Benue State University
Journal of Education
(BSUJE).
Vol. 18 N0.1
© 2018
(pp 36-47)

SKILLS IMPROVEMENT NEED OF WOODWORK TEACHERS IN TECHNICAL COLLEGES OF KANO STATE, NIGERIA

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Abstract
The study on "skills improvement need of woodwork teachers in Technical Colleges of Kano state" was influenced by the great concern about the future and continuity of woodwork as a skill oriented course which equips learners with relevant life skills. Three research questions guided the study. Descriptive survey research design was adopted and the population was 36 woodwork teachers. A structured questionnaire consisting of 71 items was developed and used for data collection. Mean and standard deviation were used to answer research question one and two while z-test analysis was used to establish the skills improvement need for research question three. The findings revealed that the teachers need re-training in construction of wooden articles. It was recommended that teachers should regularly be sent on professional courses and engage in commercial activities to update and boost their competencies in skills for teaching activities in schools workshops.

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Introduction

Technical Colleges are one of the principal technical and vocational institutions saddled with the responsibility for training craftsmen in Nigeria. These institutions play vital roles in Technological development in Nigeria. They are designed to offer theoretical and practical education for the acquisition of skills as well as basic scientific knowledge at the secondary school level (National Board for Technical Education, 2001). Technical Colleges are established to train craftsmen for industry as well as making individuals to be self-employed and create jobs in the struggle towards technological advancement.

The curricula of Technical Colleges are centred on craft/engineering trades and agriculture which includes Agric-Mechanisation, Motor-mechanics, Building Construction, Electrical Installation, Metalwork, Plumbing, and Woodwork among others. Following the establishment of more industries in Kano State, there is increased demand of technicians and craftsmen which led to the establishment of more Technical Colleges where woodwork trade is taught.

Woodwork trade is referred to as activity that involved skills for the production and servicing of wooden articles. According to Hornby (2000), woodwork is also seen as the activity or skill of making objects from wood by woodwork craftsmen. It is an integral part of Technical Vocational Education and Training (TVET) programme. It is one of the vocational trades offered in Technical Colleges of Kano State. Okwori, Adamu and Odo, (2013) stated that, training students in wood trade should be geared towards achieving the aims and objectives of the programme which include:

i. To secure employment at the end of the programme as craftsman.
ii. Set up their own businesses and become self-employed and able to employ others.
ii. Pursue further education in advanced craft technical programme or in tertiary technical institutions.

Federal Republic of Nigeria (2004) identified areas of woodwork as follows: carpentry and joinery, furniture making and upholstery. The emphasis of government on skills acquisition led to the establishment of institutions that emphasise skills acquisition at all levels of educational system (Ogbu, 2007). Among these institutions are the Technical Colleges that are expected to have workshops for various trades offered and must be well equipped as to enable the transfer of practical skills to the learners for construction of wooden projects.

Workshop is a work area with fixed or portable metal or wood-working machineries where the primary function is to fabricate or machine materials. According to Jibril (2011), a workshop is an area, room or building where machines, equipment, hand tools, work benches and materials are used in the manufacturing or repairing of things. A wood workshop is a building where tools, machines and wood materials are used in the production of wooden articles under the guidance of woodwork teacher.

To improve the teachers abilities, workshops are expected to be well equipped and coordinated to enable woodwork teachers teach woodwork skills effectively. Abba (2008) expressed that woodwork technology by its nature, requires the establishment of uniformity of working conditions, operation and motion sequences, materials, workshop arrangement, tools and equipment for teachers to carry out their duties effectively. Nwokolo (2006) opined that teacher's activities in wood workshops include: the effective use of hand tools; operation of machines; supervision of student's activities; demonstration and maintenance of tools and equipment. Teachers' and students' activities in wood workshops are solely on skill transfer that make individual acquire manipulative techniques for self-reliance.

Skill is the capability of accomplishing a job with precision of certainty, practical knowledge in combination with ability, cleverness and expertness (Abdullahi, 2010). This shows

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that skill is applicable in every field of human activities. Acquisition of skills is therefore necessary especially in teaching woodwork trade that involves instructive and manipulative skills. To increase the chances for self-reliance and employability, woodwork teachers must help students to acquire skills that are flexible and relevant to the demands of the present day. If such diverse expectations are to be met, substantial improvements are required. Woodwork trade teachers responsible for preparing the skilled personnel should possess the necessary skills for the construction of wooden projects in terms of preparation of timber to size, marking-out and cutting of wood joints. Other skills needed in the production of woodwork project involves application of adhesive and assembling, finishing techniques and maintenance of tools and equipment, which are the foundation of skills development in woodwork practice.

A woodwork project refers to an article made from wooden materials by a woodworker that required being prepared to specification to give the desired size, shape and colour for a specific purpose. The part members are needed to be prepared by planing of faces and edges and cutting off ends. Planing is the smoothing of surfaces and edges of rough sawn timber by taking off shavings with planes or machines (Walton 1976). It is the removing of imperfections on the piece of rough sawn wood to make it smooth and attractive. Cutting also describes the action of a saw which separates wood fibres in the process of cutting wood, (John, 1994). This is necessary for a perfect joint to be made. Joints in woodwork are devices for holding parts of wooden structures together firmly (Sackey, 1999). It involved cutting of members to fit into each other according to the type and method of assembling. They are collected together to make a whole, using bonding substances. To make the body more attractive, decorative and protected, the surface has to take place by a process called finishing with brush, spray or roller. Choosing a particular finish is influenced by the function of the project. The continuous use of woodwork tools render them inefficient to perform optimally, as such maintenance is required. It is carried out as a supporting service on any device to prolong its serviceable life (Parrish, 1973). It involves the systematic supply of necessary materials for the continuous operation of given equipment which includes; lubricants, grease, fluid and water. Therefore, it is important for a woodworker to possess these skills to enable him pass same to the learners for effective learning in wood workshop.

These skills are seems to be lacking by the woodwork teachers of Technical Colleges in Kano state judging by the poor performance of craftsmen in practical aspect of the trade. Although the state government has done much to improve the quality of training given to wood craft practice students by establishing new Technical Colleges and procuring tools and equipment. Ogundeji (2002), opined that the problem facing technical institution in Nigeria is that of production of unskilled technical personnel who cannot function effectively in the society. Ogundeji further stressed that, the above situation is attributed to lack of skills on the part of technical teachers or they are weak in teaching practical skills in their school wood workshops. It is on the basis of these inadequacies that the researcher seeks to determine the skills improvement need of woodwork teachers in Technical Colleges of Kano state.

Research questions

The following research questions guide the study:

i. What are the skills required by woodwork teachers in construction of woodwork projects in Technical Colleges of Kano state, Nigeria?

ii. What are the skills possessed by woodwork teachers in construction of woodwork projects in Technical Colleges of Kano state, Nigeria?

iii. What are the skills improvement needs of woodwork teachers in

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construction of woodwork projects in Technical Colleges of Kano state, Nigeria?

Methodology

Descriptive survey research design was adopted for the study. According to Nworgu, (1991), descriptive survey is a study in which a group of people or items are studied by collecting and analyzing data from the target group. The study was carried out in 28 Government Technical Colleges of Kano state offering Woodwork trades. Kano state is situated at 11.99° North latitude, 8.51° East longitude and 479 meters above sea level. These schools were selected because their products are weak in the aspect of practicing their trades and they are responsible for training and producing wood craftsmen for industrial purposes across the state that required being skilful in the production and services of wooden structures. The population of the study consists of 36 woodwork trade personnel in Government Technical Colleges of Kano state. The entire population of woodwork teachers was used as they are not many. Hence, there was no sampling. A structured questionnaire was developed by the researcher titled: "Skills Improvement Need of Woodwork Teachers (SINWT) Questionnaire". Woodwork trade teachers from the Technical Colleges were the respondents. Five points rating scale of measurement was used to guide the respondents in expressing their view on each item of the instrument. Section A of the instrument consists of 71 items which seek information on skills required by woodwork teachers with response options of Highly Required (HR) – 5, Required (R) – 4, Moderately Required (MR) – 3, Not Required (NR) – 2 and Undecided (U) – 1. Section B also contains 71 items dealing with skills possessed by woodwork teachers with response options of Highly Possessed (HP) – 5. Possessed (P) – 4, Moderately Possessed (MP) – 3, Not Possessed (NP) – 2 and Undecided (U) – 1.

The instrument for data collection was validated by three experts and pilot tested on seven woodwork teachers in Jigawa state which is not part of the area of study. The researcher adopted a test-retest technique and the two results correlated using Pearson's Product Moment Correlation Coefficient (PPMC). The reliability coefficient of the instrument was found to be 0.75. The questionnaire was administered on the respondents by the researcher with the help of three research assistants. Data collected was analysed using mean and standard deviation to answer the research questions. Decision rule on respondents' mean was based on theory of true class limit of numbers presented by Spiegel (1972).

Table 1. Real limits of number value for the five points scale.

Response scale	Numerical value limits	
	Lower	Upper
Highly Required/Highly Possessed	4.5	5.00
Required/Possessed	3.5	4.49
Moderately Required/Moderately Possessed	2.5	3.49
Not Required/Not Possessed	1.5	2.49
Undecided	0.5	1.49

Spiegel (1972).

Results

Research Question One

What are the Skills Required by Woodwork Teachers in Construction of Woodwork Projects in Technical Colleges of Kano State, Nigeria?

Research Question Two

What are the Skills Possessed by Woodwork Teachers in Construction of Woodwork Projects in Technical Colleges of Kano State, Nigeria?

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Table 2: *Mean responses of* respondents on skills required and skills possessed by woodwork teachers in construction of woodwork projects in Technical Colleges of Kano state, Nigeria.

S/N	ITEM	Skills Required			Skills Possessed		
		$\bar{x}_1$	SD_1	Remark	$\bar{x}_2$	SD_2	Remark
	Preparation of Timber To Size						
	Skills in Hand Sawing						
1.	Ability to observe tools safety precautions.	1.86	0.68	NR	4.14	0.54	P
2.	Ability to select the right saw for a particular type of sawing.	1.78	0.64	NR	4.19	0.71	P
3.	Ability to measure and mark out line.	2.03	0.51	NR	4.42	0.55	P
4.	Ability to use the right holding device before sawing.	1.75	0.69	NR	4.39	0.49	P
5.	Holding the saw with the fore finger straight out on one side of the handle.	1.69	0.62	NR	4.00	0.68	P
6.	Ability to guide the initial strokes using thumb.	1.58	0.50	NR	4.14	0.54	P
7.	Ability to maintain proper sawing angle between the saw and the work piece.	2.22	0.42	NR	4.19	0.71	P
8.	Applying moderate pressure while sawing.	2.19	0.67	NR	4.42	0.55	P
	Skills in hand planning						
9.	Ability to observe tools safety precautions.	4.14	0.54	R	1.86	0.68	NP
10.	Ability to select the right plane for a particular operation.	4.19	0.71	R	1.78	0.64	NP
11.	Ability to adjust blade to correct level of cutting edge.	4.42	0.55	R	2.03	0.51	NP
12.	Ability to select the " - side" ——	4.39	0.49	R	1.75	0.69	NP
13.	Ability to use winding stick and try square to test for flatness and squareness on a piece of wood.	4.00	0.68	R	1.69	0.62	NP
14.	Ability to take and transfer the correct measurement using marking gauge.	4.08	0.50	R	1.81	0.40	NP
15.	Ability to plane end of wood square to faces and edges.	4.25	0.73	R	2.42	0.50	NP
	Skills in Preparation of wood using machine tool						
16.	Ability to observe machines safety precautions.	4.42	0.55	R	2.19	0.67	NP
17.	Mastering the sequence of machine operations.	4.39	0.49	R	2.19	0.67	NP

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18.	**Ability to set the length of cut on the cross cutting machine.**	**4.00**	**0.68**	**R**	**1.58**	**0.50**	NP
19.	Ability to set the depth of cut correctly with the adjustment lever on jointer.	4.33	0.53	R	2.22	0.42	NP
20.	Ability to use try square in checking the squareness of the fence to the table.	4.22	0.59	R	2.31	0.62	NP
21.	Ability to feed the stock evenly on planer.	4.11	0.57	R	2.39	0.49	NP
	Skills in construction of woodwork joints						
22.	Ability to interpret working drawings.	4.42	0.55	R	2.33	0.68	NP
23.	Ability to mark out joints to specifications.	1.86	0.68	NR	4.31	0.52	P
24.	Ability to set sliding bevel when marking out dovetail joint.	1.78	0.64	NR	4.33	0.48	P
25.	Ability to use backsaws in cutting out waste.	2.03	0.51	NR	4.00	0.68	P
26.	Ability to use chisel and mallet with correct force to remove waste.	1.75	0.69	NR	4.33	0.53	P
27.	Ability to label a couple of joint.	1.69	0.62	NR	4.14	0.54	P
28.	Ability to trial assembly of project.	1.58	0.50	NR	4.19	0.71	P
	Skills in application of adhesives and assembling of wood projects						
29.	Ability to interpret working drawings.	4.06	0.83	R	1.86	0.68	NP
30.	Trial assembling of the project.	4.56	0.50	HR	1.78	0.64	NP
31.	Ability to select the right adhesive according to the purpose and type of wood.	3.86	0.49	R	2.31	0.58	NP
32.	Ability to mix adhesive to the required viscosity.	4.42	0.50	R	1.75	0.69	NP
33.	Ability to consider the amount of force t he adhesive would be subjected to.	4.03	0.74	R	1.69	0.62	NP
34.	Ability to understand the glue pot life, open time, closed time and clamping time.	4.17	0.61	R	1.58	0.50	NP

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35.	**Choosing/using the right glue applicator.**	**4.28**	**0.51**	**R**	**2.14**	**0.35**	**NP**
36.	Ability to apply sufficient adhesive on surfaces to be bonded.	4.39	0.49	R	2.31	0.67	NP
37.	Ability to select and use correct cramps.	4.08	0.60	R	2.03	0.56	NP
38.	Ability to select and use correct scrap blocks when assembling projects.	4.00	0.68	R	1.78	0.64	NP
39.	Ability to sub -assemble large projects.	4.19	0.71	R	2.03	.51	NP
40.	Ability to remove excess adhesive using soft, clean and wet cloth.	4.50	0.51	HR	1.75	0.69	NP
41.	Ability to test the squareness of the work before final cramping.	4.39	0.49	R	1.69	0.62	NP
42.	Ability to assemble a job using screws and nails.	4.17	0.65	R	1.58	0.50	NP
43.	Ability to use mechanical screwdriver.	4.33	0.53	R	2.33	0.48	NP
44.	Ability to use mechanical hammer.	4.06	0.63	R	2.19	0.67	NP
	Skills in wood finishing						
45.	Ability to use scraper/sand paper in removing dry adhesive from the surfaces.	4.19	0.71	R	1.86	0.68	NP
46.	Ability to raise dent with hot water and sponge.	4.42	0.69	R	1.78	0.64	NP
47.	Ability to remove grease and oils from the surface before applyin g finishes.	4.42	0.55	R	2.03	0.51	NP
48.	Ability to apply wood filler to patch nails holes, scratches and cracks with right material.	4.25	0.60	R	1.75	0.69	NP
49.	Ability to sand the work with abrasives using proper grades of sanding paper.	4.19	0.71	R	1.69	0.62	NP
50.	Ability to remove dust by brushing or by using air blower.	4.44	0.56	R	1.58	0.50	NP
51.	Ability to apply sanding sealer on surfaces.	4.47	0.51	R	2.33	0.48	NP
52.	Ability to select and apply finish with brush.	3.72	0.70	R	2.19	0.67	NP
53.	Ability to use spray gun with finish.	4.33	0.53	R	1.86	0.68	NP

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54.	**Ability to select ideal air pressure (psi) when spraying.**	**4.47**	**0.56**	**R**	**1.78**	**0.64**	NP
55.	Ability to use roller correctly when applying finishes.	4.19	0.71	R	2.03	0.51	NP
56.	Ability to use the brush at appropriate angle.	4.39	0.49	R	1.75	0.69	NP
57.	Maintaining correct angle and distance when applying finishes to projects	4.47	0.51	R	1.69	0.62	NP
	Skills in maintenance of woodwork tools and equipment						
58.	Ability to observe dail y or routine maintenance on a machine before use.	4.22	0.48	R	1.58	0.50	NP
59.	Ability to remove circular saw blade.	4.39	0.55	R	2.39	0.49	NP
60.	Ability to sharpen circular saw blade.	4.47	0.65	R	2.33	0.68	NP
61.	Ability to oil and grease ball bearings.	4.50	0.56	HR	1.97	0.77	NP
62.	Ability to remove and replace planer machine blades.	4.47	0.51	R	1.92	0.69	NP
63.	Ability to oil and grease screws and slides in planer machine.	4.25	0.69	R	2.14	0.59	NP
64.	Ability to sharpen band saw blade.	4.44	0.56	R	1.92	0.77	NP
65.	Ability to repair broken band saw blade.	4.44	0.65	R	1.81	0.71	NP
66.	Ability to sharpen ripsaw teeth.	4.19	0.71	R	1.58	0.50	NP
67.	Ability to sharpen cross -cut saw teeth.	4.53	0.56	HR	2.39	0.49	NP
68.	Ability to sharpen hand plane blades.	4.56	0.50	HR	2.33	0.68	NP
69.	Ability to sharpen planer machine blades.	4.08	0.73	R	1.72	0.66	NP
70.	Ability to replace or recondition worn out tools.	4.17	0.74	R	2.31	0.47	NP
71.	Ability to store tools in the right place.	4.36	0.54	R	2.28	0.66	NP
	AVERAGE	**3.80**			**2.42**		

Key: N = Number of woodwork teachers, $\bar{x}_1$ = Mean Responses of skills required, **SD**, - Standard Deviation of skills required. $\bar{x}_2$ = Mean Responses of skills possessed, **SD**, - Standard Deviation of skills possessed.

The data in Table 2 showed the skills required and the skills possessed by woodwork teachers in construction of woodwork projects in Technical Colleges of Kano state. It revealed that the skills with mean scores between **4.50 – 4.56** were highly required while items with the mean scores between 3.72 – 4.47 were required. The teachers do not require skills in items with the mean

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scores between 1.58 – 2.22. The standard deviation for the items required was between the range of 0.42 – 0.83. It was also revealed that the teachers possessed only 14 skills with the mean scores between 4.00 – 4.42. while 57 skills with the mean scores between 1.58 – 2.42 were not possessed. The standard deviation of the woodwork teachers was between the range of 0.40 – 0.77.

Research Question Three

What are the Skills Improvement Needs of Woodwork Teachers in Construction of Woodwork Projects in Technical Colleges of Kano State, Nigeria?

This research question is answered by analyzing the mean scores of respondents on the skills required and the skills possessed using Z-test analysis.

Table 3: Z-test analysis of the mean responses of respondents on skills improvement need of woodwork teachers in construction of woodwork projects in Technical Colleges of Kano state, Nigeria.

Skills	N	$\bar{x}$	SD	df	z-value	P-value, Sig. (2-tailed)	Alpha Level	Decision
Skills Required	71	3.80	0.99					
				140	8.52	0.00	0.05	Significant
Skills possessed	71	2.42	0.94					

*Significant at p≤0.05.

The analysis in table 3 revealed the Z-test result of mean responses of woodwork teachers on the skills required and the skills possessed in construction of woodwork projects. The p-value [Sig. (2-tailed)] is less than 0.05 ($p \leq 0.05$), therefore skills improvement need exists.

Discussion of Findings

Findings in table 2 provided answer to research question one and two. The findings revealed relevant skills that are required to make woodwork teachers competent enough to transfer relevant and efficient skills to learners in construction of woodwork projects such as the ability to: prepare sawn wood to size, construct wood joints, assemble wood joints and finish a wooden project as well as maintenance of tools and equipment. This is related to the findings of Umar, (2014) who discovered that the woodwork teachers required skills for improving the construction of practical project in Technical Colleges in the State. Bakare and Fadairo (2010) observed that when the required skills are given to learners, they will be competent to work efficiently with little or no supervision. Therefore, the items found required should be taken very serious during training and re-training process of teachers to update their knowledge and skills in woodwork.

The table also presented the answers to research question two. The findings revealed the important skills that are not possessed by woodwork teacher in construction of woodwork projects. The non-possession of these important skills could be lack of training and training facilities used for teaching woodwork technology. This is supported by Umar, (2014) that the skills required by woodwork teachers in cutting, planing and joint making in wood workshops were analyzed and established as being required by the teachers. This implies that the skills are not possessed. It was also stated by Audu (2008), that the development of psychomotor skills and knowledge should be thoroughly planned to identify all teachable items that individual can possess in life for financial and psychological security.

Findings in table 3 revealed the answer to research question three. The comparison between the skills required and

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skills possessed yielded the skills gap which is the skills improvement needed by woodwork teachers in construction of woodwork projects in Technical Colleges of Kano state, Nigeria. Discrepancies exist between the items means of skills required and skills possessed as the p-value [Sig. (2-tailed)] for the skills is below the alpha-level ($p \leq 0.05$). This implies that significant differences exist between the mean responses of the skills required and the skills possessed by the woodwork teachers in construction of woodwork projects in Technical Colleges of Kano state, Nigeria.

The respondents agreed with the following items as skills improvement need in the teaching of woodwork trade to produce productive wood craftsmen so that the society receive continuous supplies of skilled labour and quality goods. Thus, abilities to; prepare wood to required size using hand and machine tools, construct a strong and durable wood joints, assemble wood projects using the right bonding agents, give a project its final appearance as well as maintenance of tools and equipment to prolong their serviceable life.

Implications of the Study

This research discovered that there is need for skills improvement as regards to preparation of timber, construction of joints, project assembly, finishing as well as maintenance of tools and equipment for construction of wooden projects in schools wood workshops. The findings on preparation of timber as bases for producing wooden articles required being improved so that proper and well angled joints can be made and assembled in the right shape and strength. Similarly, finishing and maintenance skills possessed by the teachers need to be improved to higher level for competent workshop activities.

Systematic training and re-training will improve the standard of producing wooden articles. Generally, the positive implications of re-training teachers in practical skills acquisition at high level competency cannot be over emphasized. These findings will enable NBTE to serve as an advisory to government on the need to improve the skills possessed by woodwork trade teachers for training craftsmen. It will also help the Technical Schools Board of Kano state to identify the areas of weaknesses by woodwork trade teachers and organise rigorous re-trainings for these teachers to perform effectively. This will also help the graduates to be self reliant economically and eliminate joblessness that might resort to societal unrest and economic jeopardy. The study revealed the areas that need training and re-training and the extent to which training and re-training of woodwork teachers can change both the teachers and technical graduates of woodwork.

Conclusion

Based on the findings of this study, it was concluded that woodwork trade teachers of Technical Colleges do not possessed the necessary skills in workshop teaching activities and there is need for those skills to be improved to higher level in all aspect of workshop activities to bridge the gap of their inability in diverse discipline and motivate wood-craft graduates in a direction that increase the effectiveness of their performance in labour market.

Recommendations

Based on the findings of this study, the following recommendations were made:

- Technical teachers should regularly be sent on industrial training and/or professional courses to update and improve their professional competence in techniques/skills for facilitation of teaching activities in schools wood workshops.
- A revolving fund should be voted every year by Kano state government to support the activities of wood workshop teaching activities in Technical Colleges.
- Woodwork teachers in the state should be encouraged to engage in commercial activities that will boost their skills in the production of wooden projects for students to learn.

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