Rajpath Publisher
Academic Publisher

The International Scholar Journal of Arts and Social Science Research, Vol. 7 No. 2, 2024, Pp. 700-717
https://www.theinterscholar.org/journals/index.php/isjassr,

Email: editorialoffice@theinterscholar.org **ISSN: 2705-1528**

Practical skill improvement needs of mechanical craft teachers for teaching shaping, planning and slotting practices in technical colleges in south-east, Nigeria

By

Wogu, Sunday Nwabueze
Automobile/Metalwork Department,
School of Technical Education,
Abia State College of Education (Technical),
Arochukwu, Abia State

Abstract

The study seeks to determine the practical skill improvement needs of mechanical craft teachers and instructors for teaching shaping, and planning and slotting practices in technical colleges in South East, Nigeria. Findings of the study reveal that mechanical craft teachers and instructors in technical colleges in South-East Nigeria need practical skill improvement for teaching shaping and planning and slotting practices. In addition, the study shows that there was no significant difference between the mean responses of mechanical craft teachers and instructors on practical skill improvement needs for teaching shaping and planning and slotting practices in technical colleges South East, Nigeria. Based on the findings, the study concludes that mechanical craft teachers and instructors in technical colleges in South-East Nigeria need practical skills improvement in shaping and planning and slotting practices in order to adequately teach the relevant practical skills required by students to have better understanding of machines in the industrial workplace upon graduation. It is therefore recommended among others that mechanical craft teachers and instructors should attend workshops or seminars regularly to keep abreast of the current happenings in shaping and planning and slotting practices in order to adequately prepare their students for effective performance in machine shops

Key-words. Technical colleges, mechanical, craft, practice trade, teachers, instructors, practical skill, shaping and planning and slotting practices

Introduction

Technical colleges are vocational institutions that offer trade subjects to prospective technical oriented students in order to improve linkages between learning and the workplace in Nigeria. Technical colleges or Government Science and Technical Colleges (GSTC) are specialized post-primary schools where skill trades are majorly taught with general education and science subjects to help students develop and acquire self-reliant and self-sufficient skills upon graduation. Yekinni (2016) viewed technical colleges as institutions where specific knowledge and practical skills required for specific craftsmen, technicians, technologist, scientists or similar levels professionals are taught. Mechanical craft practice trade is one of the practical skill trades in technical colleges in which students are examined by the National

Business and Technical Examination Board (NABTEB) for the award of National Technical Certificate (NTC) and the Advanced National Technical Certificate (ANTC).

Mechanical craft practice trade at the technical college level exposes students to the craft of diagnosing, maintaining, repairing and operating modern electronic gadgets and equipment and different types of industrial machines. According to Kama (2018), mechanical craft practice trade involves showing students how metal parts are changed into different shapes, sizes and surfaces. The objectives of mechanical craft practice trade in technical colleges as outlined in the the National Board for Technical Education (NBTE) (2014) include to: stimulate and sustain students' interest in mechanical engineering craft, enable students' acquire useful knowledge and practical skills in mechanical engineering craft, prepare students for further learning in mechanical engineering craft; and prepare students for occupations in mechanical engineering craft.

In a nutshell, mechanical craft practice trade in technical colleges is designed to equip students with the requisite machining skills and knowledge to fulfill the needs of today's mechanical industry. According to Maliki (2015), machining include the various processes in which a piece of metal is cut into a desired final shape and size by a controlled material-removal process with the use of machines. The purpose of machining is to remove unwanted materials from a part of metal to produce a specific shape or surface (Saue, 2020). There are many machining practices but the researcher focused on shaping and planning and slotting. The teaching of shaping, and planning and slotting practices in technical colleges will form part of the foundation for human capital development which in turn gives rise to sustainable livelihood of students of mechanical craft practice trade upon graduation (Bassey & Saue, 2021). The teaching of shaping and planning and slotting skills will help technical college graduates to establish and manage their private technical workshops and generate wealth (Okwelle, Beako & Ojotule, 2019).

Shaping is a machining practice of removing material from a work piece through the linear movement of a non-rotating cutting tool, that is, pushed along the surface of a work piece and designed to cut flat geometry (Yakubu, 2014). By moving the work-piece across the path of the reciprocating tool, a flat surface is generated regardless of the shape of the tool. With special tools, attachments and devices for holding the work, a shaper can also be used to cut external and internal key ways, gears, racks, dovetails and other miscellaneous shapes (Ede & Ariyo, 2015). Shaping operations are performed using a shaper machine that strokes back and forth, but cuts only in one direction. Shaping is essentially an inefficient method of metal removal but the simplicity of the process coupled with short set up time and cheap tooling makes it extremely useful for single job (Nnodim & Quintus, 2023)

Planning and slotting is a machining practice by which surfaces are made flat and smooth, or to reduce its thickness (Maliki, Yashim & Jamous, 2022). Planning is applied on woodworking, dovetail joints, slots and groove making and creating accurate flat surfaces (Saue, 2020). Planning operations are carried out with planer machine. Planer machine is the largest of reciprocating machine tools. On the other hand, slotting is the process of creating blind holes according to the required shape and size on metallic components. Slotting operations are carried out with slotter machine. The slotter is used for cutting grooves, key ways and slots of shapes for making both internal and external regular and irregular surfaces (Beako, 2018). The working of the slotter is very similar to the shaper operation. The major difference is that shaper machines work horizontally whereas slotter machines work vertically (Ehimen & Ezeora, 2018). The planning and slotting machine cut metals dry due to the reciprocating movements involved in their operations (Bassey & Saue, 2021).

It is argued that mechanical craft practice trade teachers and instructors are charged with the responsibility of exposing students to shaping and planning and slotting practices in technical colleges. Mechanical craft practice trade teacher is one who is qualified to teach

students the theoretical aspects of mechanical craft in technical colleges. On the other hand, mechanical craft instructors deal with the practical aspects of mechanical craft practice trade in technical colleges. Collectively, mechanical craft practice trade teachers and instructors instruct the students in specific technical fields and provide technical support to them during training sessions in mechanical workshops or laboratories (Elisha, 2014). The current emphasis on competency-based learning implies that for anybody to assume the duty of a mechanical craft teacher and instructor in technical colleges, such a person is expected to possess the necessary practical skills for teaching machining practices.

Practical skill is the ability to perform certain simple and complex responsibilities without errors. Ali, Yashim and Chimen (2022) defined practical skill as the dexterity of accomplishing operational tasks with a combination of smoothness, speed and accuracy. According to Ezugu, Bala and Muhammad (2023), practical skills are sets of abilities or knowledge used to perform sophisticated tasks in the areas of science, technology and engineering. Ezugu, Bala and Muhammad further stressed that practical skills refer to specialized knowledge and expertise needed to accomplish complex actions, tasks, and processes relating to computational and physical technology among other endeavours. Therefore, practical skills are hands-on attributes that mechanical craft teachers must possess and master in the classroom for effective teaching of machining practices.

In the context of this study, practical skills are technical skills required by mechanical craft teachers and instructors for effective teaching of shaping, and planning and slotting practices in technical colleges. Sadly, Ogbonna (2020) stated that graduates of mechanical craft practice trade in South-East, Nigeria are lacking the requisite skills required for operating, repairing and maintaining modern motor vehicles and other sophisticated machines. This suggests that, in order to prepare students for productive mechanical enterprises in the labour market upon graduation, mechanical craft practice trade teachers and instructors in technical colleges need practical skills improvement for teaching shaping, and planning and slotting practices. The need for practical skills improvement always arises when there is a gap to fill (Abusomwan & Osaigbovo, 2020). The need for improvement is therefore, a robust exercise used to compare the perceived instructional performance with actual instructional performance of mechanical craft practice trade teachers and instructors in technical colleges when teaching shaping, and planning and slotting practices.

With this in mind, practical skills improvement is the development of instructional capacity of mechanical craft practice trade teachers and instructors to effectively teach shaping, and planning and slotting practices to a high quality standard in technical colleges. Instructionally, if mechanical craft teachers and instructors are not experts in teaching machining practices, they will produce graduates from technical colleges with no or poor practical shaping, and planning and slotting skills to create jobs for themselves and participate in economic development in South-East, Nigeria. Hence, the researcher sought to find out the practical skill improvement needs of mechanical craft teachers and instructors for teaching shaping, and planning and slotting practices in technical colleges in South East, Nigeria.

Statement of the Problem

The instructional design of mechanical craft practice trade in technical colleges is to keep students abreast with the trend of detecting, maintaining, repairing and operating modern electronic gadgets, equipment and machines used in industries to make them self-reliant and establish productive mechanical enterprises in the labour market. Practical shaping, planning and slotting practices needed by employers of labour cannot be acquired by students, if they are not adequately taught by mechanical craft practice trade teachers and

instructors in technical colleges. Thus, identifying the practical shaping, and planning and slotting skills of mechanical craft practice trade teachers and instructors in technical colleges and the updated skills they need to possess when going for retraining exercises is the problem of the study. Therefore, the study sought to identify the current practical skill improvement needs of mechanical craft teachers and instructors for teaching shaping, and planning and slotting practices in technical colleges in South East, Nigeria.

Purpose of the Study

Specifically, the study determined the practical skill improvement needs of mechanical craft teachers and instructors for teaching:

1. Shaping practice in technical colleges in South-East Nigeria
2. Planning and slotting practice in technical colleges in South-East Nigeria.

Research Questions

The following research questions guided the study

1. What are the practical skill improvement needs of mechanical craft teachers and instructors for teaching shaping practice in technical colleges in South-East Nigeria?
2. What are the practical skill improvement needs of mechanical craft teachers and instructors for teaching planning and slotting practice in technical colleges in South-East Nigeria?

Hypotheses

The following null hypotheses were tested at 0.05 level of significance:

1. There is no significant difference in the mean responses of mechanical craft teachers and instructors on practical skill improvement needs for teaching shaping practice in technical colleges South East, Nigeria
2. There is no significant difference in the mean responses of mechanical craft teachers and instructors on practical skill improvement needs for teaching planning and slotting practice in technical colleges South East, Nigeria.

Method

The study adopted descriptive survey research design. According to Nworgu (2015), descriptive survey research design is a research design which aim at collecting data and describing in a systematic manner the characteristics, features or facts of a given population on a research problem. The researcher used this research design because the study surveyed the opinions of mechanical craft teachers and instructors in technical colleges in South-East Nigeria regarding the practical skill improvement needs for teaching shaping, and planning and slotting practices in technical colleges with the use of questionnaire. The population for the study comprised 134 mechanical craft teachers and instructors in the 11 government technical colleges offering mechanical craft in South-Eastern states. This was made up of 80 teachers and 54 instructors. The entire population was studied without sampling because the population was manageable.

A structured and validated questionnaire containing 14 items was used for data collection. Clusters B1 and B2 of the questionnaire have response column with two categories of response scales of required and performance. The required category scale had five point response scales of Very Highly Required (VHR), Highly Required (HR), Moderately Required (MR), Slightly Required (SR) and Not Required (NR) with

corresponding values of 5, 4, 3, 2 and 1. The performance category scale had five point response scales of Very High Performance (VHP), High Performance (HP), Average Performance (AP), Low Performance (LP) and Not Performance (NP) with corresponding values of 5, 4, 3, 2 and 1. That is, the mechanical craft teachers and instructors were asked to rate the extent each skill item was required and the extent they could perform each skill item if asked to do so. Then, the mean of their performance was subtracted from the mean of the required, the difference constituted the improvement gap which could be filled by re-training them.

The instrument for data collection was subjected to face and content validation by three experts; two experts in technology and vocational education and another in educational foundations all from Nnamdi Azikiwe University, Awka. The reliability of the instrument was determined through a pilot test. Fifteen copies of the instrument were administered to 15 mechanical craft teachers and instructors in Delta and Edo States in South-South, Nigeria who were not part of the research population. Data collected were analyzed using Cronbach's alpha formula to determine the internal consistency of the questionnaire items and co-efficients of 0.79 and 0.86 for clusters B1 and B2 were obtained with an overall reliability co-efficient of 0.83. A total of 134 copies of the questionnaire were administered to the respondents in their offices personally by the researchers with the help of five research assistants. The distribution and collection of copies of the questionnaire lasted for two weeks. Out of the 134 copies of the questionnaire administered, 122 copies (representing 91 percent) were successfully retrieved and used for data analysis.

Data collected from the respondents was analysed using weighted mean and improvement need index for both required and performance categories of the instrument in order to answer the research questions. In taking the decision, the following steps were followed:

1) The weighted mean of each item under the required column was calculated (X_R)
2) The weighted mean of each item under the performance column was also calculated (X_P)
3) As (Adapted from Olaitan & Ndomi, 2000), the difference between the two means for each item (X_R-X_P) was determined for decision making on the practical skill improvement needed by mechanical craft teachers and instructors thus:
    a. Where the difference was zero, (0), there was no need for skill improvement because the level at which the skill was required was equal to the level at which mechanical craft teachers and instructors could perform the skill
    b. Where the difference was positive (+), there was need for skill improvement because the level at which the skill was required was greater than the level at which mechanical craft teachers and instructors could perform the skill
    c. Where the difference was negative (-), there was no need for skill improvement because the level at which mechanical craft teachers and instructors could perform the skill was greater than the level at which the skill was required.

The t-test was used to test the null hypotheses at 0.05 level of significance. A hypothesis was accepted where the p-value is greater than the alpha level of 0.05 ($p > 0.05$), at an appropriate degree of freedom; otherwise, the null hypothesis was rejected. Data collected were analysed using SPSS version 23.0.

Results

Research Question 1

What are the practical skill improvement needs of mechanical craft teachers and instructors for teaching shaping practice in technical colleges in South-East Nigeria?

Table 1

Mean and standard deviation of responses of respondents on practical skill improvement needs for teaching shaping practice in technical colleges in South-East Nigeria

S/N	Statements Ability to;	$\overline{x_r}$	$\overline{x_p}$	$(\overline{x_r} - \overline{x_p})$	Decision
1.	use angle plate	3.46	2.59	0.87	IN
2.	use shaping machine vice	3.51	2.90	0.61	IN
3.	remove burrs caused by previous cut	2.82	3.64	-0.82	NIN
4.	carry out repairs on shaping machine	3.33	2.75	0.58	IN
5.	maintain shaping machine	4.07	3.83	0.24	IN
6.	hold job on the shaping machine table	3.10	2.39	0.71	IN
7.	clear the work piece before switching on the shaping machine	3.63	3.02	0.61	IN
	Grand Mean	**3.42**	**3.02**	**0.40**	**IN**

N = 122; X_r = Mean of required skill level; X_p = Mean of performance level; $Xr - Xp$ = Skill Improvement need index; In=Improvement Needed; NIN= No Improvement Needed.

Data in Table 1 reveal that the performance gap value of six skills items ranged from 0.24 to 0.87 and were positive while one skill item have a negative value of -0.82. The Table summarizes that mechanical craft teachers and instructors need practical skill improvement for teaching shaping practice in technical colleges in South-East Nigeria.

Hypothesis 1

There is no significant difference in the mean responses of mechanical craft teachers and instructors on practical skill improvement needs for teaching shaping practice in technical colleges South East, Nigeria.

Table 2

Summary of t-test analysis of the mean responses of respondents on practical skill improvement needs for teaching shaping practices in technical colleges South East, Nigeria

Variable	N	$\overline{x}$	SD	df	t-value	p-value	Decision
Teachers	73	3.79	1.54	120	0.603	0.334	Not Significant
Instructors	49	3.52	1.38				

Table 2 shows that there is no significant difference between the mean responses of mechanical craft teachers and instructors on practical skill improvement needs for teaching shaping practice in technical colleges South East, Nigeria. This is shown by the p-value of 0.334, which is greater than the significance level of 0.05. The null hypothesis of no significant difference between the two groups is therefore accepted.

Research Question 2

What are the practical skill improvement needs of mechanical craft teachers and instructors for teaching planning and slotting practice in technical colleges in South-East Nigeria?

Table 3

Mean and standard deviation of responses of respondents on practical skill improvement needs for teaching planning and slotting practice in technical colleges in South-East Nigeria

S/N	Statements Ability to;	$\overline{x_r}$	$\overline{x_p}$	$(\overline{x_r} - \overline{x_p})$	**Decision**
1.	use jigs to hold work on the planer	3.24	2.98	0.26	IN
2.	use fixtures to hold work on the planer	3.10	2.53	0.57	IN
3.	carry out simple maintenance on planning and slotting machine	3.65	3.00	0.65	IN
4.	carry out repairs on planning and slotting machine	2.93	2.72	0.19	IN
5.	secure the work piece on the vice	4.07	3.84	0.23	IN
6.	firmly bolt the job on the planning and slotting machine table	3.18	2.96	0.22	IN
7.	avoid flying chips while using the planning and slotting machine	2.66	1.85	0.81	IN
	Grand Mean	**3.26**	**2.84**	**0.42**	**IN**

N = 122; X_r = Mean of required skill level; X_p = Mean of performance level; $Xr - Xp$ = Skill Improvement need index; In=Improvement Needed.

Data in Table 3 reveal that the performance gap value of all the seven skills items ranged from 0.19 to 0.81 and were positive. The Table summarizes that mechanical craft teachers and instructors need practical skill improvement for teaching planning and slotting practice in technical colleges in South-East Nigeria.

Hypothesis 2

There is no significant difference in the mean responses of mechanical craft teachers and instructors on practical skill improvement needs for teaching planning and slotting practice in technical colleges South East, Nigeria.

Table 4

Summary of t-test analysis of the mean responses of respondents on practical skill improvement needs for teaching planning and slotting practices in technical colleges South East, Nigeria

Variable	N	$\overline{x}$	SD	df	t-value	p-value	Decision
Teachers	73	3.12	1.04	120	0.163	0.405	Not Significant
Instructors	49	2.98	0.83				

Table 4 shows that there is no significant difference between the mean responses of mechanical craft teachers and instructors on practical skill improvement needs for teaching planning and slotting practice in technical colleges South East, Nigeria. This is shown by the p-value of 0.405, which is greater than the significance level of 0.05. The null hypothesis of no significant difference between the two groups is therefore accepted.

Discussion of findings

The outcome of the study revealed that mechanical craft teachers and instructors in technical colleges in South-East Nigeria need practical skill improvement for teaching shaping practice. The study clearly showed that mechanical craft teachers and instructors in technical colleges in South-East Nigeria needed practical skill improvement in the ability to hold job on the shaping machine table, use shaping machine vice, clear the work piece before switching on the shaping machine and carry out repairs on shaping machine. The finding of this study agrees with Amaechi and Thomas (2021) that teachers and instructors needed practical skill improvement in shaping operations practices. The fact that mechanical craft teachers and instructors in technical colleges in South-East Nigeria needed practical skill improvement for teaching shaping practice means that mechanical craft teachers and instructors need to undergo training and development programme on how to use shaping machines to generate flat surfaces, inclines and even curved surfaces.

In addition, the study revealed that there was no significant difference between the mean responses of mechanical craft teachers and instructors on practical skill improvement needs for teaching shaping practice in technical colleges South East, Nigeria. This finding means that mechanical craft teachers and instructors in technical colleges in South-East Nigeria shared the same position on practical skill improvement needs for teaching shaping practice. This finding supports, Saue (2020) who reported no significant difference in the mean responses of the technical teachers and instructors on skill improvement needs of technical teachers in shaping practice in technical colleges. The researcher is of the opinion that mechanical craft teachers and instructors need practical skill improvement for teaching shaping practice because they lack the technical skills to teach students how to operate shaper machines in technical colleges in South-East Nigeria.

The study revealed that mechanical craft teachers and instructors in technical colleges in South-East Nigeria need practical skill improvement for teaching planning and slotting practice. The study reported that mechanical craft teachers and instructors in technical colleges in South-East Nigeria needed practical skill improvement in the ability to avoid flying chips while using the planning and slotting machine, carry out simple maintenance on

planning and slotting machine, firmly bolt the job on the planning and slotting machine table, carry out repairs on planning and slotting machine, use fixtures to hold work on the planer and use jigs to hold work on the planer. The findings concur with Maliki, Yashim and Jamous (2022) which reported that teachers and instructors needed practical skill improvement in planning and slotting. The fact that mechanical craft teachers and instructors in technical colleges in South-East Nigeria needed practical skill improvement for teaching planning and slotting practice means that mechanical craft teachers and instructors need capacity building in using planer machines to smoothen an entire surface of a work piece to create inclined surfaces.

Furthermore, the outcome of the study revealed that there was no significant difference between the mean responses of mechanical craft teachers and instructors on practical skill improvement needs for teaching planning and slotting practice in technical colleges South East, Nigeria. This finding corresponds with the work of Aleru and Logbene (2021) which reported no significant difference between the mean responses of mechanical craft teachers and instructors on planning and slotting needs of mechanical engineering craft practice teachers and students for entrepreneurship development. The researcher is of the opinion that skill improvement needs in planning and slotting is an important skill needed by mechanical craft teachers and instructors in technical colleges because planning and slotting operations are highly needed by fabrication and welding craftsmen in the industry

Conclusion

From the findings of this study, it is concluded that mechanical craft teachers and instructors in technical colleges in South-East Nigeria need practical skills improvement in shaping and planning and slotting practices in order to adequately teach the relevant practical skills required by students to have better understanding of machines in the industrial workplace upon graduation.

Recommendations

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

1. Mechanical craft teachers and instructors should attend workshops/seminars regularly to keep abreast with the current happenings in shaping and planning and slotting practices in order to adequately prepare their students for effective performance in machine shops
2. The skill improvement in shaping and planning and slotting practices needed by mechanical craft teachers and instructors should be integrated into mechanical engineering craft practice by curriculum planners in technical colleges to enable teachers acquire practical machining skills required in machine shops
3. Administrators of technical colleges in South-East Nigeria should through the science and technical schools management board, set in motion a process for providing in-service training to mechanical craft teachers and instructors who need skill improvement in shaping and planning and slotting practices.
4. Technical colleges in South-East Nigeria should foster closer ties with industries to enable students acquire practical shaping and planning and slotting practices skills since technical schools may not have all the needed facilities and machines for learning these skills.

References

Abusomwan, S.B., & Osaigbovo, L. (2020). Competency improvement needs of teachers of brick/blocklaying and concreting works. *Journal of Education and Learning, 14*(4), 517-524

Aleru, P.D., & Logbene, L.V. (2021). Assessment of mechanical skills need of technical college students for entrepreneurship development in Rivers State. *International Journal of Contemporary Academic Research, 2*(2) 29-43

Ali, A.M., Yashim, Y., & Chimen, S.J. (2022). Skill improvement needs of technical teacher's in teaching planer, and grinding machines operations in technical colleges in Kaduna State. *Journal of Innovative Social Science & Humanities Research, 22(*6), 273 – 286

Amaechi, J.O., & Thomas, C.G. (2021). Innovative machine practice skills for mechanical engineering trades students self-reliance in a post covid-19 economy in Rivers State. *International Journal of Advances in Engineering and Management, 3*(12),14-21

Bassey, I.S., & Saue, B.P. (2021). Capacity building skills need of mechanical engineering crafts practice students for sustainable livelihood in post Covid -19 pandemic era in Rivers state. *The Colloquium, 9*(1), 72 - 78

Beako, T.Y. (2018). Work skills needed of undergraduate students of motor vehicle mechanic to maintain clutch assembly in university mechanical workshops in Rivers State, *Journal of Annals of Technology Education Practitioners Association of Nigeria, 1*(1), 149-15

Ede, E.O., & Ariyo S.O. (2015). Competency improvement needs of metalwork teachers in the use of computer numerically controlled machine tools in technical colleges in Oyo State Nigeria. *Journal of Educational Policy and Entrepreneurial Research, 2*(7), 19-27

Ehimen, T.E., & 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), 78 – 84

Elisha, N.E. (2014). Innovative strategies for enhancing study of mechanical/metalwork technology in Nigerian higher education institutions. *International Journal of Scientific Research and Education 2*(11), 2391-2399

Ezugu, L.C., Bala, A.A., & Muhammad, Z.K. (2023). Technical skills improvement needs of electrical installation and maintenance work trade teachers for effective teaching in technical colleges in Kano State. *International Journal of Multidisciplinary Research and Growth Evaluation, 4*(6), 425-431

Kama, J.D. (2018). Perceived Entrepreneurial Skills required by the graduates of mechanical engineering craft practice of technical colleges in Nigeria. *Journal Annuals of Technology Education practitioners Association of Nigeria,1*(1), 35 – 43.

Maliki, A.A. (2015). *Skill improvement needs of technical teachers in machine operations in technical colleges in Kaduna State*. Unpublished masters' thesis, Department of Vocational Teacher Education, University of Nigeria, Nsukka

Maliki, A.A., Yashim, Y., & Jamous, C.S. (2022). Skill improvement needs of technical teacher's in teaching planer, and grinding machines operations in technical colleges in Kaduna State. *Journal of Innovative Social Sciences & Humanities Research, 20*(6), 273 – 286

National Board for Technical Education (NBTE) (2014) *National Technical Certificate Examination (craft level) Syllabus for engineering trades based on the NBTE Modular Curricular.* Kaduna. NBTE

Nnodim, K.A., & Quintus, C.I. (2023). Suitability of mechanical engineering craft practice skills for self-reliance among students in technical colleges in Rivers State. *Journal of Contemporary Science and Engineering Technology, 2*(2)1-10

Nworgu, B.G. (2015). *Educational research: Basic issues and methodology*. Nsukka: University Trust Publishers

Ogbonna, G.N. (2020). Technical education skill improvement needs and ethics required by technical teachers for machine shop operation in Enugu State. *International Journal of Educational Benchmark, 17*(1),1 – 10

Okwelle, P.C., Beako, Y.T., & Ojotule, I.D. (2019). Mechanical craft practice trade facilities and competencies required for soaring sustainable national productivity in Rivers State. *European Journal of Educational and Development Psychology, 7*(3), 46-55

Olaitan, S.O., & Ndomi, B.M. (2000). *Vocametrics*. Onitsha- Nigeria: Cape Publisher International Limited

Saue, B.P. (2020). *Assessment of mechanical engineering craft practice skill needs for graduates employability in technical colleges in Rivers State*. Unpublished masters' thesis, Ignatius Ajuru University of Education Port Harcourt, Rivers State.

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, 5*(8), 153-154

Yekinni, S.A. (2016). Management of electrical/electronics workshop accident in technical colleges in Oyo and Ogun States Nigeria. *Journal of Information Engineering and Applications, 6*(9),1 - 10