



COMPETENCIES REQUIRED BY TECHNICAL AND VOCATIONAL EDUCATION (TVE) GRADUATES FOR THE INSTALLATION OF SOLAR ENERGY SYSTEMS FOR SUSTAINABLE GREEN JOBS IN SOUTHWEST NIGERIA

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Abstract

This study examined the competencies required by technical and vocational education (TVE) graduates for the installation of solar energy systems for sustainable green jobs in southwest Nigeria. A survey research design was adopted, involving a population of 180 respondents comprising 120 graduate solar practitioners engaged in solar installation and maintenance and 60 TVE lecturers from colleges of education in Southwest Nigeria. Three objectives guided the study, with corresponding research questions and hypotheses tested at the 0.05 level of significance. Data were collected using a validated 31-item structured questionnaire, with a reliability coefficient of 0.89 established using Cronbach's alpha. Mean and standard deviation were used to answer the research questions, while the t-test statistic was employed for hypothesis testing. The findings revealed that both theoretical competencies and practical skills are essential for TVE graduates in solar energy system installation for sustainable green employment. Key competencies identified include knowledge of solar panel assembly, understanding of electrical systems; correct mounting of solar panels and accessories, routine maintenance and measurement skills, goal setting, and the ability to identify customers' installation needs. Based on the findings, the study recommended that sustainable green jobs should be prioritized in national development strategies with supported awareness campaigns, targeted advocacy, and engagement with industries and the provision of adequate instructional materials and tools to enhance students' acquisition of solar installation skills, given the importance of solar energy as a viable alternative source of electricity in Nigeria.

Keywords: Competencies, TVE Graduates, Solar energy, Green jobs and Sustainability

Introduction

In the contemporary global economy, young people seeking employment, either as wage earners or entrepreneurs, require innovative and market-relevant competencies to effectively navigate increasingly dynamic labour markets. Despite possessing substantial theoretical knowledge, many graduates lack the practical competencies demanded by employers, thereby exacerbating persistent skills mismatches in Nigeria (International Labour Organization [ILO], 2025). The integration of cognitive knowledge with hands-on practical experience is therefore essential for developing employability-oriented skills aligned with labour market needs. The demand for relevant employability skills remains one of the major challenges confronting Nigeria's post-school education system, particularly in the context of high youth unemployment and widespread underemployment (Oyediran, 2020).

Graduates entering the labour market with academic qualifications frequently exhibit limited exposure to real-world work environments, underscoring the urgent need to strengthen linkages between education and industry. This objective can be achieved through deliberate acquisition of relevant skills and experiential learning opportunities within higher education institutions. Emphasis on skills development and practical training aligns with global initiatives aimed at ensuring inclusive and equitable quality education and promoting lifelong learning opportunities for all, as articulated in Sustainable Development Goal 4 (SDG 4) (McDicksen, 2016). Specifically, SDG Target 4.3 seeks to expand access to formal and non-formal education and

training, including technical and vocational education, to equip youth and adults with competencies necessary for decent work and entrepreneurship (Emah, 2023). Within this framework, Technical and Vocational Education (TVE) plays a critical role in fostering economic, social, technological, and ethical transformation, particularly within environmentally sustainable or "green" contexts (Izuagba et al., 2017).

The promotion of green jobs as viable employment pathways capable of mitigating productivity losses while simultaneously addressing climate change and environmental degradation. Central to green job preparedness is sustainability literacy, which largely encompasses soft skills, environmental awareness, and action-oriented competencies (International Energy Agency [IEA], 2025). Among these competencies, solar photovoltaic (PV) installation skills are particularly significant, as solar energy offers a reliable and widely accessible source of electricity wherever sunlight is available. Notably, the Earth receives more solar energy within one hour than the total energy consumed globally in an entire year, with annual solar radiation estimated at approximately 795×10^{12} MWh (Orakwe, 2022).

Globally, electricity generation is increasingly transitioning from fossil fuel-based systems toward alternative energy sources such as solar, wind, biomass, and hydropower, which are considered more cost-effective and environmentally sustainable (Obada, 2024). Consequently, many Nigerian enterprises depend heavily on self-generated power, increasing operational costs and exacerbating environmental degradation. Solar energy is abundant, renewable, and environmentally

benign, producing no direct carbon emissions during electricity generation, thereby positioning it as a cornerstone of global sustainable energy strategies (REN21, 2024; Encyclopaedia Britannica, 2025).

Nigeria is particularly endowed with substantial solar energy potential due to its high solar irradiance levels, making solar power a viable option for rural electrification, commercial energy solutions, and grid-connected systems. Distributed renewable energy initiatives, including solar mini-grids and home systems, have significantly improved electricity access and generated local green employment opportunities, demonstrating their socioeconomic benefits (Oyedepo, 2012). Globally, renewable energy deployment continues to expand rapidly and is projected to supply an increasing share of electricity demand over the coming decade, driven by declining costs, technological innovation, and supportive policy frameworks (IEA, 2025). Consequently, building competencies in solar technologies among Federal Colleges of Education graduates and other skilled workers is essential for reducing fossil fuel dependence and advancing Nigeria's economic and technological development.

Competencies refer to the integrated set of knowledge, skills, and abilities required for effective task performance. Competency is a combination of skills and knowledge needed to perform a specific task in a given context (Jones, Voorhees & Paulson, 2009). In this study, competencies denote the requisite technical and practical capabilities necessary for the installation of solar energy systems. When TVE graduates are adequately trained in solar energy installation, they are positioned to

become sustainable green employees or entrepreneurs. The persistent competency gap among graduates has been attributed to the gap between school-based learning and employment in the industry. Bridging this gap necessitates targeted skills training within educational institutions. Accordingly, this study seeks to determine the competencies required by technical and vocational education graduates for the installation of solar energy systems toward sustainable green job creation in Southwest Nigeria.

Statement of the Problem

The contemporary technological landscape is increasingly dependent on highly skilled human capital to drive productivity and innovation. Graduates of colleges of education in technical and vocational education (TVE) are expected to play a critical role in producing competent manpower capable of meeting the demands of the electrical industry and domestic energy applications. However, emerging technologies, particularly solar energy systems, require specialized competencies that extend beyond conventional electrical training. This necessitates the acquisition of up-to-date technical knowledge and hands-on skills in solar technology by TVE graduates to ensure relevance and functionality in both industrial and household applications.

Despite the objectives of vocational and technical education, these expectations remain largely unmet due to persistent deficiencies in practical training and solar-specific competencies among TVE graduates. The limited acquisition of relevant solar installation skills constrains graduates' capacity for self-employment and entrepreneurial engagement, as well as their employability in the renewable energy sector. Consequently, many TVE

graduates in Southwest Nigeria are unable to effectively harness solar energy technologies, a situation that not only undermines their entrepreneurial potential but also reinforces continued reliance on conventional, non-renewable energy sources. This dependence impedes economic diversification and contributes significantly to environmental degradation and national energy insecurity.

.Given these challenges, there is an urgent need to address the competency gap among technical and vocational education graduates with respect to solar energy system installation for sustainable green job creation in Southwest Nigeria. Consequently, the problem addressed in this study centers on identifying and addressing the key competencies required by technical and vocational education (TVE) graduates for the installation of solar energy systems as a pathway to sustainable green jobs in Southwest Nigeria.

Purpose of the Study

The main purpose of this study was to determine the competencies needed by among the technical and vocational education (TVE) graduates for the installation of solar energy systems for sustainable green jobs in southwest Nigeria. Specifically, the study sought to determine the;

1. Theoretical competencies needed technical and vocational education (TVE) graduates for the installation of solar energy system for sustainable green jobs in southwest Nigeria
- 2) Practical competencies needed by technical and vocational education (TVE) graduates for the installation of solar energy system for

sustainable green jobs in southwest Nigeria.

Research Questions

The following research questions guided the study;

- 1) What are the theoretical competencies needed by technical and vocational education graduates for the installation of solar energy system for sustainable green jobs?
- 2) What are the practical competencies needed by technical and vocational education graduates for the installation of solar energy system for sustainable green jobs?

Hypotheses

The following null hypotheses were tested at 0.05 level of significance;

HO₁: There is no significant difference between the mean responses of technical and vocational education lecturers and graduate practitioners on the theoretical competencies needed by technical and vocational education graduates for installation of solar energy systems for sustainable green jobs.

HO₂: A significant difference does not exist between the mean responses of the technical and vocational education lecturers and graduate practitioners on the practical competencies needed by technical and vocational education graduates for installation of solar energy systems for sustainable green jobs.

Methodology

Research Design

The study adopted a descriptive survey research design. According to Nworgu (2015), a survey research design involves collecting data from a representative group in order to describe

and interpret characteristics, opinions, or behaviours of a larger population. This design was considered appropriate because it enabled the collection of data through a polychotomous questionnaire and facilitated the elicitation of opinions from technical and vocational education (TVE) lecturers and graduate solar practitioners on competencies required for solar energy system installation.

Study Location

The study was conducted in the Southwest geopolitical zone of Nigeria, which is predominantly inhabited by the Yoruba ethnic group. The zone comprises six states: Ekiti, Lagos, Ogun, Ondo, Osun, and Oyo. Like other regions of the country, the Southwest experiences persistent electricity supply challenges, thereby highlighting the relevance of renewable energy solutions, particularly solar energy systems, as viable alternatives for addressing energy deficits.

Population of the Study

The population of the study consisted of 185 respondents, made up of 62 lecturers in the schools of technical and vocational education in colleges of education across the Southwest zone and 123 graduate solar practitioners actively engaged in the installation and maintenance of solar energy systems. The population of graduate solar practitioners was determined through a field survey conducted by the researcher in November 2025 across the Southwest states.

Sampling and Sampling Techniques

Given the manageable size of the population, no sampling technique was employed. The entire population of 185 respondents was studied using a census approach to ensure comprehensive coverage and to eliminate sampling bias.

Data Collection

Data were collected using a 31-item structured questionnaire developed by the researcher based on an extensive review of relevant literature. The instrument was designed to elicit respondents' perceptions of competencies required for solar energy system installation. A four-point rating scale was used with the following response options and weights: Highly Needed (HN) – 4, Needed (N) – 3, Slightly Needed (SN) – 2, and Not Needed (NN) – 1. The questionnaire was administered with the assistance of six trained research assistants. Out of the 185 copies of the questionnaire distributed, 180 copies were correctly completed and returned, representing a 97.29% response rate. Consequently, responses from 60 TVE lecturers and 120 graduate solar practitioners were used for data analysis.

Validity and Reliability of Instrument

The questionnaire was subjected to face and content validation by three experts from the department of technical education, Federal college of education (Special), Oyo. Their comments, suggestions, and corrections were incorporated into the final version of the instrument to ensure clarity, relevance, and adequate coverage of the study variables. Four copies of the questionnaire were administered to lecturers in vocational and technical education at Kwara State College of education (Technical), Lafiagi, while six copies were administered to graduate solar practitioners in Kwara State who were not part of the main study. The data obtained were analyzed using Cronbach's Alpha, which yielded a reliability coefficient of 0.89. This value falls within the acceptable reliability range of 0.60–1.00 as recommended by Uzoagulu (2013),

indicating that the instrument was highly reliable.

Data Analysis

Data were analyzed using mean scores and standard deviation to answer the research questions. Mean scores were interpreted using the following decision rule based on the four-point rating scale: Highly Needed (HN): 3.50–3.00; Moderately Needed (MN): 2.99–2.49; Slightly Needed (SN): 2.50–2.00; and Not Needed (NN): 1.99–1.49. Any item with a mean score between 2.00 and 3.50 was regarded as needed. Standard deviation was used to determine the degree of homogeneity in respondents’ opinions. To

test the null hypotheses, the independent samples t-test was employed. All statistical analyses were carried out using the Statistical Package for Social Sciences (SPSS). Decisions were made at the 0.05 level of significance (two-tailed). The null hypothesis was rejected when the calculated significance value was less than 0.05; otherwise, it was accepted.

Results and Discussions

The research questions that guided the study and the null hypotheses that were examined were the basis for the presentation of the study's results in tables (see Tables 1-5).

Table One: Demographic Distribution of Respondents

S/N	STATE Colleges of Participants	Education	TVE Lecturers	Solar Practitioners Graduates	Sex	
					M	F
1	EKITI		08	18	19	05
2	LAGOS		16	25	28	10
3	OGUN		10	19	24	08
4	ONDO		07	16	20	07
5	OSUN		08	19	22	06
6	OYO		11	23	23	08
	TOTAL		60	120	136	44

Table 1 presents the demographic distribution of technical and vocational education (TVE) graduates involved in the installation of solar energy systems for sustainable green jobs in southwest Nigeria. The sample population comprised 180 participants, consisting of 136 males (75.6%) and 44 females (24.4%) of the total respondents, 60 (33.3%) were TVE graduates, while 120 (66.7%) were solar

practitioner graduates. The table further indicates that Lagos State, being highly populated, recorded the highest participation, with 16 TVE graduates (26.7% of TVE respondents) and 25 solar practitioners (20.8% of solar practitioner respondents). In contrast, Ondo State had the lowest representation, with 7 TVE graduates (11.7%) and 16 solar practitioners (13.3%).

Research Question 1

What are the theoretical competencies needed by the technical and vocational education graduates for the installation of solar energy system for sustainable green jobs?

Table 2: Mean ratings and standard deviation of the respondents on the theoretical competencies needed by technical and vocational education graduates for the installation of solar energy system for sustainable green jobs.

S/N	Theoretical competencies needed include knowledge of	Lecturers N= 60		Graduate Practitioners N= 120		Overall		Decision
		\bar{X}_1	SD ₁	\bar{X}_2	SD ₂	\bar{X}_G	SD _G	
1	different solar system components like solar panels, inverters, batteries	3.19	0.73	3.17	0.67	3.13	0.66	Highly Needed
2	solar panel assembly	3.28	0.61	3.46	0.64	3.43	0.65	Highly Needed
3	photovoltaic technology	3.35	0.62	3.49	0.65	3.49	0.62	Highly Needed
4	and understanding electrical systems	3.38	0.66	3.50	0.68	3.45	0.69	Highly Needed
5	mounting and wiring	3.19	0.65	3.31	0.63	3.28	0.59	Highly Needed
6	environmental considerations	3.18	0.63	3.38	0.59	3.32	0.57	Highly Needed
7	the rules in installation and maintenance	3.15	0.75	3.34	0.76	3.34	0.76	Highly Needed
8	site assessment in solar installation	3.29	0.82	3.48	0.72	3.39	0.75	Highly Needed
Cluster Mean/SD		3.25	0.68	3.39	0.67	3.35	0.66	Highly Needed

Based on the data analysis presented in Table 2, graduate solar practitioners and lecturers of technical and vocational education recorded cluster mean ratings of 3.25 and 3.39, respectively, indicating a high level of requirement for the identified competencies. The overall mean ratings of the respondents ranged between 3.13 and 3.49, further suggesting that the competencies assessed are strongly

required. This implies that the listed competencies constitute essential theoretical skills required by graduates of technical and vocational education programmes for the effective installation of solar energy systems and for sustainable self-employment in Southwest Nigeria.

Furthermore, the overall cluster mean score of 3.35 confirms that the theoretical competencies necessary for solar energy system installation for

sustainable green jobs are considered adequate and relevant for graduates of technical and vocational education. The relatively low standard deviation value of 0.66 indicates a high degree of consensus

among the respondents, suggesting minimal variation in their opinions regarding the required competencies.

Hypothesis 1

There is no significant difference between the mean responses of technical and vocational education lecturers and graduate practitioners on the theoretical competencies needed by technical and vocational education graduates for installation of solar energy systems for sustainable green jobs in southwest Nigeria

Table 3: Summary of t-test analysis of mean ratings of vocational and technical education lecturers and graduate practitioners on the theoretical competencies needed by vocational and technical education graduates for installation of solar energy systems for sustainable green jobs in southwest Nigeria

Variables	N _T	t	df	Sig(2tailed)	Mean Difference	Std. Difference	Error Decision
Lecturers	60	0.448	79	0.326	0.55017	1.6731	NS
Graduate Practitioners	120						

Table 3 presents the results of the independent samples t-test analysis. The findings reveal that at the 0.05 level of significance and 79 degrees of freedom. The calculated t-value is 0.448, with an associated significance (p-value) of 0.326. Since the obtained p-value (0.326) exceeds the critical significance level of 0.05, the null hypothesis is not rejected. This result indicates that there is no statistically significant difference between the mean

ratings of lecturers and graduate solar practitioners regarding the theoretical competencies required by technical and vocational education graduates for the installation of solar energy systems for sustainable green jobs in southwest Nigeria. The low standard deviation value of 0.67 further suggests a high level of agreement among respondents, reflecting minimal variation in their perceptions of the required competencies.

Research Question 2

What are the practical competencies needed by technical and vocational education graduates for the installation of solar energy system for sustainable green jobs in southwest, Nigeria?

Table 4: Mean ratings and standard deviation of the respondents on the practical competencies needed by technical and vocational education graduates for the installation of solar energy system for sustainable green jobs in southwest, Nigeria

S/N	Practical competencies needed include ability to;	Lecturers N= 60	Graduate Practitioners N= 120	Overall	Decision
		\bar{X}_1	\bar{X}_2	\bar{X}_G	
9	ensure correct mounting of solar panels with accessories	3.24	3.38	3.23	Highly Needed
10	perform maintenance tasks such as measurement, cut and installation of wire in solar system	3.41	3.26	3.27	Highly Needed
11	work on multi-conductor cables	3.29	3.13	3.43	Highly Needed
12	install unshielded twisted pair cables	3.48	3.25	3.22	Highly Needed
13	uninstall faulty solar system	3.40	3.40	3.29	Highly Needed
14	carry out surface wiring with the appropriate tools	3.37	3.24	3.05	Highly Needed
15	identify polarities in components	3.34	3.42	3.06	Highly Needed
16	select appropriate cables	3.31	3.23	3.14	Highly Needed
17	identify materials, equipment with tools used for installation and maintenance	3.46	3.09	3.19	Highly Needed
18	conduct simple test on battery	3.42	3.00	3.08	Highly Needed
19	protect battery terminals from corrosion	3.42	3.45	3.39	Highly Needed
20	interpret electrical wiring diagram for buildings and equipment	3.43	3.27	3.24	Highly Needed
21	Test the solar system installation based on the voltage supplied	3.04	3.10	3.08	Highly Needed
Cluster Mean/SD		3.35	3.25	3.21	Highly Needed

The data analysis presented in table 4 shows that the cluster mean ratings of graduate solar practitioners and lecturers in technical and vocational education are 3.04 and 3.45, respectively, indicating a high level of requirement for the identified practical competencies. The total mean ratings of the 13 items ranged from 3.29 to 3.40, suggesting that these competencies

are extremely essential. This finding indicates that the listed items represent the practical skills necessary for graduates of technical and vocational education to effectively construct solar energy systems for sustainable green jobs in southwest Nigeria. The overall cluster mean of 3.35 and cluster standard deviation of 0.79 further reinforce that these practical

competencies are crucial for employability and self-employment in solar energy installation.

Moreover, the relatively low standard deviation of 0.81 suggests that there is substantial agreement among

respondents, indicating minimal variation in their perceptions regarding the practical competencies required for technical and vocational education graduates to succeed in sustainable green job

Hypothesis 2

A significant difference does not exist between the mean scores of the technical and vocational education lecturers and graduate practitioners on the practical competencies needed by technical and vocational education graduates for installation of solar energy systems for sustainable green jobs in southwest Nigeria.

Table 5: Summary of t-test analysis of mean ratings of the technical and vocational education lecturers and graduate practitioners on the practical competencies needed by technical and vocational education graduates for installation of solar energy systems for sustainable green jobs in southwest Nigeria.

Variables	N _T	t	Df	Sig(2tailed)	Mean Difference	Std. Difference	Error Decision
Lecturers	60	0.748	79	0.312	0.6751	1.56834	NS
Graduate Practitioners	120						

Table 5 presents the results of the t-test analysis at the 0.05 level of significance and with 79 degree of freedom, the calculated *t*-value is 0.6751, with an associated *p*-value of 0.312. Since the *p*-value (0.312) exceeds the significance threshold of 0.05, the null hypothesis is not rejected. This finding indicates that there is no statistically significant difference between the mean ratings of graduate solar practitioners and lecturers of technical and vocational education regarding the practical competencies required for the installation of solar energy systems for sustainable green jobs in southwest Nigeria. In other words, both groups share similar perceptions of the practical skills necessary for graduates to succeed in this domain.

Discussion of Findings

The findings of this study are discussed in relation to the research questions and tested null hypotheses. The theoretical competencies required for solar energy system installation in response to research question one, the study identified the theoretical skills required of technical and vocational education (TVE) graduates for the installation of solar energy systems to support sustainable green jobs in southwest Nigeria. The key theoretical competencies include: understanding the components of solar systems (solar panels, inverters, and batteries), knowledge of photovoltaic technology, comprehension of electrical systems, familiarity with system assembly, and the principles of mounting and wiring. These competencies were consistently rated as highly necessary by both graduate practitioners and

lecturers in TVE. These findings align with previous studies. Orakwe (2022) emphasized that theoretical understanding is essential for solar system installation and maintenance, while also, Alio, Kate & Uzor (2025) found that graduates in electrical/electronic technology education require similar competencies to enable sustainable self-employment in Enugu state. The consistency between these studies and the current research reflects alignment in terms of scope, objectives, methodology, and data collection instruments.

Moreover, the study revealed no significant difference between the mean ratings of graduate practitioners and lecturers regarding theoretical competencies. This indicates that respondents' professional status, whether lecturer or practitioner, did not influence perceptions of the essential theoretical skills required for TVE graduates to install solar energy systems for sustainable green jobs. Regarding research question two, the study identified the practical competencies necessary for TVE graduates to effectively construct and maintain solar energy systems for sustainable green jobs in southwest Nigeria. these competencies include: proper mounting of solar panels with accessories, performing installation and maintenance tasks (measuring, cutting, and wiring), working with multi-conductor and unshielded twisted pair cables, uninstalling malfunctioning systems, performing surface wiring with appropriate tools, identifying polarities in components, selecting suitable materials and equipment, conducting battery tests and protecting battery terminals from corrosion, interpreting electrical wiring diagrams, and testing system performance based on voltage output.

These results are consistent with Tyagi, Rahim & Selvaraj (2018), who emphasized that installing and maintaining solar systems required extensive practical expertise. The findings suggest that these practical competencies are essential for graduates seeking sustainable, long-term employment or self-employment in the renewable energy sector. Similar to the theoretical competencies, no significant differences were observed between the responses of graduate practitioners and lecturers regarding practical skills. This implies that the respondents' professional status did not influence their perceptions of the practical competencies required for graduates to engage effectively in sustainable green jobs. These results corroborate that of Mbah (2016), who reported no significant differences between lecturers' and practitioners' ratings of practical skills necessary for renewable energy occupations.

The results of the tested null hypotheses confirmed that there is no statistically significant difference between the mean ratings of graduate practitioners and lecturers regarding the entrepreneurial competencies required for sustainable green jobs. This indicates that the respondents' professional positions did not influence perceptions of the entrepreneurial skills necessary for graduates to succeed in solar energy system installation and related green employment ventures. In summary, the study demonstrates that TVE graduates require a combination of theoretical knowledge, practical skills, and entrepreneurial competencies to effectively construct and maintain solar energy systems for sustainable green jobs in southwest Nigeria. The graduate practitioners and lecturers consistently

agreed on the importance of these competencies, and no significant differences were observed between their perceptions. These findings underscore the critical role of comprehensive TVE training in equipping graduates with the skills needed to advance renewable energy adoption, foster economic empowerment, and support sustainable development in the region.

Conclusion

There is substantial scientific evidence indicating that the earth's surface is experiencing a progressive increase in average temperatures. In this context, the adoption of green or alternative energy sources, particularly solar energy, represents a critical strategy for sustainable energy generation, economic development, and environmental protection. The benefits of solar energy can serve as a catalyst for rural economic development, especially in regions where energy access is limited, thereby promoting equitable distribution of energy resources. This study investigated the competencies required by technical and vocational education (TVE) graduates to engage in sustainable green jobs in southwest Nigeria, with a focus on solar energy system installation and maintenance. The findings demonstrate that graduates must acquire and strengthen both theoretical knowledge and practical skills to perform effectively in solar energy technologies. These competencies are essential for enabling graduates to be self-reliant, entrepreneurial, and employable in the renewable energy sector.

The study also highlights the critical role of TVE lecturers and graduate practitioners in shaping these competencies, perspectives informed the identification of both theoretical and practical skill sets necessary for graduates

to succeed in sustainable green jobs. The study underscores the relevance of aligning education, skills training, and practical experience to meet the demands of the renewable energy sector and support the region's sustainable development goals.

Recommendations

Based on the findings of this study, the following recommendations are proposed:

- 1) Colleges of education and relevant organizations should systematically incorporate the identified theoretical and practical competencies into their programs to prepare graduates for sustainable green jobs in southwest Nigeria.
- 2) The curriculum of skill-acquisition programmes in colleges of education should integrate competency categories in solar energy technologies for advancing the adoption of sustainable energy solutions for employment or self-employment in southwest Nigeria
- 3) Lecturers in technical and vocational education should leverage appropriate teaching resources, practical tools, and industry-based learning experiences to ensure that students develop proficiency in solar energy system installation and maintenance.
- 4) Students should actively ensure that, upon graduation, they possess the requisite skills and competencies necessary for engaging in sustainable green jobs, particularly in the renewable energy sector.
- 5) Sustainable green jobs should be prioritized in national development

strategies and supported through awareness campaigns, targeted advocacy, and engagement with industries, organizations, and trainees to promote the adoption and implementation of renewable energy technologies.

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