

Assessment of Work-Based Skills Possessed by Technical College Students for Effective Performance in Industries in Ogun State

by

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Abstract

The study assessed the work-based skills possessed by technical college students for effective performance in the Industry. Four research questions guided the study. A survey research design was adopted for the study. The population for the study comprised of all the 127 Year Three technical college students of building/woodwork trades, metalwork/automobile trades and electrical/electronics trades, from eight technical colleges in Ogun State. A structured questionnaire consisting of 52 items developed by the ERASMUS + programme was used for data collection. Two experts from the Department of Industrial Technical Education, University of Nigeria, Nsukka, and one expert from the Lafarge WAPCO Industry face validated the instrument. The reliability coefficient of the instrument was 0.86. Data collected were analyzed using mean and standard deviation for the research questions, while t-test was used to answer the hypotheses. It was found from the study that some work-based skills in manufacturing, marketing, management, quality and safety were not possessed by technical college students. It was recommended that these skills should be incorporated into technical college curriculum to enable students to perform effectively in the industries.

Keywords: Assessment, Technical College, Work-based skills, Industries

Introduction

Education is an important agent of change and national development. If attention is paid to education, it can become a key to sustainable development of Nigeria. The Federal Republic of Nigeria (2013) identified eight forms of education in Nigeria and they are; early childhood/pre-primary education, primary education, secondary education, mass literacy and non-formal education, open and distance education, tertiary education and science, technical and vocational education. Technical education as defined in the national policy on education is that aspect of education that leads to the acquisition of practical and applied skills as well as basic scientific knowledge (Federal Republic of Nigeria 2004). Owolabi (2003) defined technical education as a form of training for engineering, manufacturing and industrial occupations. Technical education involves training for skills acquisition in trades such as welding and fabrication, carpentry and joinery, mechanics, electrical and electronics.

Technical education is primarily concerned with specific skills necessary for employability especially in the industry such as, automobile and building technology. These are skills which prepare beneficiaries for work that is largely manipulative and practical. This specialized form of education is offered at different institutions such as Colleges of Education, Universities, and the Technical Colleges.

Technical colleges are institutions where students are trained to acquire relevant knowledge and skills in different occupations for employment in the world of work. Okorie (2001) explained that technical colleges in Nigeria are established to prepare individuals to acquire practical skills and basic scientific knowledge within the confinement of a technical institution. According to the National Board for Technical Education (NBTE) (2004), Technical colleges in Nigeria are established to produce craftsmen at the craft (secondary) level and technicians at the advanced craft (post-secondary) level. There are different trade subjects that is been offered in technical

colleges in Nigeria, such as building/woodwork trades, metalwork/automobile trades, electrical/electronic trades and business trades. In the context of this study, the study will be delimited to students of building/woodwork trades, metalwork/automobile trades and electrical/electronic trades.

The Federal Republic of Nigeria (2004) outlined the following as the aims of technical education: provide trained manpower in applied science, technology and commerce particularly at sub-professional grades; provide the technical knowledge and vocational skills necessary for agricultural, industrial, commercial and economic development; to provide people who can apply scientific knowledge to the improvement and solution of environmental problems for the use and convenience of man; give an introduction to professional studies in engineering and other technologies; give training and impart the necessary skills leading to the production of craftsmen, technicians and other skilled personnel who will be enterprising and self-reliant; enable young men and women to have an intelligent understanding of the increasing complexity of technology. To achieve one of these aims which is to provide trained manpower for industries, technical college students must be able to perform effectively in the work place. Sadly this has not been happening; this is because there is noticeable gap in the skills possessed by students of technical colleges and the skills required in world of work (Ede & Ariyo, 2014). According to the Institute and Faculty of Actuaries (2018) students of technical colleges upon graduation are finding it difficult to perform in industries because they do not have relevant skills such as work-based skills needed to perform in today's industries.

Skill is required to effectively perform a given task. Skill according to Osinem and Nwaoji (2005) is the proficiency displayed by someone in the performance of a given task. In the context of this study, skill is the ability that an individual has acquired that enables him perform a task efficiently in his or her place of work. For students of technical colleges to perform effectively in their place of work, they require adequate and necessary work-skills. Work-based skills are skills which are designed

to increase the knowledge of students in a workplace; it also helps them to gain entry level into a workplace or to diversify into another course. Educators who support acquisition of work-based skills for secondary school students make a number of different claims for its utility. Urquiola and his colleagues (1997) identified five primary purposes for work-based learning: 1) acquiring knowledge or skill related to employment in particular occupations or industries; 2) providing career exploration and planning; 3) learning all aspects of an industry; 4) increasing personal and social competence related to work in general; and 5) enhancing students' motivation and academic achievement.

There is a noticeable gap between the work-based skills possessed by technical college students and the skills required for them to perform effectively in the industries. This lack of appropriate work-based skills has made industries to be reluctant to employ them because of fear of incurring additional expenses for their training (Dangana, 2006). To bridge this gap, student should be exposed to relevant work-based skills so that they can be effective in the industry. According to the Institute and Faculty of Actuaries (2018) there are four main areas of work-based skills, they include: skills in manufacturing process, skills in safety and quality control, skills in marketing and skills in management and administration. These four areas of work-based skills will be studied in this research. This study was therefore embarked upon to find out through research, the work-based skills possessed by technical college students for effective performance in the industries.

Statement of the Problem

Changes in technology have created a gap between education and the world of work. Inadequacy of work-based skills on the part of technical college students is reducing their effectiveness in the industry. This has led to a decline in the performance of students upon entering into the world of work. Technical college students are finding it hard to perform effectively in the modern industries because of the lack of required work-based skills needed to perform in the industries. Industries are also becoming reluctant in employing technical

college students because they do not want additional expenses in training them, this reluctance from the part of the industries can be linked to lack of work-based skills by the students.

To solve this problem and enhance their effectiveness, technical college students must be properly equipped with the necessary work-based skills that will enable them to be effective. . Hence it becomes pertinent to assess the work-based skills possessed by technical college students for effective performance in the industries.

Research Questions

The following research questions guided the study:

1. What are the work-based skills in manufacturing processes possessed by technical college students?
2. What are the work-based skills in safety and quality control possessed by technical college students?
3. What are the work-based skills in marketing possessed by technical college students?
4. What are the work-based skills in management and administration possessed by technical college students?

Hypotheses

The following research null hypotheses were tested in the study:

- H0₁: There is no significant difference between the mean responses of male and female technical college students on the work-based skills possessed in manufacturing processes in the industries.
- H0₂: There is no significant difference between the mean responses of male and female technical college students on the work-based skills possessed in safety and quality control in the industries.
- H0₃: There is no significant difference between the mean responses of male

and female technical college students on the work-based skills possessed in marketing.

- H0₄: There is no significant difference between the mean responses of male and female technical college students on the work-based skills possessed in management and administration.

Methodology

A descriptive survey design was adopted for this study. The study was carried out in Ogun State. The population of the study consisted of all the 127 year three technical college students in building/woodwork trades, metalwork/automobile trades and electrical/electronics trades from eight technical colleges in Ogun State. Since the numbers of the technical college students are not too large, the entire population was used because it was manageable for the study.

The questionnaire about competencies and skills needs for industries was adapted for this study. This questionnaire had 52 items, it was developed by ERASMUS + programme, and it was the instrument used for data collection. This instrument had a reliability level of 0.81. The level of adaptation included the use of possessed instead of important in the response categories, the response categories of the instrument used are Very Highly Possessed (VHP), Highly Possessed (HP), Moderately Possessed (MP), Barely Possessed (BP) and Not Possessed (NP), which were assigned numerical values of 5, 4, 3, 2, and 1 respectively. The instrument was subjected to face validation by two lecturers from the Department of Industrial Technical Education, University of Nigeria Nsukka, and one expert from Lafarge WAPCO Industry Sagamu, Ogun State to attest the appropriateness of the instrument in measuring what it intended to measure. The adapted instrument was trial tested on 10 technical college students in Lagos State. This yielded a reliability co-efficient of 0.86 using the Cronbach Alpha formula. The data was collected by administering the questionnaire directly on the respondents by the researchers and two research assistants.

The data collected from the study was analyzed using mean for answering the research questions and t-test for testing the null hypotheses at probability level of 0.05 and 95 degree of freedom (df). Any item with a mean value of 3.00 and above was regarded as possessed while any item with a mean of 2.49 and below was regarded as not possessed. The SPSS 22.0 was used to determine the mean,

standard deviation, and Independent sample t-test. For the test of significance, the probability (p) value was used in comparison with the alpha value of .05, and at other relevant levels. If any item has a probability value greater than .05 ($P>0.05$) it will be concluded that there is no significant difference in the mean responses of the respondents.

Results

Table 1: Mean and t-test Analysis of the Responses of Technical College Students on Work-based Skills Possessed in Manufacturing Processes

S/N	Item Statements	X	SD	X ₁	SD ₁	X ₂	SD ₂	Sig.	H ₀	Decision
1	Monitoring process	1.73	0.79	1.75	0.89	1.67	0.55	.862	NS	BP
2	Organise and supervise the execution of activities	1.64	0.67	1.88	0.64	1.00	0.43	.006	NS	BP
3	Select tools or methods to optimise production	3.45	0.82	3.63	0.74	3.00	1.02	.400	NS	MP
4	Promote innovation in working methods and/or optimise production	1.55	0.69	1.63	0.74	1.33	0.56	.524	NS	BP
5	Analyse and assess production schedules and methods	3.55	0.69	3.63	0.74	3.33	0.72	.524	NS	HP
6	Analyse production data and produce reports	1.55	0.52	1.62	0.52	1.33	0.67	.494	NS	BP
7	Check compliance with current legislation	3.64	0.67	3.75	0.71	3.33	0.67	.368	NS	HP
8	Check production processes or machinery functioning	3.09	0.94	3.50	0.54	2.00	1.00	.109	NS	MP
9	Monitoring or managing proper implementation of safety rules	4.55	0.52	4.63	0.51	4.33	0.56	.494	NS	VHP
10	Research & Development	1.27	0.47	1.25	0.46	1.33	0.58	.837	NS	NP
11	Product Development	1.64	0.67	1.50	0.76	2.00	0.48	.104	NS	BP
12	Engineering Maintenance	3.36	0.81	3.38	0.92	3.33	0.60	.931	NS	MP
13	Test prototypes, components or finished products	4.00	0.63	3.88	0.64	4.33	0.57	.319	NS	HP
14	Check the logistics and functioning of systems or machinery	4.27	0.47	4.25	0.46	4.33	0.77	.837	NS	HP
15	Carry out management audits for industrial production processes (analytic accounting, cost control, budget, plans, reporting, etc.)	1.72	0.79	1.00	0.75	1.33	0.68	.808	NS	BP

Note **X** = Grand Mean; **SD**= Standard Deviation; **X₁** = Male; **SD₁** = Standard Deviation of Male; **X₂** = Female; **SD₂** = Standard Deviation of Female **NS** = Not Significant; **VHP** = Very Highly Possessed; **HP** = Highly Possessed; **MP** = Moderately Possessed; **BP** = Barely

Possessed; **NP** = Not Possessed; **H₀** = Null Hypothesis.

Data presented in Table 1 show that the work-based skills with mean values from 3.09 – 4.55 are possessed by technical college students while the work-based skills with a mean range of 1.27 – 1.73 are not possessed by technical college

students in manufacturing processes. Table 2 also shows that all the 14 work-based skills items had their significant value to be greater than .05 ($P>0.05$). This indicated that, there was no significant difference between the mean responses of male and female students of technical colleges in Ogun State on the work-

based skills possessed by them therefore the hypothesis which stated that there is no significant difference between the mean responses of male and female technical college students on the work-based skills possessed in manufacturing processes in the industries was accepted.

Table 2: Mean and t-test Analysis of the Responses of Technical College Students on Work-based Skills Possessed in Safety and Quality Control in the Industries

S/N	Item Statements	X	SD	X ₁	SD ₁	X ₂	SD ₂	Sig.	H ₀	Decision
1	Safety management & safety control	4.09	0.70	4.33	0.53	4.00	1.18	.472	NS	HP
2	Define and implement procedures for quality production (define standards, provide guidelines, etc.)	1.64	0.67	1.50	0.54	2.00	0.72	.483	NS	BP
3	Check compliance with current legislation	3.82	0.60	4.00	0.64	3.33	0.63	.170	NS	HP
4	Handle product quality certification protocols	1.82	0.60	1.88	0.64	1.60	1.16	.632	NS	BP
5	Test product quality	2.00	0.77	2.13	0.35	1.69	0.54	.570	NS	BP
6	Draw up technical reports or documents	1.27	0.47	1.13	0.74	1.64	0.67	.239	NS	NP
7	Check the cleanliness of rooms and machinery	3.82	0.75	3.63	0.64	4.33	0.59	.159	NS	HP
8	Calibrate laboratory instruments	2.82	0.60	2.88	0.52	2.64	0.56	.632	NS	MP
9	Monitor or manage proper implementation of safety rules	3.64	0.50	3.63	0.35	3.67	0.58	.919	NS	HP
10	Check compliance with product or process standards	2.73	0.47	2.88	0.64	2.33	0.68	.239	NS	MP
11	Monitor product quality	2.82	0.60	2.87	0.52	2.67	0.57	.632	NS	MP
12	Verify compliance with the standards and fill out the appropriate forms of certification	1.64	0.50	1.63	0.46	1.67	1.00	.919	NS	BP

Data presented in Table 2 show that the work-based skills with mean values from 3.64 – 4.09 are highly possessed by technical college students while the work-based skills with a mean range of 1.27 – 2.00 are barely possessed or not possessed by technical college students in safety and quality control. Table 2 also shows that all the 12 work-based skills items in relation to safety and quality control had their significant value to be greater than .05 ($P>0.05$).

This indicated that, there was no significant difference between the mean responses of male and female students of technical colleges in Ogun State on the work-based skills possessed by them therefore the hypothesis which stated that there is no significant difference between the mean responses of male and female technical college students on the work-based skills possessed in safety and quality control in the industries was accepted.

Table 3: Mean and t-test Analysis of the Responses of Technical College Students on Work-based Skills Possessed in Marketing

S/N	Item Statements	X	SD	X ₁	SD ₁	X ₂	SD ₂	Sig.	H ₀	Decision
1	Relaunch existing products or services	1.27	0.47	1.25	0.35	1.33	0.46	.84	NS	NP
2	Organise or manage marketing initiatives	1.55	0.69	1.63	0.53	1.34	0.74	.52	NS	BP
3	Evaluate results	1.91	0.54	1.89	0.46	2.00	0.36	.85	NS	BP
4	Handle relations with technicians and specialists	4.00	0.63	4.00	0.76	4.00	0.54	1.00	NS	HP
5	Select and disseminate current affairs or informative material	3.18	0.60	3.25	0.71	3.00	0.46	.71	NS	MP
6	Organise events (i.e. be to be events and fairs)	2.00	0.63	2.00	0.75	2.00	0.71	1.00	NS	BP
7	Study competitors	1.82	0.75	1.75	0.70	2.06	0.70	.72	NS	BP
8	Do market research	1.45	0.69	1.50	0.49	1.33	0.77	.71	NS	NP
9	Define and implement product promotion strategies	1.45	0.69	1.50	0.36	1.38	0.75	.71	NS	NP
10	Develop and launch new services or products	1.36	0.50	1.25	0.38	1.66	0.46	.34	NS	NP
11	Internationalization (Export management)	1.18	0.40	1.13	0.53	1.32	0.35	.61	NS	NP

Data presented in Table 3 show that the work-based skills with mean values from 3.18 – 4.00 are possessed by technical college students while the work-based skills with a mean range of 1.18 –2.00 are barely possessed or not possessed by technical college students in marketing. Table 3 also shows that all the 11work-based skills items in relation to marketing had their significant value to be

greater than .05 ($P>0.05$). This indicated that, there was no significant difference between the mean responses of male and female students of technical colleges in Ogun State on the work-based skills possessed by them therefore the hypothesis which stated that there is no significant difference between the mean responses of male and female technical college students on the work-based skills possessed in marketing was accepted.

Table 4: Mean and t-test Analysis of the Responses of Technical College Students on Work-based Skills Possessed in Management and Administration

S/N	Item Statements	X	SD	X ₁	SD ₁	X ₂	SD ₂	Sig.	H ₀	Decision
1	Leadership and people management	1.45	0.69	1.25	0.89	2.00	1.00	.32	NS	NP
2	Communication skills	3.73	0.77	3.75	0.52	3.67	.58	.86	NS	HP
3	Time management	4.09	0.94	4.38	0.88	3.33	1.53	.36	NS	HP
4	Organizational ability	2.73	0.77	2.75	0.46	2.67	.68	.86	NS	MP
5	Problem-solving capacity	1.82	0.60	1.75	0.92	2.00	1.03	.71	NS	BP
6	Planning skills	2.45	0.82	2.38	0.74	2.56	.59	.55	NS	BP
7	Networking and Influencing ability	1.36	0.67	1.38	1.41	1.33	.57	.93	NS	NP

8	Customer orientation	1.64	1.43	1.50	0.83	2.03	1.73	.68	NS	BP
9	Industry knowledge	2.91	0.83	2.87	1.03	3.01	1.00	.86	NS	MP
10	Language skills	3.91	0.94	3.75	0.76	4.33	.52	.28	NS	HP
11	Innovation orientation	1.64	1.03	1.50	1.46	2.03	1.72	.67	NS	BP
12	Business management skills	1.91	1.30	2.13	0.76	1.33	1.46	.23	NS	BP
13	Finance knowledge	1.55	0.82	1.50	0.71	1.667	1.16	.83	NS	BP
14	Technology skills	3.91	0.70	3.75	0.89	4.03	.77	.22	NS	HP

Data in Table 4 show that the work-based skills with mean values from 2.73 – 3.91 are possessed by technical college students while the work-based skills with a mean range of 1.36 – 2.45 are barely possessed or not possessed by technical college students in Management and Administration. Table 4 also shows that all the 14 work-based skills items in relation to Management and Administration had their significant value to be greater than .05 ($P > 0.05$). This indicated that, there was no significant difference between the mean responses of male and female students of technical colleges in Ogun State on the work-based skills possessed by them therefore the hypothesis which stated that there is no significant difference between the mean responses of male and female technical college students on the work-based skills possessed in Management and Administration was accepted.

Discussion

The findings of the study showed that seven work-based skills required for manufacturing process were not possessed by technical college students. This finding is in agreement with Bailey & Merritt (1997) who found that, students often lack required skills to transition effectively from school to work. They went further to advocate for the potential of school to work strategy to help students acquire the necessary skills. Further, the results of the study also showed that five work-based skills required for safety control were not possessed by technical college students. This finding is in agreement with Olaitan and Hassan (2010) who found out that technical college students lack skills in carrying out machine shop practices of which safety skills is among them.

It was also found from the study that nine work-based skills were not possessed by

technical college students in marketing. Marketing skills is an important work-based skill required by industries, as the world of work has transcended production alone, technical college students are expected to be able to function in the production lines and also market the products developed. This is in line with Lippman, Ryberg, Carney and Moore (2015) who reported work-based skills such as marketing are required by students to understand the work environment and also achieve organizational goals.

Finally the findings in the study also revealed that work-based skills were not possessed by technical college students in management and administration. The importance of management and administration skills cannot be overstated in achieving organizational objectives, in the modern world of work the possession of this skill is important as it will enable the workers to multitask. This finding is also in line with Aworanti (2012) who stated that management and administrative skills are needed for effective management of oneself at work.

Conclusion

Based on the findings of the study, it can be concluded that technical college students in Ogun State are deficient in some work-based skills and this can seriously hinder their performance in the industry. The study also found no significant difference in the mean ratings of the respondents on the work-based skills possessed by technical college students for effective performance in the industry.

Recommendations

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

- Technical college students should be retrained on those work-based skills that they do not possess, so that they can function effectively in the industries
- Work-based skills that were not possessed by the students should be integrated into the curriculum of technical colleges.
- Government and administrators of technical colleges should organize seminar and workshop for technical college students on work-based skills required for effective performance.

References

- Aworanti, A.O. (2012). *Integration of Soft Skills Assessment into Public Examining in Technical and Vocational Education (TVE)*. Paper presented during the 31st Annual Conference of Association of Educational Assessment in Africa held at Botswana.
- Bailey, T., & Merritt, D. (1997). *School-to-work for the college bound* (MDS-799). Berkeley, CA: National Center for Research in Vocational Education.
- Dangana, S.A. (2006). Technical skills Improvement needs of Auto-Electronic Technicians in the maintenance of modern day cars in Niger State. *An Unpublished M.Ed thesis, Department of Vocational Teacher Education, University of Nigeria, Nsukka*.
- Ede, E.O. and Ariyo, S. O. (2014). Assessment of the Skills Possessed By the Teachers of Metalwork in the Use of Computer Numerically Controlled Machine Tools in Technical Colleges in Oyo State. *Journal of Education and Practice*, 5 (31)28-33
- Federal Republic of Nigeria (2004). *National policy on education*. Lagos: NERDC.
- Federal Republic of Nigeria (2013). *National policy on education*. Lagos: NERDC
- Institute and Faculty of Actuaries (2018). A Guide to work-based skills and the experience requirement.
- Lippman, L.H., Ryberg, R., Carney, R., & Moore, K.A. (2015). *Key Soft Skills That Foster Youth Workforce Success: Toward a consensus across fields*. Washington DC: Child Trends
- National Board for Technical Education (2004). *National technical certificate examination (craft level) syllabus for engineering trades based on the NBTE curriculum* (Ed.), Kaduna: NBTE.
- National Business and Technical Examinations Board (2004). *Syllabus for engineering trades in technical college*. Benin: NABTEB.
- Okorie, J. U. (2001). *Vocational Industrial Education*. Bauchi: League of Researchers of Nigeria: Bauchi.
- Olaitan, O. O. and Hassan, A. M. (2010). Assessment of the competence and improvement needs of metalwork instructors in colleges of education in south Western states of Nigeria. *Nigerian Vocational Association Journal*, 15(1), 413 – 424.
- Osinem, E.C. and Nworji, U. (2005). *Students Industrial Work Experience in Nigeria: Concept, Principles and Practices*. Enugu Cheston Ltd
- Owolabi, H.O. (2003) *Perspectives on History of Education in Nigeria* Ilorin: Emola-Jay communications
- Urquiola, M., Stern, D., Horn, I., Dornsife, C., Chi, B., Williams, L., Merritt, D., Hughes, K., & Bailey, T. (1997, November). *School to work, college and career: A review of policy, practice, and results 1993-1997*. Berkeley: National Center for Research in Vocational Education, University of California at Berkeley.