Analysis of the Effect of Inadequate Facilities and Equipment in Universities on Technology and Vocational Education and Training (TVET) in South-South Nigeria

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Abstract: This paper examined critically the effect of inadequate facilities and equipment on the successful delivery of technical and vocational education and training. Four research questions were raised and answered to guide the research study. The sample of 40 students was purposively selected from three universities from two states that made up the six states in the South-South geopolitical zone. The instrument for data collection was a structured questionnaire which was subjected to validation by three (3) experts in TVET from Vocational and Technical Education from University of Benin, Benin City and their corrections were effected in the final draft of the instrument. Using the Spearman Product Moment Correlation Coefficient, the instrument gave a reliability value of r = 0.72, which implied that the instrument was reliable. The research study revealed that inadequate facilities and equipment and machines have negative effects on the creativity skills of its recipients and that the 6 months Students' Industrial Work Experience Scheme (SIWES) to a high extent improve on the employability skills of the students. It was also revealed that inadequate facilities and equipment have negative effect on the interest and performance of the students in the courses and their employability skills are also negatively affected to a high extent. The recommendations made include the fact that all TVET institutions should have suitable and well-equipped workshop and that there should be improved funding of TVET programmes with enriched and enhanced curriculum to impact employability skills in the students.

Keywords: Analysis, Effects, Facilities and Equipment, Technology, Vocational Education and Training (TVET).

Article History

Received: 30/12/2024; Accepted: 14/01/2025; Published: 20/01/2025

ISSN: 3048-717X (Online) | https://takshila.org.in

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Introduction

Technical and Vocational Education and Training is most recently known as has education for work, which focuses on providing learners with skills and knowledge needed to successfully transition to the work place (Arowolo, 2023). The present education system is broad and complex, spanning many grades levels, subject areas, and educational institutions. In the late 20th and early 21st centuries the system has also evolved from being initially focused on entry-level job preparation to include adult retraining programs, college preparatory course work, post-secondary options and programs, and many other options enhancing professional evolvement in work and the need for a skilled, adaptable workforce (Abrassart & Wolter, 2020).

The vocational and technical education system will continue to hold a vital role in any country economy. Technical education, as entrenched in the Nigerian National Policy on Education is concerned with qualitative technological human resources development directed toward a national pool of skilled and self-reliant craftsmen, technicians and technologists in technical and vocational fields (Audu, Kamin & Balash, 2023). The two key phrases, which readily come to mind in this type of education, are competency-based skill acquisition and sound scientific knowledge in order to cope with the requirements of fast developing economy, to gear up employment generation and meet the challenges of globalization, and information and communication technology (ICT) (Ayonmike, 2024). It is evidently clear now that vocational and technical education is a course which needs a high level of practical engagement than theory, and practical can't be done with no or inadequate facilities and machines (Besmat-Digbori, 2020). A growing body of research has found that school facilities can have a profound impact on both teacher and student outcomes (Okoro, Nwosu, & Otty, 2021; Mohsen, & Isa, 2015; Olabiyi, Adigun, & Adenle, 2018; Owoeye, & Yara, 2021, Ozoemena, 2023; Philemon, 2020; Wanjala, Barasa, & Alunga, 2023; Umunadi, 2021). With respect to teachers, school facilities affect teacher recruitment, retention, commitment and effort. With respect to students, school facilities affect health, behavior, engagement, learning and growth in achievement (Dubem & Anyiekere, 2015). Thus, researchers (Blom, Keevy, Green, Mathey, Magnus & Sethusha, 2022;

Eze, Chinedu-Eze & Bello, 2018; Sunday, Job, & Mujidat, 2015; Wanjala, Barasa, & Alunga, 2023) generally concluded that without adequate facilities and resources, it is extremely difficult to serve large number of learners with complex needs. This implies that students have to be taught using available equipment and machineries and by practical hand-on learning (Cantrell & Sudweeks, 2016; Wuni, Henry & Dinye, 2017).

Methods employed by teachers to teach are to a very large extent influenced by the kind of resources and facilities available in the school. The teaching methods, in turn, influence the level of participation and performance of the students. In general, where resources and facilities, teachers, textbooks, materials, tools and equipment, workshops, machines, stores etc. are inadequate, the teaching approach tends to be teacher centered (Blom, Keevy, Green, Mathey, Magnus, & Sethusha, 2022). This type of approach is heavily dominated by teacher as he or she lectures on the subject, gives notes and demonstrates the practical aspects of the lesson. The students remain passive participants expected to listen and observe only. A teaching approach that centers on teacher is bad for technical and vocational education as it kills the interest of the students on the course (Ibrahim, Yeboah, & Boafo, 2018). But where facilities, machines and resources are available, a qualified and motivated vocational and technical education lecturer will deploy methods that centers on the learner. According to Uwaifo (2020) such an approach emphasizes practical activities and has the students experimenting, solving problems, discussing with each other and involved with practical hands-on-activities. This approach stimulates curiosity, imagination and critical thinking. It keeps the lesson exciting and captivating to the students.

Availability of facilities and machines exposes the students to the same conditions and environment same as the work environment the students would be employed but with the inspection of the teacher (Kamarazaly, 2024). In this way, the student are exposed to knowledge and skills expertise in vocational and technical education and its creativity, they would be able to create jobs and be gainfully employed, rather than seek jobs from non-existent white collar jobs and limited industries (Khatete & Chepkoech, 2018). This will empower graduates to become job makers, rather than job seekers, thereby increasing the economic sector of the nation.

Vocational and technical education is an aspect of education designed to prepare students for industry, agriculture, commerce, fine and applied arts and home economics. According to the National Policy on Education (NPE) (FGN, 2014) which came into existent as result of the

national curriculum conference of 1969, vocational technical education is defined as that aspect of education that leads to the acquisition of practical skills as well as basic scientific knowledge. The National Policy on Education also stated vocational and technical education is an integral part of general education and is a mean of preparing people for occupational field and effective participation in the world of work. In this sense it forms a pratical segment of education that involves skill acquisition.

Vocational and technical education according to Okolocha (2020) is an educational training which encompasses knowledge, skills, competencies, structural activities, abilities, capacities and all other structural experiences for securing jobs in various sector of the economy and even enabling one to be self dependent by being a job creator.

Statement of the Problem

In the South-South Nigerian Universities, the growing problem of inadequate facilities, machines, tools and teachers has contributed largely to the worsening state of the country's system of education generally (and TVET in particular), limiting of the individuals level of creativity, individuals lacking acquisition of skills to fit into the work force, also individuals lacking the skills to be self-employed thereby leading to the high rate of unemployment in the country. They lack the necessary occupational skills to be self-employed and effectively function in today's world of work. Vocational and technical education has impacted on socio-political productivity and economic development of most nations. This has made TVET an integral part of national development strategies of such societies. However, despite its contribution to societal and economic development, Nigerian leaders have not given this aspect of education the attention it deserves. This could be one of the reasons for the nation's underdevelopment. Though there are a couple of technical colleges, polytechnics and universities in the country, they are poorly funded with little or no functioning equipment, facilities and machines. The resultant effect of these inadequate facilities and equipment is the basis of the worry of this research study.

Purpose of the Study

The main purpose of this study is to analyze the effects of lack of necessary facilities and equipment in vocational and technical education. Specifically the study seeks to:

1. Find out the extent to which inadequate facilities and machines in vocational and technical education affects creativity in its recipients.
2. Enquire how the 6 months SIWES programme give the students the required experience and skills with machines needed in the world work.
3. Examine the extent to which inadequate facilities and machines in vocational and technical education affects student's interest and performance in the course.
4. Examine the extent to which inadequate facilities and machines affect employable skills gained in vocational and technical education.

Research Questions

The following questions were raised to guide the study

1. To what extent do inadequate facilities and machines in vocational and technical education affects creativity in its recipients?
2. To what extent do the 6 months SIWES give the students the required experience and skills needed in the world of work?
3. To what extent do inadequate facilities and machines in vocational and technical education affects student's interest and performance in the course?
4. To what extent do inadequate facilities and machines affect employable skills gained in vocational and technical education?

Theoretical Framework

Prosser cited in Odu (2017) outlined the sixteen theories of vocational and technical education as follows: environmental habit theory, process habit theory, specific habit theory, specific attitudes and interest theory, repetitive training theory, experience instructor theory, minimum employment standard theory, training to market requirement theory, job training theory, origin of context theory specific occupation content theory, the service theory, group characteristics theory, elastic administration theory and uncompromising cost theory. The following are the postulates of the theory.

- Environmental habit theory states that vocational education will be efficient in proportion as the environment in which the learner is trained is a replica of the environment in which he must work.

- Process habit theory states that effective vocational training can only be given were the training jobs are carried in the same way with the same operations, the same tools and the same machines as in the occupation itself.
- Thinking habit theory states that the learner must be trained in habits of thought, which are similar to those habits possessed by people who engaged on the operation.
- Specific habits theory states that vocational education will be effective in proportion as it trains the individual directly and specifically in the thinking habits and manipulative habits required in the occupation itself.
- Specific attitude and interest theory states that vocational and technical education will be effective in proportion as it enables each individual to capitalize his interest, aptitudes and intrinsic intelligence to the highest possible degree.
- Repetitive training theory states that vocational education will be effective in proportion as the specific training experiences for forming right habits of doing and thinking are repeated to the point these habits become fixed to the degree necessary for gainful employment.
- Experience instructor theory states that vocational education will be effective in proportion as the instructor has had successful experience in the application skills and knowledge to the operations and processes he undertakes to teach.
- Minimum employment standard theory states that for every occupation, there is a minimum of productivity which an individual must possess in order to secure or retain employment in that occupation. If vocational and technical education is not carried to that point with that individual, it is neither personally nor socially effective.
- Training to market theory states that vocational education must recognize conditions as they are and must train individuals to meet the demands of the market.
- Job training theory stipulates that effective establishment of process habits in any learner will be secured in proportion as the training is given on actual jobs and not on the exercises or pseudo jobs.
- Origin content theory states that the only reliable source of content for specific training in an occupation is in the experience of masters of that occupation.

- Specific occupational content theory stipulates that for every occupation there is a body of content which is peculiar to that occupation and to which has no functional in any other occupation.
- Service theory stipulates that vocational and technical education will render efficient social service in proportion as it meets the specific training needs of any group at the time they need it and in such a way that they can most effectively profit the instruction.

Any attempt to disregard one of these basic fundamental concepts, can only result in undermining and destroying the program of vocational and technical education for the citizens of the community.

Methodology

The research design in this study is the survey research design. The survey helps to collect data from the defined population to describe the present conditions of the population. This is usually done with the aid of variables identified in the study. According to Nworgu (2006), the survey research design is one in which a group of people or items is studied by collecting and analyzing data from only a few people or items considered to be a representative of the entire group using the questionnaire.

The population of the study consist of all the students in South-South Universities in TVET related areas which gave out infinite population. The researcher used the purposive sampling technique to select 40 students from three Federal and State Universities from two States out of the Six states that made up the South-South geopolitical zone of Nigeria. The instrument employed is the structured questionnaire. This was divided into two sections. Section A was concerned with demographic variables such as sex, level, while section B was made up of fifteen structured questions based on the research questions earlier stated to elicit information from the respondents. All the points are raised on the four point response scale as follows: Very High Extent (4), High Extent (3), Low Extent (2), Very Low Extent (1), 4+3+2+1= 10, 10/4 = 2.5

The instrument, which is the structured questionnaire, was validated by three specialists in the Department of Vocational and Technical Education, University of Benin for face and content validity. Their corrections were effected into the final draft of the instrument. The reliability of the instrument was carried out using the split-half reliability technique. Twenty (20) respondents who are part of the population but not part of the sample was split into two halves and

administered with the instrument. The data collected were analyzed using the spearman product moment correlation coefficient. The score obtained r = 0.72 indicating that the instrument is reliable. The researcher personally administered and retrieved questionnaires from respondents. The data collected from the respondents was analyzed using mean and standard deviation SD. Any calculated mean equal to or greater than 2.5 was regarded as High Extent, while any calculated mean less than 2.5 was regarded as Low Extent.

Result

Demographic Analysis

Table 1: Distribution of Respondents Based on Sex

Sex	Frequency	Percentage (%)
Males	23	57.5
Females	17	42.5
Total	**40**	**100**

The table reveals that 57.5% of the respondents were male while 42.5% of the respondents were females. This implies that there are more male respondents than female respondents that took part in the study.

Table 2: Distribution of Respondents According to the University

University	Frequency	Percentage (%)
University of Benin	15	37.5
Ambrose Alli University, Ekpoma	10	25.0
Delta State University, Abraka	15	37.5
Total	**40**	**100**

The table reveals that 37.5% of the respondents are from the University of Benin and Delta State University and 25.0% of the respondents are from Ambrose Alli University, Ekpoma. This implies that there are more respondents from University of Benin and Delta State University, Abraka than from Ambrose Alli University, Ekpoma in the study.

Research Question 1: To what extent do inadequate facilities and machines in vocational and technical education affects creativity in its recipients?

Table 3: Mean and Standard Deviation of Responses on the Extent to which Inadequate Facilities and Machines in Vocational and Technical Education Affects Creativity in its Recipients

S/N	Item Statement	N	VHE	HE	LE	VLE	Mean	Std dev	Remark
1.	Adequate facilities and machines in the workshop has increased my level of creativity	40	18	9	5	8	2.93	1.16	Agreed
2.	Adequate facilities and machines in school workshop has increased my creative thinking	40	20	6	8	3	2.93	1.28	Agreed
3.	Use of adequate facilities and machines in the workshop brings new idea to mind	40	14	12	8	6	2.7	1.40	Agreed
4.	The use of machines and equipment in my course of study have increased my creative skill	40	19	7	9	5	3.0	1.10	Agreed

Average Mean = 2.89

Results presented in table 3 show that the mean responses range from 2.7 to 3.0 with standard deviation ranging from 1.10 to 1.40 Respondents agreed to item 1 statement "Adequate facilities and machines in the workshop has increased my level of creativity" with a mean value of 2.93. In item 2, respondents agreed with the statement "Adequate facilities and machines in school workshop has increased my creative thinking" with a mean value of 2.93. In item 3, respondents agreed with the statement "Use of adequate facilities and machines in the workshop brings new idea to mind" with a mean value of 2.7. Item 4 agreed that the use of machines and equipment in my course of study have increased my creative skill with a mean of 3.0. Therefore, with an average mean of 2.89 which is above the agreed mean of 2.5, there exist a high extent to which inadequate facilities and machines in vocational and technical education affects creativity in its recipients.

Research Question 2: To what extent do the six months SIWES done give the students the required experience and skills needed in the world of work?

Table 4: Mean and Standard Deviation of the Responses on the Extent to which the six months SIWES Training Give the Students the Required Experience and Skills Needed in the World of Work.

S/N	Item Statement	N	VHE	HE	LE	VLE	Mean	Std dev	Remark
5.	During SIWES training I was exposed to various machines that relates to my course of study	40	24	6	7	3	3.28	0.98	Agreed
6.	Due to SIWES training I'm able to operate machines related to my course of study	40	12	4	8	16	2.3	1.27	Disagreed
7.	SIWES training improved the production skills in me needed in the world of work	40	11	21	7	1	3.05	0.74	Agreed
Average Mean = 2.88									

Results presented in table 4 shows that the mean of responses range from 2.3 to 3.28 with standard deviation ranging from 0.74 to 1.27. Respondents agreed to the statement of item 5 "During SIWES training I was exposed to various machines that relates to my course of study" with a mean of 3.28. Respondents disagreed to the statement of item 6 "Due to SIWES training I'm able to operate machines related to my course of study" with a mean of 2.3. Respondents agreed to item 7 statement "SIWES training improved the production skills in me needed in the world of work" with a mean value of 3.05. The average mean is 2.88 which is above the average mean of 2.5, therefore there exist a high extent to which the six months SIWES done give the students the required experience and skills needed in the world of work.

Research Question 3: To what extent do inadequate facilities and machines in TVET affects student's interest and performance in the course?

Table 5: Mean and Standard Deviation on the Extent to which Inadequate Facilities and Machines in Vocational and Technical Education Affects student's interest and performance in the course.

S/N	Item Statement	N	VHE	HE	LE	VLE	Mean	Std dev	Remark
8.	Adequate facilities and machines in school workshop has increased my interest in my course of study	40	13	19	7	1	3.1	0.77	Agreed
9.	Adequate facilities and machines in vocational and technical education increased my zeal to learn more in my course of study	40	10	17	11	2	2.88	0.82	Agreed
10.	Use of adequate facilities and machines makes me understand my course of study better	40	21	18	1	0	3.5	0.55	Agreed
Average Mean = 3.16									

Results presented in table 5 show that the mean values ranges from 3.1 to 3.5 and standard deviation range from 0.55 to 0.82. The respondents agreed to the statements made in item 8 "Adequate facilities and machines in school workshop has increased my interest in my course of study" with a mean value of 3.1. Item 9 agreed to the item statement "Adequate facilities and machines in vocational and technical education increased my zeal to learn more in my course of study" with a mean of 2.88. Respondents agreed to item 10 statement "Use of adequate facilities and machines makes me understand my course of study better" with a mean of 3.5. An average mean of 3.16 which is which is above the agreed mean of 2.5 was derived. Therefore there exist a high extent to which inadequate facilities and machines in vocational and technical education affects student's interest and performance in the course.

Research Question 4: To what extent do inadequate facilities and machines affect employable skills gained in vocational and technical education?

Table 6: Mean and Standard Deviation on the Extent to which Inadequate Facilities and Machines affect Employable Skills gained in vocational and technical education

S/N	Item Statement	N	VHE	HE	LE	VLE	Mean	Std Dev	Remark
11.	Adequate facilities and machines in school workshop provide me with necessary skills and competencies	40	19	12	7	2	3.2	0.9	Agreed
12.	The use of adequate machines and facilities provide me with necessary skills for employment	40	22	9	9	0	3.33	0.8	Agreed
13.	The constant use of adequate facilities and machines improve my efficiency in work	40	28	12	0	0	3.7	0.46	Agreed
14.	Use of adequate facilities and machines in vocational and technical education leads to self-employment	40	21	18	1	0	3.5	0.55	Agreed
15.	I have acquired practical skills with machines and facilities in my course area enough to earn a living	40	8	11	17	4	2.58	0.9	Agreed
Average Mean = 3.26									

Results presented in table 6 show that the mean values range from 2.58 to 3.7 and standard deviation range from 0.46 to 0.9. The respondents agreed to the statement made in item 11 "Adequate facilities and machines in school workshop provide me with necessary skills and competencies" with a mean value of 3.2. Item 12 agreed to the statement "The use of adequate machines and facilities provide me with necessary skills for employment" with a mean of 3.33. Respondents agreed to item 13 statement "The constant use of adequate facilities and machines improve my efficiency in work" with a mean of 3.7. Respondents agreed to item 14 statement "Use of adequate facilities and machines in vocational and technical education leads to self-employment" with a mean value of 3.5. Respondents agreed with item 15 statement "I have acquired practical skills with machines and facilities in my course area enough to earn a living" with a mean of 2.58. An average mean of 3.26 which is above the agreed mean of 2.5 was derived. Therefore there is a high extent to which inadequate facilities and machines in

vocational and technical education affect employable skills gained in vocational and technical education.

Discussion of Findings

Based on the findings of the study presented in table 3: the findings revealed that inadequate facilities and machines in vocational and technical education have a negative effect on the level of creativity in its recipients as most of recipients agreed to a very high extent that adequate facilities machines has increased their level of creativity, increased their creative thinking, brings about new idea to mind and has increased their creative skill. The findings agree with Umunadi (2021) and the Federal Republic of Nigeria (FRN) (2014) when they stated that creativity with regular innovation in understanding all the forces at work within the environment would bring in an improvement of saleable skills in technical and vocational students.

The findings presented in table 4 revealed that the six months SIWES training done in the course of study actually build and improve in the students the required experience and skills needed in the world of work as 60% of the respondents agree to a very high extent that during their SIWES training, they were exposed to various machines that relates to their course of study, while 52.5% of the respondents agreed to a high extent that the SIWES training done improved the various production skills needed in them in the world of work but 40% of the respondents disagreed to a very low extent that due to SIWES training, they are able to operate machines related to their course of study, as this shows that most companies and institutions accepting students for Industrial Training, don't actually allow the students operate the machine but just to observe and take down notes on how it is operated and the process. This is in line with the objectives of SIWES in Industrial Training Fund (1973) provide students with an avenue for students in institutions of higher learning to acquire industrial skills and experience during their course of study, prepare students for industrial work situation that they are likely to meet after graduation, expose students to work methods and techniques in handling equipment and machinery that may not be available in their institutions, make the transition from school to the world of work carrier and enhances students contacts for later job placements, provide students with the opportunities to apply their educational knowledge in real work situations, thereby bridging the gap theory and practical.

The findings presented in table 5 disclosed that inadequate facilities and machines in vocational and technical education reduce student's interest and negatively affect their performance in the course. The use of machines, facilities and equipment, engaging in more practical classes than theoretical classes increases the interest of the students and their zeal to learn more in their various course area, it also facilitate easy comprehension and interpretation of what is been taught and done in class. This is in line with Owoeye and Yara (2021) who posited that poor performance of vocational and technical graduates is as a result of insufficient tools, equipment, materials and teachers.

The findings presented in table 6 proves that inadequate facilities, equipment and machines in Vocational and Technical Education retards the expected skills gained in Vocational and Technical Education needed for employment. Use of adequate facilities and machines in school workshop make students competent, provide them the necessary skills and efficiency needed in the world of work which give assurance of being employed or after graduation. The findings also revealed that vocational and technical education taught in schools with aid of adequate facilities and machines in the school workshop lead to self-employment. This is in line with Dubem and Anyiekere (2015) who opined that vocational and technical programme provide practical skills for occupational purposes that are capable of refining the society improving the standard of living and ensuring economic growth. This findings also agree with Kamarazaly (2024) on the impact of inadequate educational facilities that, the training of the students becomes impeded and they end up not acquiring the skills to go into the labour market.

Conclusion

Based on the findings of the data analyzed from the study, it was concluded that to a high extent inadequate facilities and machines in TVET affects creativity in the recipients, to a high extent the six months SIWES training give the students the required experience and skills needed in the world of work, to a high extent inadequate facilities and machines in vocational and technical education affects student's interest and performance in the course, to a high extent inadequate facilities and machines affect employable skills gained in vocational and technical education, adequate facilities and machines in school workshops increases creative thinking in students, use of adequate facilities and machines in the school workshop brings about new idea to mind, adequate facilities and machines enable students to understand their respective course of study

better and they are able to improvise when the need arises, being taught with adequate facilities and machines in the school workshop provide the students with the necessary skills and competencies needed in the world of work, adequate facilities and machines provide students with the necessary skills to gain employment and also be self-employed if they choose to, constant use of adequate facilities and machines improve students efficiency in work.

Recommendations

Based on the findings of the study, the following recommendations are made:

1. All TVET institutions should have suitable workshops with adequate machines and facilities and equipment.
2. TVET programmes require massive funding. Government should make efforts in the budgetary allocation made to vocational and technical education to aid the procurement and maintenance of modern workshop facilities, equipment and machines in their right number for skill acquisition and for training
3. The curriculum in the Nigerian educational system should be geared toward vocational and technical in order to eradicate unemployment among youths.
4. The teaching of vocational and technical education should be more practical oriented. In schools, practical should be assigned more marks than theory.
5. Students Industrial Work Experience Scheme (SIWES) should be revitalized and well sponsored.
6. There should be attractive remuneration, positive reward systems and general welfare services for educators and intellectual trainers in the field of vocational and technical education, as a way of motivating them to impart better level of skills and knowledge needed by students to be successful in the world of work.
7. Available facilities and machines in the school workshop should be properly used and maintained in order to increase it service life.
8. Public lectures should be done on vocational and technical programmes to encourage public and private individuals in aiding the programmes with funds and scholarships to vocational and technical education students. Government should avail further funds to TVET programmes by engaging in private-public partnerships.

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