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IMPACT OF MACHINE TOOLS UTILIZATION ON STUDENTS' SKILL ACQUISITION IN METALWORK TECHNOLOGY DEPARTMENT, KANO STATE TECHNICAL COLLEGES

ADAMU YUSUF SAWABA

Abstract: The study focused on the impact of machine tools utilization on students' skill acquisition in metalwork technology department, Kano state technical colleges.The study adopted a descriptive survey design that used a 10 item structured questionnaire for data collection. However, the population of the study was 260 respondents and random sampling was used as sampling technique. The z- test statistic using theSPSS package was used to analyze the data by testing the two hypotheses of this study at 0.05 level of significance. The study found there are low or rather small quantities of machine tools in Metalwork technology in Kano State technical colleges. The impact of machine tools utilization on students' skill acquisition in Kano state technical colleges is moderate in all major technical skills areas identified and the teachers' background in those technical skills areas are either obsolete or defective. Based on these findings, the researcher recommended that teachers and students should be encouraged by providing the needed resources, condition and enabling environment by the authorities for them to be equipped with needed technical skills for effective utilization of difference types of machine tools.

INTRODUCTION

Background of the Study

Metalwork technology is one of the trade subjects offered in Nigerian technical colleges, leading to the production of metalwork technicians. Among the objectives of teaching the trade subject in technical colleges as contained in the Nigerian National Policy on Education (NPE, 2004), are;

(i) Providing the technical knowledge and practical skill necessary for industrial, commercial, agricultural and economic development.
(ii) To prepare students for further studies in the area of industrial education and other related disciplines at higher levels among others.

The National policy on education (NPE, 2004), also defines technical education as that aspect of education that leads to the acquisition of practical and applied skills as well as basic scientific knowledge. Aganga, (2011).stated that "development of technical skills is the key to the realization of transformation agenda of the federal government as well as the actualization of a long term project of becoming one of the 20 most industrialize nations of the world by the year 2020.

This kind of skills can be obtain in workshop where machine tools are kept for practical, therefore there is need for proper utilization towards these machine tools or else students may not be able to have this practical skills needed.Machine tools utilization is the proportion of time that machine tool is available for use for intended purpose. Students' skill acquisition is termed as dependent variables because it depends upon the extent of machine tools are utilized.

According to Olaitan (2007), skill is the ability to do real things, and do it expertly too. Training in skills involves large percentage of time to be spent in practical. To realize this goal, it is obvious that sufficient and effective machine tools for the number of students to be taught must be provided (Makoju, 1998). Similarly, Ademola (2013) stressed that teachers should understand that effective operation of machine tools depends to a large extent upon his/her ability not only using it properly but also to evaluate the suitability of the machine tools for its intended use.

Statement of the problem

School machine tools of any neither typeno matter how simple or complex, is liable to deteriorate or break down with time and usage. Despite that, the need for proper utilization should be emphasize. The of teaching and learning metalwork technology trade in technical colleges in Nigeria is carried out uniformly, following the NBTE minimum standard which is meant to guide its academic activities.

Quality in technical education can be measured by the performance of the product of such schools. The performance of the students is indication of effective utilization of tools and machine tools while in training.(Olaitan, 2007)

The purpose of study

The purpose of this study is to re-examine the machine tools utilization in Metalwork technology department of Kano State technical colleges with view to improve student's skill acquisition. Specifically, the study intended to:

1. To determine the adequacy of machine tools utilization for students' skills acquisition.
2. Examine the usage of machine tools in the metalwork workshop in technical colleges.
3. Identify the problems associated with the machine tools utilization for skills acquisition in metalwork workshop in technical colleges.
4. Determine new ways for improvingmachine tools utilization

Research Question

Base on the purpose of studyfour research questions were formulated.

(i) How adequate are the available machine tools for metalwork technology in Kano State technical Colleges?

(ii) What are the impacts of machine tools utilization on students' skill acquisition in Kano State Technical Colleges?

(iii) Whatare the problems of machine tools utilization in technical colleges in Kano state?

(iv) What are the new ways of improving machine tools utilization in technical colleges in Kano state?

Hypotheses

Four null hypotheses were formulated and tested at 0.05level of significance:

H_{o1}: There is no significant difference between the mean responses of teachers and students on adequate machine tools in Kano State Technical Colleges.

H_{o2}: There is no significant difference between the mean responses of teachers and students on the impact of machine tools utilization on students' skill acquisition in Kano State technical colleges.

H_{o3}: There is no significant relationship between lack of machine tools and students' acquisition of practical skills.

$H_{o4:}$ There is no significant relationship between emerging technologies and students' practical performance.

SIGNIFICANCE OF STUDY

The researcher believes that the findings will be benefited by:

1. Federal government of Nigeria and states ministry of education
2. Lecturers of vocational/technical education
3. Technical teachers
4. Workshop attendants
5. Students

REVIEW OF RELATED LITERATURE

The reviewing of related literature is done under the following sub-headings:

1. Theoretical framework of study.
2. Conceptual framework.
3. Types of machine tools in metalwork workshop.
4. Roles of workshop formachine tools skills acquisition.
5. Review of related Empirical works.
6. Summary of Review of related literature.

RESEARCH METHODOLOGY

The study was a descriptive survey research, which was be conduct in all technical colleges in Kano state

This chapter describes the design and procedures for data collection and analysis, specifically the following aspects of this study are discussed.

Research design

The study adopted survey research design, Sambo (2005) pointed out that survey research is a study in which a random sample is taken from a well defined population, and the sample is subjected to statistical analysis for results that would be used to estimate the true value in the population.

Population of the study

The population for this study comprises of 713 students and 25 teachers of Metalwork technology department of Kano state technical colleges, making finite population of 738 students and teachers.

Sample and sampling techniques

Five technical colleges are involved in this study namely: Government Technical college Kano with 176 students and six teachers, government technical Ungogo with 163 students and six teachers, government technical college Wudil with 144 students and five teachers, government technical college Bagauda with 122 students and four teachers and government technical college Kwakwachi with 108 students and four teachers.
Applying Taro Yamane formula for finite population, the sample size was determined statistically to be 260 teachers and students population.

Instrument for Data Collection

A questionnaire was be developed on five points rating scale as follows: Very High Impact (VHI), High Impact (HI), Moderate Impact (MI), Low Impact (LI) and Very Low Impact (VLI).
Method of data collection
A structured response questionnaire wasemployed for collecting data from 260 students and teachers. A total of 221 copies of the instrument was retrieved in usable form (22 teachers and 199 students return rate) thus, 85 percent retrieval achieved.

Method of data analysis

The data was be analyzed using the mean to answer research questions while the null hypothesis was be tested using Z – test statistics at .05 level of significance, the mean response of each item was be interpreted.
Table 1: Mean responses of teachers and students on adequate machine tools for metalwork technology in Kano State Technical Colleges.

N1 = 22, N2= 199, NG = 221

S/No	Machine tools	X_1	X_2	XG	SD	Remark
1	Lathe Machine	2.14	2.10	2.12	1.68	L
2	Milling Machine	2.30	2.24	2.17	1.99	L
3	Drilling Machine	2.12	2.06	2.09	1.63	L
4	Shaping Machine	3.16	3.31	3.23	1.04	M
5	Power Hacksaw	3.24	2.23	2.73	1.03	M

X = mean response of teachers
X_2 = mean response of students
XG = Grand mean response of teachers and students
SD = Standard division
M = Moderate impact
L = Low impact
Table 1 shows that three machine toolss rated with low impact while two machine toolss rated moderate impact, this however suggests that there is low presence of machine tools in Kano State technical colleges.
Table 2: Mean response of teachers and students on the impact of machine tools utilization on students skill acquisition in Kano State Technical Colleges

S/No	Machine tools	X1	X2	XG	SD	Remark
1	Lathe Machine	2.24	2.30	2.27	1.99	L
2	Milling Machine	2.12	2.34	2.23	1.90	L
3	Drilling Machine	2.60	2.97	2.78	1.05	M
4	Shaping Machine	3.16	3.31	3.23	1.04	M
5	Power Hacksaw	3.24	2.23	2.73	1.03	M

Table 2 shows that machine tools rated with low impact while three machine tools rated moderate impact. These however suggest that there is moderate impact of machine tools utilization on students' skill acquisition in Kano State Technical Colleges.
Table 3: Z – test of mean responses of teachers and students on adequate machine tools for metalwork technology in Kano State technical colleges

Respondents	X	SD	N	df	Standard error	Level of significance	Z-cal	Z-tab	Remark
Teachers	2.59	1.12	22	219	2.824	.05	0.067	1.96	Significant
Students	2.39	1.09	199						

As could be seen in table 3, the Z calculated is 0.067 while Z critical value is 1.96. the critical value exceeds the Z calculated, therefore the null hypothesis (H_{o1}) was accepted, hence there is no significant difference between the mean ratings of teachers and students on adequate machine tools in Kano State technical colleges.

Table 4: Z test of mean responses of teachers and students on the impact of machine tools utilization on students skill acquisition in Kano State technical colleges.

Respondents	X	SD	N	df	Standard error	Level of significance	Z-cal	Z-tab	Remark
Teachers	2.67	1.18	22	219	2.824	.05	0.257	1.96	Significant
Students	2.63	1.12	199						

The Z-calculated value is 0.257 is less than critical value of Z 1.96. This makes the null hypothesis (H_{o2}) to be accepted, hence there is no significant difference between the mean ratings of teachers and students on the impact of machine tools utilization on students skill acquisition in Kano State technical colleges.

Findings of the Study

1. There are low or rather small quantities of machine tools in Metalwork technology in Kano State technical colleges.
2. The impact of machine tools utilization on students' skill acquisition in Kano state technical colleges is moderate.

Recommendation

Based on these findings, the researcher recommended that teachers and students should be encouraged by providing the needed resources, condition and enabling environment by the authorities for them to be equipped with needed technical skills for effective utilization of difference types of machine tools.

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