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# Innovative Machine Practice Skills For Mechanical Engineering Trades Students Self-Reliance In A Post Covid-19 Economy In Rivers State

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**ABSTRACT**
The study investigated the machine practice skills for mechanical engineering trade students self-reliance in a post covid-19 economy in rivers state. One research question raised and one null hypothesis formulated which guided the study, were analyzed using mean and standard deviation to answer the research questions and z-test was used to test the null hypothesis at 0.05 level of significance. The study adopted a descriptive design. The population was 219 comprised of 170 technicians and 49 technical education teachers/ instructors in four respective NBTC accredited Government Technical Colleges in Rivers State. A structured questionnaire was used for data collection. The instrument was validated by two experts from the Faculty of Education, Rivers State University, Port Harcourt. The reliability index was established using Crombach alpha formula which yielded a reliability coefficient of 0.80 which was considered sufficient for the study. The study revealed that to a high extent practical skills in milling, shaping, planning, slotting, drilling, grinding, and turning are required by mechanical engineering trade students for self-reliance in a post covid-19 economy in Rivers State.
**KEYWORDS**: Mechanical, skills, students, technical colleges, reliance, machining skills.

## I. INTRODUCTION

Unemployment in Nigeria has become a difficult problem. This scourge that has often caused problems for governments in the industrialized nations is now assuming gigantic dimension in Nigeria (Akpan and Etor, 2013). The authors further stated that the rate at which young people are leaving school and seeking employment continuously outpaces the capacity of the economy to provide employment. Students who graduate from technical institutions acquire knowledge and practical skills without entrepreneurial skills that would enable them, on graduation to practice what was learnt in school, create jobs for themselves and participate in economic development (Akpan and Etor, 2013). In order to make technical education in Nigeria to be functional, relevant and practical, the Federal Government of Nigeria (FGN), made entrepreneurship education a compulsory course for all technical college students (FGN, 2013). The aim of this policy is to ginger in the students the entrepreneurial spirit that will help curb the increasing rate of unemployment, develop in the learners the entrepreneurial capacities and mindsets that will help them on graduation to recognize and exploit business opportunities and mobilize resources for self- employment (Akpan and Etor, 2013).

However, for an individual to venture into a self-employed enterprise and flourish, he/she must acquire relevant entrepreneurship skills and competencies (Barakabo and Suwari, 2016). On the other hand, Okwelle and Owo (2017) opined that entrepreneurship skills refers to the skills acquired from the type of training giving to individuals to start and nurture dynamic businesses that provide high value addition to the benefit of both the individuals and the society at large. Continuing, Okwelle and Owo stated that such skills when acquired would help prospective self-employed individuals to start and grow their businesses that would not only add value to their quality of life in this present economic situation but in the future.

Self-employment, entrepreneurship skills, technical and vocational job-specific skills can be acquired through the system of education offered by technical and vocational education and training (TVET) (FGN, 2013). This implies that students of technical colleges in addition to the acquisition of technical and vocational skills also receive entrepreneurship education for self-employment (Okwelle and Owo, 2017).Technical Vocational Education and Training (TVET) is widely recognized as the most effective means of empowering the citizenry to stimulate sustainable national development, enhance employment, improve the quality of life, reduce poverty, limit the incidence of social vices due to joblessness and promote a culture of peace, freedom and democracy (Okwelle, Beako, and Ajie, 2017). TVET is used as a comprehensive term referring to those aspects of educational processes involving, in addition to general education, the study of technologies and related sciences, and the acquisition of practical skills, attitudes, understanding and knowledge relating to occupations in various sectors of economic and social life (FGN, 2013).

Technical colleges are institutions where students are trained to acquire relevant knowledge and skills in different occupations for employment in the world of work (Emmanuel and Ariyo, 2014). According to NBTE (2011) technical colleges are post primary institutions where students are giving full vocational training that will enable them acquire relevant knowledge, skills and attitude for paid or self-employment in various occupations in the world of work. The trades offered in the Technical Colleges in Nigeria according to NBTE (2016) include Mechanical Engineering Trades from which the metal works trade is subsumed.

Mechanical Engineering Trades (METs) is a common term that is being utilized in defining trades that are having complete bearing with metal welding/forming and or servicing/repairs of machines or machine related equipment and appliances. According to Dublin Institute of Technology (2008) mechanical engineering education is the most liberal of all engineering fields, with the broadest applicability and most flexibility in terms of occupations. The subsistence of any industry is mostly relied on the availability of METs craftsmen. Abdullahi (Atsumbe, 2012) asserted that for any industry in Nigeria either mechanical or civil to keep on production, it would need the services of skilled mechanical engineering craftsmen. Mechanical engineering craftsmen are involved in services which includes; fabrication of spare parts to specifications; carrying out routine maintenance of equipment and tools. The job of a mechanical engineering craftsman is multi-facet; some of his jobs involve plant and equipment maintenance, operating on the CNC machines, align and fix mechanical components, fabrication of die sinkers, structural iron work and being a tool maker amongst others (Oranu, Nwoke, Ogwo as cited in Emmanuel & Ariyo, 2014). Therefore, it is a fact that efficient training in skills improvement in engineering trades either soft or hard skills has greatly contributed to the technological development and economic self-reliance of individuals and industrialized nations. According to Cranmer (2014) skill is an ability and capacity acquired through deliberate, systematic and sustained effort to smoothly and adaptively carryout complex activities or job functions involving ideas (cognitive skill) things (technical skills) and/or people (interpersonal skills). Technical skills are skills expertise or technical competence related to the field of the worker, whether engineering or technical (Medina, 2011). Yakubu (2014) stated that the importance of mechanical engineering trades to everyday life and the overall objective of vocational and technical education that offer training in skill for self-employment and for employment into the world of work made mechanical engineering become an important trade to be taught to students. Therefore, for the students to be trained in machine practice skills for self-reliance, self-sufficiency and for employment in the world of work, they require the relevant technical skills which are different from the conventional technical skills imparted to the mechanical engineering students. Hence, the need to assess the machine practice skills required by mechanical engineering trades students becomes imperative.

Machining process is a term that evolved over the past one and a half centuries as technology has advanced. In the 18th century, the word machinist simply meant a person who built or repaired machines. This person's work was done mostly by hand, using processes such as the carving of wood and the hand-forging and hand-filing of metal. Therefore, during the Machine Age, machining referred to (what we today might call) the traditional machining processes, such as turning, boring, drilling, milling, broaching, sawing, shaping, planning, reaming, and tapping. In these "traditional" or "conventional" machining processes, machine tools such as lathes, milling machines, drill presses or others, are used with a sharp cutting tool to remove material to achieve a desired geometry (Nabertherm, 2013).

Presently, machining (turning, milling, and drilling) which is the most widespread metal shaping process in mechanical manufacturing industry. According to Childs, Maekawa, Obikawa, and Yamane (2014) machining include the various processes in which a piece of raw material is cut into a desired final shape and size by a controlled material-removal process. The many processes that have this common theme, controlled material removal, are today collectively known as subtractive manufacturing, in distinction from processes of controlled material addition, which are known as additive manufacturing. Exactly what the controlled part of the definition implies can vary, but it almost always implies the use of machine tools.

Worldwide investment in metal-machining machine tools holds steady or continues to increase year by year, the only exception being in the worst of recessions. The wealth of nations can be judged by this investment. From 1970 onwards, machine tools of new design started to be introduced in significant numbers into manufacturing industry, with the effect of greatly reducing the times for tool positioning and movement between cuts.

The new, computer numerical control (CNC), designs stemmed directly from the development of numerically controlled (NC) machine tools in the 1950s (Childs, Maekawa, Obikawa, and Yamane, 2014). In a CNC machine tool, all the motions are mechanically separate, each driven by Its own motor and each coordinated electronically by computer with the others.

In the industry we have three principal machining processes which are classified as turning, drilling and milling. Other operations falling into miscellaneous categories include: shaping, planning, boring, broaching and sawing. Machining operations:

- Turning operations are operations that rotate the workpiece as the primary method of moving metal against the cutting tool. Lathes are the principal machine tool used in turning.
- Milling operations are operations in which the cutting tool rotates to bring cutting edges to bear against the workpiece. Milling machines are the principal machine tool used in milling.
- Drilling operations are operations in which holes are produced or refined by bringing a rotating cutter with cutting edges at the lower extremity into contact with the workpiece. Drilling operations are done primarily in drill presses but sometimes on lathes or mills.

According to Childs, Maekawa, Obikawa, and Yamane (2014) metal cutting has been at the core of manufacturing throughout history. For metals many methods are used and can be grouped by the physical phenomenon used.

- Chip forming - sawing, drilling, milling, turning etc.
- Shearing - punching, stamping, scissoring.
- Abrading - Grinding, lapping, polishing; water-jet.
- Heat - flame cutting, plasma cutting, laser cutting.
- Electro-Chemical - Etching, Electrical discharge machining (EDM).

Every method has its limitations in accuracy, cost, and effect on the material. For example: heat may damage the quality of heat treated alloys, and laser cutting is less suitable for highly reflective materials such as aluminum. (Childs, Maekawa, Obikawa, and Yamane, 2014).

Similarly, Nabertherm (2013). Emphasized the significance of a cutting tool or cutter as used in removal of material from the workpiece by means of shear deformation (Nabertherm, 2013). Cutting may be accomplished by single-point or multipoint tools. Single-point tools are used in turning, shaping, planning and similar operations, and remove material by means of one cutting edge. Milling and drilling tools are often multipoint tools. Grinding tools are also multipoint tools. Each grain of abrasive functions as a microscopic single-point cutting edge (although of high negative rake angle). Furthermore, Nabertherm (2013) maintained that cutting tools must be made of a material harder than the material which is to be cut, and the tool must be able to withstand the heat generated in the metal-cutting process. Also, the tool must have a specific geometry, with clearance angles designed so that the cutting edge can contact the workpiece without the rest of the tool dragging on the workpiece surface. The angle of the cutting face is also important, as is the flute width, number of flutes or teeth, and margin size. In order to have a long working life, all of the above must be optimized, plus the speeds and feeds at which the tool is run.

**Statement of the Problem**

Federal Government of Nigeria (FGN, 2013) stated that technical education would provide training and impart the necessary skills to technical college students for self-reliance economically. FGN further stated that trainees who have completed the technical college programmes should be able to become self-employed and possibly employ others. To achieve the above stated objective, technical college students need to acquire relevant metalwork skills that will guarantee self-employment upon graduation.

Yakubu (2014) observed that one major challenge facing students of metal works trades upon graduation is the lack of competent knowledge and practical skills that will enhance self-reliance. Graduates of technical colleges who are supposed to be employers of labours are now job seekers (Ehimen and Ezeora, 2018). This seems as a defect in academic curriculum that prepares recipients with little or no jobs related skill contents. In many cases, many technical college graduates compensate for insufficient academic preparation by undergoing trainings and remedial courses in different private technical workshops (Ehimen and Ezeora, 2018).
Individuals that cannot afford to take the risk of undergoing this training end up not becoming self-employed thus multiply the number of unemployed graduates roaming the street of Rivers State in search for jobs. The skills, which are learnt while in school, are as a result of the skills embedded in the technical college curriculum and used in teaching the students. Hence, it becomes pertinent to assess the level of students machining skills achievement in metal works trade in the technical colleges in Rivers State. Therefore, the problem of the study was; what are the machine practice skills that are required by mechanical engineering trade students for self-reliance in a post covid-19 economy in Rivers State?

**Purpose of the Study**

The purpose of the study is to assess the machine practice skills that are required by mechanical engineering trade students for self-reliance in a post covid-19 economy in Rivers State. Specifically the study will seek to:

1. Determine the extent to which machine practice skills that are required by mechanical engineering trade students for self-reliance in a post covid-19 economy in Rivers State.

**Research Questions**

The following research questions guided the study.

1. To what extent are machine practice skills that are required by mechanical engineering trade students for self-reliance in a post covid-19 economy in Rivers State?

**Hypotheses**

The following null hypotheses (Ho) tested at 0.05 level of significance will guide the study.

**1**: There is no significant difference in the mean ratings of metal work industry technicians and metal work teachers/ instructors on the machine practice skills that are required by mechanical engineering trade students for self-reliance in a post covid-19 economy in Rivers State.

## II. METHODOLOGY

The descriptive survey design was adopted for the study, the population of the study is comprised of 219 respondents, 170 technicians from registered metalwork teachers/instructors in the four NBTE accredited Government Technical Colleges in Rivers State. Assessment of metalwork skills for self-employment (AMWSSE) was the instrument used to gather data. It was structured based on 4 – point scale. The instrument was validated by two experts in Vocational and Technology Department of Rivers State University Cronbach Alpha coefficient formular (x) was used to determine the internal consistency of the instrument and the reliability coefficient value obtained 0.80, which represent a high reliability coefficient for the study. Results were analysed with mean and standard deviation while hypothesis were tested with z-test statistics at 0.05 level of significance.

**Results Presentation and Discussion**

**Research Question**

To what extent are machine practice skills that are required by mechanical engineering trade students for self-reliance in a post covid-19 economy in Rivers State?

*Table 1: Respondents Mean and Standard Deviation on Machine Practice Skills Required by Students of for Self-reliance in Post-Covid-19 Economy.*

| | | Metalwork Technicians | | | Metalwork Teachers/ Instructors | | |
|---|---|---|---|---|---|---|---|
| **S/N** | **Machine Shop Practice Milling** | $\bar{X}$ | **SD** | **RMK** | **X** | **SD** | **RMK** |
| | **Ability to:** | | | | | | |
| 1 | Set the machine for milling Operation | 3.39 | .837 | HE | 3.05 | .990 | HE |
| 2 | Sharpen milling cutters | 3.53 | .826 | HE | 2.81 | 1.039 | HE |
| 3 | Mill parallel and square surface with a milling machine | 3.10 | .939 | HE | 3.11 | .859 | HE |
| 4 | Mill angular surfaces | 3.11 | .772 | HE | 3.16 | .924 | HE |
| 5 | Select indexing plate - hexagonal, pentagonal | 2.97 | .986 | HE | 3.35 | .719 | HE |

| | | | | | | | |
|---|---|---|---|---|---|---|---|
| 6 | Set the sector arm | 3.04 | .755 | HE | 2.95 | .932 | HE |
| 7 | Produce large range of circular division by using indexing head | 3.09 | .903 | HE | 3.42 | .844 | HE |
| 8 | Mount and align the cutters | 3.11 | .994 | HE | 3.09 | .860 | HE |
| 9 | Produce a seat for flat surfaces | 3.32 | .841 | HE | 3.32 | .736 | HE |
| 10 | Mill two surface parallel at one setting. | 3.28 | .940 | HE | 3.31 | .790 | HE |
| 11 | Produce multiple surfaces at one passage of the cutter | 2.75 | .982 | HE | 3.19 | .915 | HE |
| 12 | Mount the cutters desired to produce the required | 3.05 | .833 | HE | 2.82 | 1.030 | HE |
| 13 | profile ensuring the elimination of end thrust | 2.83 | 1.097 | HE | 3.19 | .895 | HE |
| 14 | Maintain the milling machine | 3.14 | .953 | HE | 2.93 | .997 | HE |
| 15 | Set up the machine for milling Operation | 2.59 | 1.142 | HE | 3.57 | .692 | HE |
| | **Shaping, Planning and Slotting Ability to:** | | | | | | |
| 16 | Set and operate the shaper to produce various components applying safety precautions | 3.56 | .732 | HE | 3.42 | .844 | HE |
| 17 | Clean, oil and grease the shaping machine and adjust the slides | 3.31 | .798 | HE | 3.09 | .860 | HE |
| 18 | Adjust the length of stroke and mount work and tool correctly | 3.28 | .750 | HE | 3.32 | .736 | HE |
| 19 | Carry out the planning operations observing safety precautions | 2.93 | 1.004 | HE | 3.31 | .790 | HE |
| 20 | Clean, oil, grease and adjust the slides of the panning machine | 3.16 | .941 | HE | 3.42 | .625 | HE |
| 21 | Calculate the working speed of slotting machine average cutting speed | 2.95 | .875 | HE | 3.106 | .513 | HE |
| | **Drilling: Ability to** | | | | | | |
| 22 | Practical safety in the work place. | 3.291 | .502 | HE | 3.39 | .837 | HE |
| 23 | Drill to specification applying the correct lubricant and observing the safety precautions | 3.23 | .834 | HE | 2.92 | .951 | HE |
| 24 | Grind drills to the correct angles. | 3.40 | .821 | HE | 3.04 | .886 | HE |
| 25 | Set up tools for counter boring, counter sinking and facing Operations | 3.09 | .722 | HE | 3.10 | .606 | HE |
| 26 | Machine the seating as required for cheese head bolts or screw, counter sunk head screw etc (observe safety precautions) | 3.39 | .840 | HE | 3.14 | .518 | HE |
| | **Grinding Ability to** | | | | | | |
| 27 | Clean, operate and match the following grinding machine with their uses | 2.95 | .990 | HE | 3.58 | .706 | HE |
| 28 | Maintain any grinding machines | 2.98 | 1.033 | HE | 3.09 | .785 | HE |
| 29 | cleaning the machines at regular intervals during use and at the end of the day | 3.19 | 1.043 | HE | 2.98 | .719 | HE |
| 30 | top up oil level | 3.07 | .838 | HE | 3.22 | .856 | HE |
| 31 | grease the machine | 3.09 | .808 | HE | 3.14 | .811 | HE |
| 32 | adjust the slides at the end of the day | 3.11 | .994 | HE | | | HE |
| 33 | Interpret wheel specification and mount it on the spindle | 3.27 | .877 | HE | 3.26 | .856 | HE |
| 34 | Test a grind wheel for soundness | 2.93 | .863 | HE | 3.32 | .776 | HE |
| 35 | Clean, mount and operate work holding devices for a surface grinder e.g. | 3.24 | .906 | HE | 3.21 | .725 | HE |

| | | | | | | | |
|---|---|---|---|---|---|---|---|
| | permanent and electro-magnetic chuck | | | | | | |
| 36 | Carry out surface grinding operation to angular operation to angular and cylindrical surfaces | 3.33 | .740 | HE | 3.108 | .552 | HE |
| 37 | Select, inspect and operate work holding devices for a cylindrical grinder e.g. centers and the clog, work rest in the case of a long work piece | 3.077 | .553 | HE | 3.23 | .881 | HE |
| 38 | Carry out cylindrical operation to external surfaces | 3.147 | .570 | HE | 3.44 | .926 | HE |
| 39 | Carry out centreless grinding operations Practicing | 3.26 | .809 | HE | 3.11 | .858 | HE |
| 40 | Calculate the wheel speed (S) of a grinding machine using the formulae | 3.32 | .827 | HE | 3.26 | .897 | HE |
| | **Turning: Ability to** | | | | | | |
| 41 | Select and grind to the correct angles lathe tool cutters/bits for different materials/operations | 2.88 | .880 | HE | 3.07 | .838 | HE |
| 42 | Operate the lathe to produce a piece of job to Specification | 2.84 | .882 | HE | 3.09 | .808 | HE |
| 43 | Cleaning and lubricating the machine | 3.34 | .797 | HE | 3.04 | .947 | HE |
| 44 | select work holding devices | 3.16 | .902 | HE | 3.19 | .766 | HE |
| 45 | determine the sequence of operation | 2.70 | 1.059 | HE | 3.12 | .982 | HE |
| 46 | carry out related calculation | 2.86 | 1.025 | HE | 3.39 | .774 | HE |
| 47 | eccentric turning | 3.17 | .891 | HE | 3.19 | .860 | HE |
| 48 | clean the machine | 3.25 | .830 | HE | 3.26 | .856 | HE |
| 49 | oil the machine | 3.23 | .834 | HE | 3.32 | .776 | HE |
| 50 | adjust slides | 3.40 | .821 | HE | 3.21 | .725 | HE |
| 51 | replace components due for replacement instruction | 3.09 | .722 | HE | 3.10 | 0.55 | HE |
| 52 | Calculate the angle for taper turning | 3.18 | .658 | HE | 3.23 | .881 | HE |
| 53 | Calculate the angular error in taper turning derived from tool setting | 3.05 | .924 | HE | 3.44 | .926 | HE |
| 54 | Determine the work plan for a turning job | 3.19 | .953 | HE | 3.11 | .858 | HE |
| 55 | interpret working drawings | 2.99 | .881 | HE | 3.26 | .897 | HE |
| 56 | select work holding devices | 2.95 | .990 | HE | 3.09 | .989 | HE |
| 57 | determine the sequence of operation | 2.98 | 1.033 | HE | 3.18 | .889 | HE |
| 58 | select appropriate tools and materials | 3.19 | 1.043 | HE | 2.97 | .954 | HE |
| | **Grand Mean** | **3.13** | **0.87** | HE | **3.19** | **0.87** | HE |

**Source**: Researchers field work 2021.

Data in table 1 revealed that metal work technicians had a mean range of 2.59-3.53 and standard deviation range of 0.75-1.14 in milling. The technicians also had a mean range of 2.93-3.56 and standard deviation range of 0.73-1.00 in shaping, planning and slotting, they had a mean range of 3.23-3.40 and standard deviation range of 0.50-0.83 in drilling. 2.93-3.32 and 0.55-104 in grinding, 2.70-3.34 and 0.72-1.05 in turning. While the metal work teachers had a mean range of 2.81-3.57 and standard deviation range 0.69-1.03 in milling. The metal work teachers also had a mean range of 3.09-3.42 and standard deviation range of 0.51-0.86 in shaping, planning and slotting. They had a mean range of 2.92-3.14 and standard deviation range of 0.51-0.95 in drilling. 2.98-3.44 and 0.55-0.92 in grinding and 2.70-3.34 and 0.55-0.98 in turning. The standard deviation showed homogeneity of the respondents' opinion. This indicated that both respondents agreed that to high extent machine practice skills are required by mechanical engineering trade students for self-reliance in a post covid-19 economy in Rivers State.

**HO**: There is no significant difference in the mean rating of metal work industry technicians and metal work teachers/ instructors on the machine practice skills that are required by mechanical engineering trade students for self-reliance in a post covid-19 economy in Rivers State.

*Table 2: t-test Analysis on Machine Practice Skills Required by Students of for Self-reliance in Post-Covid-19 Economy.*

| Respondents | N | Mean | SD | P-value | df | t-cal | t-tab | RMK |
|---|---|---|---|---|---|---|---|---|
| Teachers/Instructors | 49 | 3.14 | .87 | | | | | |
| | | | | 0.05 | 197 | 1.03 | 1.69 | No Sig |
| Technicians | 150 | 3.19 | .87 | | | | | |

**Source**: Researchers Field Work 2021.

Result in Table 2 revealed that t-cal (1.03) which is less than t-crit (1.69) this indicates that the null hypothesis stated was accepted. Therefore there is no significant difference between the mean responses of mechanical teachers and instructors on machine practice skills that are required by mechanical engineering trade students for self-reliance in a post covid-19 economy in Rivers State.

## III. DISCUSSION OF FINDINGS

The study revealed that to a high extent practical skills in milling, shaping, planning, slotting, drilling, grinding, and turning are required by mechanical engineering trade students for self-reliance in a post covid-19 economy in Rivers State. The finding of the study is agreement with Nabertherm (2013) and Childs, Maekawa, Obikawa, and Yamane (2014) who found that conventional machining processes in machine tools such as lathes, milling machines, drill presses that are used presently in machining operations (turning, milling, and drilling) which is the most widespread metal shaping process are very useful and highly sought in mechanical and manufacturing industry. When students are trained in mechanical engineering trades and acquired relevant practical skills in machine shop practice. It speaks volume of the role of our technical institutions in production of technical manpower need of this 21stcentury labour market and equipped for self-reliance in a post covid-19 economy in Rivers State.

## IV. CONCLUSION

The study on metal works skills required by students of technical colleges for self-employment in Rivers State is as a result of the technical manpower in the 21stcentury labour market demands which have caused many metalwork graduates with various certificate to be unemployed. The study determined forging skills required by metalwork technical college students for self-employment in Rivers State. Data were collected, analyzed and interpreted. Based on the findings of the study, it was concluded that machine practice skills are highly required by mechanical engineering trade students for self-reliance in a post covid-19 economy in Rivers State.

## V. RECOMMENDATIONS

Base on the findings of study, the following recommendations were made:

**1.** Government should encourage non-government organizations (NGO) to sponsor and organized seminars, conferences, workshops and symposia for metalwork technical teachers and metalwork instructors in technical colleges in Rivers State to sensitize them on communicating the different machining skills open to students, as well as how these skills will lead to employers' workplace expectations.

**2.** Government should encourage graduates of mechanical engineering trades to go into entrepreneurship business after graduation since they have acquired machine practice skills such as drilling, tuning, milling, grinding etc.

## REFERENCE

[1]. Childs, T., Maekawa, K., Obikawa, T. and Yamane, Y. (2014). Metal Machining Theory and Applications. Retrieved from http://www.arnoldpublishers.com, on 30th March, 2019

[2]. Cranmer, J.K. (2014). Career Centre, Building the Western Australian Workforce by Increasing Government of Western Australia, Department of Training and Workforce Development.

[3]. Ehimen, T. E and Ezeora, B. U. (2018).Metalwork practice skills needed by technical college graduates for sustainable employment in Edo and Enugu States of Nigeria. *International Journal of Education and Evaluation*, 4(6).Retrieved from www.iiardpub.org on 20th September 2018.

[4]. Emmanuel, O. E. and Ariyo. S. O. (2014). Assessment of the skills possessed by the teachers of metalwork in the use of computer numerically controlled machine tools in

technical colleges in Oyo State. *Journal of Education and Practice*, 5(3).Retrieved from www.iiste.org, on 20th September, 2018.

[5]. Federal Government of Nigeria (2013). *National policy on education (6thed.).* Lagos: NERDC Press.

[6]. Nabertham (2013). Heat Treatment, Annealing, Hardening, Brazing, Forging, Nitriding. Retrieved from www.nabertherm.com, on 30th March, 2019.

[7]. Mahesh, N.S. (2013). Forging and Extrusion Process. Retrieved on 2nd March, 2019 from http//www. ramaiahschoolofadvancedstudies.com

[8]. Medina, G.R. (2011). Medina Construction Students put Skills to Work on Bind house. From www.iiardpub.org, on 23rd May, 2019.

[9]. National Board for Technical Education (NBTE) (2011). The Development of National Vocational Qualifications Framework for Nigeria: A Report of the National Steering Committee, NBTE Press. Retrieved from https://www.nbte.gov.ng/

[10]. Okwelle, P. C. and Owo, O. F. (2017). Skills Acquisition in Technical Vocational Education and Training: Tool for Sustainable Entrepreneurship Development of Electrical/Electronic Students in Polytechnics, Rivers State. *Book of proceeding for 2ndAnnual Conference of the Faculty of Technical Education, Ignatius Ajuru University of education Rumuolumeni, Port Harcourt.*

[11]. Okwelle, P. C. (2011). Effective students' involvement in public relations: a strategy for improving enrolment into technical teacher education programme in Nigeria *American Journal of Social and Management Sciences*. Retrieved from on 10th September, 2018 from http://www.scihub.org.

[12]. Okwelle, P. C., Beako, Y. T. and Ajie, M. P. (2017). Technical skills needed by motor vehicle mechanic apprentice to establish standard motor mechanic enterprise in Port Harcourt Metropolis, Rivers State. *International Journal of Innovative Scientific & engineering*

[13]. Park, R. M. (2012). Forging and Stamping, Encyclopaedia of occupational health and safety. A revision of the 3rd edition IOP Conference Series: Materials Science and Engineering Paper. Open Access. Retrieved from http://www.ohio.com/w/medina-constructionstudent-put-skills-to-work on bindhouses-in Accessed on March 15, 2017 *from* https://peakng.com/

[14]. Yakubu, B. (2014). The Need for Competency in Metal Work Technology in Nigerian Technical Colleges. *Journal of Emerging Trends in Educational Research and Policy Studies* (JETERAPS) 5(8): 153-154. Retrieved from jeteraps.scholarlinkresearch.com, on 20th September 2018.