



Air-conditioning Skills Needed for Entrepreneurship among Graduates of Technical Education Programmes in Rivers State

Thomas, Chinujinim Godstime

Faculty of Education, Rivers State University, Port Harcourt

&

Engr. Amaechi O. Joseph

Faculty of Technical and Vocational Education, Ignatius Ajuru University of Education, Port Harcourt

Abstract: *The study investigated the air-conditioning skills needed for entrepreneurship among graduates of technical education institutions in Rivers state. The survey research design was adopted for the study. The population of the study was 561 made up of 141 teachers and 420 final year students in four government technical colleges in Rivers state Nigeria. The purposive random sampling technique was used in selecting 9 teachers and 270 students, making a sample size of 279 that was used as respondents for the study. A structured questionnaire was developed and used as instrument for data collection. The instrument was face and content validated by two experts in department of technical education, Omoku, Rivers State. A five point anchored scale of Highly needed, Needed, Moderately Needed, Not-Needed, Highly Not-Needed, were written against each item with a corresponding assigned values of 5, 4, 3, 2, and 1 respectively. The reliability of the instrument was achieved using Cronbach Alpha formula, by analyzing response of 20 respondents who are not part of the sample and it yielded a reliability index of 0.97 which was considered very sufficient for the study. Data collected were analyzed on statistical package for social sciences SPSS version 20, using mean and standard deviation to answer the two research questions and t-test was used to test the null hypotheses at 0.05 level of significance. A criterion mean of 3.50 was set as bench mark for the acceptance or rejection. The findings of this study revealed the all that items listed on Automobile and Industrial air conditioning are needed for entrepreneurship development of graduates of technical colleges in Rivers State. It therefore, recommended that technical colleges should vigorously empower their student with skills by providing facilities and equipment they need to infuse in the students the necessary technical skills to aid them for entrepreneurship. Also, that the government should ensure that her policy statement regarding the establishment of technical colleges is effectively implemented and make available the necessary facilities for technical institutions to equip their students with requisite technical skills for entrepreneurship.*

Keywords: *Automobile Air-conditioning, Industrial Air conditioning, Entrepreneurship, Skills and Technical and vocational education*

I. Introduction

The economic prosperity of the 21st century requires the possession of technical skills as well as entrepreneurial skills to function. Because, the world has become private sector driven and it requires only people who are capable of establishing businesses to help cushion the adverse effects of high unemployment and poverty rate in the society. It therefore calls for an education system that would make our skills training programmes to be more relevant because the need for her products is always there. But this expectation is often cut short, by the quality

of products from our technical and vocational institutions this day, which is posing serious concern when matched with skills needs of both the industries and the private sector. According to Okorie (2010) most Nigerian educational institutions of learning do not provide their students with adequate training in skills that will help them fit for productive work. Rather they have remained too academic, with major emphasis upon pure knowledge and western cultural values and less stress on technical and vocational training and practical skills. Okorie (2010) further noted that those who lack sufficient skills live on the subsistence level, and often out of desperation and frustration, constitute a nuisance to the society. Therefore, the need to make our education programme meaningful, functional and relevant to the demands of the present-day industrial sectors is emphasized. Furthermore, educational institutions need to give their students a system of education which should be not just job-oriented, but should emphasize entrepreneurship development which can be acquired in technical and vocational education institutions.

There is no doubt that technical colleges in Nigeria were established to prepare youths for employment and 'self reliant'. The curricular of the technical college institutions in Nigeria are designed to produce craftsmen at all levels and with different specializations. Thus, technical and vocational education could be described as the provision of skills, knowledge, attitude and values needed for a specific occupation. That is to say, TVE is a programme of study that is meant to prepare learners for careers based on manual and practical activities, understanding of laws of science and technology as applied to modern design and production (Osuala, 2006). With the aim of TVE, among other things, to give training and impart the necessary skills to individual who shall be self-reliant economically (FRN, 2013). In Nigeria, this special education programme is offered in technical colleges and vocational training centre as well as skills acquisition centre. This means that technical and vocational institutions had shouldered the responsibility of manpower development Nigeria (FRN, 2013). It further means that 'entrepreneurship' which implied, acquainting the recipients with the relevant technical skill that will earn them a living in either wage employment or self employment could as well be co-opted in the training programme.

Therefore, acquisition of appropriate skills and competencies in both mental and physical is equipment for the individual to life and to also contribute to growth of the society. Students in mechanical engineering trade in the technical and vocational institutions undergo theoretical and practical aspects of refrigeration and air-conditioning course. These courses are generally designed to produce skilled craftsmen with good knowledge of the working principles of air conditioning system as well as the techniques and safety practices involved in its maintenance. Just as Chiorlu, Ogundu & Obed (2016) had posited that the learning environment should expose students to the use of air conditioning equipment in a way that will lead students to acquire relevant knowledge and skills. According to the National Board for Technical Education (NBTE, 2012) the goal of Air conditioning training is to give the trainee competence in the trade, such that on completion of the training the graduate should be able to: 1. Install, analyze, diagnose and repair refrigeration equipment using proper hand-tools, meters, gauges and test instruments; 2. Demonstrate proper refrigerant handling techniques in recovery, recycling and reclamation when installing, repairing and removing refrigeration equipment; 3. Analyze systems and components for proper installation, operation and efficiency; 4. Analyze prints and drawings including mechanical and electrical schematics and pictorials for job specifications, equipment location and diagnostics; and 5. Diagnose and facilitate repair to the smallest repairable unit on a refrigeration unit. Amadi, Obed & Orlu (2016) postulated that the workshops, laboratories and the overall technical and vocational education environment must be adequately equipped so as to reflect the actual working environment beyond the classroom, in a way that will lead students to acquire relevant knowledge and skills that will enhance their future endeavors. Therefore, acquiring skills and competency in air conditioning would enable a graduate of technical and vocational education institutions to set up and run an enterprise that will contribute to the development of the nation's economy.

Skill has been described as observable competence to perform a learned behavior, regarding the relationship between mental activity and body movements (Okorie, 2011; and Thomas & Amaechi, 2016). Which means possessing a skill is the ability to demonstrate that habit of acting, thinking and behaving in a specific activity in such a way that the process becomes natural to the individual through repetition or practice (Okeke, 2012; and Thomas & Amaechi, 2016). Competent on the other hand, means that the individual has acquired the knowledge, skills and attitudes required in order to perform successfully at a specified proficiency level in a given work (Nwokolo, 2009). That is the individual's ability to use, apply and demonstrate a group of related

awareness, knowledge, skills and attitudes in order to perform tasks and duties successfully and which can be measured against well-accepted standards (levels) required in employment as well as assessed against provided evidences at work location. The competency affects both individual's job responsibility and performance on the job and usually fall into two categories, namely technical and behavioral (Wahba, 2013). It also indicates a satisfactory state of knowledge, skills and attitudes and the ability to apply them in a variety of situations (EU Commission, Open Cred study, 2016).

Entrepreneurship skills development allows the beneficiaries to explore the various occupational possibilities the work required, available rewards, necessary training and relative advantages and disadvantages of each (Nwoye, 2011). Entrepreneurship skill development is therefore a planned effort undertaken by an individual or individuals, institutions or agencies to develop the required skill competencies in people that will enable them contribute to the economy of the nation. According to Maigida, Saba & Namkere (2013) entrepreneurial traits (skills) are characteristics that give individuals the potential or propensity to run a successful business. These traits includes creativity, need to achieve, need for autonomy, intuition among others are the ingredients of good leadership and requirements for effectiveness in any vocational area. Marjor-Ritta (2009) added the mastering of technical skill, marketing ability, knowledge of business creation, knowledge of business plan, knowledge of action planning, knowledge of record keeping, knowledge of quality control and Knowledge of new techniques of production as entail skill to run an enterprise. It is expected that graduates who may not have paid employment opportunities can effectively utilize the entrepreneurship skill acquired to establish and run a small and medium enterprise that can compete with their mates who are in high-paying employment.

Finally, for a country in recession like Nigeria, where high rate of unemployment is being prevalent, which is likely brought by the system failure, coupled with inability of government to create job for the its populace (Muhammed, 2010). Entrepreneurship which involves the acquisition of skills, ideas and managerial abilities necessary for personal self-reliance cannot be overemphasized. It is therefore believed that in addition to the possession of entrepreneurial traits as identified by (Maigida, Saba & Namkere, 2013; and Marjor-Ritta, 2009). The possession of competent practical skills in air conditioning is also a prerequisite for graduates that would enable an individual to create a business of his own.

II. Statement of the Problem

The curricular of technical and vocational education programme in Nigeria are designed to produce craftsmen at all levels and with different specializations, who shall be self-reliant economically (FRN, 2013). Similarly the National Board for Technical Education (NBTE, 2012) reemphasized that the technical education trades provide training that leads to the production of skilled personnel like craftsmen and technicians who could either secure employment at the end of their training, set up their own businesses (entrepreneur) or further their studies in Polytechnics, Colleges of Education (Technical) and Universities. Nwachukwu, Bakare and Jika (2011) opined that technical college provides students through training with the relevant and adequate knowledge, skills and attribute for employment under the guidance of a teacher in related occupations. It is expected that these craftsmen will either set up a business of their own called small and medium enterprises (SMEs) where they can apply the knowledge and skills they acquired from technical college after graduation for production of goods and services (Ile, 2001).

Unfortunately, the country is stilled faced with the burdens of surplus unemployable manpower irrespective of the objectives setting up the TVE institutions. This according to Olaitan, Igbo, Nwachukwu, Onyemachi & Ekong as cited by Maigida, Saba & Namkere (2013) is as a result of the institutions spending time theorizing at the expense of developing practical skills among youths, because of lack of materials and facilities needed to infuse in youths the necessary skills likely to be required for employment. Furthermore this skills gap among graduates of technical and vocational education has equally resulted in absence of entrepreneurship among graduates. This is evident in most of the beneficiaries of TVE after graduations going about the streets hunting for employment. When they could not find any, they became frustrated and often-time resort to doing whatever possible just to earn a living.

The problem of this study is 'what are the air-conditioning skills needed for entrepreneurship among graduates of technical education institutions in Rivers state?

III. Purpose of the Study

The study sought to empirically investigate the air-conditioning skills needed for entrepreneurship among graduates of technical education institutions in Rivers state. Specifically, the study sought to identify the skills that are in:

1. Automobile air-conditioning skills needed for entrepreneurship among graduates of technical education institutions in Rivers state.
2. Industrial air-conditioning skills needed for entrepreneurship among graduates of technical education institutions in Rivers state.

Research Questions

Two research questions were raised which guided the study:

1. What are the automobile air-conditioning skills needed for entrepreneurship among graduates of technical education institutions in Rivers state?
2. What are the industrial air-conditioning skills needed for entrepreneurship among graduates of technical education institutions in Rivers state?

Hypotheses

Two hypotheses were formulated to guide the study and were tested at 0.05% level of significance;

1. There is no significant difference in the mean responses of teachers and students on the automobile air-conditioning skills needed for entrepreneurship among graduates of technical education institutions in Rivers state.
2. There is no significant difference in the mean responses of Teachers and students on the industrial air-conditioning skills needed for entrepreneurship among graduates of technical education institutions in Rivers state.

IV. Method and materials

The study was carried out in the government technical colleges in Rivers state which is located in the South-South geo-political zone of Nigeria. The State has technical and vocational institutions offering Technical and Vocational Education programmes at various degree levels.

The survey research design was adopted for the study. The population of the study was 561 made up of 141 technical Teachers and 420 year three students in four government technical colleges in Rivers state Nigeria. The purposive random sampling technique was used in selecting 9 Teachers and 270 students, making a sample size of 279 that was used as respondents for the study.

A structured questionnaire with 21 items was developed and used as instrument for data collection from the respondents. The instrument was divided into two sections A & B: Section A sought information on the personal data of respondents. While Section B sought informations from the Teachers and students on the various skills in air conditioning needed for entrepreneurship development of graduates in Rivers State. The instrument was face and content validated by two experts in department of technical education FCE (T) Omoku, Rivers State. A five point anchored scale of Highly needed (HN), Needed (N), Moderately Needed (MN), Not-Needed (NN), Highly Not-Needed (HNN), were written against each item with a corresponding assigned values of 5, 4, 3, 2, and 1 respectively. The reliability of the instrument was achieved using Cronbach Alpha formula, by analyzing response of 20 respondents who are not part of the sample and it yielded a reliability index of 0.97 which was considered very sufficient for the study. According to Okoli, (2009) a reliability coefficient of 0.70 and above is desirable.

The assistance of the office of the Head of Department in these institutions was used in data collection. Through the help of these heads of department the researchers were able to account for 93% return rate of the instrument distributed to the respondents. Data collected were analyzed on statistical package for social sciences SPSS version 20, using mean and standard deviation to answer the two research questions and t-test was used to test the null hypotheses at 0.05 level of significance. A criterion mean of 3.50 was set as bench marks for the acceptance or rejection. Hence, the grand mean of items were used to answer the two research questions, to consider as needed skills if the calculated grand mean of that item is equal to or greater than 3.50, while mean of

any item below 3.50 was considered as not needed skills. Likewise their corresponding t-test result, items whose t-cal is greater than t-crit were rejected while the other wise were accepted.

V. Results

Research Question 1 What are the automobile air-conditioning skills needed for entrepreneurship among graduates of technical education institutions in Rivers state?

Ho1: There is no significant difference in the mean responses of Teachers and students on the air-conditioning skills needed for entrepreneurship among graduates of technical education institutions in Rivers state.

Table 1 t-test analysis of the mean responses of Teachers and students on automobile air-conditioning skills needed for entrepreneurship

S/N	Automobile air conditioning skills needed for entrepreneurship includes the ability to:	\bar{X}_1	\bar{X}_2	\bar{X}_G	Remark	t-cal	Result
1	Check belt tension and adjust if necessary	4.83	4.73	4.75	Needed	1.518	NS
2	Check blower motor operation at all speeds	4.09	3.99	4.02	Needed	1.010	NS
3	Discharge the system of refrigerant	4.09	3.99	4.02	Needed	1.010	NS
4	Evacuate the system of refrigerant	4.16	4.15	4.16	Needed	-.113	NS
5	Using the appropriate refrigerant and equipment, charge the system to the manufacturer's specifications.	4.09	3.99	4.02	Needed	1.010	NS
6	Perform leakage test to determine that the system is not leaking. Use electronic leak detector	4.02	3.93	4.00	Needed	-.878	NS
7	Detect internal leaks using electronic equipment	4.31	4.25	4.30	Needed	-.614	NS
8	Adjust thermostat valve	4.31	4.25	4.30	Needed	-.614	NS

Note: X_1 = mean Teachers, X_2 = mean of students, X_G = grand mean, $N = 279$, $df=277$, $t_{critical} = 1.960$

Data presented in Table 1 above, revealed that the respondents agreed in all the items with grand mean range of 4.02 to 4.75 which indicate that both the Teachers and students in technical education agreed that the automobile air-conditioning skills are all needed for entrepreneurship among graduates of technical education institutions in Rivers state. Also in Table 1 shows that all the items had their t-Calculated less than t-critical at 0.05 level of significance. This implies that there was no significant difference between the mean responses of Teachers and students on automobile air-conditioning skills that are needed for entrepreneurship among graduates of technical education institutions in Rivers state.

Research question 2 What are the industrial air-conditioning skills needed for entrepreneurship among graduates of technical education institutions in Rivers state?

Ho2: There is no significant difference in the mean response of Teachers and students on the industrial air-conditioning skills needed for entrepreneurship among graduates of technical education institutions in Rivers state.

Table 2 *t*-test analysis of the responses of Teachers and students on industrial air-conditioning skills needed for entrepreneurship

S/N	Industrial air conditioning skills needed for entrepreneurship includes the ability to:	\bar{X}_1	\bar{X}_2	\bar{X}_G	Remark	t-cal	Result
1	Describe the principles of operation of both direct and indirect systems of air-conditioning	4.58	4.57	4.58	Needed	-.096	NS
2	Identify the different components of a central air conditioning system and explain their functions	4.57	4.54	4.55	Needed	.494	NS
3	Read and interpret the layout diagram of an air conditioning system	4.58	4.57	4.58	Needed	-.096	NS
4	Explain the principles of operation of direct and indirect systems of air-conditioning	4.57	4.54	4.55	Needed	.494	NS
5	Identify various components in a central air conditioning plant such as compressor, condenser, air handling unit, fan, coil unit, chiller and other auxiliary components like diffusers, ductings, electrical panel, thermostatic expansion valve, Solenoid valve, Anemometer, cooling towers.	4.57	4.54	4.55	Needed	.494	NS
6	Interpret the layout diagram of air-conditioning Systems such as direct and indirect systems diagrams and electrical circuit.	4.64	4.64	4.64	Needed	-.010	NS
7	Install and commission a central air-conditioning system.	4.72	4.49	4.55	Needed	3.288	S
8	install and commissioning a central air-conditioning	4.61	4.34	4.41	Needed	2.779	S
9	Accurately diagnose faults in the system and effect repairs with confidence	4.72	4.49	4.55	Needed	3.288	S
10	Effectively maintain the system and adjust the various controls	4.51	4.38	4.41	Needed	1.909	NS
11	Diagnose faults in the electrical circuit in electrical panel	4.69	4.67	4.69	Needed	-.414	NS
12	Effect repairs on all types of faults such as faulty compressor, motor open circuit, short circuit and single phasing.	4.51	4.38	4.41	Needed	1.909	NS
13	Diagnose faults within refrigerant circuits, such as low level of refrigerant, incomplete charging faulty expansion valve and erratic air-conditioning.	4.84	4.58	4.64	Needed	3.089	S

Note: X_1 = mean Teachers, X_2 = mean of students, X_G = grand mean, $N = 279$, $df=277$, $T_{critical} = 1.960$

Data in Table 2: shows that the respondents had a grand mean range of 4.41 to 4.69 in all the items listed. This indicates that the respondents agreed that all the items listed on the industrial air-conditioning skills are needed

for entrepreneurship among graduates of technical education institutions in Rivers state. Also, data in table 2 shows that items 9, 10, 11, 12, 13, 14, 18, 19 & 20 had their t-calculated values less than t-critical at 0.05 level of significance. This implies that there is no significant difference in the mean response of Teachers and students on the industrial air-conditioning skills needed for entrepreneurship among graduates of technical education institutions in Rivers state. However, items 15, 16, 17 & 21 had their t-cal greater than t-critical, which means a significant difference exist in the mean response of Teachers and students with respect to those items.

VI. Discussion of Findings

The findings of the study revealed that all the skills in automobile air conditioning are needed for entrepreneurship development of graduates of technical and vocational education institutions in Rivers State. The findings further showed that there is no significant difference in the mean responses of Teachers and students on the automobile air-conditioning skills needed for entrepreneurship among graduates of technical education institutions in Rivers state. This finding is in line with Chiorlu, Ogundu & Obed (2016) who posited that the learning environment should expose students to the use of automobile air conditioning equipment in a way that will lead students to acquire relevant knowledge and skills that will enhance their future endeavors.

The findings of the study also revealed that the all the industrial air-conditioning skills are needed for entrepreneurship. More-also, there is no significant difference in the mean responses of Teachers and students on the industrial air-conditioning skills needed for entrepreneurship among graduates of technical education institutions in Rivers state. This finding is in line with Amadi, Obed & Orlu, (2016) who postulated that the workshops, laboratories and the overall technical and vocational education environment must be adequately equipped so as to reflect the actual working environment beyond the classroom, in a way that will lead students to acquire relevant knowledge and skills that will enhance their future endeavors.

VII. Conclusion

Teachers and students of technical colleges expressed their views on the basic technical skills in Air-conditioning for entrepreneurship development of graduates of technical and vocational education in Rivers state. The basic technical skills cannot be undermined in light of entrepreneurship skills development in technical and vocational education.

Though, there is no skill-acquiring project that is without challenges, it is imperative that government through ITF and technical institutions in Nigeria should consider a proper implementation of technical education curricula to improve entrepreneurship skills development of graduates of technical and vocational education in Nigeria.

Recommendations

1. Technical colleges should vigorously empower their student with skills by providing facilities and equipment they need to infuse in the students the necessary technical skills to aid them for entrepreneurship.
2. The government should ensure that her policy statement regarding the establishment of technical colleges is effectively implemented and make available the necessary facilities for technical institutions to equip their students with requisite technical skills for entrepreneurship.

References

- [1.] Amadi, S.W, Obed O.O & Orlu, I (2016). Assessing the Adequacy of Skills Required of Electrical Technology Students in Rivers State Technical Colleges in Domestic Wiring. *International Technology Research Journal*, 4 (1), 189-207.
- [2.] Chiorlu, D. O; Ogundu, I & Obed O. O, (2016). Strategies for Enhancing Electrical Students Performance in Domestic Wiring in Technical Colleges in Rivers State Nigeria. *Journal of Research Science and Technology Education*, 6 (1), 170-188.
- [3.] Federal Republic of Nigeria (2013). *National Policy on Education (6th Ed)*. Yaba. NERDC Press.

- [4.] Maigida, J. F., Saba, T. M., Namkere, J. U. (2013). Entrepreneurial Skills in Technical Vocational Education and Training as A strategic Approach for Achieving Youth Empowerment in Nigeria. *International Journal of Humanities and Social Science*, 3 (5) 303-310.
- [5.] Marjo-Ritta, L. (2009). *Training and Skills Acquisition in the Informal Sector: A Literature Review*. Retrieved June 25, 2017 from www.ilo.org/public/English/employment/i
- [6.] National Board for Technical Education (2012). *Revised curricula for technical colleges and polytechnics*. Kaduna. NBTE
- [7.] Nwokolo, P. O. (2009). *Entrepreneurship in Technology Education in Entrepreneurship practices in Education*. Immunize: Research and publication unit.
- [8.] Okorie J.U. (2011). *Vocational Industrial Education*. Bauchi: league of Researchers in Nigeria.
- [9.] Okorie, J.U. (2010). *Developing Nigeria Workforce*. Calabar: Page Environs Publishers.
- [10.] Okoro, O. M. (1999). *Principles and Methods in Vocational and Technical Education*. Nsukka. University Trust Publisher.
- [11.] Okoye, E. (2012) *Manpower Development in Nigeria Educational System: Issues and Challenges in the 21st Century*, 11-20.
- [12.] Olabiyi, O.S (2014). *Relevance of Students Industrial Work Experience Scheme to Skill Acquisition among Technical College Students in Lagos State*. Unpublished M.Ed Thesis, Department of Vocational Teachers Education, University of Nigeria, Nsukka.
- [13.] Olabiyi, O.S and Ologban, J.O (1999). Psychomotor Skills Required for Enhancing the Performance of Woodwork/Building Technology Students in Oyo and Lagos States. *International Journal of Research in Education*, 1 (2), 63- 68.
- [14.] Olaitan, S.O (1996). *Vocational and Technical Education in Nigeria (Issues and Analysis)* Onitsha: Noble Graphic Publishers.
- [15.] Olaitan, S.O., Igbo, C.A., Nwachukwu, C.E., Oyemachi, G., A and Ekong, A.O, (1999), *Curriculum Development and Management in Vocational Technical Education*. Onitsha: Cape Publishers International Limited
- [16.] Osuala, E. C. (2005) *Introduction to Research Methodology*. The Millennium Edition. Enugu, Cheston Agency.
- [17.] Thomas, C. G. & Amaechi, O. J. (2016). The Relevance of Technical and Vocational Skills Acquisition Programme in the Development and Empowerment of Rural Youths in Niger Delta Region, Nigeria. *Journal of Scientific and Engineering Research*, 3(6), 473-478.
- [18.] Wahba, M. (2013) *Glossary of Terms for TVET, Assessment and Verification*. Retrieved from: <http://www.unevoc.unesco.org/go.php?q=TVETipedia+glossary+A-Z&filt=all&id=222>