



Effects of Promoting Competency-Based Training on Building Solar Energy Skill Base among Electrical Engineering Trainees in Kakamega County, Kenya

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Abstract: *Inadequate skilled labor in the renewable energy sector, particularly in solar energy, presents a significant challenge to sustainable renewable energy achievement in Kenya. Despite the growing demand for solar energy solutions, many electrical engineering trainees lack practical competencies to meet industry needs. The purpose of this study was to examine the effect of promoting Competency-Based Education and Training (CBET) on building solar energy skill base among electrical engineering trainees in Kakamega County. Anchored on the Human Capital Theory, the study adopted a descriptive research design targeting a population of 108 electrical engineering trainees, from which a sample size of 108 respondents was selected. Data was collected using structured questionnaires and interview schedules. Instrument validity was ensured through expert review, while reliability was tested using Cronbach's alpha coefficient ($\alpha = 0.812$), confirming internal consistency. Data were analyzed using both descriptive statistics and inferential methods, including Pearson correlation and regression analysis. Ethical considerations such as informed consent, confidentiality, and voluntary participation were strictly observed. Findings revealed that promoting CBET had a positive and statistically significant effect on building solar energy skill base ($\beta = 0.270$, $t = 2.237$, $p < 0.05$), with a moderate positive correlation ($r = 0.464$, $p < 0.01$). The study concluded that competency-based training enhances technical expertise, industry readiness, and employability of electrical engineering trainees. The study therefore recommended that training institutions integrate modular, practical, and industry-aligned CBET curricula, strengthen industry-academia collaboration, and expand solar energy infrastructure for training.*

Keywords: *Competency-Based Training, Solar Energy Skills, Human Capital Theory, Electrical Engineering Trainees, Kakamega County.*

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1. Introduction

Competency-based training (CBT) is an approach emphasizing the acquisition of measurable, industry-relevant skills that align with global labor market needs

(Mulenga & Kabombwe, 2019). In expanding renewable energy, CBT has been increasingly applied to solar energy training programs as a means of building specialized human capital for sustainable energy transitions (Afriyie et al., 2020). Solar energy skill development is particularly crucial in sub-Saharan Africa, where electricity access gaps

persist, and localized training approaches can directly address unemployment while fostering technological adoption (Adom et al., 2022). The adoption of CBT in training electrical engineering trainees enhances practical competence, adaptability, and employability compared to traditional knowledge-based instruction models (Okoye & Atteh, 2021).

In the modern world, competency-based training has been widely recognized as a driver for bridging the mismatch between education and industry by focusing on practical demonstrations of skill mastery rather than theoretical examinations (Rasool & Botha, 2021). In the United States, vocational education reforms have mainstreamed CBT into renewable energy training, particularly in solar photovoltaic (PV) installation and maintenance, thereby preparing technicians to meet the rapidly expanding clean energy workforce demand (Zhang & Gallagher, 2020). Germany's dual training system integrates CBT principles with apprenticeships, enabling electrical trainees to acquire hands-on solar energy expertise while working in industries, ensuring smooth school-to-work transitions (Euler & Severing, 2021). Japan has leveraged CBT frameworks to advance its solar PV workforce training, supporting its broader strategy of diversifying renewable energy sources following the Fukushima nuclear crisis (Yamada & Kodama, 2021).

Australia has incorporated CBT in technical and vocational education and training (TVET) through national training packages, with solar energy skills being prioritized in its renewable energy industry as part of the country's clean energy transition policies (Curtis, 2020). Russia, in its pursuit of renewable energy diversification, has integrated CBT within engineering curricula to strengthen solar PV skill development, thereby reducing dependence on fossil fuels while aligning with international climate agreements (Kucherov & Proskuryakova, 2021). China, as the world leader in solar energy production, has invested heavily in CBT-driven vocational training programs to build a robust solar workforce, ensuring sufficient technical expertise to sustain its globally dominant solar industry (Zhao & Luo, 2022). In Egypt, government initiatives under its Vision 2030 agenda have incorporated CBT approaches into renewable energy training programs, targeting the expansion of solar farms and strengthening local technical expertise (El-Emam & Mosalam, 2020).

South Africa has also adopted CBT approaches within its TVET colleges to train solar technicians, addressing both unemployment and energy shortages, while building capacity for renewable energy projects in line with the country's Integrated Resource Plan (Mahlangu & Fraser, 2022). Rwanda, through its national TVET policy, has emphasized CBT as a strategy to develop a skilled solar workforce to support its electrification agenda and reduce

dependence on hydroelectricity (Nsengimana & Uwitonze, 2021). In Kenya, CBT has been institutionalized within TVET reforms, guided by the Kenya National Qualifications Framework, to produce skilled solar technicians capable of supporting the country's renewable energy expansion and Vision 2030 goals (Kinyanjui & Mwangi, 2022). In an era where demand for electricity access and green energy solutions continues to grow, integrating CBT in solar energy training for electrical engineering trainees is essential in equipping graduates with relevant competencies for employment, entrepreneurship, and local sustainable development (Were & Wambua, 2023).

The promotion of CBT in solar energy training addresses critical gaps in traditional curricula by emphasizing hands-on practice, problem-solving, and industry collaboration, thereby fostering a workforce capable of driving renewable energy adoption (Asiimwe & Ruhinda, 2020). Definitions of competency-based training emphasize its learner-centeredness, where trainees progress upon demonstrating mastery of specific occupational standards rather than through time-based progression (Akinsolu & Oladipo, 2021). Building a solar energy skill base among electrical engineering trainees in Kakamega County is, therefore, not only a strategy for addressing skills shortages but also a pathway for enhancing sustainable livelihoods and regional development (Mulei & Otieno, 2022). This approach ensures that graduates can design, install, and maintain solar systems, thus directly contributing to Kenya's clean energy targets, rural electrification, and reduction of dependency on fossil fuels (Mwangi & Kariuki, 2023).

1.1 Study Objective

1. To examine Effects of promoting competency-based training on building Solar Energy Skill Base among Electrical Engineering Trainees in Kakamega County, Kenya

1.2 Research Question

1. What is the effect of promoting competency-based training on building solar energy skill base among electrical engineering trainees in Kakamega County?

2. Literature Review

Competency-based training (CBT) has increasingly become a subject of scholarly investigation in the context of renewable energy, particularly in relation to building solar energy skill bases among electrical engineering trainees (Mulenga & Kabombwe, 2019). As an approach, CBT emphasizes skill mastery and application, positioning it as a vital tool in aligning technical and vocational

education with labor market demands in the fast-growing solar energy sector (Rasool & Botha, 2021). The following literature review synthesizes empirical and theoretical studies from different economic contexts—developed, middle-income, and developing countries—highlighting the methodologies, findings, interpretations, and gaps that necessitate focused research. Competency-based training has been defined as a learner-centered approach to education in which progress is determined by the demonstration of mastery in knowledge, skills, and attitudes rather than seat time or rote learning (Okoye & Atteh, 2021). Within solar energy training, CBT is understood as a framework that prioritizes hands-on skills, industry collaboration, and standard-based assessment to ensure that graduates are ready to perform practical tasks in real-world energy contexts (Akinsolu & Oladipo, 2021). This definition has shaped research globally, with studies examining the role of CBT in bridging gaps between education systems and the renewable energy industry.

In Canada a study by Lewis and Mahon (2021) utilized a mixed-methods design involving surveys of solar industry employers and interviews with TVET graduates. The findings revealed that CBT-trained graduates demonstrated higher adaptability and problem-solving skills compared to traditionally trained peers. The interpretation suggested that CBT promoted critical thinking alongside technical mastery, while the conclusion highlighted its role in workforce readiness. The gap, however, was the lack of localized adaptations of CBT in diverse provinces with varying energy policies, which the current study sought to address by contextualizing CBT within a devolved county framework. In the United Kingdom, Smith and Davies (2020) conducted a longitudinal case study of solar energy training centers using document analysis and focus groups with trainees. Findings showed that CBT programs significantly improved employability rates, but there were challenges of standardization across training institutions. Interpretations pointed to the need for national accreditation frameworks, and the conclusion emphasized policy integration for uniformity. The gap lay in understanding how localized training centers in non-metropolitan contexts could operationalize CBT, a challenge mirrored in rural Kenya.

In France, a quantitative study by Bernard and Dupont (2021) employed regression analysis to examine the link between CBT in renewable energy training and job absorption rates. Results confirmed a statistically significant positive correlation. The interpretation noted that CBT increased labor market alignment, while the conclusion reinforced its necessity in addressing energy transition demands. The gap identified was the absence of research in decentralized training institutions in semi-urban regions, aligning with the present study's focus. A study in Sweden by Karlsson and Nystrom (2022) applied

ethnographic methods to examine solar engineering apprenticeships within CBT frameworks. Findings indicated high levels of trainee satisfaction and skill competence, though employers raised concerns about gaps in entrepreneurial training. The interpretation was that CBT prepared technicians but not entrepreneurs, and the conclusion recommended integration of business modules. The gap lay in contextualizing entrepreneurship in CBT for rural settings, which this study addresses by considering solar business potential in Kakamega.

In Italy, Rossi and Bellini (2023) conducted an experimental study comparing CBT and traditional models in solar PV training. The findings demonstrated superior skill retention and application among CBT trainees. Interpretations highlighted the practical advantage of CBT, and the conclusion confirmed its efficiency in preparing a green workforce. However, the gap was its limited application in marginalized regions with low resource allocation, which resonates with challenges in Western Kenya. Among middle-income countries, Brazil has been a notable case. Silva and Ferreira (2021) conducted a quasi-experimental study on solar energy CBT programs. Findings showed improved technical competencies but limited scalability due to resource constraints. The interpretation stressed that CBT requires robust institutional support, and the conclusion called for public-private partnerships. The gap involved regional inequalities in access to solar CBT, a gap mirrored in Kenya's counties.

In Mexico, Gonzalez and Ramirez (2020) employed surveys and observational methods to evaluate CBT in renewable energy TVETs. The findings revealed that while technical mastery was achieved, soft skills were underdeveloped. Interpretations suggested a need to balance technical and socio-emotional learning, while conclusions highlighted the success of CBT in technical areas. The gap identified was the lack of holistic skill integration, which the Kenyan study sought to bridge by combining technical and entrepreneurial components. Turkey has also made strides, with Yildiz and Demir (2022) conducting mixed-methods research on CBT in solar energy training programs. Findings indicated increased employability, but also revealed gender disparities in access to training. The interpretation was that CBT promotes technical equity but social inequalities persist. In Malaysia, Abdullah and Ismail (2021) utilized a qualitative approach involving focus groups with trainees and instructors. The findings revealed that CBT enhanced confidence and problem-solving but lacked consistent assessment models. Interpretations stressed the importance of standardized assessment rubrics, and the conclusion suggested integration of competency benchmarks. The gap lay in the need for county-level or local-level assessment

frameworks, relevant to the Kenyan decentralization context.

In Argentina, Torres and Lopez (2023) carried out survey-based research on CBT in renewable energy colleges. The findings showed that CBT contributed to regional employment creation but struggled with aligning curricula to fast-changing industry standards. The interpretation pointed to curriculum rigidity, and the conclusion recommended periodic curriculum reviews. The gap was the failure to adjust CBT to regional dynamics, similar to challenges solar markets. In developing countries, Bangladesh provides an illustrative case. Rahman and Hossain (2020) employed an action research methodology to study solar CBT in rural communities. Findings indicated increased installation skills but poor maintenance knowledge. Interpretations highlighted the partial effectiveness of CBT, while the conclusion recommended comprehensive module design. The gap was the lack of holistic training, a gap the current study addresses by focusing on complete skill sets. In Nepal, Shrestha and Adhikari (2021) used longitudinal surveys with solar trainees in CBT programs. The findings revealed sustainability of skills but poor industry linkages. The interpretation suggested limited stakeholder involvement, and the conclusion underscored the need for stronger collaboration. The gap lay in weak industry partnerships, a gap that Kakamega County training institutions must address.

In Ghana, Osei and Boateng (2022) conducted case studies of polytechnics offering CBT in solar training. Findings revealed improved employment rates but low innovation capacity. Interpretations indicated that CBT prepared followers rather than innovators, and conclusions recommended innovation-oriented modules. The gap was innovation neglect, which the Kenyan study sought to fill by encouraging problem-solving. In Tanzania, Mwita and Ally (2023) used experimental design to compare CBT and conventional training in solar PV programs. Findings showed that CBT produced better-skilled graduates with higher employment uptake. Interpretation stressed CBT as more labor-market aligned, while the conclusion endorsed it as a national strategy. The gap lay in localized tailoring of curricula, relevant to county-level approaches in Kenya.

In Uganda, Nakato and Ssembatya (2020) employed descriptive research on CBT implementation in solar energy training. Findings revealed limited resources and weak trainer capacity. The interpretation pointed to institutional limitations, while the conclusion emphasized capacity building. The gap was trainer preparedness, which this Kenyan study addresses by assessing institutional readiness. From the reviewed studies, it is evident that CBT has been widely applied across contexts with varying levels of success, yet common gaps persist such as lack of

localized adaptation, limited resource support, weak industry linkages, and neglect of entrepreneurial and innovation skills. The current study in Kakamega County, Kenya sought to fill these gaps by investigating how promoting competency-based training can build a sustainable solar energy skill base among electrical engineering trainees while addressing contextual challenges unique to the county's social, economic, and energy realities.

2.1 Theoretical underpinning

This paper was anchored on Human Capital Theory as advanced by Becker (1993), which emphasizes the role of education, training, and skill development as investments that enhance individual productivity and contribute to overall economic growth. The theory posits that when individuals acquire relevant skills through structured learning, they increase their value in the labor market while simultaneously enabling organizations and societies to reap economic benefits. By grounding this study on Human Capital Theory, it is acknowledged that promoting competency-based training in solar energy equips electrical engineering trainees with practical, market-driven skills that can improve employability, foster entrepreneurship, and support Kenya's transition to renewable energy.

In this study, Human Capital Theory is applied to explain how investment in competency-based training for solar energy among electrical engineering trainees in Kakamega County translates into tangible outcomes such as workforce readiness, enhanced technical capacity, and long-term socio-economic development. Trainees who undergo CBT in solar energy not only acquire the technical know-how for installation and maintenance of solar systems but also position themselves as contributors to sustainable energy access and green job creation. This aligns with the theoretical assumption that the benefits of investing in training extend beyond the individual to the broader community and national economy, particularly as Kenya seeks to achieve its Vision 2030 and sustainable development goals.

Other researchers have similarly applied Human Capital Theory in related contexts. For example, Osei and Boateng (2022) found that solar energy trainees in Ghana who received competency-based training improved their employment prospects and contributed to local electrification projects, confirming the link between skill development and economic advancement. Similarly, Silva and Ferreira (2021) observed in Brazil that investments in CBT for renewable energy produced a workforce capable of sustaining the growing solar industry, thereby validating the economic rationale of human capital investments. In South Africa, Mahlangu and Fraser (2022) reported that competency-based training in TVET colleges not only

enhanced technical capacity but also reduced youth unemployment, further reinforcing the application of Human Capital Theory. These studies support the relevance of anchoring this research on Human Capital Theory by illustrating how structured training directly contributes to individual empowerment and broader societal development.

3. Methodology

The study adopted an explanatory research design. The study was conducted in Kakamega County, Kenya, covering 12 constituencies, with respondents drawn from public TVET institutions' electrical engineering departments (Amaniclubs, 2020). The target population consisted of 108 respondents (100 trainers and 8 HoDs) in electrical engineering across eight TVET institutions. A census inquiry was used, selecting all 108 respondents purposively since the population was small and homogenous (Mugenda & Mugenda, 2012). Data was collected using self-administered questionnaires designed with a 5-point Likert scale for trainers and semi-structured interviews for HoDs (Singh, 2017). A pilot study involving 11 respondents (10% of the sample) was conducted at

Kisumu National Polytechnic to test the tools (Lucas & Brent, 2012). Validity (face, content, and construct) was ensured through expert review and literature alignment (Taherdoost, 2016), while reliability was tested using Cronbach's Alpha with a threshold of 0.7 (Taber, 2018). Data collection procedures included obtaining NACOSTI approval, notifying institutions, and administering questionnaires directly. Collected data was coded and analyzed using SPSS 25, applying descriptive statistics (mean, SD, frequencies) and inferential statistics (correlation and regression) to test relationships. Ethical considerations included informed consent, confidentiality, anonymity, and voluntary participation to protect respondents' rights.

4. Results and Discussions

4.1 Promoting competency-based training

The findings on the promoting competency-based training for effective solar energy training in TVET institutions in Kakamega County, Kenya were presented in Table 1.

Table 1: Descriptive Analysis of Promoting competency-based training

Statement	N	MIN	MAX	SKEW	KURT	M	SD
An opportunity is provided for each individual to develop skills at their own pace and the environment	78	2	4	-.581	.752	3.62	.743
Learners are able to understand the competencies they need to master to achieve their technical and sustainability goals	78	4	5	.957	1.876	4.15	.363
Students are asked to plan individual and collective actions for engaging the environment	78	2	5	-.114	-.822	3.54	.935
Learning is outcomes-based	78	4	5	.303	-.310	4.23	.424
Facilitator uses inductive approach in training	78	2	5	-.759	.676	3.85	.774
Students to move beyond their engineering knowledge to solar energy technology	78	2	5	-.347	-.686	3.62	.929
Comment and input from the wider community and stakeholders is encouraged on learning gaps.	78	2	5	-.347	-.686	3.62	.929
Promoting competency-based training						3.83	.389

Source: Research Data, (2025)

The mean of 3.62 shows that most respondents agree with the statement that each person has the opportunity to develop abilities in their own surroundings and at their own pace. The standard deviation of the replies was .743, which indicates that they were generally consistent. The slightly negative skewness suggests that higher agreement responses were more common, and the kurtosis indicates a distribution close to normal with a moderate peak (Skewness=-.581 Kurtosis= -.752) with a min of 2 and max

of 4. Besides, majority of respondents concur with the fact that learners are able to understand the competencies they need to master to achieve their technical and sustainability goals (Mean= 4.15 SD=.363). The range from 4 to 5 demonstrates that the respondents provided a spectrum of ratings, from agree to strongly agree (Skew= .957 Kurt=1.876). With a mean score of 3.54, the majority of respondents generally agreed that students are asked to plan individual and collective actions for engaging the

environment. With some variability in responses SD of .935 which suggests differing opinions. The minimum response of 2 and the maximum response of 5 indicate that respondents used the full range of the scale from strong disagreement to strong agreement (Skew= -.114 Kurt=-.822). From a qualitative perspective the interviewees were asked what are the aims of competency-based training approaches embraced by the department? One of them had this to say:

"Our department aims to ensure that learners acquire practical, job-ready skills by focusing on hands-on training and real-world application. We prioritize mastery of competencies over theoretical knowledge to align with industry standards and workforce demands."

Another interviewee noted that

"The competency-based training approach embraced by our department seeks to enhance employability by equipping trainees with the necessary technical and soft skills required in their respective fields. This ensures that graduates meet the evolving needs of the labor market."

This implies that the promotion of competency-based training approaches are dictated by the dynamic industry demands for solar energy skill base. This approach ensures that solar technicians and engineers are well-prepared for installation, maintenance, and troubleshooting of solar systems. It helps bridge the skills gap in the renewable energy sector by producing competent professionals that can add to the growth of solar energy adoption.

Furthermore, most responders concur that education is outcome-based (Mean= 4.23 SD=.424). The range from 4 to 5 demonstrates that the respondents provided a spectrum of ratings, from agree to strongly agree (Skew= .303 Kurt=.310). On average, majority of respondents were in agreement with a Mean of 3.85 that facilitator uses

inductive approach in training students to move beyond their engineering knowledge to solar energy technology. With some variability in responses SD of .774 which suggests differing opinions. The minimum response of 2 and the maximum response of 5 indicate that respondents used the full range of the scale from strong disagreement to strong agreement (Skew= -.759 Kurt=.676). Besides, majority of respondents agree that comment and input from the wider community and stakeholders is encouraged on learning gaps (Mean= 3.62 SD=.929). The range from 2 to 5 demonstrates that the respondents provided a spectrum of ratings, from agree to strongly agree (Skew= -.347 Kurt=-.686). From a qualitative perspective the interviewees were asked which are the instruction approaches which are frequently used by their trainers to achieve solar energy skill base? One of them had this to say:

"Our trainers frequently use hands-on, practical training sessions where learners directly engage with solar panels, inverters, and battery systems. This method guarantees that trainees develop technical proficiency through real-world experience."

Another interviewee noted that

"We emphasize problem-based learning (PBL), where trainees work on real-world solar energy challenges, such as system troubleshooting and efficiency optimization"

These implies that the instruction approaches used by TVET institutions in Kakamega county are geared towards helping the trainees gain confidence in solar installation and maintenance, reducing errors and increasing efficiency in system deployment. This leads to higher-quality installations and improved performance of solar energy systems.

4.2 Correlation analysis

Table 2: Correlation Coefficient between Promoting CBET and Solar Energy Skill Base

	Solar Energy Skill Base
Promoting CBET	r = .464** p = .000 n = 78

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

The correlation analysis results indicate that there is a moderate positive and statistically significant relationship between promoting Competency-Based Education and Training (CBET) and building the solar energy skill base among electrical engineering trainees ($r = 0.464$, $p = 0.000$,

$n = 78$). The positive correlation coefficient (0.464) suggests that as the promotion of CBET increases, the level of solar energy skills among trainees also improves. The significance level ($p < 0.01$) confirms that this relationship is not due to chance, implying that enhancing CBET

practices plays a crucial role in equipping trainees with the necessary competencies in solar energy.

4.3 Regression analysis

Regression analysis was conducted to examine the effect of promoting Competency-Based Education and Training (CBET) on building the solar energy skill base among electrical engineering trainees in Kakamega County. The results were as indicated in table 3

Table 3: Regression Analysis Results on the Effect of Promoting CBET on Solar Energy Skill Base

Predictor Variable	β (Coefficient)	t-value	p-value
Promoting Competency-Based Training	0.270	2.237	0.000

From the findings, a unit increase in promoting competency-based training would lead to increase in building solar energy skill base among electrical engineering trainees by a factor of 0.270 ($\beta_1 = 0.270$). Besides, promoting competency-based training has a statistically significant effect on building solar energy skill base among electrical engineering trainees in Kakamega County ($t = 2.237$; $p\text{-value} = 0.000$) which is less than $\alpha = 0.05$). These findings are supported by Li, et al., (2023), Gelbmann and Pirker (2023) who pointed that teaching methodologies affects learning. Srichanpiyom, Yensiri, Dechpratum, and Intakhruea, (2024) also found that the efficiency value of the competency-based curriculum on Solar Cell Installation System was significant. In the context of electrical engineering education, promoting Competency-Based Training (CBT) in solar energy plays a significant role in developing a highly skilled labor force capable of supporting the global transition to renewable energy as premised on the human capital theory.

In this regard the study concludes that there is a statistically significant effect of promoting competency-based training on building solar energy skill base among electrical engineering trainees. Competency-based training aligns with HCT principles as it ensures that learners develop technical expertise, problem-solving skills, and industry readiness, thereby strengthening the solar energy sector. By integrating real-world industry exposure, electrical engineering graduates become job-ready and technically proficient, reducing skill gaps in the renewable energy workforce. Therefore the Competency-Based Training (CBT) is essential in developing a skilled workforce for the solar energy industry by ensuring learners acquire hands-on, practical experience aligned with industry demands. A structured, modular, and flexible CBT approach enhances employability, fosters entrepreneurship, and accelerates the adoption of renewable energy technologies.

5. Conclusion and recommendations

5.1 Conclusion

The study concludes that promoting Competency-Based Education and Training (CBET) has a significant positive effect on building the solar energy skill base among electrical engineering trainees in Kakamega County. The findings demonstrate that trainees exposed to CBET acquire more practical, industry-relevant skills that enhance their technical proficiency and job readiness in the renewable energy sector. In line with Human Capital Theory, CBET ensures that learners develop competencies such as problem-solving, hands-on expertise, and adaptability, which are essential in bridging skill gaps in the solar energy workforce. Therefore, CBET is vital in fostering employability, entrepreneurship, and sustainable energy transition by producing a competent and skilled labor force for the solar industry.

5.2 Recommendations

Based on the findings, the study recommended the following:

1. There is a need to strengthen the integration of Competency-Based Education and Training (CBET) in electrical engineering curricula to ensure that trainees acquire practical skills in solar energy technologies that match industry requirements.
2. Training institutions should collaborate with solar energy companies and industry stakeholders to provide hands-on training, internships, and mentorship opportunities that expose learners to real-world applications of solar energy systems.
3. Policymakers and education authorities should provide adequate resources, infrastructure, and

modern training equipment to support the effective implementation of CBET in technical and vocational institutions.

4. Continuous professional development programs should be offered to trainers to enhance their capacity in delivering competency-based instruction, with a particular focus on emerging solar energy innovations and practices.

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