable political environment, and a lack of clear, suitable marketing strategies (Igbokwe-Ibeto et al., 2018). In addition, insecurity, inadequate funding, a lack of innovativeness, and poor corporate social responsibility and community engagement further exacerbate the situation. Collectively, these constraints hinder these students and graduates from

setting up businesses for themselves and contributing to the economic growth and development.

The consequences of widespread joblessness in Nigeria include increased involvement in social vices such as gossiping, theft, robbery, Boko Haram, prostitution, money laundering, political thuggery, kidnapping, cultism, and other forms of social behaviours (Peter & Ahon, 2021). The perpetrators of these activities are largely unemployed youths and students who could have engaged in meaningful and productive ventures that contribute to economic growth and development. Consequently, these students are unable to meet their personal needs or contribute to the nation's developmental aspirations.

Several studies on technical and vocational education and employability have approached the topic from different perspectives, resulting in a thematic knowledge base that has not resolved the challenges of how the management of technical and vocational education (TVE) skills relates to job creation among university students. For instance, a study by Kumpliw et al. (2025) focused on developing a model for effective vocational education management of bachelor's degree programmes in the Institute of Vocational Education in the North-Eastern, Nigeria, investigating components like personnel management, vocational training, student development, teaching and learning management, curriculum management, cooperation with enterprises, and measurement and evaluation.

Similarly, Sibiya and Nyembezi (2018) also examined the factors that shape technical and vocational education and training engineering students' understanding of their career choices in South Africa, highlighting the importance of management and how institutional management enables students to meet their employment expectations. At the same time, Magadza and Mampane (2024) examined the role of TVET colleges in addressing the needs of youth in a South African province. Other scholars, such as Scheuring (2025) have identified TVE as a catalyst for youths' employment. All the above studies have contributed to the examination of the management of technical and vocational education-to-employment. However, none have addressed how the management of practical TVE skills, such as electrical installation, welding, and fabrication skills (MWFS), correlates with job creation among university students. Given the divergent views in the literature, the present study aims to fill gaps by investigating the relationship between the management of technical and vocational education skills (MTVES) and job creation among university students in North-Eastern Nigeria.

Theoretical Framework

Competency-Based Education and Training (CBET) by Brown, M (1994)

According to Brown (1994), the competency-based education and training (CBET) philosophy guides the development of curricula in the TVET environment. The theory addresses the learning outcomes or competencies that align with the expectations and requirements of the workplace, linking knowledge to the skills required for the job. It also seeks to develop learners' ability to understand, learn, and apply knowledge, both individually and in a team setting (Gervais, 2016). According to theory, competence is not confined solely to technical skills but also extends to key employability skills, such as collaboration, creativity, and critical thinking. Competency-Based

Education and Training (CBET) addresses specific competencies, or task outcomes that must be performed. It emphasises workplace requirements and links subject knowledge to the demonstration of a skill aligned with a job requirement. At the heart of competency-based education and training is the importance of demonstrating competencies that align with occupational fields. The theory of Competency-Based Education and Training (CBET) is applicable to this study because it emphasises practical rather than theoretical knowledge. The theory also emphasises the competence of integrating knowledge, practical skills, and appropriate attitudes necessary for effective job performance. This theory has a direct impact on management outcomes, including employability and productivity, making it particularly relevant to job creation. It provides students with practical skills to create jobs and foster self-reliance. To accomplish this study, the following objectives guided the study:

1. Find out if there is a relationship between the management of electrical installation and maintenance skills (MEIMS) and job creation by university students in North-Eastern Nigeria.
2. Ascertain if there is a relationship between the management of welding and fabrication skills (MWFS) and job creation among university students in North-Eastern Nigeria.

Hypotheses

The following hypotheses were tested at the 0.05 level of significance:

- HO₁ The relationship between the management of electrical installation and maintenance skills (MEIMS) and job creation among university students in North-Eastern Nigeria is not statistically significant.
- HO₂ The relationship between management of welding and fabrication skills (MWFS) and job creation among university students in North-eastern Nigeria is not statistically significant.

Methodology

Design of the Study

A quantitative, correlational research design was adopted. Correlational research design examines the relationship between one or more variables to determine the extent to which they are associated. It examines variables in their natural environments without introducing any imposed researcher treatments (Marilyn & Jim, 2011). Correlational research design aims to determine whether a relationship exists between two or more variables.

Area of Study

The study area was North-eastern Nigeria. North-eastern Nigeria is one of Nigeria's six geopolitical zones. North-eastern Nigeria comprises the states of Adamawa, Bauchi, Borno, Gombe, Taraba, and Yobe. The choice of North-eastern Nigeria is because there are prevalent cases of Boko Haram attacks on the citizens, and the companies that used to provide jobs for the students after graduation are folding up, thereby leaving students jobless after graduation. This creates a problem in securing a job for graduates.

Population

The population consisted of 10,313 staff members from 11 public universities in North-eastern Nigeria. The choice of academic and non-academic staff was based on their responsibility for managing the entrepreneurship centres at universities.

Sample and Sampling Technique

The study comprised 397 staff members from entrepreneurship centres at universities in North-eastern Nigeria. The sample size was determined using Slovin's (1960) sample size formula. A multi-stage sampling procedure was employed. In the first stage, the six states constituting North-Eastern Nigeria (Adamawa, Bauchi, Borno, Gombe, Taraba, and Yobe) served as geographical clusters. One university was purposively selected from each state based on the existence of a functional entrepreneurship centre, resulting in six universities (three Federal and three State universities). The choice of the six universities out of 11 universities in North-Eastern Nigeria is because the geo-political zone is very large, and it was impossible for the researchers to cover all the universities. Also, insecurity in some states does not permit the researchers to visit some of the states due to Boko haram and kidnapping.

In the second stage, proportionate stratified sampling was used to allocate the 397 respondents to the selected universities based on each university's staff population. In the third stage, simple random sampling was employed to select respondents from each university. A list of eligible staff members was obtained from the entrepreneurship centres of the selected universities, and everyone was assigned a number. Using a table of random numbers, respondents were selected proportionately from each university until the required sample size was achieved.

Instrumentation, Validation, and Reliability

The instrument used for data collection was a structured questionnaire titled "Technical and Vocational Education Skills Questionnaire (TVESQ) and Job Creation Questionnaire (JCQ)". The instrument was validated by five experts, comprising three in Educational Administration and Planning and two in Measurement and Evaluation, using both content and face validity. The experts rated all items as either quite relevant (3) or highly relevant (4). Based on their ratings, the Item-Level Content Validity Index (I-CVI) for all items was 1.00, while the Scale-Level Content Validity Index (S-CVI) was also 1.00, indicating excellent content validity of the instrument. Cronbach's Alpha Reliability Coefficient was used to analyse the data collected from the respondents, with reliability indexes of 0.80 for management of electrical installation and maintenance, 0.83 for welding and fabrication skills, and 0.97 for the job creation questionnaire, respectively.

Method of Data Collection and Analysis

The instrument was administered to the respondents by the researcher, with the aid of six research assistants (Students and Staff) chosen from six sampled universities in the six states of North-eastern Nigeria. A total of 397 copies of the questionnaire were administered to 397 respondents. A total of 386 copies, representing 97%, were returned and answered, and used for data analysis. Meanwhile, 11 copies (3%) were not retrieved. The Pearson Product-Moment Correlation (PPMC) was used to test the null hypotheses at the 0.05 significance level. The decision rule was that if the calculated probability value is greater than the set alpha level of 0.05, the null hypothesis

was not rejected. On the other hand, if the calculated probability value is less than the set alpha level of 0.05 significance, the null hypothesis is rejected.

Ethical Declaration

This study was conducted in accordance with the University of South Africa's research ethics committee. The study was given the approved reference number Ref #: 12172, indicating that it complied with all ethical requirements for research involving human subjects. The study complied with established ethical norms by upholding the concepts of informed consent, voluntary involvement and confidentiality. Participants were fully told about the study's objectives, its methods, and their freedom to discontinue participation at any time without incurring any fees. Prior to data collection, they provide their oral informed consent.

Findings

Hypothesis 1: The relationship between management of electrical installation and maintenance skills (MEIMS) and job creation by university students in North-Eastern Nigeria is not statistically significant.

Table 1

Pearson Product Correlation Moment (PPMC) on the Relationship between Management of Electrical Installation and Maintenance Skills (MEIMS) and Job Creation among University Students in North-Eastern Nigeria

Variables	N	\bar{X}	Std	R	p.value	Decision	Remark
Management of Electrical Installation and Maintenance Skills (MEIMS)	386	3.16	.71				
Job Creation	386	3.12	.62	0.90	0.00	Reject H ₀	Sig. Positive Relationship

**Correlation is significant at the 0.01 level (2-tailed).

Table 1 shows a Pearson Product-Moment Correlation analysis showed a statistically significant and very strong positive relationship between management of electrical installation and maintenance skills (MEIMS) and job creation among university students in North-Eastern Nigeria, $r(386) = .90, p < .001$. Therefore, the null hypothesis was rejected, indicating that effective management of electrical installation and maintenance skills is significantly associated with increased job creation among university students.

Hypothesis 2: The relationship between management of welding and fabrication skills and job creation among university students in North-eastern Nigeria is not statistically significant.

Table 2

Pearson Product Correlation Moment (PPMC) on Relationship between Management of Welding and Fabrication Skills (MWFS) and Job Creation by University Students in North-Eastern Nigeria

Variables	N	\bar{X}	Std	R	p.value	Decision	Remark
Management of Welding and Fabrication Skills (MWFS)	386	3.14	.65				
				.89**	0.00	Reject H_0	Sig. Positive Relationship
Job Creation	386	3.12	.62				

**Correlation is significant at the 0.01 level (2-tailed).

Table 2 indicates the result of the Pearson Product-Moment Correlation analysis conducted to determine the relationship between management of welding and fabrication skills (MWFS) and job creation among university students in North-Eastern Nigeria. The analysis revealed a very strong positive relationship between management of welding and fabrication skills and job creation ($r = 0.892$, $N = 386$). The relationship was found to be statistically significant at the 0.05 level ($p = 0.00 < 0.05$). Therefore, the null hypothesis was rejected. This implies that improved management of welding and fabrication skills is related to increased job creation among university students.

Discussions

The study's findings reveal that the relationship between management of electrical installation and maintenance skills (MEIMS) and job creation among university students in North-Eastern Nigeria is statistically significant. The study reveals that students who are taught how to identify electrical faults in buildings tend to exhibit greater creativity and enhanced practical problem-solving capacities. Students who learn to perform corrective services on electrical appliances also develop competencies in rewinding electrical machines, thereby acquiring practical skills that can facilitate job creation. This finding is consistent with the Competency-Based Education and Training (CBET) theory advanced by Brown (1994), which emphasises the development of workplace-oriented competencies that integrate knowledge, practical skills, and attitudes required for effective job performance.

The finding suggests that effective management of electrical installation and maintenance training enables students to demonstrate occupational competencies that are directly relevant to self-employment and employability. This result agrees with the findings of Onyebuenyi and Mbah (2018), who observed that electrical installation and maintenance work skills, such as planning, wiring installation, testing electrical work for safety, competence in the use of tools, effective use of materials, inspection of electrical installations, and interpretation of wiring diagrams, enable students to acquire the skills needed for job creation. The finding also supports Onyebuenyi and Mbah, who reported that students trained in air-conditioner fault diagnosis and maintenance develop competencies that enhance their employment prospects. Similarly, Dauda et al. (2017) found that graduates of electrical installation and maintenance trades acquire installation skills that facilitate employment opportunities.

Additionally, skills in installing ducts and performing trucking tasks in industrial installations enable students to become self-employed. This result aligns with Tumba and Shuaibu (2016), who reported that demonstration, assignments, drills, practice, and apprenticeship are effective strategies for enhancing students' acquisition of practical skills for employment. The finding further supports the CBET proposition that learning should be competency-driven and assessed through practical performance rather than solely on theoretical knowledge. The implication is that effective supervision and management of students' practical activities in electrical installation and maintenance programmes enhance the acquisition of employable competencies, thereby promoting self-reliance and job creation after graduation.

Furthermore, the study shows that the relationship between management of welding and fabrication skills (MWFS) and job creation among university students in North-Eastern Nigeria is statistically significant. The study found that when a favourable learning environment is provided, students are better equipped to develop competencies in producing iron doors, gates, windows, and other fabricated products, which encourages them to establish self-employment ventures after graduation. This finding is consistent with Competency-Based Education and Training (CBET) theory, which posits that training should focus on developing competencies aligned with occupational requirements and labour market demands. Through effective management of welding and fabrication programmes, students acquire not only technical competencies but also problem-solving, creativity, and entrepreneurial capabilities that support job creation. This result lends credence to Sati's (2017) assertion that welding and fabrication training provides students with a sound understanding of equipment, materials, techniques, and safety practices required in metalwork, thereby enhancing their capacity for self-employment. The finding also agrees with Eteh (2013), who found that welding skills, such as resistance welding and arc welding, provide employment opportunities both within organisations and through self-employment. The present finding suggests that when welding and fabrication skills are effectively managed and aligned with competency-based training principles, they significantly contribute to employability, self-reliance, and job creation among university students.

Conclusion

The study concludes that effective management of technical and vocational education skills, particularly electrical installation and maintenance, as well as welding and fabrication, significantly enhances job-creation opportunities for university students in North-Eastern Nigeria by equipping them with practical competencies required for self-employment and labour market participation.

Implications

The findings imply that strengthening the management of technical and vocational education programmes in Nigerian universities can help address graduate unemployment by developing industry-relevant practical skills. The study provides empirical evidence that effective supervision, mentoring, coaching, and provision of adequate training facilities are critical factors in enabling students to acquire employable competencies. Consequently, policymakers, university administrators, and curriculum planners should prioritise competency-based technical and vocational education programmes to promote youth employment and economic development.

Recommendations

Based on the findings, the following recommendations were made:

1. The National Universities Commission (NUC) and the Federal Ministry of Education should, within the next two academic sessions, review university curricula to increase the practical content of technical and vocational education courses from predominantly theoretical instruction to competency-based training.
2. University authorities should, in collaboration with state governments and private-sector industries, upgrade electrical installation and welding/fabrication workshops with modern equipment and training facilities within the next three years to enhance students' exposure to current industry practices.
3. Universities should establish partnerships with industries and small-scale enterprises to provide internship, apprenticeship, and work-integrated learning opportunities that expose students to real workplace environments before graduation.

Limitations of the Study

The study was limited by the inability to obtain the views of some directors and secretaries of entrepreneurship centres due to their administrative responsibilities, as well as conferences and meetings. In addition, industrial action by academic staff reduced their participation, leading to greater reliance on non-teaching staff respondents. Consequently, some perspectives that could have enriched the findings were underrepresented.

Suggestions for Future Research

1. Future studies should include the perspectives of academic staff, entrepreneurship centre directors, and students to provide a more comprehensive understanding of how technical and vocational education skills contribute to job creation.
2. Future researchers should employ mixed methods designs that combine quantitative surveys with qualitative interviews or focus group discussions to gain deeper insights into the experiences of students and programme administrators regarding skills acquisition and job creation.
3. Longitudinal studies should be conducted to track students over time after graduation to determine the long-term impact of technical and vocational education skills on employment outcomes and business creation.

Contribution to Knowledge

This study has contributed to knowledge by demonstrating that it is not just the existence of technical and vocational skills, but their effective and efficient management, that significantly drives job creation among university students. This provides a more nuanced and actionable understanding of how education systems can respond to unemployment challenges.

Author Notes

Authors contributed greatly by making sure that all literature reviewed are related and relevant to the context of the study.

Declaration: In order to correct and improve the language of this paper, we have used the Grammarly and ChatGPT (Version 5) to enhance grammar accuracy and clarity.

Transparency Statement: The data used in conducted in this study are available for research purposes upon reasonable request to the corresponding author.

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Conflict of Interest: The authors declare that they have no financial or personal interests that might have influenced the conduct of this study.

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Ethical Considerations: Ethical approval for the study was secured through an official letter of introduction from the Department of Educational Administration and Planning, College of Education, Joseph Sarwuan Tarka University, Makurdi. The letter grants permission for the study to contact participants and gather data solely for the study's academic purposes. The participants were university staff working across the entrepreneurship centres in North-eastern Nigeria. The data gathered were from a questionnaire, and the respondents were assured that the data collected would be used only for research purposes.

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