

MULTILINGUAL ACADEMIC JOURNAL OF EDUCATION AND SOCIAL SCIENCES



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To Link this Article: <http://dx.doi.org/10.6007/MAJESS/v1-i2/7361>

DOI: 10.6007/MAJESS/v1-i2/7361

Received: 22 August 2013, Revised: 22 September 2013, Accepted: 08 October 2013

Published Online: 20 October 2013

In-Text Citation: (Okwori et al., 2013)

To Cite this Article: Okwori, R. O., Adamu, M. M., & Moses, O. I. (2013). Evaluation of Practical Skills Possessed by Woodwork Graduates of Technical Colleges in Niger State, Nigeria. *Multilingual Academic Journal of Education and Social Sciences*, 1(2), 138–148.

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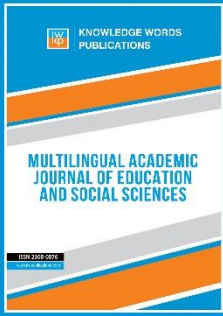
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Vol. 1, No. 2, 2013, Pg. 138 - 148

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Evaluation of Practical Skills Possessed by Woodwork Graduates of Technical Colleges in Niger State, Nigeria

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Abstract

The study identified practical skills possessed by woodwork graduates of Niger state technical colleges in using woodworking machines, hand tools and consumables. Three research questions were answered and two hypotheses tested at 0.05 level of significance. A survey research design was adopted for the study. A structured questionnaire was used to gather data from one hundred and two respondents. Simple random sampling was applied to identify the study sample. Mean rating was used to answer research questions, t- test statistics was used to test the hypotheses. Cronbach Alpa Formula was used to determine reliability coefficient of the instrument. The reliability coefficient of the instrument was found to 0.81. The findings of the study showed that Woodwork graduates of technical colleges in Niger State used all the woodworking machines listed except band saw machine, tenoning machine, mortiser and thicknesser. They used all the hand tools such as hammer, screw driver, hand plane, electric jig saw, scraper, pincer, plier, try square and spanner. It was recommended that State Government should provide modern machines for improving practical skills of woodwork students and Woodwork teachers should teach students how to apply formica on wood surfaces.

Keywords: Evaluation, Practical Skill, Woodwork, Technical College.

Introduction

Wood is a hard, tough substance that forms the trunk of a tree. Technically, the term *wood* includes other parts of the tree such as the roots and branches. The process of working with wood is called woodwork. According to Hornby (2000), woodwork is also seen as the activity or

skill of making objects from wood by woodwork craftsmen. Woodwork has areas of specialization and these include carpentry, joinery, cabinet making and wood machining. FRN (2004) identified areas of woodwork as follows: Upholstery, carpentry and Joinery, wood machines and furniture making. There are six state Technical Colleges in Niger State and one of them is Federal Technical College. These science and technical colleges run various trade courses including woodwork, Metalwork practice, Block laying and Concreting, Electrical Installation and Maintenance Practice, painting and Decorating etc. Students admitted into these trade courses spend three (3) years in school for the award of National Technical Certificate (NTC) after completion of the course. Holders of this certificate are grouped as craftsmen.

In order to evaluate technical colleges in Nigeria, National Business and Technical Examination Board, (NABTEB) came into existence in 1992 to conduct examination leading to the award of the National Technical certificate (NTC), National Business Certificate (NBC), Advanced National Technical Certificate (ANTC) and Advanced National business Certificate (ANBC).

A woodwork graduate of technical college should be capable of independent work; they should interpret technical drawing and perform all the calculations relating to his/her trade. He/she should also have sufficient knowledge of elementary science to understand the materials in which he works with. Therefore, training in technical colleges should be geared towards achieving the aims and objectives of the program which include:-

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

Evaluation is the process of determining the extent of change in learners' behaviour after teaching him/her a particular skill or area of knowledge. In assessing learner performance in technical education such as woodwork, either process or product evaluation or combinations of both methods are used. In science and technical colleges, during the period of training, students were involved in practical projects and subjected to process and product evaluation by their teachers to determine their level of proficiency in practical skill acquisition. However, ultimate evaluation determines how well the individual performs in their place of employment after graduation (Okoro, 2000). It is obvious that the importance of this level of manpower to the development of Niger state and Nigeria in general cannot be under estimated. Therefore, it is essential to know how woodwork graduates produced by technical colleges in Niger state perform in their places of employment after graduation.

The quest for functional education that will stimulate national development and empowerment of the citizen is very essential. The introduction of woodwork in technical colleges is to encourage the acquisition of practical skills by students to use their hands in making and repairing items that are made of wood. It has been observed that there are unemployed woodwork graduates from technical colleges in Niger State while the products of such colleges by the aim and objectives of the programme is to make the graduates be self-employed and employer of labour. As a result of this ugly situation, the researchers wonder whether this could be attributed to lack of practical skills acquired in the use of woodworking machines or hand tools during the period of their training while in the school.

Purpose of the Study

The purpose of the study is to evaluate the woodwork graduates produced by technical colleges in Niger State. Specifically, this study sought to:

1. Find out the level of skillfulness of woodwork graduates produced by Niger State technical colleges in using woodworking machines.
2. Find out the level of skillfulness of woodwork graduates produced by Niger state technical colleges in using consumable materials.
3. Determine the dexterity in the use of woodworking hand tools by woodwork graduates produced by Niger state technical colleges

Research Questions

The following research questions were developed for the purpose of this study.

1. What are the levels of skillfulness of woodwork graduates produced by Niger state technical colleges in using woodworking machines?
2. What are the levels of skillfulness of woodwork graduates produced by Niger state technical colleges in using consumable materials?
3. Which of the woodworking hand tools effectively used by woodwork graduates produced by Niger state technical colleges?

Hypothesis

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

1. There is no significance difference between the mean responses of woodwork graduates of technical colleges in Niger state and Head of woodwork sections in using woodworking machines.
2. There is no significance difference between the mean responses of woodwork graduates of technical colleges in Niger state and Head of woodwork sections in using woodworking hand tools.

Methodology

In carrying out this study, survey research design was used Yalams and Ndomi (2000) defined survey research as the gathering of information about a large number of people or objects by studying a representative sample of the entire group through the use of questionnaires. Therefore, survey research design was found suitable since it sought information from the sample that was drawn from a population using questionnaire. The study was conducted using the three zones of Niger State. The population for this study was made up of 137 Woodwork graduates of technical colleges and 24 Heads of Woodwork sections in Niger State. The sample of the study was drawn from Ministry of Works, maintenance section of Niger state General Hospitals, Technical Colleges and Works Department of local Government council (secretariat) in the three zones in Niger State. The researchers used these organizations because these are areas where most woodwork graduates of science and technical college work. A Simple Random Sampling (SRS) was employed in the selection of the respondents. The total of one hundred and twenty (120) respondents were sampled and used for the study. This method was used to give equal chance of selecting the organizations and respondents. The instrument used for data collection was a structured questionnaire developed by the researchers. It consisted of three

sections A, B and C . All items were responded to using four point rating scales. Section A contains eight items on the level of skilfulness of woodwork graduates produced by Niger State technical Colleges in using Woodworking Machines. Section B also contains eight items which deals with the level of skilfulness of woodwork graduates produced by Niger State technical Colleges in using Consumable Materials. Section C contains ten items which deals with the Woodworking hand tools used effectively by Woodwork graduates produced by Niger State technical Colleges. The instrument for the data collection was designed by the researchers and was validated by three Lecturers of Woodwork Technology option of Industrial and Technology Education Department, Federal University of technology, Minna to ascertain the appropriateness of the questionnaire items before administering it to respondents.

The instrument for the study was subjected to pilot test using five woodwork graduates of Government technical college, Bukuru, Plateau State working with Ministry of Works, Jos and Federal Ministry of Works, Jos. Two Head of woodwork Sections were also used. These respondents do not form part of the study. The reliability coefficient of the instrument was determined using Cronbach Alpa Formula. The internal consistency of the instrument was found to be 0.81. The instrument for the study was administered to the respondents by the researchers and one research assistants. The data were analyzed using mean. The hypotheses were tested using t- test statistics. The mean was used to determine the degree of acceptance or rejection of questionnaire items, while t- test was used to test the hypotheses at 0.05 level of significance. The mean of 2.50 was used as decision point for every questionnaire item. Consequently, any item with a mean response of 2.50 and above was considered agreed and any item with a mean response of 2.49 and below was equally considered as disagreed. Also the t- test was used to test the hypothesis at 0.05 level of significant to compare the mean response of the groups. A critical value of ± 1.96 was used based on the degree of freedom at 0.05 level of significant. Therefore, any item with t- calculated value less than the critical value was regarded as not significant. While any item with calculated value equal or greater than the critical value was regarded as significant.

Results and Discussion

Research Question 1

What are the levels of skillfulness of woodwork graduates produced by Niger state technical colleges in using woodworking machines?

Table 1: Mean responses of the level of skillfulness of woodwork graduates produced by Niger state technical colleges in using woodworking machines

N₁ = 19, N₂ = 101					
S/NO	ITEMS	\bar{X}_1	\bar{X}_2	\bar{X}_T	REMARK
1.	Woodwork graduates used Drilling machine for boring hole on a wood surface accurately	3.00	2.23	2.62	Agreed
2.	Woodwork graduates used Band saw machine for making curve shapes on wood surface perfectly	2.14	2.36	2.25	Disagreed
3.	Woodwork graduates used Jigsaw machine for making curved shapes on wood surface accurately	2.57	2.45	2.51	Agreed
4.	Woodwork graduates used Circular saw machine for ripping wood perfectly	2.28	2.70	2.49	Disagreed
5.	Woodwork graduates used Thicknesser for reducing the size of a piece of wood accurately	2.57	2.34	2.46	Disagreed
6.	Woodwork graduates used Mortising machine for making mortise joint on wood perfectly	1.71	2.20	1.96	Disagreed
7.	Woodwork graduates used Tenoning machine for making tenon joints on wood perfectly	1.86	2.19	2.03	Disagreed
8.	Woodwork graduates used Planning machine for planning wood surfaces accurately.	2.71	2.73	2.72	Agreed

Key: N₁ = Woodwork Head of sections, N₂ = Woodwork graduates, \bar{X}_1 = Mean of response of Woodwork Head of sections, \bar{X}_2 = Mean of response of Woodwork graduates, \bar{X}_T = Average mean of responses of the level of skillfulness of woodwork graduates produced by Niger state technical colleges in using consumable materials.

The analysis of mean responses of the two groups of respondents in table 1 revealed that the respondents agreed with item 1, 3, 8 and disagreed with items 2, 4, 5, 6 and 7.

Research Question 2

What are the levels of skillfulness of woodwork graduates produced by Niger state technical colleges in using consumable materials?

Table 2: Mean responses of the levels of skillfulness of woodwork graduates produced by Niger state technical colleges in using consumable materials.

		N₁ = 19, N₂ = 101			
S/NO	ITEMS	\bar{X}_1	\bar{X}_2	\bar{X}_t	REMARK
1.	Woodwork graduates applied glue on wood surfaces to be joined very well	3.14	3.18	3.16	Agreed
2.	Woodwork graduates applied Sanding sealer on wood surface for finishing process perfectly	2.71	3.46	3.09	Agreed
3.	Woodwork graduates used Glass paper for smoothing wood surface perfectly	3.00	2.72	2.86	Agreed
4.	Woodwork graduates used formica to cover wood surface perfectly	2.71	2.03	2.37	Disagreed
5.	Woodwork graduates fixed Hinges to door and cabinets perfectly	3.29	3.54	3.42	Agreed
6.	Woodwork graduates Nailed wood during rafter construction perfectly	2.86	3.26	3.06	Agreed
7.	Woodwork graduates fixed handles perfectly	3.00	2.38	2.69	Agreed
8.	Woodwork graduates selected the right type of fabric material for upholstery work perfectly	3.00	2.37	2.69	Agreed

Key: N₁ = Woodwork Head of sections, N₂ = Woodwork graduates, \bar{X}_1 = Mean of response of Woodwork Head of sections, \bar{X}_2 = Mean of response of Woodwork graduates, \bar{X}_t = Average mean of responses of the level of skillfulness of woodwork graduates produced by Niger state technical colleges in using consumable materials.

The data in table 2 revealed that items 1,2,3,5,6,7,8 were accepted while item 4 were rejected by respondents.

Research Question 3

Which of the woodworking hand tools are effectively used by woodwork graduates produced by Niger state technical colleges?

Table 3: Mean responses of the woodworking hand tools effectively used by woodwork graduates produced by Niger state technical colleges.

		N₁ = 19, N₂ = 101			
S/NO	ITEMS	\bar{X}_1	\bar{X}_2	\bar{X}_t	REMARK
1.	Hammer	4.00	3.86	3.93	Agreed
2.	Screw drivers	2.71	2.63	2.67	Agreed
3.	Hand planner	3.29	3.38	3.34	Agreed
4.	Jig saw	3.29	3.86	3.58	Agreed
5.	Scraper	3.00	2.00	2.50	Agreed
6.	Pincer	3.43	2.72	3.08	Agreed
7.	Pliers	2.57	2.31	2.44	Agreed
8.	Spanner	2.43	2.40	2.42	Agreed
9.	Jack saw	3.43	3.67	3.55	Agreed
10.	Try square	3.57	2.60	3.09	Agreed

Key: N_1 = Woodwork Head of sections, N_2 = Woodwork graduates, \bar{X}_1 = Mean of response of Woodwork Head of sections, \bar{X}_2 = Mean of response of Woodwork graduates, \bar{X}_t = Average mean of responses of the level of skilfulness of woodwork graduates produced by Niger state technical colleges in using consumable materials.

The analysis in table 3 disclosed the two groups of respondents agreed with all the items.

Testing Hypothesis: Two hypotheses were tested as part of the study at 0.05 level of significance.

H_{O1} : There is no statistical significance difference between the mean responses of respondents on the level of skilfulness of woodwork graduates and Head of sections in using woodworking machines.

The result of the test of significance difference in mean responses of respondents on the levels of skilfulness of woodwork graduates and Head of sections in using woodworking machines is presented in Table 4.

Table 4: T– test statistical Analysis of the levels of skilfulness of woodwork graduates and Head of sections in using woodworking machines.

							$N_1 = 19, N_2 = 101$
S/NO	ITEMS	SD_1	SD_2	t- cal	REMARK		
1.	Woodwork graduates used Drilling machine for boring hole on a wood surface accurately	1.07	0.39	1.90	S		
2.	Woodwork graduates used Bandsaw machine for making curve shapes on wood surface perfectly	1.12	0.98	- 0.42	NS		
3.	Woodwork graduates used Jigsaw machine for making curved shapes on wood surface accurately	1.40	1.17	0.19	NS		
4.	Woodwork graduates used Circular saw machine for ripping wood perfectly	0.88	1.10	- 0.19	NS		
5.	Woodwork graduates used Thicknesser machine for reducing the size of a piece of wood accurately	0.50	1.13	0.77	NS		
6.	Woodwork graduates used Mortising machine for making mortise joint on wood perfectly	0.88	1.20	-1.09	NS		
7.	Woodwork graduates used Tenoning machine for making tenon joints on wood perfectly	0.99	1.13	- 0.69	NS		
8.	Woodwork graduates used Planning machine for planning wood surfaces accurately	0.70	1.15	- 0.05	NS		

Key: N_1 = Woodwork Head of sections, N_2 = Woodwork graduates, \bar{X}_1 = Mean of response of Woodwork Head of sections, \bar{X}_2 = Mean of response of Woodwork graduates, \bar{X}_t

= Average mean of responses of the level of skilfulness of woodwork graduates produced by Niger state technical colleges in using consumable materials.

The analysis in table 3 disclosed the two groups of respondents agreed with all the items.

Table 5 revealed that the t –test accept the null hypothesis only for items 2, 3, 4, 5, 6 and 7 respectively at 0.05 level of significance, meaning that there is no statistical significance difference between the mean responses of respondents on the levels of skilfulness of the woodwork graduates and Head of sections on the above items while the null hypothesis was rejected for item1.

HO₂: There is no statistical significance difference between the mean responses of the level of skilfulness of the woodwork graduates and Head of woodwork section in using woodworking hand tools. The data is presented in table 6.

Table 6: T– test statistical Analysis of the levels of skilfulness of woodwork graduates and Head of woodwork sections in using woodworking hand tools.

		N ₁ = 7, N ₂ = 105			
S/NO	ITEMS	SD ₁	SD ₂	t- cal	REMARK
1.	Hammer	0.00	0.35	4.67	S
2.	Screw drivers	0.70	1.19	0.21	NS
3.	Hand planner	1.03	0.81	- 2.32	S
4.	Jig saw	0.45	0.35	- 7.85	S
5.	Scraper	0.64	1.03	2.94	S
6.	Pincer	0.49	1.15	2.37	S
7.	Pliers	0.73	1.03	0.68	NS
8.	Spanner	0.73	0.98	0.08	NS
9.	Jack saw	1.05	0.47	- 0.55	NS
10.	Steel square	0.49	1.11	3.34	S

Key: N₁ = Woodwork Head of sections, N₂ = Woodwork graduates, \bar{X}_1 = Mean of response of Woodwork Head of sections, \bar{X}_2 = Mean of response of Woodwork graduates, \bar{X}_t = Average mean of responses of the level of skilfulness of woodwork graduates produced by Niger state technical colleges in using consumable materials.

Table 6 revealed that the t –test accept the null hypothesis only for items 2, 7, 8 and 9 respectively at 0.05 level of significance, meaning that there is no statistical significance difference between the mean responses of respondents on the level of skilfulness of the woodwork graduates and Head of sections on the above items while null hypothesis was rejected for item 1,3,4,5,6 and 10

Findings

The findings of the study are stated as follows:

1. Woodwork graduates of Niger state technical colleges used all the woodworking machines listed except band saw machine, tenoning machine, mortiser and thicknesser.
2. They used all the hand tools listed such as hammer, screw driver, hand plane, Electric jig saw, scraper, pincer, plier, try square and spanner.
3. Woodwork graduates used all the consumables listed except covering wood surfaces with formica.

Discussion of the Finding

The findings of the study indicated that Woodwork graduates of technical colleges used all the woodworking machines listed except band saw machine, circular saw machine, mortiser and thicknessing machine. The woodwork graduates could not use band saw machine, circular saw machine, mortiser and thicknessing machine. This could be attributed to lack of those machines in their school workshops or the teacher failed to teach them. Olorunyomi (2002) pointed out that to ensure effective teaching and learning of manipulative skills, principals of technical colleges should endeavour to make sure that teachers teach by making use of relevant tools and machines. The study also revealed that woodwork graduates used all the hand tools listed such as hammer, screw driver, Electric jig saw, scraper, pincer, plier, try square and spanner. and hand plane. Technical colleges become very strategic as suppliers of skilled manpower for the realization of national goals and it can only be possible when students are exposed to practical skills using machines while in school (Shobowale, Odo & Okwori,2011). It was also discovered from the study that woodwork graduates of technical colleges used all the consumables listed except covering wood surfaces with formica. According to Okorie (2001) technical college is concerned with equipping individuals a worthwhile activity such as in knowledge, attitudes and skills that will enable such an individual enter into a chosen occupation and progress in it. Therefore, it is expected that every student learn how to use all the consumables so that they can function effectively in their places of work after graduation. In Soviet Union, technical colleges receive much attention from government and as a result, the curriculum, method of teaching, staff, equipment are provided to ensure a high standard and acquisition of practical skills(Osuala,2004).

Implications of the Study

From the result of data analyzed, some implications of the study have emerged. Woodwork teachers should always endeavour to train woodwork students well in terms of acquisition of practical skills, knowledge and technique in the use of woodwork hand tools and machines. When woodwork students acquire skills in using woodwork equipment and materials, they can contribute to economic development of the nation. It is important to note that when students acquire practical skills and get employment after graduation or become employer of labour, it means their parents didn't waste their money in training them. They are also useful to their parents and society at large which can bring about technological development of the country.

Conclusion

Functional technical education requires the manipulation of tools and machines to acquire the necessary skill. The introduction of woodwork in technical colleges is to encourage the acquisition of practical skills by students so that they can use their hands in making and repairing items that are made of wood. It was discovered that some of woodwork graduates can't use some of the woodworking machines such as mortise, thicknesser and circular saw machine. They can use all the hand tools perfectly. They can also use consumable materials except some of them can't apply formica perfectly on the wood surfaces. Woodwork teachers in technical colleges should back up theory with practical since this will help students to function very well in the labour market after graduation. It is observed that some these problems could be attributed to lack of some of the machines and consumables in the wood workshops. Therefore, provision of modern

equipment is absolutely necessary so that students can meet up with the modern trends in technology. Principal of technical colleges should endeavour to supervise teachers and direct where necessary in order to teach the students well (Olorunyomi,2002).

Recommendations

The following recommendations are made base on the findings of the study.

1. Niger State Government should strive to provide modern machines and hand tools for improving practical skills of woodwork students.
2. Technical colleges should involve students in practical continuously in order to improve their practical skills so that they can function well after graduation..
3. Woodwork teachers should teach students how to apply formica on wood surfaces.

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