Annals of Technology Education Practitioners Association of Nigeria
ATEPAN (September, 2026) 11(1), 170-176
ISSN: 2645-2839 (Print)
eISSN: 2645-2847 (Online)

PRACTICAL SKILLS FOR EMPLOYABILITY IN CARPENTRY/JOINERY POSSESSED BY FINAL YEAR BUILDING/WOODWORK STUDENTS OF UNIVERSITIES IN SOUTH-EAST STATES OF NIGERIA

Chinyeaka L. Mbachu[1] P. N. Opara[2] E. I. Egba[3] E. N. Elom[4]
Correspondence email address: *demacc.linda@gmail.com*
Department of Technology and Vocational Education, Abakaliki, Ebonyi State, Nigeria

Abstract: *The study assessed practical skills in carpentry/joinery possessed by final year building/woodwork students of Southeast universities. Two research questions were posed and two hypotheses were formulated respectively to guide the study. The study adopted a survey research design. The population of the study was 20 and there was no sampling because the population was manageable. An instrument (observational schedule) containing 20 items and each item has 2 clusters, was used as the instrument for data collection. The instrument was subjected to face validation by three experts. Kendal Coefficience of Concordance (W) was used to establish the internal consistency of the instrument which yielded a reliability value 0.76. Data collected were analysed using the mean and standard deviation for the research questions at acceptance value of 2.50 - 3.49 as highly possessed and 3.50 - 4.00 as very highly possessed, while t-test was used for the hypotheses at 0.05 level of significance. The study revealed that the final year building/woodwork students of the universities in South East of Nigeria possessed practical skills in a satisfactory level in carpentry and joinery. There were no significant differences between federal and state universities in the skill areas. It was recommended that lecturers and instructors should adopt competency-based teaching methods that emphasize hands-on learning and skill mastery.*
Keywords: *Practical Skills, Carpentry/Joinery, Building/Woodwork, University and Employability*

Introduction

The Federal Ministry of Education's National Policy on Science and Technology Education (2020) and its implementation guidelines emphasize improving practical contact hours, strengthening workshop resources and ensuring that science, technical and vocational programs produce work-ready graduates. At the same time, the National Universities Commission's Core Curriculum and Minimum Academic Standards (CCMAS 2023) sets out program outcomes and minimum practical requirements for university education, which create a regulatory imperative for valid practical assessment in building and woodwork programs. United Nations Educational, Scientific and Cultural Organization (UNESCO)-(UNEVOC)'s TVET country profile for Nigeria also documents the national move toward competency-based frameworks and skills standards that better reflect workplace demands and the need for performance evidence rather than relying solely on theory examinations (UNESCO-UNEVOC, 2024).

Research evaluating task/project instruction in woodworking concludes that while these methods raise skill levels, implementation fidelity is uneven because of resource constraints and limited teacher professional development (Udo, 2023). Competency-based education analyses likewise highlight institutional capacity gaps that undermine the translation of policy into practice, suggesting the need for university-level evidence that documents exactly which carpentry skills final-year students possess and the institutional factors associated with those outcomes (Odewumi, 2020).

Carpentry/joinery competence spans cognitive, affective and psychomotor domains, meaning that robust assessment must capture drawing interpretation and material calculation (cognitive), accurate marking and joinery execution (psychomotor), and safety behavior, time management and teamwork (affective). Recent CBET literature in Nigeria recommends assessment blueprints that explicitly map tasks to these domains and prescribe evidence-collection methods for each (Odewumi, 2020). For instance, constructing a door leaf and frame simultaneously generates evidence for reading a technical drawing (cognitive), for observing safe tool use and workspace housekeeping (affective) and for

producing joints to specified tolerances (psychomotor). Multi-modal evidence collection product inspection, process observation, time/quality metrics and post-task oral questioning, therefore yields a richer basis for defensible graduation decisions than single-mode assessments. (UNESCO-UNEVOC, 2024). Institutional assessment practices that produce portable, verifiable proof of practical carpentry skills are critical not only for graduation but also for graduates' ability to secure contracts, apprenticeships, or micro-enterprise clients in the South-East construction economy. (National Bureau of Statistics, 2023).

Udo & Ikpe (2023), measuring in carpentry/joinery is a foundational cognitive-manual skill that underpins all subsequent workshop operations; it involves selecting appropriate units and tools, interpreting scales, 162 transferring dimensions, and marking workpieces accurately prior to cutting or joining. Accurate measurement ensures components meet design specifications, fit together correctly, and satisfy functional and aesthetic requirements; without reliable measuring skill, even technically sound cutting or joining cannot produce quality outcomes.

Lai et al. (2024), cutting in carpentry/joinery refers to the deliberate separation or shaping of timber and wood-based materials to produce components with specified dimensions, profiles, and edge conditions for subsequent joining, assembly, or finishing. Cutting encompasses a range of operations which includes crosscutting, ripping, resawing, dadoing, and profiling, performed with hand tools (chisels, hand saws) or powered equipment (circular saws, band saws, routers). The technical importance of cutting lies in its direct influence on dimensional accuracy, fit of joints, and the overall structural integrity of carpentry work.

carpentry assessment extends beyond individual graduate prospects to institutional accountability and regional development. Universities that can demonstrate that their graduates meet defined practical competence thresholds are better positioned to attract industry partnerships, donor investments for workshop upgrades and government support.

Statement of the Problem

Despite significant investments in curriculum development and workshop facilities, many graduates still face challenges in demonstrating hands-on competence that meets industry standards (Udo, 2023). The observed skill-performance gap raises questions about the effectiveness of instructional methods, the sufficiency of practical exposure, and the alignment of university carpentry programs with the realities of the labor market (George, 2022). However, the recurring evidence of inadequate skill mastery among graduates calls for a systematic assessment of the level of carpentry skills possessed by final-year students to identify gaps and suggest reforms (Odewumi, 2020).

Purpose of the Study

The main purpose of this study is to assess the practical skills in carpentry/joinery possessed by final year building/woodwork students of the universities in the South-East States of Nigeria.

Specifically, the study assessed;

1. Measuring skills, possessed by final year building/woodwork students of the universities in the South-East States of Nigeria.
2. Cutting skills, possessed by final year building/woodwork students of the universities in the South-East States of Nigeria.

Research Questions

The following research questions guided the study.

1. What is the level of practical skills on measuring possessed by final year university students of building/woodwork technology?

2. What is the level of practical skills on cutting possessed by final year university students of building/woodwork technology?

Hypotheses

The following five null hypotheses were formulated and tested at 0.5 level of significance:

H01: There is no significant difference in the measuring skills, possessed by final year building/woodwork students of federal and state universities in the South-East States of Nigeria.

H02: There is no significant difference in the cutting skills, possessed by final year building/woodwork students of federal and state universities in the South-East States of Nigeria.

Methodology

This study adopted a descriptive survey design. Descriptive survey research design is a systematic method used to collect data from a population or a representative sample in order to describe existing conditions, opinions, attitudes, or characteristics without manipulating any variables (Osha et. al. 2024). This study was conducted using four universities in South East State of Nigeria namely: Ebonyi State University, Nnamdi Azikwe University, University of Nigeria Nsukka and Enugu State University. The population of this study was all the 20 final year students of Building/Wood work Technology in the Universities in the study. The population of the study comprised of 8 final year students from Ebonyi State University, 9 final year students from Nnamdi Azikwe University, 2 final year students from University of Nigeria Nsukka and 1 final year student from Enugu State University in building/woodwork, totalling 20 final year students. There was no sampling because the number of students was manageable. Hence, the whole population of 20 respondent were used. The approach was census survey. The data were collected using an observational schedule titled: Carpentry Practical Performance Instrument (CPPI). The instrument was developed by the researcher from the content of the study of Carpentry/Joinery and practical areas of the trade. The instrument contained 20 items and arranged in 2 clusters. The instrument was subjected to face validation by two experts from the Department of Technology and Vocational Education, and one expert from measurement and evaluation unit of Science Education Department all in Ebonyi State University, Abakaliki. The reliability of the instrument was determined by administering the instrument titled: Carpentry Practical Performance Instrument (CPPI) in Benue State University, Markurdi, which is not among the states or institutions used for the study. The data generated were analyzed using Kendal Coefficience of Concordance (W) and this yielded a reliability coefficient of 0.76. The researcher used 4 workshop technologists as research assistants to observe building/woodwork final year students on carpentry/joinery skills in their respective institutions. The data collected for the study were analyzed using mean, standard deviation, and t-test. Mean was used for description in order to answer the research questions. Standard deviation was used to show how individual scores clustered around the mean. Any item with a mean value of 3.50-4.00 was considered as Very Highly Possessed, any item with a mean value of 2.50-3.49 was considered as Highly Possessed, any item with a mean value of 1.50-2.49 was considered as Lowly Possessed and any item with a mean value of 1.00-1.49 was considered Very Lowly Possessed. The five null hypotheses were tested using t-test at a 0.05 level of significance. Any item where the calculated significance value is greater than 0.05, the hypotheses of no significance difference was not rejected but where the calculated significance value is less or equal to 0.05, the hypotheses of no significance difference was rejected. (The researcher used SPSS package for the computation).

Results and Analysis

Data answering the research question are summarized in Table 1

Table 1: Mean and Standard Deviation on Measuring skills in carpentry/joinery possessedby final year students of the universities in South East States of Nigeria.

S/N	Measuring skills	N	Mean	Std. Dev.	Decision
1	Use of Measuring Tape	20	3.25	0.64	HP
2	Use of Steel Rule	20	3.30	0.73	HP
3	Use of Square	20	3.30	0.66	HP

4	Marking Gauge Usage	20	3.00	0.63	HP
5	Use of Callipers	20	3.10	0.79	HP
6	Use of Spirit level/Plumb Line	20	3.05	0.76	HP
7	Measurement Transfer Techniques	20	3.15	0.59	HP
8	Checking Accuracy of Cuts	20	3.20	0.83	HP
9	Measuring of Joints Construction	20	3.10	0.72	HP
10	Measurement Safety and Efficiency	20	3.05	0.69	HP

The results in Table 1 show that respondents generally demonstrated a moderate to highly possessed in measurement skills. The highly possessed skills were use of steel rule and use of square. This was followed by the use of a measuring tape and checking the accuracy of cuts. The lowest possessed skill was marking gauge usage, although its mean score still indicates a relatively satisfactory level of skill. The standard deviations, indicate relatively moderate variation in respondents' ratings, with measurement transfer techniques showing the greatest consistency, while checking accuracy of cuts showed the greatest variation. The findings suggest that the respondents possessed the assessed measurement skills to a generally satisfactory level, although marking gauge usage represents the comparatively weakest area and may require additional practical emphasis.

Data answering the research question are summarized in Table 2

Table 2: Mean and Standard Deviation on Cutting skills in carpentry/joinery possessedby final year students of the universities in South East States of Nigeria

S/N	Cutting Skills	N	Mean	Std. Dev.	Decision
11	Use of Handsaw	20	3.50	0.51	VHP
12	Use of Crosscut Saw	20	3.10	0.85	HP
13	Use of Rip Saw	20	2.95	0.51	HP
14	Use of Tenon Saw	20	3.10	0.79	HP
15	Use of Coping Saw	20	3.20	0.62	HP
16	Chiselling Technique	20	3.25	0.44	HP
17	Cutting with Planer	20	3.15	0.75	HP
18	Cutting with Circular Saw	20	3.05	0.60	HP
19	Cutting for Joints	20	3.20	0.89	HP
20	Cutting Safety and Efficiency	20	3.40	0.68	HP

Data in table 2 indicate that respondents generally demonstrated highly possessed in cutting skills. The highest possessed skill was using a handsaw, followed by cutting safety and efficiency. Chiselling technique also recorded a relatively high mean score. The lowest possessed skill was using a rip saw, although its mean score still indicates a relatively satisfactory level of skill. The standard deviations, indicate relatively moderate variation in respondents' ratings. Chiselling technique had the most consistent ratings, whereas cutting for joints showed the greatest variation. The findings suggest that respondents possessed the assessed cutting skills at a generally satisfactory level, with particular strength in handsaw operation and cutting safety and efficiency. However, rip saw operation and circular saw operation appear to be comparatively weaker areas that may benefit from additional practical training.

Hypotheses Testing

Data collected for federal and state university students with cluster A of the observational schedule were subjected to t-test of difference between means of independent samples.

Table 3: t-test Analysis of the Mean Responses of State (S) and Federal (F) Universities Final Year Students on Measuring Skills Possessed in Carpentry/Joinery

Groups	N	Mean	SD	t-value	df	P-value	Decision
State University	9	3.21	0.31				
Federal University	11	3.02	0.34	1.32	18	0.21	NS

Results of data analysis on table 3 shows the results of the independent samples t-test comparing the measuring skills of respondents from State and Federal Universities. The results indicate that none of the ten measuring-skill areas showed a statistically significant difference between the two groups, as all p-values were greater than 0.05.

Data collected for federal and state university students with cluster B of the observational schedule were subjected to t-test of difference between means of independent samples.

Table 4: t-test Analysis of the Mean Responses of State (S) and Federal (F) Universities Final Year Students on Cutting Skills Possessed in Carpentry/Joinery.

Groups	N	Mean	SD	t-value	df	P-value	Decision
State University	9	3.27	0.24				
Federal University	11	3.02	0.20	2.51	18	0.52	NS

Results of data analysis on table 4 shows the independent-samples t-test comparing the cutting skills of respondents from State and Federal Universities. Cutting skill areas showed no statistically significant difference between the two groups, since their *p*-values were greater than 0.05. The State University respondents recorded a substantially higher mean than their Federal University counterparts, indicating stronger demonstrated proficiency.

Findings of the Study

Based on the research questions answered and the hypotheses tested, the following summary of findings were made;

1. The measuring skills in Carpentry/Joinery were highly possessed by final year students of building/woodwork in the universities and there was no significant difference in the measuring skills, possessed by final year building/woodwork students of federal and state universities.
2. The cutting skills in Carpentry/Joinery were highly possessed by final year students of building/woodwork in the universities and there was no significant difference in the cutting skills, possessed by final year building/woodwork students of federal and state universities.

Discussions of Findings

The findings revealed that final-year building/woodwork students possessed all the measuring skills at a high level. This suggests that the students could use measuring tapes to determine lengths, widths and other dimensions required for preparing wood components. The finding is consistent with Hasan et al. (2022), who identified relevant competencies for assessing carpentry and joinery students' practical skills in Nigerian senior secondary schools. Their work supports the importance of identifying and assessing practical competencies associated with woodwork operations. Mannir et al. (2023), in their study of furniture construction skills among technical college teachers in Zamfara and Katsina States, identified practical competencies requiring further training. Their findings provide contrasting evidence regarding the broader assumption that practical woodworking competencies are consistently developed across all training contexts. Although their study did not directly assess measuring skills among final year university students, it demonstrates the importance of continuous practical training. Furthermore, the comparison between state and federal university students revealed no statistically significant difference in measuring skills. This suggests that students from both categories of universities demonstrated comparable competence in this activity, although their individual training experiences might differ.

The findings revealed that final year building/woodwork students possessed all the cutting skills at a very high level. This suggests that the students could cut wood components to the required dimensions

during carpentry and joinery operations. The finding is consistent with Udo and Ikpe (2023) who examined woodwork students' skill acquisition in technical colleges in South-South Nigeria and demonstrated the importance of appropriate instructional methods in developing practical woodworking competencies. Their work supports the importance of assessing practical skills systematically to establish students' competence in trade-related operations. Nevertheless, Mannir et al. (2023) identified practical skill areas requiring further development among furniture construction teachers, indicating that adequate proficiency in woodwork related operations cannot be assumed in every Nigerian training context. Their findings offer a contrasting perspective on practical skill acquisition, although they did not directly investigate cutting skills among university students. Regarding university ownership, the results showed no statistically significant difference between state and federal university students. This suggests that students from both categories of institutions demonstrated comparable competence in this operation.

Conclusion

Based on the findings of this study, it can be concluded that final-year building/woodwork students in universities in South-East Nigeria possess a satisfactory level of practical skills in carpentry and joinery. The students demonstrated competence across all skill areas. However, despite this overall satisfactory performance, certain areas of weakness still exist, particularly in tasks requiring precision and consistency. The absence of significant differences between federal and state universities in the skill areas suggests a relatively uniform training standard across institutions. While students possess acceptable levels of practical competence, there is a need for further improvement to meet industry expectations and enhance employability.

Recommendations

1. Curriculum planners should review and restructure the curriculum to increase the proportion of practical content relative to theoretical instruction.
2. Lecturers and instructors should adopt competency-based teaching methods that emphasize hands-on learning and skill mastery.

References

Federal Ministry of Education. (2020). National policy on science and technology education. *Federal Ministry of Education*. https://education.gov.ng/wp-content/uploads/2020/09/National-Policy-On-Science-and-Technology-Education.pdf.

George, W. K. (2022). Assessment of technical education undergraduate students' employability skills in colleges of education in Nigeria. *Universal Scientific Bulletin*, 5(1), 107–121. https://www.globalacademicstar.com/download/article/assessment-of-technical-education-undergraduate-students-employability-skills-in-colleges-of-education-in-nigeria.pdf.

Hasan, S., Deba, A. A., & Saulawa, B. U. (2022). Development and standardization of an instrument for assessing carpentry and joinery students' practical skills in Nigerian senior secondary schools. *Canadian Journal of Educational and Social Studies*, 2(1), 73–85.

Lai, Z., Xiao, Y., Chen, Z., Li, H., & Huang, L. (2024). Preserving woodcraft in the digital age: A meta model based robotic approach for sustainable timber construction. *Buildings*, 14(9), Article 2900. https://doi.org/10.3390/buildings14092900

Mannir, M. S., Bala, M. M., & Hassan, A. M. (2023). Furniture construction skill gap analysis among technical college teachers in Zamfara and Katsina States, *Nigeria. Journal of Vocational and Technical Education Studies.*

National Bureau of Statistics. (2023). Nigeria Labour Force Survey Q4 2022 & Q1 2023 (NLFS). *National Bureau of Statistics*. https://www.nigerianstat.gov.ng/elibrary/read/1241365.

National Universities Commission. (2023). Core Curriculum and Minimum Academic Standards (CCMAS): Education (Version 2023). *National Universities Commission*. https://nuc-ccmas.ng/download/ccmas-education/.

Odewumi, A. S. (2020). Competency-based education and technical vocational education and

training (TVET) for employment in Nigeria. *Vocational and Technical Education Journal*, 2(1), 1–9. https://acjol.org/index.php/votej/article/view/374.

Osha M. I., Ewuru A. A., Edim G. N., Edim A. E., & Agba G. A. (2024). Innovative record management strategies and principals' administrative efficiency in public secondary schools in Cross River State, Nigeria. *Unizik Journal of Educational Research and Policy Studies*, 18(3), 170–186.

Udo, E. E., & Ikpe, S. A. (2023). Evaluating task and project instructional impact on woodwork students' skill acquisition in technical college in South-South, Nigeria. *International Journal of Engineering and Modern Technology (IJEMT)*, *9*(2), 123–134. https://doi.org/10.56201/ijemt.v9.no2.2023.pg123.134

UNESCO-UNEVOC. (2024). Dynamic TVET country profiles: Nigeria. UNESCO-UNEVOC. https://unevoc.unesco.org/home/Dynamic%2BTVET%2BCountry%2BProfiles/country%3DNGA