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INNOVATIVE STRATEGIES REQUIRED FOR PROMOTION OF GREEN REVOLUTION JOB OPPORTUNITIES AMONG TECHNICAL VOCATIONAL EDUCATION AND TRAINING OF GRADUATES IN THE 21ST CENTURY

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Abstract

This study examined the innovative practices required for the promotion of green revolution job opportunities for Technical Vocational Education and Training graduates in the 21st century. Two research questions and two null hypotheses guided the study. The study used survey research design and was carried out in public universities in South-South Nigeria. The population for the study was 573 vocational educators drawn from 10 public Universities in the South-South Nigeria. Due to the manageable size of the population there was no sampling as the entire population was used. Questionnaire which was validated by three experts was used for data collection from the respondents. The researcher with the help of three research assistants administered the instrument to the respondents. Cronbach Alpha reliability method was used and a general reliability coefficient of 0.89 was obtained. Data collected were analyzed and hypotheses tested using mean, standard deviation and t-test statistic. It was found out that most of our TVET institutions lack the necessary training facilities and qualified instructors to train people in vocational and technical skills. The study recommended that TVET graduates in the course of their learning should be subjected to research and undergo training on green job matters; TVET educators should undergo training in specific green sectors to improve the quality of knowledge transferred to TVET student with regards to green revolution jobs.

Keywords: Innovative, Green Revolution jobs, Innovative Practices, Promotion of green jobs, Technical Vocational Education and Training (TVET)

Introduction

The world in which we live today is characterized by tremendous scientific and technological exploration, innovation and explosion. It is the world of the world wide web, Internet surfacing, face-book, twitters, You Tube, blogs, supersonics jets, virtual learning, CAD/CAM, the robotics, Nano technologies and mechatronics. It is a global village bound together with an array of Information and Communication Technology (ICT) network unimagined hardly two decades ago. Gone are the days when economic growth relied solely on tangible assets; today, it thrives on intangible assets such as knowledge, creativity and innovation (Apetu, Egbe & Sunday, 2023). Thus, innovation is a positive, constructive, and productive change. Change is inevitable so as to maintain a competitive advantage in the face of constantly changing demographics, technologies and globalization trend (Siltala, 2010). Scores of definitions have been offered for innovation, each seeming to grow lager. Edison, Ali & Torkar (2013) defined Innovation as

encompassing the entire process, starting from a kernel of an idea continuing through all the steps to reach a marketable product that changes the economy. Innovation can therefore be seen as the process that renews something that exists and not, as is commonly assumed, the introduction of something new. According to Anthony, Johnson, Sinfield and Altman (2008), the central meaning of innovation thus relates to renewal. For this renewal to take place especially in the promotion of green revolution job opportunities among technical vocational education and training graduates. It is necessary for vocational educators to change the way, methods and approaches used in teaching of vocational courses. Vocational educators must choose to do things differently, makes choice outside their normal norms. Innovation in any sector requires specific tools, rules, and disciple (Lansiti, Lakhani, Karim, 2017). In the context of this study, the attention of the researcher is on the innovation practises required for the promotion of green revolution jobs. For any job to exist and survive especially in a changing and competitive world there must be a paradigm shift from the old ways of doing things to new. New ways, methods and approaches that should be adopted or utilized in teaching and learning of technical vocational education and training for the promotion of green revolution job opportunities that have 21st century relevance. According to (Okanazu, Egbulonu and Abdulrahaman, 2019), there are new and latest skills, abilities, competencies required to function well in green revolution jobs. These includes; skills on how to keep toxin-free homes, skills on organic gardening, public transit, energy conservations, water conservation, biodiversity, solar and wind power, local and natural food processing and preservation, environmental health management, waste reduction and reuse or recycling, consumerism. Others include skills on how to construct green building, wildlife, parks and nature, environmental education, green tourism, climate change, sustainable agriculture, green business, green media, sustainable living among others.

We are living and experiencing a new industrial revolution popularly known as Green Revolution based on alternative sources of energy and innovative ways of production, preservation and conservation. The trail blazers in his revolution include, the European Union which cut the EU's greenhouse gas emissions by 20% in 2020 compared with 1990 level. The USA which targets significant reduction in greenhouse emissions to include cuts in emissions up to 25% by 2020 and cuts up to 80% by 2050 (Wanjalakerre, 2019).

It has similarly shifted technological change from low technology (that is manual intensive) to high technology (that is cognitive intensive). The McKinsey Global Report (2012) indicated that technology and globalization have reshaped economies around the world unleashing sweeping changes in market and economies. This paradigm shift has lots of implications for the demand for higher skilled college graduate labour force as opposed to lower skilled high school graduates ultimately impacting on teaching and learning today. The green revolution brings a new set of green jobs and skills that will need retooling of the current labour force to be engaged (Maclean, Jagannathan and Panth, 2022).

Promotion is any activity that supports or encourages a cause, venture, or aim. It is the act of helping something to happens, develop or increase. It is the act of furthering the growth and development of something (Merram-Webster 2018). Based on this information, promotion of green revolution jobs among TVET graduates means all the activities embarked upon in the cause of supporting, encouraging and helping vocational graduates acquired the needed skills and competencies that will position them well for green revolution jobs. Countries like Egypt have done a lot in promoting green jobs among its youths. The project "Decent Jobs for Egypt's Young People (DJEP) done in Egypt was aimed at creating job opportunities for youth and TVET graduates in environmentally sustainable activities and has promoted green job at both national and local levels. Technical and Vocational Education and Training (TVET) is education and training which provides knowledge and skills for employment (UNESCO)-UNEVOC, 2017). According to Springrt Link (2018), technical and vocational education and training

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(TVET) is particularly important for promoting economic development, expanding employment size and improving the quality of employment.

The term technical vocation education and training is the merger of both technical education and vocational education with the aim of training students in basic technical and scientific knowledge with the skill based vocational programmes. Technical education and vocational education are often used interchangeably but, they are separate and distinct terms. According to Danjuma and Levong (2022), Vocational education refers to skill based programmes which are designed for skill acquisition at lower level of education. Vocational education programmes focus on specific vocations for entry into defined workforce. Technical education, on the other hand is not designed for any particular vocation but provides general technical knowledge. This type of education prepares people for entry into recognized occupation at a higher level but not usually lower than first degree.

The essential role of Technical Vocational Education and Training (TVET) in facilitating skills development for the socio-economic and technological development of countries globally account for the increasing importance that is being attached to this type of education. TVET provides individual with skills, knowledge an attitude for effective employment in specific occupation. According to Chukwunwendu (2016), TVET is a comprehensive term referring to those aspect of the educational process in addition to general education, the study of technologies and related sciences, and the acquisition of practical skills, attitudes, understanding and knowledge relating to occupation in various sectors of the economic and social life. Similarly, Okoye, Otuka and Iheonunekwu (2010) define TVET as all forms and aspects of education that are technical and vocational in nature, provided in either in educational institutions or under their authority, either by public authorities, the private sector or through other forms of organized education, formal or non-formal, aiming to ensure that all members of the community have access to the pathways of life-long learning. According to the National policy on education (FRN, 2016), the objectives of TVET are to:

i. Provide the trained manpower in applied science, technology and commerce particularly at sub-professional level;
ii. Provide the technical knowledge and vocational skills necessary for agricultural, industrial, commercial and economic development;
iii. Provide people who can apply scientific knowledge to the improvement and solution of environmental problems for the use and convince of man;
iv. Introduce professional studies in engineering and other technologies;
v. Give training and impart the necessary skills leading to the production of craftsmen, technicians and other skilled personnel who will be enterprising and self-reliant; and
vi. Enable our young men and women to have an intelligent understanding of the increasing complexity of technology

The traditional TVET cluster comprises of five disciplines of study, namely; Agricultural Education, Business Studies Education, Health Education, Home Science Education and Technology Education. The foundations and critical pillars underpinning TVET as a field of study have over the years been articulated, discussed in educational forums and adopted within given diverse socio-cultural, economic and political setting around the globe. In traditional Africa, the demarcation between general education and training was not as visible and defined as in the Western civilizations. Education and training was one package imparted at home. It was all encompassing and all members of the family and community took responsibility for the conduct and up-bringing of the youth (Wanjalakerre, 2019).

The fundamental philosophical underpinning of TVET is that the mandate is to prepare each individual for the world of work in which their individual talents sharpened by education

and training will contribute to the wellbeing of society. The TVET's contribution is pivotal in the application and use of knowledge, skills, materials, tools, equipment, and competencies in the production of goods and services to meet human needs and wants.

Unfortunately, despite all the glaring contributions of TVET, Nigeria is yet to accord this type of education the attention it deserves. Oviawe, Umameiye and Uddin (2017), described TVET in Nigeria as a 'disaster' due to inadequate funding, chronic dearth of qualified teachers, inadequate facilities, inappropriate curriculum and students' population explosion. With the alarming of advancement in technology and the clarion call by expects for a change in TVET curriculum, there seems to be an attempts to remedy the ugly situation. What is urgently needed now is a replacement of the existing structure a summit to reposition TVET delivery system.

Since the world is moving towards green economy as such high demand of green jobs, TVET has an important role to play in transfer of knowledge and skills relevant to the new development. This transfer will not only create employment for TVET graduates, but will equally bring rapid technological progress especially in the area of equipment production, low carbon economy and environmentally friendly commercial activities. Thus, adopting innovative practices in teaching and learning of TVET courses will continue to have significant implications for TVET graduates. As such, understanding and anticipating changes that will emerge as a result of shift to green jobs and green economy has become crucial for designing responsive TVET system and, more broadly, effective skills policies. The adaption of innovative practices in the supply of skills to the rapidly, and in some cases radically, changing needs in sectors such as information technology, energy conservation, green business, green economy among others has become a central focus of TVET system. Globally, the skill requirements and qualifications demanded for job entry especially the green jobs are rising. This reflects a need for not just a more knowledgeable and skilled workforce, but one that can adapt quickly to green revolution jobs and new emerging technologies in other to drive the green economy forward. It is against this backdrop that the researcher seeks to identify innovative practices required for the promotion of green revolution job opportunities for Technical Vocational Education and Training graduates in the 21st century.

Purpose of the Study

The main purpose of the study is to identify innovative practise required for the promotion of green revolution job opportunities among Technical Vocational Education and Training graduates in the 21st century. Specifically, the study identifies the

1. Innovative training and initiative practices required for the promotion of green revolution job opportunities among technical vocational education and training graduates.
2. Challenges technical vocational education and training graduates face in acquisition of innovative practices for the promotion of green revolution job opportunities.

Research Questions

The following research questions were formulated for the study:

1. What are the innovative practices required for the promotion of green revolution job opportunities among Technical Vocational Education and Training graduates?
2. What are the Challenges Technical Vocational Education and Training graduates face in the acquisition of innovative practices for the promotion of green revolution job opportunities?

Hypothesis

Ho_1: There is no significant difference between the mean ratings of vocational educators in federal universities on the innovative training and initiative practices required for the promotion of green revolution job opportunities among TVET graduates.

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Ho_2: There is no significant difference between the mean rating of male and female vocational educators on the challenges TVET graduates face in the acquisition of innovative practices for the promotion of green revolution job opportunities.

Method

Two research questions guided the study and two hypotheses were tested at the probability level of 0.05. Survey research design was adopted for the study. Survey design was found suitable for the study because questionnaire was used to collect data from respondents on innovative strategies required for promotion of green revolution job opportunities among technical vocational education and training of graduates in the 21st century. The population of the study consisted of 573 TVET lecturers in public tertiary institutions drawn from 5 Federal 5 States universities in South-South Nigeria offering TVET programme. There was no sampling since the population was manageable and accessible to the researcher.

The instrument for data collection was a 27 items structured questionnaire titled: "innovative practices for green revolution job Questionnaire" (IPGRJQ). The questionnaire was structured on four-point rating scale of "Strongly Agree" (SA), "Agree" (A), "Disagree" (D) and "Strongly Disagree" (SD) respectively. Face and content validity of the instrument was determined using the opinions of 3 experts, 2 from Technical Vocational Education and Training, and one expert from Measurement and Evaluation Unit. For the purpose of establishing the internal consistency of the instrument, Cronbach Alpha reliability method was used which yielded coefficient value of .89. The researcher with the help of three research assistants adequately briefed and administered copies of the questionnaire to TVET lecturers in their institutions. On the spot distribution and collection of questionnaires was deployed and those who did not fill their instrument immediately were revisited after one week. All the 573 copies of the questionnaires administered were retrieved representing 100% return rate. The data collected were analysed using mean and standard deviation to answer the research questions while t-test was used to test the null hypotheses at 0.05 level of significance. The null hypotheses of no significance difference was for items whose p-value were greater than 0.05 level of significance while the hypothesis of no significant difference was rejected for items whose p-values were less than 0.05 level of significance.

Results

Research Question 1

The result of Innovative training and initiative practices required for the promotion of green revolution job opportunities among technical vocational education and training graduates.

$H0_1$: There is no significant difference between the mean ratings of vocational educators in federal universities on the innovative training and initiative practices required for the promotion of green revolution job opportunities among TVET graduates.

Table 1
Mean ratings and t-test of the responses of Innovative practices for the promotion of green revolution job opportunities among technical vocational education and training graduates.

SN	Innovative training and initiative practices Required for the promotion of green Revolution jobs opportunities among TVET graduates include :	$\bar{x}$	SD	Rmks	P-value	Rmks
1.	Translation of operational training manual into the official and local language of the graduates on the course of their training	3.41	71	A	.61	NS
2.	Translation of training toolkits into the official and local language of the graduates on the course of their training NS		3.56	.69	SA	.71
3.	Incorporation of local initiatives of the graduates into the new ways of doing things for easy understanding	3.67	.80	SA	.58	NS
4.	Creating forums where TVET students will collaborate with other students outside their domain on green revolution job issues	3.51	.93	SA	.61	NS
5.	Subjecting TVET graduates to undergo online green revolution job training while in school	3.87	.77	SA	.82	NS
6.	Forming group of volunteers that will help in raising green revolution job opportunities awareness among TEVT graduates	3.56	.46	SA	.76	NS
7.	Constant in-cooperation of latest green revolution Job development in the teaching and learning TVET courses	3.37	.81	A	.91	NS
8.	Training on the proper solid waste management, recycling, pollution and greenhouse gas reduction	3.51	.73	SA	.52	NS
9.	Training TVET students on the innovative way to improve agricultural practices like solar drying, processing and packaging of products	3.88	.61	SA	.71	NS
10.	Developing TVET students on how to integrate environmental and labour market with green issues	3.66	.88	SA	.43	NS
11.	Guiding students to research on better ways of using organic manner, sustainable forestry, land management, wildlife conservation which are part of green revolution jobs	3.99	.59	SA	.79	NS
12.	Training TVET students on how to develop skills to promote the development, discrimination and use of green technologies to support greener economy	3.60	.93	SA	.53	NS
13.	Training TVET students on how to invest in green infrastructures	3.45	.67	A	.53	NS
	Grand Mean	**3.60**	**.74**	**SA**	**.66**	**NS**

Note X= Mean; G= Grand Mean; SA=Strongly Agreed; A=Agreed; N=No of Respondents; S*=Significant; NS=Not Significant; Sig at 0.05

The data presented in Table 1 revealed that the mean ratings of the respondents on items 1, 7 and 13 in the table were 3.41, 3.37 and 3.45. This indicated that the respondents agree that items were innovative training and initiative practices required for the promotion of green revolution job opportunities among TVET graduates. On the other hand, the mean values of the

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remaining 10 items, ranged from 3.51 to 3.99. This implies that the respondents strongly agreed with the remaining 10 items as innovative practices required for the promotion of green jobs opportunities among TVET graduates.

Data presented in Table 1 on the first hypothesis show that the t-values of the 13 items ranged from 0.43 to 0.91 which are all greater than 0.05 level of significance. This indicates that there were no significant differences in the mean ratings of vocational educators in federal universities and those in state universities on the innovative training and initiative practices required for the promotion of green revolution job opportunities among TVET graduates. Therefore, the hypothesis of no significant difference was accepted on the entire 13 items.

Research Question 2

What are the Challenges Technical Vocational Education and Training graduates face in the acquisition of innovative practices for the promotion of green revolution job opportunities?

Ho_2: There is no significant difference between the mean rating of male and female vocational educators on the challenges TVET graduates face in the acquisition of innovative practices for the promotion of green revolution job opportunities.

The data for answering the second research question and testing the second null hypothesis are presented in Table 2.

Table 2: Mean ratings and t-test of the responses on the challenges technical vocational education training graduates face in the acquisition of innovative practices for the promotion of green revolution job opportunities.

SN	Items	$\bar{x}$	SD	Rmks	P-Value	Rmks
1.	Preparation of training manual and toolkit in another language that TVET students are not conversant with	3.79	.76	SA	.69	NS
2.	Insufficient management of funds meant for green Projects	3.47	.81	A	.92	NS
3.	Inadequate staff with skills in specific green revolution Sector	3.55	.87	SA	.95	NS
4.	Seeing green revolution issues as non-priority issues among graduates	3.71	.83	SA	.87	NS
5.	Poor understanding of green revolution concepts among TVET students	3.63	.92	SA	.23	NS
6.	Delay in the incorporation of latest green job developments in the teaching and learning of TVET courses	3.88	.71	SA	.58	NS
7.	Poor anticipation of latest green revolution skills among TVET staff	3.61	.83	SA	.62	NS
8.	Non-encouragement of TVET to research on green revolution job matters	3.86	.66	SA	.36	NS
9.	Non-sponsorship of students who what to research on green revolution job matters	3.86	.59	SA	.83	NS
10.	Non-collaboration among TVET students especially on green job matters	3.54	.67	SA	.52	NS
	Grand Mean	**3.70**	**.77**	**SA**	**0.66**	**NS**

Note X= Mean; G= Grand Mean; SA=Strongly Agreed; A=Agreed; N=No of Respondents; S*=Significant; NS=Not Significant; Sig at 0.05

Data presented in Table 2 reveal that the mean ratings of the respondents on one of the Table was 3.47 which showed that the respondents agreed that the item was one of the challenges TVET graduates face in the acquisition of innovative practices for the promotion of green job revolution opportunities. The result further show that the mean rating for the remaining 9 items ranged from 3.54 to 3.88 respectively as challenges TVET graduates face in the acquisition of innovative practices for the promotion of green revolution job opportunities.

Data presented in Table 2 also reveal that the p-value of the entire 10 items range between 0.23 to 0.87 which are all greater than 0.05 level of significance. This indicates that there is no significant difference in the mean rating of male and female vocational educators on the challenges TVET graduates face in the acquisition of innovative practice for the promotion of green revolution job opportunities. Therefore, the null hypothesis of no significant difference is accepted on all the 10 items.

Discussion of findings

The finding of this study on initiative training and initiative practices required for the promotion of green revolution jobs opportunities for TVET graduates shows that the respondents agreed on the three items in the table 1 that is: translation of training toolkits into the official and local language of the graduates on the course of their training; Forming group of volunteers that will help in raising green revolution job opportunities awareness among TVET graduates and training TVET students on how to invest in green infrastructures. While the remaining items like: translation of operational training manual into the official and local language of the graduates on the course of their training, incorporation of local initiatives of the graduates into the new ways of doing things for easy understanding; subjecting TVET graduates to undergo online green revolution job training while in school; creating forums where TVET students will collaborate with other students outside their domain on green job issues; constant in cooperation of the latest green revolution job developments in the teaching and learning of TVET courses; training on the proper solid waste management, recycling, pollution and greenhouse gas reduction among others. These findings corroborated with the report of International labour Organization (ILO, 2016) on the project "Decent Jobs for Egypt's Young People (DJEP) which aims to create job opportunities for youth in environmentally sustainable activities and has promoted green revolution jobs at both national and local levels. The project was funded by Department of Foreign Affairs, Trade and Development Canada (DFATD), and has facilitated more than 3,000 employment opportunities for youth, with a particular of Minya, Port Said and Red Sea. The project, according to ILO, have helped to create awareness and dialogue on the potential benefits of green revolution jobs across several areas like waste recycling and renewable energy, agricultural and green Tourism in Egypt.

There is no significant difference between the mean rating s of vocational educators in federal universities and those in state universities on the innovative training and initiative practices required for the promotion of green revolution job opportunities among TVET graduates. This finding conformed to that of Taylor (2011) who asserted that the green careers whether obtained in universities or any other institution focuses on creating green products or providing services in five distinct groups or segments. To the author, these segments include: energy efficiency that focuses on products and services that provide efficient use of the energy, recycling and reuse, pollution reduction and greenhouse gas reduction that focuses on pollution control methods, recycling of materials and the removal of hazardous waste, renewable energy that focuses on producing energy from renewable sources, environmental compliance, education and training and public awareness helps to enforce the environmental protections and laws, educate and provide green job training or increase awareness about environmental issues. And the national conservation that provides one with the opportunity to work with area such as

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sustainable forestry, organic agriculture, land management and conservation of water, soil or wildlife.

There is no significant difference in the mean ratings of male and female vocational educators on the challenges TVET graduates face in the acquisition of innovative practices for the promotion of green revolution job opportunities.

Furthermore, the study identified the challenges TVET graduates faces in the acquisition of innovative practices for the promotion of green revolution job opportunities show that the respondents agreed on one item in the table 2 that is: preparation of training manual and toolkit in another language that TVET students are not conversant with was among the challenges TVET graduates' faces in the acquisition of innovative practices for the promotion of green job opportunities. This is in agreement with the opinion of Greenforall (2018) that identified critical issues of economy required new skills. According to the author, new skills are needed for the adjusting of the existing jobs. Without a suitably trained workforce the transition to green jobs will be impossible. Since skill gaps and shortages are already recognized as a major bottleneck in a number of sectors, such as renewable energy, energy and resource efficiency, renovation of buildings, construction, environmental services and manufacturing. It is now imperative to seek for innovative practices since the use of clean technology requires skills in technology application, adaptation and maintenance. The availability of workers and enterprises with the right skills for green revolution jobs plays not only a critical role in initiating the transition to a green economy, but also in enabling a just transition that ensures social inclusion and decent work. Employers investing in new technologies in terms of self-development, training and capacity building need to be able to find workers with the right skills.

Additionally, EU (2015) noted that environmental awareness among TVET graduates needs to be part of education and training at all levels. For green revolution jobs to be promoted in any country there are need for strategies that combine energy, environment, education and skills development objectives and policies. Effective social dialogue, coordination among ministries and communication between employers and training providers will be key for the success of green revolution job strategies. Seeing green issues as a priority issues among TVET graduates will allow for elaboration of in-debt programmes for potential skills upgrading and the redesigning of national vocational training and education schemes which the overall objective is to merge skills development with green policies and investment.

There is no significant difference between the mean ratings of male and female vocational educators on the challenges TVET graduates face in the acquisition of innovative practices for the promotion of green revolution jobs opportunities. This finding conformed to that of Mare Regional Green Job (2018) who asserted that Green Jobs creation in any sector requires new competencies and skills form both male and female individuals that will engaged in them. Those skills need, can be anticipated by making adjustments to existing education and training systems and by creating new trainings opportunities.

Conclusion

Green revolution jobs are central to sustainable development and respond to the global challenges of environmental protection, economic development and social inclusion. Green revolution jobs have tremendous benefits to works who hold them, the environment and country who embrace them in general. In developed countries, it is on record that green revolution jobs accounted for millions of jobs in manufacturing sector, energy sector, waste recycling and reduction sector among others. Despite the great benefits and prospects that green revolution jobs have for many nations, it seems however that developing nations like Nigeria still struggle to transit for already existing jobs to green jobs. For this to happen, there is need for the countries to adopt and embrace innovative practices for the promotion of green job opportunities

among technical vocation education and training graduates in the 21st century since TVET holds the key for job creation especially for up-coming generation.

From the findings of the study, it was recommended that:

1. TVET graduates in the course of their learning should be subjected to research and undergo training on green job matters.
2. The training toolkit, operational training of learners for green job opportunities be translated into the language that the learners are conversant with.
3. TVET educators should undergo training in specific green sectors to improve the quality of knowledge transferred to TVET student with regards to green matters.
4. Finally, there should be constant skill anticipation among TVET educators especially on green matters to be abreast with the new trend on the sector.

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