IMPROVING METHODS AND AVAILABILITY OF FACILITIES FOR TEACHING AND LEARNING OF METALWORK TECHNOLOGY IN OYO STATE OWN COLLEGES OF EDUCATION

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Abstract

The advancement in technology has brought about innovation in teaching methods used in metalwork technology most especially in the way practical are being conducted in metal workshop. The study examined students' insight on improving methods and availability of facilities used in teaching and learning of metalwork technology in Oyo State own Colleges of Education. Population of the study consist of twenty (22) NCE Technical Education students of Oyo State own Colleges of Education, Lanlate and thirty five (35) NCE Technical Education students of Emmanuel Alayande College of Education, Oyo. No sampling was taking considering the small students population. Self-structured instrument was designed to elicit information from the respondents. Test-re-test method was used to determine the reliability co-efficient of the instrument of the result were correlated using Pearson Product Moment Co-efficient to determine the reliability co-efficient which yielded a value of 0.85. The findings revealed that improving methods such as use of digital gadgets like laptops, computers, projectors, digital presentation, whiteboard, microphones should be emphasized on than the traditional method. Finding further showed that the availability of facilities such as lecture rooms, workshops, basic hand tools, machine tools, holding devices, consumables are inevitable if teaching and learning of metalwork technology is to be enhanced. Based on the findings, recommendations were made such as: more emphasis should be given to improving methods of teaching and learning metal work technology; government should make funds available for the provision of facilities. Teachers and students should undergone training on how to use digital equipment like computers, laptops, internets.

Keywords: Improving methods, Facilities, Metalwork Technology, Teaching and Learning.

Introduction

The prosperity of a nation is measured by its natural endowment and its quality, the availability of human resources and their ability to make use of materials for improving living standards of its citizens (Ajibuwa, 2014). In Nigerian education system, there have been clamoring for improve teaching and learning by teachers on the side of the students and with a request from the government the provision of facilities for teaching and learning of Technical Education of which metalwork technology is of major focus. "The philosophy of technical education, NCE (Technical) is to provide technical teachers with the intellectual and professional

background adequate for teaching technical subjects and to make them adaptable to any changing situation in technological development". Colleges of education in Nigeria play major roles in human capacity development. This statement is in support of the claim that colleges of education gives more regards to the cognitive, psychomotor and affective domain development and it is a major requirement for progress in life (Danjuma & Umaru, 2019). Not only that, with inclusion of technical education, such institutions train and produce technicians for industries because apart from theoretical knowledge they also embark on practical knowledge and this help them toward realizing the goal of being self-employed and an entrepreneur of labour. Though in technical education, students acquire practical skills in the following areas: Automobile building, Electrical/electronics, Metalwork and Woodwork.

Metalwork technology is one of areas of specialization in colleges of education in Nigeria. Metalwork technology is defined as the acts of making object out of metal in an artistic and skilful means (Hornby, 2011). It is established by Ajibuwa (2014) that metals play vital role in all human endeavours. He stated that metal pots are used to cook food, we use metal plate to eat, food are being stirred with metal spoons, forks, knifes, cutlass for cutting and in our homes are one metal product or another.

Metalwork personnel as observed by Eze (2011) involved in the following operations: selection of appropriate metals to be used; manipulation of complex tools and equipment; adherence to safety rules and regulation guiding the operation of machines. He stated further that all these could only be made possible through the help of dedicated metalwork technology teacher that will transform and harness materials into suitable products. Metalwork technology teachers are teachers saddled with the responsibility of using improve teaching methods to promote teaching and learning of metalwork technology to students. It was reported that metalwork technology teachers teach students with the use of instructional aides to impart necessary skill to students in various subjects or courses (Akpan, 2014). He explained further that the teachers also carried out periodical check on machines, equipment, tools and other facilities to ascertain their functionality. Quality teachers exhibit desirable traits, uphold the standard and norms of the teaching professions (Kerene, 2018). Teachers are vital and valuable tools in education industry. They help in policy formulation and its implementation (Beako & Wichendu, 2017). Teachers facilitate teaching and learning with sound knowledge of the subject matter. They also employ various methods, strategies, principles and make use of resources for teaching and learning. Teachers seek to understand and interpret all learning programmes and materials, identifies basic requirement for specific content of teaching and learning and prepare suitable and adequate instructional materials for teaching (Ibeako, Okagwu & Hillary, 2019). As teachers, we have to constantly innovate to adapt our style to the ever-changing needs of new students. New teaching techniques are always emerging, so,

whether one has been a teacher for so many years or for few months, one should always be looking for ways to improve one's teaching quality. Students need to learn a wide range of abilities; therefore, it is extremely important that teachers have a wide range of strategies to ensure that all students are able to achieve their best possible results (teacheracademy.eu, 2021)

A sound education system is the prerequisite for the development of any nation. This is a well- known fact that our education system still relies on traditional methods and there is a need to combine the traditional method of teaching with the modern teaching methods for a better and advance education system (gcwgandhinagar.com). Teaching method according to Amadi & Akpomi (2016) is defined as the strategies and principles used for passing instruction to be carried by teachers in order to achieve desire learning in students. They stated further that the principles depend on the subject matter of the course to be taught and the knowledge of the students. In the case of teaching and learning of metalwork, teachers and students must embrace modern teaching techniques and must have access to equipment, tools, materials and digital facilities such as computers, laptops, Wi-Fi connection, LCD projector, whiteboards, websites, microphones in the lecture rooms and workshops. Traditional teaching methods consist of the following: Demonstration method, Workshop method, Lecture method, Discovery method, Field trip method, Discussion method. However, these methods are summarized as follows:

- Demonstration method involves emphasizing on the subject matter of the course to students. It helps to raise students' curiosity and retention (Leni, 2013, Akpomi, 2013). Field trips/Visitation/Excursion provides unique opportunities for learning outside the four walls of classroom. Tal and Morag (2009) described field trips as students experiences outside of the classroom at interactive locations designed for educational purposes. They highlighted that field trips may be planned for the following purposes
- Provide firsthand experience; simulate interest and motivation, add relevance to learning and interrelationships; strengthen observation and perception skills; promote personal development. Excursion means a journey, trip, tour planned for students in which students visit places or site and has firsthand experience. It provides ample opportunities to students for seeing, hearing, examining, gathering data and asking questions. Lecture method used pedagogical method within educational institutions at all levels. It makes use of various types of teaching- learning's materials and instructional strategies. The instructors are making use of modern, scientific, technical and pioneering method of teaching. Also, there are usages of technologies as well (Radhika, 2020).

On the other hand, discovery learning is the method that takes place when a teacher set up an experiment, acts as a coach, and provides students clues along the way to help students come to solutions. In this way, teachers provide students with certain tools for learning a concept, and the students make

sense of the tools (Krisnawati, 2015). In discussion method, the instructor leads or guides the learners in expressing their opinions and ideas with a view to identifying and solving problems collectively. Summers (2007) described it as an exposition that the image of teaching involves exchange of ideas between the instructor and learners through questions and probes, answers and reactions, and praise and criticism. In his own view, Zvavanhu (2010) said that class discussion could motivate learners while also helping them retain knowledge and develop effective problem-solving abilities. During discussion session, learner participates in the learning process by contributing problems, placing the solution(s) into action and evaluating results.

In workshop methods, Ndubisi (2016) explained that availability of equipment, tools, and machines and with constant practice on the part of students in the workshop will improve teaching and learning of metalwork technology. He stated further that the availability of facilities in the workshop contributes significantly to improve educational performance of students. Always starting is not easy but shifting from traditional to modern technology approaches has been privileged to teachers and students. The choice of effective, adequate, relevant, and improve methods by qualified metalwork technology instructor cannot be over emphasized. Putting into consideration the topic to be taught and the students' level and ability should be the starting point and a foundation for attaining effective transaction and communication between instructor and students in metalwork technology lecture room. This is because the success or failure of metalwork lecture depends on the choice and utilization of effective instructional methods. The major problem confronting metalwork technology in Nigeria, especially colleges of education own by Oyo State is the inability of the lecturers to compliment the traditional methods of teaching with the modern method of teaching and non-availability of facilities. It has been observed that students' performance in metalwork technology in Technical education programme of State own Colleges of Education has declined over the years. This could be attributed to the lecturers' and instructors' use of only the traditional methods of teaching which hinders students' comprehension of facts, concepts and details about metalwork technology. It is against this background that this study sought to investigate improving methods and availability of facilities for teaching and learning of metalwork technology in Oyo state own colleges of education.

Research Questions

- The following research questions were asked to guide the study:
- What the perceptions of students are on improved methods used in teaching and learning of metalwork technology?
- How available are facilities for teaching and learning of metalwork technology?

Hypothesis

There is no significant difference in the mean response of NCE students of Department of Technical Education of Oyo State College of Education, Lanlate (OYSCOED) and NCE students of Department of Technical Education of Alayande College of Education, Oyo

(EACOED) on the perception of students on improve methods used in teaching and learning of metalwork technology.

There is no significant difference in the mean response of NCE students of Department of Technical Education (OYSCOED) and NCE students of Department of Technical Education (EACOED) on the availability of facilities for teaching and learning of metalwork technology.

Methodology

The study used descriptive survey research design. The population of the study is fifty seven (57). It comprised twenty two (22) NCE students Department of Technical Education of Oyo State College of Education, Lanlate and thirty five (35) NCE students of Department of Technical Education of Emmanuel Alayande College of Education, Oyo, all colleges from Oyo state own college of education and consist of students offering metalwork courses. No sampling was taken due to small size of the population. The instrument was constructed in form of questionnaire and rated on four-point Likert rating scale of Strongly Agreed (SA=4), Agreed (A=3), Disagreed (D=2) and Strongly Disagreed (SD=1) and was used to collect necessary data for the study. Copies of the instrument were given to three experts (two in Department of Technical Education of Emmanuel Alayande College of Education, Oyo and one in Department of Technical Education of Oyo State College of Education, Lanlate) for face validity. The instruments were vetted by the experts in term of relevance, appropriateness and language used. Relevant observations made were incorporated into the work. Test-retest method was used to determine the reliability of the instrument. The instrument was administered, retrieved and analyzed. Pearson Product Moment Correlation (PPMC) was used to determine the reliability coefficient of the entire instrument which is equal to 0.85; and it shows that the instrument was reliable. The research questions were analyzed using mean and standard deviation while the hypotheses were analyzed using z-test. In deciding the agreement level for the research questions, a criterion mean of 2.50 and above were considered agreed while items whose mean falls below 2.50 were considered not agreed. For testing the hypothesis, the value of the calculated z–test was compared with z-critical (z-table value) and null hypothesis was accepted where the value of t-calculated was less than z-critical, otherwise the null hypothesis was rejected. Table value of z was 1.96 at $P< 0.005$

Results

Table 1: Mean and Standard Deviation on perception of students on improve methods used in teaching and learning of metalwork technology

S/N	Perception of students on improved methods used in teaching and learning of metal work technology	NCE (OYSCOED) Students			NCE (EACOED) Students		
		M1	SD1	Remark	M2	SD2	Remark
1	Demonstration method helps to raise student curiosity retention	3.18	0.78	Agreed	3.29	0.75	Agreed
2	Field trip stimulates interest and motivation	2.72	0.83	Agreed	3.09	0.74	Agreed
3	Lecture method uses various types of teaching-learning materials and instruction	2.87	0.80	Agreed	3.12	0.72	Agreed
4	Discovery method provides students with certain tools for learning	3.10	0.68	Agreed	3.03	0.70	Agreed
5	Discussion method helps students to develop effective problem solving abilities	2.82	0.64	Agreed	3.14	0.67	Agreed
6	Workshop method enhances students when equipment, tools and machines are available for practice	2.91	0.76	Agreed	3.17	0.65	Agreed
7	Use of computers or laptops with Wi-Fi connection improve teaching and learning	3.32	0.58	Agreed	3.43	0.62	Agreed
8	Use of LCD projector enhances teaching and learning	3.27	0.54	Agreed	3.34	0.60	Agreed
9	Use of special websites or blogs for teaching encourage innovation on the part of students	3.15	0.57	Agreed	3.20	0.59	Agreed
10	Use of interactive board and microphones for lectures encourages audible learning	3.23	0.61	Agreed	3.26	0.63	Agreed
	Grand Mean/Standard Deviation	**3.06**	**0.76**		**3.21**	**0.67**	

Key: M1= Mean Response of NCE (OYSCOED) Technical Students
M2= Mean Response of NCE (EACOED) Technical Students
SD1= Standard Deviation of OYSCOED Technical Students
SD2= Standard Deviation of EACOED Technical Students

Table 1 shows that the mean values ranging from 2.72 to 3.43 which are all above the cut-off point of 2.50. This indicates that all the 10 items are agreed on perception of students on improve methods used in teaching and learning of metalwork technology in Oyo state own colleges of education. The table also shows that the standard deviation ranges from 0.54 to 0.83, and indicates that the means values are not far from each other.

Table 2: Mean and Standard Deviation on the availability of facilities for teaching and learning of metalwork technology

S/N	Availability of faculties for teaching and learning of metalwork technology	NCE (OYSCOED) Students			NCE (EACOED) Students		
		M1	SD1	Remark	M2	SD2	Remark
1	Adequate building blocks for lecture rooms, workshop, drawing room and laboratory	2.63	0.81	Agreed	3.25	0.88	Agreed
2	Availability of basic hand tools such as measuring, striking, cutting and marking-out tools	2.72	0.75	Agreed	3.30	0.86	Agreed
3	Adequate machine tools such as lathe, drilling, boring, milling and power saw tools	2.57	0.84	Agreed	3.15	0.90	Agreed
4	Adequate work holding devices such as bench vice, machine, G and C clamps, step bricks	2.80	0.71	Agreed	3.10	0.93	Agreed
5	Availability of consumables such as sheet metal, welding material e.g. electrodes, iron bars	2.60	0.82	Agreed	3.00	0.90	Agreed
6	Availability of workshop benches and tools	2.85	0.73	Agreed	3.58	0.83	Agreed
7	Adequate workshop safety equipment such as goggles, fire extinguishers, boots, earmuff, respirators, helmets and overall	2.70	0.76	Agreed	3.60	0.82	Agreed
8	Adequate finishing tools and materials such as grinding tools, emery clothes, paint, polish	2.65	0.79	Agreed	3.35	0.85	Agreed
9	Adequate work holding devices such as chucks, jaws, mandrel, face plates and attachments.	2.55	0.85	Agreed	3.05	0.95	Agreed
10	Adequate tool holding devices such as tool post	2.68	0.78	Agreed	3.02	0.98	Agreed
	Grand Mean/Standard Deviation	**2.68**	**0.78**		**3.24**	**0.97**	

The data presented in table 2 shows that all the ten (10) items on the availability of facilities for teaching and learning of metalwork technology for the two colleges of education own by Oyo State have mean values ranging from 2.55 to 3.60. This shows that the mean value of each item is above the cut-off point of 2.50. This indicates that all the respondents agreed that facilities are available for teaching and learning of metalwork technology. The table also shows that the standard deviations of the items are within the range of 0.71 to 0.98, this indicated that the mean values of the respondents were not far from one another.

Test of Hypothesis

Table 3: Z-test Analysis on Perception of students on Improve Methods used in Teaching and Learning Metalwork Technology

Respondents	Mean	No	SD	Df	α	Z-cal	Z-cri	Remarks
TE (NCE) students (OYSCOED)	3.06	22	0.76	55	0.05	2.112	+1.96	Rejected
TE (NCE) students (EACOED)	3.21	35	0.67					

Table 3 shows that the Z-cal calculated is 2.112 at 0.05 level of significance and 55 degree of freedom while the Z-critical is 1.96. Based on this result, the Z-calculated is greater than Z- critical. Hence, the finding indicates that there is a significant difference in the responses between TE (NCE) students (OYSCOED) and TE (NCE) students (EACOED) on the perception of students on improve methods used in teaching and learning of metalwork technology

Table 4: Z-test Analysis on responses of Students on the availability of Facilities for Teaching and Learning of Metalwork Technology

Respondents	Mean	No	SD	Df	α	Z-cal	Z-cri	Remark
TE (NCE) students (OYSCOED)	2.68	22	0.78	55	0.05	2.228	+1.96	Rejected
TE (NCE) students (EACOED)	3.24	35	0.97					

Table 4 reveals that the Z-cal calculated is 2.228 at 0.05 level of significance and 55 degree of freedom while the Z-critical is 1.96. Based on this result, the Z-calculated is greater than Z- critical. Hence, the finding indicates that there is a significant difference in the responses between TE (NCE) students (OYSCOED and TE (NCE) students (EACOED) on the availability of facilities for teaching and learning of Metalwork Technology.

Discussion of Findings

The findings of this study revealed that the items listed in the tables are improve methods and availability of facilities for teaching and learning of metalwork technology in Oyo State own Colleges of Education. The finding revealed in table 3 that the use of improve methods i.e. traditional and new methods such as demonstration, lecture, discovery, workshop, use of computer, laptops, LCD projector, interactive whiteboard, microphones, methods enhance teaching and learning of metalwork technology. The finding agreed with the opinion of Amadi & Akpomi (2016), who stated that teachers and students must embrace modern teaching techniques and must have access to equipment, tools, materials, digital facilities such as computers, laptops, WI-FI connection, LCD projector, whiteboards, website, microphones in the lecture rooms and workshops. The finding also agreed with Ibeako, Okagwu & Hillary (2019) who emphasize that teachers facilitate teaching and learning with sound knowledge of the subject matter. They also employ various methods, strategies, principles and make use of resources for teaching and learning. The result of the study indicates that there is a significant difference in the mean responses between TE (NCE) students (OYSCOED) and TE (NCE) students (EACOED) on the perception of students on improve method used in teaching and learning of metalwork technology in Oyo State Own Colleges of Education. This shows that the rate at which each institution embraces the improve methods of teaching and learning varies.

The finding further revealed 10 ways by which facilities may be classified for teaching and learning of metalwork technology in Oyo State Own Colleges of Education. These include: building blocks for lecture, workshop, basic hand tools, machine tools, holding devices, consumables, safety equipment, finishing tools, work and tool holding devices. This finding agreed with the opinion of Ndubisi (2016) who explained that availability of equipment, tools, and machines and with constant practice on the part of students in the workshop will improve teaching and learning of metalwork technology. He stated further that the availability of facilities in the workshop contributes significantly to improve educational performance of students. The finding further revealed that there is a significant difference in the mean responses between TE (NCE) students (OYSCOED) and TE (NCE) students (EACOED) on the availability of facilities for teaching and learning of metalwork technology in Oyo State Own Colleges of Education. This shows that availability of facilities for teaching and learning of metalwork technology varies from one institution to another.

Conclusion

The study examined improves methods and availability of facilities for teaching and

learning of metalwork technology. The finding revealed that the respondents agreed that traditional methods, such as Demonstration, Discovery, Lecture, Field trip, Discussion, workshop methods and improve methods such as use of computers, laptops, internet, digital presentation, LCD projector, whiteboards, website, microphones were teaching and learning methods utilized in metalwork technology. It also established that more emphasis should be placed on improve methods for effective teaching and learning. The study also revealed that availability of facilities such as Lecture rooms, workshops, basic hand tools, machine tools, holding tools, consumables, for teaching and learning of metalwork technology are pre-requisite to good teaching delivery and student's success story.

Recommendations

The following recommendations were made:

More emphasis should be placed on improve methods of teaching and learning identified in this study by metalwork technology teachers.

Oyo State government should make funds available for the provision of facilities needed for teaching and learning of metalwork technology.

Teachers and students should undergone training on how to use digital equipment such as computers, laptops, projectors, internets.

Metalwork technology students should participate actively in students industrial work experience scheme (SIWES).

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