

ADEQUACY OF HUMAN AND MATERIAL RESOURCES OF TECHNICAL AND VOCATIONAL EDUCATION AND TRAINING IN NIGERIA: A STUDY OF GOVERNMENT TECHNICAL COLLEGES IN NIGER STATE NIGERIA

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Abstract: *Technical and Vocation Education and Training (TVET) is a type of education that empowers and prepares people to go from learning to working and to become helpful members of society, which in turn improves the country's economic standing. The study was carried out to determine the Adequacy of Human and Material Resources of Technical and Vocational Education and Training in Nigeria: A study of Government Technical Colleges in Niger State Nigeria. Three research questions guided the study. The study adopted mixed research design. The target population of the study consist of all the technical teachers, workshops personnel's and administrators in government technical colleges in Niger State, Nigeria. Multistage Cluster Sampling technique was employed and a total of 825 respondents were used for the study. The instrument for data collection was a structured questionnaire and interview. Mean statistics, standard deviation and thematic analysis were employed to analyze data for answering the research questions. The findings of the study revealed among others that, some of the human resources at technical colleges in Niger State are adequate while some are not-adequate. Physical materials resources are adequate while, the ICT materials resources are not adequate at technical colleges in Niger State. It was recommended among others that, ministry of technical education should encourage cooperative education; this will improve the practical knowledge of both the teachers and the students. There should be relationship between industries and private sectors to ensure there is appropriate interface between what is been taught and learnt in the class and the world of work.*

Keywords: *Technical and Vocation Education and Training (TVET), Human and material resources, Technical College.*

Introduction

Technical and Vocation Education and Training (TVET) is a large field of education that covers all areas of education such as formal, non-formal and informal education sector. It addresses the affective, cognitive, and psych-motive learning domains. In Ismail, et al. (2018), the United Nations Educational, Scientific, and Cultural Organization (UNESCO) redefined TVET as including education, training, and skill development linked to a variety of occupational sectors, production, services, and livelihood. TVET, which is a component of lifelong learning, can be studied at the secondary, post-secondary, and tertiary levels and involves on-the-job training, ongoing professional development, and training that could result in a certification. It covers a wide variety of local and national skill development. It must take into account the essential TVET competencies of literacy, numeracy, transversal skills, and citizenship abilities (UNESCO, 2015). As a result, the summary of TVET can be grouped into three key characteristics: 1) inclusive of education and training procedures; 2) Complete talent development; and 3) across all professional sectors (Ismail, et al. 2018). According to the International Labour Organization (ILO), European Training Foundation (ETF), and United Nations Educational, Scientific and Cultural Organization (UNESCO), TVET is taught and learned in a variety of settings, including schools, public and private vocational centers and institutes, higher education institutions, and workplaces

in both the formal and informal economies de Dakar, (2020). This study focuses on the formal sector in a learning environment (Government Technical Colleges).

TVET is a type of education that empowers and prepares people to go from learning to working and to become helpful members of society, which in turn improves the country's economic standing. According to UNESCO, TVET "plays a significant role in every society when it comes to supplying competent labour for the economy and moving young people from 'learning to earning,'" the organization stated in its 2021 report. More specifically, it was emphasized that "TVET is perhaps the education sector closest to the labor market." It is evident from the previous studies that TVET is created to address both current and future concerns. TVET trains individuals to be strong and skilled across all domains, including affective, cognitive, and psych motive domain so that they could be equipped to handle any obstacles that the rapidly altering society might present.

In the world we live in, change is inevitable and is happening or is taking place more quickly than it ever has. To keep up with the change, we must thus arrange everything. Voogt and Roblin (2010) argued that the rapid spread of technology, rising globalization and internationalization, and the shift from industrial to knowledge-based social economies have all contributed to the need for 21st century skills, supporting the argument for the necessity of effective TVET in the twenty-first century.

TVET is a unique form of education since it combines formal and informal learning experiences, such as workshops and classroom settings. Everyday changes in the world mean that teachers must adapt as well in order to impart the necessary and sufficient skills to the students so that they are always future-ready. Unlike other educational systems, TVET requires that both teachers and students develop the digital abilities that are the cornerstone of 21st -century activities. The best course of action is to embrace digital competency and to take on new challenges posed by industry 4.0, the digital economy, society, and the COVID-19 pandemic. Adopting digital competency and incorporating it into TVET is the safest course of action.

The ability of students to apply their knowledge and skills to real-world problem-solving situations has generally been the focus of TVET. These abilities include those "necessary to make the best use of quickly evolving technologies," as well as those for communication, cooperation, problem-solving, critical and creative thinking (Walser, 2008). Digital literacy, which includes an awareness of multimodality and how it may be used for learning as well as in the job, is thus one of the defining skills of the twenty-first century (Chinien & Boutin, 2011; Wynne & Cooper, 2007). A key component of skills for the twenty-first century is the capability to safely use digital technology in the workplace to solve issues, develop, cooperate, and communicate. Despite the widespread belief that digital technologies can enable educators and students to support the development of twenty-first century skills.

The world is changing as a result of the quick advancement in technology, which has had an impact on every aspect of the global economy. To be able to address and respond to emerging societal, economic, and technological challenges, our educational system must be designed and prioritized. The Nigeria TVET education system needs and calls for urgent and serious attention. It is clear from its definition, scope, objective, goal, and aim that it is the answer to the problems facing the present and the future. Therefore, sufficient investment and an emphasis on capacity building are required for the TVET to achieve its goals and objectives.

TVET systems must respond more quickly than in the past to the changes and demands confronting society and the workplace in terms of innovation in digital technology, new demands in sustainability and environmental protection, and needs for an entrepreneurial attitude, to name just a few areas (Comyn *et al.*, 2021). One of the biggest challenges facing the entire world right now is the COVID-19 epidemic. While other areas of the world were able to manage the problem even during a complete lockdown, online lectures and classes continued, in Nigeria we were caught off guard since we were unprepared. Nearly all of the schools, particularly those that are run by the government, had to wait until the lockdown was lifted before students could return.

According to Hassani *et al.* (2021) and the United Nations Conference on Trade and Development [UNCTAD] (2021), artificial intelligence (AI), the Internet of Things (IoT), big data, block chain, 5G, 3D printing, robotics, drones, gene editing, nanotechnology, and solar photovoltaic (Solar PV) are the new technologies that are influencing the global economy, industries, and labour force. Is our TVET education sufficient to adequately equip students to meet both existing and future challenges based on new technologies and the digitization of the global workforce? A new global economy has emerged as a result of globalization. The way we live, learn, work, and even think about work has been drastically altered by new information and communication technology (UNESCO, 2003). In this context, the researcher sought to examine the Nigerian technical and vocational education and training systems on adequacy of human and material resources at technical colleges in Niger State.

Qualification and competencies are two of the most important and crucial terms in TVET that require a comprehensive grasp. Any TVET graduate working in a formal or informal context must be qualified and proficient in their field. According to the International Labour Organization [ILO] (2006), a qualification is a document that is given to a person in acknowledgement of having attained a specific set of knowledge, skills, or abilities. The official result of an assessment and validation process (certificate, diploma, or title) is gained when a competent organization determines that a person has met learning objectives to a certain standard and/or has the required competence to perform a job in a certain field of work (CEDFOP, 2008). It is also referring to the official confirmation, usually in the form of a document certifying the successful completion of an educational programme or of a stage of a programme (UNESCO UIS 2013). Therefore, qualification in TVET is the certificate awarded to an individual after completing a programme having been tested both in theory, practical and soft skill.

On the other hand, competence is thought of as a person's innate potential and non-observable disposition. As a result, it addresses information, abilities, and attitudes (knowing, doing, and wanting) (UNESCO, 2021). The ability to use, apply, and demonstrate a group of related awareness, knowledge, skills, and attitudes in order to successfully carry out tasks and duties is known as a competency. It can be measured against widely-accepted standards (levels) required in employment and assessed against materials made available at the place of employment (Wahba, 2013). A competency is typically described as a set of abilities that someone possesses in order to properly complete a task or activity while doing a specific job (International Atomic Energy Agency [IAEA], 2020). Competency is the capacity of an individual to use his or her acquired knowledge, skill, and ability to accomplish a task in the twenty-first century while still achieving the desired result. The Nigeria TVET education system at technical colleges should be able to produce graduates with a wealth of relevant knowledge and skills, the ability to utilize the acquired skill, and the willingness to do the necessary work required of him, it is clear from all the definitions and explanations of competencies given above. Since the entire world is becoming more digital, it is obvious that Nigerian TVET institutions at all levels, particularly technical colleges, should give their students all the necessary training to help them fit in with this more digital world. Additionally, TVET students should receive additional training in the professional, technical, and specialized knowledge and skills required to meet the demands of particular occupations as well as those that may be transferable to and relevant in brand-new, as-yet-unexplored domains.

One method of meeting the objectives of education in Nigeria as outlined in the National Policy on Education Federal Republic of Nigeria (FRN) (2014) is to ensure that instruction is practical, activity-based, experiential, and IT-supported, and that it is connected to the general needs of the community. In order to determine how sufficient, the current human and material resources are, both in the classroom and workshop, as well as to determine whether the teaching and learning are related up-to-date to meet the overall needs of the community, it is necessary to examine TVET at the technical college level. Trending requests are what the community as a whole need. Let's examine one of the objectives of education in Nigeria, which is the complete integration of the learner into their immediate environment, Nigerian society, and the global community. This

implies that the type of education that should be provided to Nigerian students should be current so that our graduates can compete with those around the world. To do that, the skills that are taught should be those that are current, in demand, and relevant. In order for education to be effective and complete, it must be designed with the necessary 21st century abilities in mind. Collaboration, effective communication, research, problem solving, critical thinking, creativity, and computer literacy are skills required in the twenty-first century.

The necessity for ICT in our daily lives is so great that it is no longer an exaggeration to suggest that technical college students and their teacher need to be ICT-literate. In this era of post COVID-19 ICT is used to deliver lectures through Google Meet, Zoom, Video Conference, Post-cast and Audio-cast, Virtual Reality, Distance Learning, e-learning to mention a few. ICT is now used in a variety of ways in our institutions. Kasworm and Londoner (2000) assert that an emphasis on ICT literacy development is necessary. This competency is broken down into two generic ICT competencies, including keyboarding, word processing, working with databases, spreadsheets, desktop publishing, and using the Internet for communication and research. While the second group of ICT skills focuses on ICT literacy abilities that are industry-specific. Utilizing CNC equipment, working with CAD/CAM software, and operating machinery with digital system controls are a few examples of these abilities. The use of ICT as a tool for delivery mechanisms, such as computer-assisted instruction (CAI), computer-based instruction (CBI), and web-based or online training, was further emphasized. Programs for open and distance learning.

Anything involving technology in education is often referred to as ICT in education. This covers hardware like computers, tablets, cellphones, and interactive whiteboards as well as software like educational games, digital learning tools, and any online educational applications. The way technical education and general education are conducted has changed as a result of the development of digital technologies and COVID-19. According to the studies examined, TVET must incorporate the following aspects of the digital future: social media, mobile computing, cloud computing, the Internet of Things (IoT), and big data (Valacich & Schneider 2018). These digital futures will have a big impact on many aspects of human life. There has already been a considerable shift toward the use of digital or technology for all aspects of teaching and learning prior to the outbreak of COVID-19 pandemic.

The world is evolving to the point where learning and employment will not only take place where it is convenient for individuals, but also where it is possible. If that's the case, is our technical college equipped to prepare students for such a situation? To determine if technical colleges can keep up with the 21st century's growth in technology, the digital environment, and automation sectors, it is vital and crucial to review or examine both the materials and human resources in technical colleges. To make it easier for students to move from school to work and to prepare them for the demands of the modern workplace as a member of larger society.

According to the 2014 National Policy on Education, Technical and Vocational Education and Training (TVET) is a colloquial term used to refer to those aspects of the educational process that involve, in addition to general education, the study of technologies and related sciences as well as the acquisition of practical skills, attitudes, understanding, and knowledge relating to occupations in various sectors of economic and social life. It covers Technical College, National Vocational Qualification Framework (NVQF), and Vocational Enterprise Institutions (VEIs).

Technical colleges are secondary schools created to get students ready for technical and vocational training so they may get jobs, start their own businesses, or hire others. According to Okolie, et al. (2019), Technical Colleges (TCs) are educational institutions created with the goal of educating students in order for them to develop their intellectual, social, physical, emotional, and economic capabilities, become self-sufficient, and support the economic growth and development of their countries.

The National Policy on Education, Federal Republic of Nigeria, Federal Republic of Nigeria (FRN) (2014) stipulates that the curriculum of technical colleges must be divided into foundational and trade modules. The general education, theory and related courses, workshop

practices, industrial training/production work, and entrepreneurship training are the five components that make up each trade's curriculum. The technical colleges (TCs) offer a variety of vocational and technical trades, including: Automobile Trades, Building & Wood Work Trades, Business Trades, Computer Trades, Electrical/Electronic Trades, Hospitality Trades, Mechanical Trades, Printing Trades (Creative Arts/Design), Textile Trades, Agriculture, and General Education Subjects. The teacher to student ratio should be maintained at 1:20 to ensure that students participate effectively in practical tasks. The three options available to graduates of technical college programs are as follows: 1) obtain employment, either at the conclusion of the entire programme or after passing one or more employment skills modules; 2) establish their own businesses, become self-employed, and have the ability to hire others. 3) Continue your study in advanced craft/technical programmes at universities, polytechnic, colleges of education, and other post-secondary (tertiary) technical institutions. It is clear from the possibilities provided as trainees finish technical college programmes. The programmes must be thorough, detailed, and up to date if the first two alternatives are to be viable. In order to keep up with the current improvement in technology and the arrival of the digitalization of the workplace, the students must be taught both the theoretical and more of the practical subjects by skilled and competent instructors in a well-equipped and modernized classroom and workshop.

Statement of the Problem

A growing emphasis on the advantages of entrepreneurial learning, the digitization of the workplace and the training cycle, the shift to green and sustainable economies, and the rise in migration are some of the current global trends that are placing more pressure on TVET stakeholders to offer effective training solutions. The COVID-19 pandemic presents new difficulties for TVET and the workplace (BILT). Most people believe that education has moved into a new environment where quality is becoming more and more important (Ismail & Abiddin 2014). As a result, TVET institutions must be cognizant of technological advancements and offer students effective support (Ismail, et al, 2015).

Graduates with a wide range of skills are needed in the workforce. Those who might blend in and outperform the labour market's current demands while remaining strong. Those who are knowledgeable and skilled. Those who have learned and are able to use 21st century abilities and be able to achieve the target. If the aforementioned claim is accurate, then our educational system must be more focused on making all of the necessary tools, personnel, and environments available to train the students. No student can develop beyond his teacher, just as the adage goes, "A country cannot develop beyond the standard or the level of its education."

One reason students may not be as aware of practical applications or as prepared to satisfy the professional and technical requirements of industry is the limited expertise of teachers (Ismail at. el 2018). This suggests that teachers are limited in what they can impart. Additionally, students can only demonstrate or put into practice what their teacher has taught them. On the other hand, one of the main issues with TVET is that no matter how good, certified, and competent the teachers are, they are helpless without the necessary tools, materials, and equipment. Fundamentally speaking, TVET is a program that heavily relies on equipment. A TVET education without sufficient material resources is equivalent to a body without an engine.

TVET at the Technical College level in Nigeria needs to move quickly and be proactive in whatever they do. Individuals should be prepared through TVET to gain correct and appropriate knowledge and skills, as well as to always be prepared to join in or take advantage of any opportunity that arises without feeling intimidated or dread. It therefore addresses knowledge, skills, and attitudes (knowing – doing – wanting). To the advantage of individuals, economies, and society, TVET systems should be proactive in how they change their training supply. To enable the student to have a good impact on society, TVET education should be a type of education that impacts the current, required, and marketable knowledge, skills, values, and attitudes.

TVET must be repositioned to become what it ought to be: a vehicle for people to prosper, a driver of sustainable economies, and a tool for social justice. There is no doubt that TVET is the ideal

educational system for preparing people for the future while also addressing today's issues. Because of this, the instruction and learning that take place at technical institutions should be geared toward 21st century competences that support people, economies, and society. The question now is whether or not our TVET at technical colleges is ready and has the material and human resources needed to equip the students to meet the challenges of the present and the future. Thus, the study's motivation.

Research Questions

1. How adequate are the human resources in Technical Colleges?
2. How adequate are the material resources in Technical Colleges?
3. What are the strategies toward acquiring adequate human and material resources in Technical College?

Methodology

Mixed research design was considered suitable for this study to collect data from the targeted population. Where questionnaires and interview were used to collect data from teachers, workshops personnel's and administrators in Niger State technical colleges.

The study was carried out in all the 6 technical colleges offering Electrical Installation and Maintenance Work, Motor Vehicle Mechanics, building and woodwork trade in Niger State. The population of the study consist of all the technical teachers, workshops personnel's and administrators in government technical colleges in Niger State, Nigeria. The technical colleges are according to their zone: Zone A: Government Technical College, Eyagi Bida. Zone B: Government Technical College, Minna and Sulaiman Barau Technical College, Suleja. Zone C: Government Technical College, Kontangora, Mamman Kontangoran Technical College, Pandogari and Government Technical College, New Bussa.

The sample size of the study is 825 consist of 21 administrators (Principals, Vice Principals and Heads of department), 60 Technical Teachers, 24 Workshop personnel (craft trainers also known as workshop Assistants & Attendants) and 720 students in the department of Electrical Installation and Maintenance Work, Motor Vehicle Mechanics, building and woodwork trade in Niger State. They were selected from the six technical colleges through a Multistage Cluster Sampling technique. Here, three technical colleges was selection by balloting out of six technical colleges offering Electrical Installation and Maintenance Work, Motor Vehicle Mechanics, building and woodwork trade in Niger State, the technical colleges are: Government Technical College, Minna, Government Technical College, Eyagi Bida and Sulaiman Barau Technical College, Suleja. Four department were selected through balloting and a class was selected in each of the sampled department. Stratified random sampling divides populations into strata, and then randomly selects samples from each stratum (Neill, 2006).

Three types of questionnaires were used, one of the questionnaires consisting 16 items focused on the adequacy of human resources in technical colleges in Niger State. The second question consisting of 20 items which focused on adequacy of materials resources in technical colleges in Niger State while the third research question consisting of 12 items seeking the answers to the solution to the inadequacy of human and material resources in technical colleges to determine the present and the future of TVET in Nigeria. The questionnaire was closed-ended and was developed by the researchers using data obtained through the review of related literature. Decisions on the research questions were based on the resulting means score interpreted relative to the concept of real lower and upper limits of numbers as shown in Table 1.

Structured interviews schedule was conducted among selected technical teachers and the administrators in the sampled technical colleges in Niger State Nigeria on the adequacy of human and materials resources in technical colleges in Niger State. In these interviews, the researchers attempted to achieve a holistic understanding of the interviewees' point of view or situation as suggested by (Dawson 2002).

All the questionnaires administered were returned representing 100% return rate. The data collected for the study was organized and analyzed on the basis of the research questions. Data collected for this study were analyzed using mean, standard deviation with the help of the statistical package for the social sciences (SPSS version 26) computer program, data obtained from interview was analyzed using thematic analysis. Decisions on the research questions were based on the resulting mean score interpreted relative to the concept of lower and upper limits of real numbers as shown in Table 1. The standard deviation was used to decide on the closeness or otherwise of the respondents to the mean in their responses. Any item with standard deviation of less than 1.96 indicated that the respondents were not too far from the mean or from one another in their responses and any item having standard deviation equal or above stated value signified that respondent were too far from the mean.

Table 1: Interpretation of Four Point Scale

S/N	Scale of R.Q 1	Scale of R.Q 2	Point
1	Very Highly Adopted	Very High Aware	3.50 – 4.00
2	Highly Adopted	High Aware	2.50 – 3.49
3	Rarely Adopted	Rarely Aware	1.50 – 2.49
4	Not Adequate	Not Aware	0.50 – 1.49

Result s

Table 2: Mean responses of the teachers and administrators on the adequacy of human resources in technical colleges.

S/N	Items	\bar{X}_1	SD1	\bar{X}_2	SD2	Remark
1	Uses of PowerPoint presentation by the teacher	3.11	1.16	2.83	1.19	MA
2	Number of teachers per subjects	2.63	1.09	3.10	.97	MA
3	teacher-students ration	1.44	1.05	1.39	1.03	NA
4	In-service training of the teachers on the uses of 21 st century skills	1.11	.11	1.21	.71	NA
5	Teachers training on related education application software.	1.32	.93	1.36	.95	NA
6	Up-skilling and re-skilling of the teachers	1.42	.99	1.44	.89	NA
7	ICT training for teachers	1.39	.72	1.21	.71	NA
8	Uses of Augmentations Reality (AR)/Number of Virtual Reality (VR) devices by the teacher	1.44	.89	1.17	.38	NA
9	Uses of overhead projector to present lecture by the teacher	1.33	.17	1.37	.56	NA
10	Teachers-students relation	3.00	1.10	3.39	.92	MA
11	Teacher's generic purpose of the computer	2.00	1.25	2.42	1.32	A
12	ICT certificate obtained by the teachers	1.33	.17	1.45	1.25	NA

13	Teachers mastering of the subject	3.22	.79	3.35	.99	MA
14	Psychomotor skills of the teachers	2.67	1.16	3.17	.91	MA
15	Effective communication of the teachers	2.67	1.06	2.75	1.18	MA
16	Innovative skills of the teachers	2.67	1.06	2.54	1.03	MA

Key. \bar{X}_1 = teachers mean, \bar{X}_2 = administrators mean, SD1 = teachers' standard deviation and SD2 = administrators' standard deviation.

Table 2. Shows that, respondents agreed with items 1, 2, 4, 10, 13, 14, 15 and 16 with mean values ranging between 3.39 - 2.54 signify that the items are moderately adequate. Item 11 with the mean values of 2.42 signified that the respondents agreed that the item is adequate. While the items 3, 4, 5, 6, 7, 8, 9 and 12 with the mean response's ranges between 1.11 - 1.45 signified that the items in question are not adequate. However, the standard deviation of all the respondents is less than 1.95 which is an indication that the respondents are not too far from each other from their responses.

Table 3: the mean responses of teachers, administrators, workshops personnel's and students on the material resources in technical colleges.

S/N	ITEMS	\bar{X}_1	\bar{X}_2	\bar{X}_3	\bar{X}_4	\bar{X}_T	SD	Remark
1	Workshop for 20 students in each trade areas	2.86	3.19	2.67	3.43	3.04	1.01	MA
2	Ceiling fans or A/Cs for ventilating systems in the workshop.	3.22	2.88	2.97	3.32	3.09	1.01	MA
3	15 quantities of discharge lamps for artificial lighting	3.23	2.31	3.22	3.08	2.96	.96	MA
4	16 quantities of standard work benches	2.72	3.13	2.56	2.42	2.71	1.10	MA
5	4 cylinders of fire extinguishers	1.94	2.88	1.97	2.39	2.29	1.03	A
6	Two quantities of first aid facilities	1.37	1.33	2.08	2.18	1.74	1.12	A
7	Computers-Students ratio	1.33	1.43	1.43	1.49	1.42	0.87	NA
8	Electronics Studio for (AutoCAD)	1.32	1.33	1.38	1.41	1.36	0.99	NA
9	How adequate are the machines in the workshops	1.89	2.77	2.56	2.25	2.37	1.17	A
10	How adequate are the tools/materials in the workshops	1.50	2.56	3.22	2.28	2.39	1.07	A

11	Number of Augmentations Reality (AR)/Number of Virtual Reality (VR) devices in the workshops	1.39	1.33	1.33	1.29	1.33	0.79	NA
12	Overhead Projectors in the school	1.37	1.42	1.36	1.39	1.39	0.77	NA
13	Up-to-date of the computers	1.37	1.42	1.44	1.33	1.39	1.06	NA
14	Numbers of the computer	1.48	1.38	1.47	1.31	1.41	1.02	NA
15	Generic purpose of the computer	2.50	3.19	2.56	1.71	2.49	1.07	MA
16	Internet network in the school	1.33	1.93	1.37	1.29	1.48	.92	NA
17	Electricity supply from national grid	1.84	2.21	2.67	1.46	2.06	1.03	A
18	Electricity supply from other sources	2.06	2.25	1.86	2.53	2.17	1.16	A
19	e-library in the school	1.21	1.36	1.45	1.40	1.36	.84	NA
20	Library in the school	3.35	3.10	2.67	2.80	2.98	.99	MA

Keys: \bar{X}_1 = teachers mean, \bar{X}_2 = administrators mean, \bar{X}_3 = workshop personnel's mean, \bar{X}_4 = students mean, \bar{X}_T = total mean and SD = total standard deviation.

Table 3. Shows that, respondents agreed with items 1, 2, 3, 4, 15 and 20 with the mean values ranging between 3.09 - 2.49 meaning the items are moderately adequate. Items 5, 6, 9, 10, 17 and 18 with the mean values between 2.39 to 1.17 signified that the respondents agreed that the items are adequate. While the items 7, 8, 11, 12, 13, 14, 16 and 19 with the mean response's ranges between 1.48 - 1.33 signified that the items in question are not adequate. However, the standard deviation of all the respondents is less than 1.95 which is an indication that the respondents are not too far from each other from their responses.

Table 4: The mean response of teachers and administrators on the strategies towards acquiring adequate facilities and human resources in technical colleges.

S/N	Items	\bar{X}_1	SD1	\bar{X}_2	SD2	Remark
1	Installation of internet network in technical colleges	3.06	1.18	3.25	.73	MA
2	Establishment of electronics studio for AutoCAD practice	3.33	1.06	2.88	1.14	MA
3	Employment of more qualify teachers with ICT literacy	3.06	.78	2.88	1.14	MA
4	More provision of ICT facilities in the technical colleges	3.08	1.07	2.96	1.03	MA
5	Government should reduce tax on ICT facilities	3.33	.88	2.85	1.03	MA
6	There should be collaborative education in technical colleges	3.61	.83	3.19	.87	MA
7	There should be in-service training in all domains to improve the 21 st century skills both the	3.17	1.17	2.89	.83	MA

theoretical, practical and soft skills of the teacher						
8	Provision of augmentative reality (AR)/virtual reality (VR)	3.22	.98	2.88	.94	MA
9	Up-skilling and re-skilling of the teachers	3.46	.84	3.15	.83	MA
10	Governments should collaborate with ICT experts for the training and provision of ICT facilities to technical colleges	2.78	.98	3.08	.82	MA
11	Pear learning should be encouraged	3.11	.88	2.67	.99	MA
12	Blended learning should be introduced	3.17	1.07	3.15	.95	MA

Keys: \bar{X}_1 = teachers mean, \bar{X}_2 = administrators mean, SD1 = teachers' standard deviation and SD2 = administrators' standard deviation.

Table 4. Shows that, respondents agreed with all items on the strategies towards acquiring adequate human and material resources in technical colleges with the mean ranges between 3.46 - 2.67 that the items are moderately agreed. However, the standard deviation of all the respondents is less than 1.95 which is an indication that the respondents are not too far from each other from their responses.

Interview schedules

To determine the adequateness of the material and human resources in technical colleges. Interviews were conducted with a few technical teachers, administrators, workshop personnel and students from various departments and schools.

Result of interviews of teachers and administrator on adequate are the human resources in Technical College.

According to the interview, the majority of the teachers agreed that technical colleges' human resources are insufficient. The teachers-to-students ratio is higher than the UNESCO standard of 1:20. Some said that there are roughly 80 students for every teacher in a class. The teacher's use of augmentation and virtual reality. The majority of the teachers who replied said that they did not use virtual reality or augmentation because it is not available in their schools. Regarding the applications of overhead projectors, it should be mentioned that some technical schools do not have overhead projectors, and those that do only have one which is not enough for all teachers to use when necessary. One of the issues presented to the teachers and administrators at the technical colleges in Niger State of is about the up-skilling and re-skilling of the teachers. Their comments made it evident that the teachers' up-skilling and re-skilling is insufficient. Sometimes they wait a long time before starting any training.

Interviewed administrators and teachers both believed that the teachers' psych-motive skills were sufficient because they had the necessary practical knowledge and were prepared to impart it to the students. They also concurred that there are competent teachers with effective communication skills. All of the fundamental computer abilities are available to technical teachers. However, the main issue is that there are not enough computers in technical colleges.

Result of interviews of teachers and administrator on adequate of the material resources in Technical Colleges.

The answer to the question of whether the material resources in technical colleges are adequate. According to the majority of the teachers, administrators, students, and workshop personnel who participated in the interview, the industrial revolution, the COVID-19 pandemic, digitalization, and the rapid advancement of technology have rendered the workshop structure in technical colleges as antiquated. They concurred that the workshops have good structures, proper ventilation systems, fire extinguishers, and first aid facilities. Some of the people who were questioned about the e-library, electronics studio, internet accessibility, and augmentative or virtual reality in

technical colleges claimed that none of these items are sufficient. Some people thought they were excluded from the NABTEB list of requirements for technical colleges.

Result of interviews of teachers and administrators on the strategies toward acquiring adequate human and material resources in Technical College.

Concerning the methods for obtaining sufficient human and material resources at technical colleges. The following suggestions were made by several respondents as ways to ensure that technical colleges have enough human and material resources for efficient TVET. Computers for both teachers and students should be provided by the government. In technical colleges, networks ought to be accessible. The teachers need to receive up-skilling and re-skilling training. This will enable the teacher to acquire the necessary digital and trend skills. They will provide it to their students in exchange.

Summary of Findings

1. Some of the human resources at technical colleges in Niger State are adequate while some are not-adequate.
2. Physical materials resources are adequate while, the ICT materials resources are not adequate at technical colleges in Niger State.
3. There are the strategies towards acquiring adequate facilities and human resources in technical colleges.

Discussion of Finding

The responses of teachers and administrators regarding the sufficiency of human resources at technical colleges in Niger State are displayed in Table 2. The entire human race is transitioning to a digital environment. The students' talents are impacted more appropriately and effectively when the human resources at the technical college is adequate. The findings showed that the relationship between teachers and students, teachers' subject-matter expertise, teachers' psychomotor skills, their ability to effectively communicate with one another, and their inventive skills are all adequate. It is impossible to overstate the importance of effective communication in the 21st century. The teachers' psychomotor skills are sufficient, indicating that they possess the practical knowledge required for the twenty-first century, but are the materials resources adequate? This is consistent with the findings of Shear et al. (2011) which cites a lack of access to professional development that provided cogent support for the necessary abilities as one of the TVET hurdles. The lack of adequate technical assistance for teacher is one example of this, as is assisting teachers in learning how to incorporate cutting-edge techniques into their instruction that go beyond the technical features of technology. The results showed that the teachers-to-students ratio is insufficient, which means that there are more students per teacher than the recommended 1:20. Overcrowding would make it difficult for people to communicate effectively, which would impede communication. There isn't a public address system in technical colleges that could be used to improve communication.

The results show that certain of the ICT skills that are essential for the 21st century is not being adequately at technical colleges. These include in-service training for teachers on the application of 21st century skills, ICT training for teachers, up-skilling and re-skilling of teachers, use of overhead projectors by teachers to conduct lectures, and teacher's use of augmented reality (AR)/virtual reality (VR) devices. It is significant to note that earlier skills are becoming obsolete and are no longer useful or usable in the workplace without the up-skilling and re-skilling of the teacher in technical colleges. This is consistent with the results of Pelgrum (2001), who identified one of the issues facing TVET as a lack of training opportunities and subpar teacher preparation.

Devices that are commonly used today, such as augmented reality (AR) and virtual reality (VR) headsets, could be applied at the technical college level to improve the practical activities there. They represent fresh IT innovation. As stated in [FRN] (2014), one of the objectives of education

in Nigeria is to fully integrate each student into their local community, Nigerian society, and the global community. The purpose of education could not be achieved if the technical college teachers and students lacked the most recent ICT/IT abilities.

The information on the material resources at technical colleges was presented in Table 3. The results showed that the workshop for 20 students in each trade area, ceiling fans or A/Cs for ventilation systems in the workshop, 15 quantities of discharge lamps for artificial lighting, 16 quantities of standard work benches, 4 cylinders of fire extinguishers, and the school's library are moderately adequate. According to the NBTE request, the resources listed above are material ones. It is also disclosed that technical colleges have enough of the following resources: 4 cylinders of fire extinguishers, 2 quantities of first aid kits, machines in the workshops, and tools/materials in the workshops. This is consistent with the study of Umar and Ma'aji's (2010) conclusions regarding the efficient repositioning of facilities in Technical College workshops.

The inadequate state of the computers at technical colleges is made clear. In other words, there are more students than there are computers in the classrooms. Each student should have sufficient access to adequate computers in this twenty-first century. The use of computers is necessary in every aspect of our lives. This supports the findings of Pelgrum (2001) the TVET schools lack resources that are supported by technology, including computers for students and teachers, dependable Internet access, obsolete equipment, and resources themselves.

The study's findings show that no electronics studio exists where technical, engineering, and building drawings could be completed electronically. Given that the world has gone digital, drawing is a must for technical students. There is a need for an electronics studio where students can be taught how to draw utilizing various software programs via computers. Technical colleges' overhead projectors are inadequate. In the classroom, objects are projected onto the wall using an overhead projector for greater visualization. But regrettably, the so-called educational system (TVET) that needs it most in this digital era is insufficient. The technical colleges in Niger State's internet network and e-library are found to be inadequate. In the post-COVID-19 period and the twenty-first century, there is no possibility that kids will be taught without internet connectivity and a network that will enable them to use Google and the World Wide Web (www) and connect to the rest of the world. The educational system is developing toward a paperless environment where printed textbooks are not required. The results are consistent with Pelgrum (2001) study, which found that resources included inadequate numbers of computers and copies of software, inadequate simultaneous access to the (www), low-quality software, and inaccurate information on the (www).

Although they may not be specifically mentioned in the NABTEB requirements for technical workshop setup, augmentation/virtual reality, the internet, an electronics studio, and an e-library are essential in the 21st century, where everything is digitalized and smarter. New issues that are reshaping the global system have been highlighted by European TVET institutions and are supported by Subrahmanyam (2020). These challenges include global migration, entrepreneurship, sustainable development, the COVID-19 pandemic, and digitalization. In order to attain the desired results and make Nigeria TVET competitive with its modern counterparts and future-ready, newer equipment is required due to the aforementioned developments that call for new approaches. The development of skills must be encouraged across all of our economic sectors if TVET graduates are to become job creators and labor employers.

The study found that there are numerous approaches to addressing the problems with human and material resources in technical colleges. Some of the profound solutions include collaborative learning in technical colleges, the availability of augmented reality (AR) and virtual reality (VR), the up-skilling and re-skilling of teachers, and increased ICT infrastructure in technical colleges. Technical colleges should have internet access, and an electronics studio should be set up for AutoCAD training. Our current predicament requires a decisive approach, which requires some of the traditional methods of doing things to shift in order to make room for a fresh, all-encompassing perspective. We cannot carry on doing things the same old manner and expect different and

advancement in our results. According to the Subrahmanyam (2020) study, there are new issues that are changing the global system, as highlighted by European TVET institutions. These include global migration, entrepreneurship, the COVID-19 pandemic, sustainable development, and a human-centered educational paradigm. Umar and Ma'aji (2010) discussed the efficient repositioning of the facilities in the Technical College workshops. According to UNCTAD's results from 2021, which were also in agreement with the study noted that TVET, more than any other area of the education system, must discover ways to stay current and future-ready in three primary stages: identification, integration, and implementation. According to research by Darling-Hammond (2000) and Rowe (2003), teachers develop professionally by continuing to engage in new learning experiences and putting the new knowledge they have learned as a result of those experiences into practice. Professional growth is crucial for sustaining and enhancing teaching effectiveness and student learning outcomes. According to research, one of the most important factors influencing students' achievement is the caliber of teachers. Students at technical institutions will be able to know what to do, how to do it, and be ready to do it when the aforementioned tactics are combined. Knowing, acting, and desiring. As supported by Hassani, Huang, MacFeely, & Entezarian, (2021) on the study on digitalization of national TVET and skills systems: Harnessing technology to support LLL noted that the crisis has illuminated issues that are already known to the sector; there is a need to improve internet infrastructure and ensure affordable connectivity; teachers' digital skills and competencies must be developed along with those of students; flexible, distance and online training approaches should be part of mainstream delivery to improve both access and resilience.

Conclusion

In terms of digitalization and technology, as well as in the industrial context, the world is changing and developing every day. Without education, this cannot be accomplished. It is clear that TVET is the best educational system for teaching students how to be adaptable to a world that is constantly changing. It has been discovered that while certain technical colleges in Niger State have adequate human resources, others do not. The physical resources of technical colleges in Niger State are sufficient. The technical colleges in Niger State lack sufficient ICT resources. There are methods for helping technical colleges get the resources and personnel they need.

Recommendations

Based on the above revelations from the findings of this study, the following recommendations are necessary in order to reposition the human and material resources in technical college for adequacy.

1. Ministry of technical education should encourage cooperative education; this will improve the practical knowledge of both the teachers and the students.
2. There should be relationship between industries and private sectors to ensure there is appropriate interface between what is been taught and learnt in the class and the world of work.
3. Government should reduce tax on ICT related equipment so that it will be easily assess by schools.
4. Ministry of education should encourage, sponsor and monitor Up-Skilling and Re-Skilling of technical staff.
5. Non-Governmental Organizations (NGOs), Parent Teacher Association (PTA), and Old Boys Associations (OBAs) should be encouraged to support in supplying relevant resources and sponsor programme in technical colleges.

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