

Professional Skills in Mechanical Technology Education for VTE Students' Private Enterprise Development After School

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Abstract

There are non-utilized silent professional skills encapsulated in Mechanical Technology Education (MTE). These skills when harnessed and develop, have the capacity of launching Vocational and Technical Education (VTE) students into private enterprise ventures upon graduation. Hence, the purpose of this study was professional skills in Mechanical Technology for VTE students' private enterprise development after school. To achieve the objective of the study, a descriptive survey design was adopted. A total population of 45 respondents (20-MTE lecturers and 25-Mechanical Engineering Industry Practitioners (MEIP)) was used for the study. There was no sampling. Four specific purposes and Research Questions (RQs) guided the study. The only data collection instrument for the study was the: "Professional Skills in Mechanical Technology Education Questionnaire" (PSMTEQ). The PSMTEQ was face validated by three experts. Cronbach Alpha Coefficient method was used to establish the reliability coefficient index for the MTE professional skills as follows: Engineering Drawing (0.89), Refrigeration and Air-Conditioning (0.87), Machine Tools Processing (0.81), Motor Vehicle Repair (0.90); and the entire instrument (0.87). The four stated RQs were analyzed using Mean, and Standard Deviation. The study found sixty-eight professional skills in Mechanical Technology for VTE students in private enterprise development after school. Therefore, the study recommended among others, that to maximize the full benefits of this study, the identified skills should be developed into practical entrepreneurship development programs to be followed in higher VTE institutions to teach students skills for self-reliance in private enterprising ventures. With this, graduates of MTE will be aware of the several skill options available in their chosen careers.

Keywords: Professional Skill, Mechanical Technology Education, VTE, & Private Enterprise Development.

Introduction

Entrepreneurship skill development programs have gained awareness due to unemployment level and skills mismatch challenges all-round the globe, most especially in this post-pandemic era. Private enterprising education according to Brown (2002) is designed to communicate and inculcate competencies, skills, and values needed to recognize business opportunities, organize business opportunities, organize and start new private business ventures. Gorman, Hanlon, and King (1997) affirmed that entrepreneurship education is an educational program that is focused on impacting students with private enterprise ventures. Oduma (2007) asserts that entrepreneurship education has the overall objective of generating employment in small-scale enterprises in the country. According to Oduma, entrepreneurship education is aimed at encouraging self-employment as a

conscious and pre-determined choice and generating employment opportunities for others. Katz (2007) and Kpabep (2012) identified some qualities and altitudes that make one a successful entrepreneur as a commitment to the task of taking a calculated risk, identification and seizing opportunities, objectivity, need for feedback on reward, optimism, proactive manager, capacity to influence others, motivation for independence, innovative and creative, perceptive, capable of preparing businessman managing growth and development and planning for competitive advantage. These qualities may not be complete in an individual, but some of these qualities can be acquired through formal and informal education and training. Entrepreneurship education is designed to empower youths for sustainable employment.

Entrepreneurship education alongside vocational skills in mechanical technology has the capacity of providing employment for individuals that have acquired the training. In order to acquire excellent skills and achieve the desire for job creation and poverty reduction, the Federal Government of Nigeria introduced National Economic Empowerment and Development Strategy (NEEDS) (FRN, 2005). The objectives of NEEDS are to ensure that graduates acquire sufficient technical/entrepreneur skills and competencies to be self-employed through job creation. The entrepreneurial skills needed by graduates of VTE in the opinion of Meyer and Crane (2011) include communication skills, teamwork spirit skills decision-making skills, leadership skills, managerial skills, information management skills, financial management skills, opportunity identification skills, business idea development skill, business plan writing skill, risk management skill, and perseverance skill. All of these skills as enumerated by Meyer and Crane (2011) are the basic business components for the management of vocational-technical education-related skills.

VTE is perceived by the local, state, and federal governments as a source of sustainable economic development. Hence, the blueprint of the Federal Ministry of Education and Master Plan (2001-2010) as regards VTE development in my country Nigeria, stipulates the following as its objectives: to produce semi-skilled and technical manpower necessary to restore, revitalize, energize, operate and sustain the national economy and substantially reduce unemployment; and to provide orientation and basic skills, competencies and occupational abilities for those wishing to open entrepreneurship to produce saleable goods or services desired by the public as cited in Oduma, (2007). There are aspects of VTE that contains occupational areas that are capable of equipping students with needed saleable vocational skills; one such area is Mechanical Technology Education.

Mechanical Technology Education focuses on technology processes from conceptual design to practical problem solving, as well as the application of scientific principles. The concepts behind the course provide the scope for the wide application in different processes, services, and systems used for the manufacture of goods and other products for the satisfaction of human needs. According to Thomson (2009), the educational and career opportunities that are associated with the study of mechanical technology are based on systems, controls, structures, and processes. These are discovered in the technology of the learned device that is applied to the overall educational concept and teaching in a given educational institution. Within the same teaching period, students are also shown skills on how to use and apply mechanical advantages in design to promote the safety and efficiency of mechanical equipment and tools. Herman (2013) maintained that mechanical technology as a course of study is designed to equip students with a solid background that tends to bring out both technical and practical skill abilities for private enterprise development. Hunter and Bryant (1991) commented that the component of mechanical technology has the capacity to prepare students' practical skills acquisition in five distinct areas. These skills can be applied

to the enhancement of the entrepreneurial skills of the students (Hugh, Jon, Joe, Terry, Wallace, and Rosemary, 2009). Opinion of Parker (2013) concludes that the general subject content scope of mechanical technology covers the areas of; Engineering Drawing, Machine Tools processes, Motor Vehicle Repairs, Refrigeration and Air-Conditioning Repairs, effective communication techniques, earth-moving equipment mechanics, computer applications, and measuring instruments among others.

For the purpose of brevity, this study will only deal with five component areas of MTE among the constituents proposed by Parker (2013). The researcher will explore possible skills that will aid VTE students' private enterprise ventures after graduation. They are skills in: Engineering Drawing, Refrigeration, and Air-Conditioning Repairs, Machine Tools Processing, and Motor Vehicle Repairs.

Professional skills in Engineering Drawing are the abilities required of the students to be able to develop and apply a sense of creativity in the production and presentation of technological abstracts into draft drawings and at the same time have the capacity to interpret already prepared computer design blueprint drawings. According to Hugh, Jon, Joe, Terry, Wallace, and Rosemary (2009) the skills available in Engineering Drawing are skills for: (a) review of blueprint notes and dimensions, (b) identification of basic layout of drawings, (c) identification of basic types of drawings, (d) listing of the purpose of each type of drawing, (e) Verification of drawing elements, (f) description of the relationship of engineering drawings to planning, (g) use of standards to verify requirements, (h) analyses of Bill of Materials (BOM), and (i) understanding and use of quality systems. Private enterprise skills are not only limited to only Engineering Drawing, Refrigeration, and Air-conditioning but also have some skills to offer.

The study of Ogbuanya and Kpabep (2013) suggested the following skills in Refrigeration and Air-conditioning to include skills; leak detection, brazing, flaring, bending, vacuuming, recovery, retrofitting, troubleshooting, and commissioning. Most of the practical activities in Refrigeration and Air-conditioning are centered on the knowledge of Machine Tools and Processing technology.

Machine Tools Processing is the technical skill of the use of the machine for shaping or machining metal or other rigid materials, usually by cutting, boring, grinding, shearing, or other forms of deformation. Machine tools employ some sort of tool that does the cutting or shaping. Hunter and Bryant (1991) opined that the necessary entrepreneurial skills found in machine tools technology are: communication skills, use of measurement tools, use of inspection devices, mathematical skills, reading/writing skills, knowledge of safety regulations, the practice of safety in the workplace, organizational skills, knowledge of company policies/procedures, mechanical aptitude, ability to comprehend written/verbal instructions, knowledge of cutting fluids/lubricants, basic knowledge of fasteners, ability to work as part of a team, converse in the technical language of the trade, knowledge of occupational opportunities, knowledge of employee/employer responsibilities, knowledge of company quality assurance activities, and practice quality-consciousness in performance of the job. Machine Tools Processing skills are some worth similar to some Motor Vehicle Repairs entrepreneurial skills.

The skills in Motor Vehicle Repairs as proposed by Parker (2013) include strong customer service skills, strong communication skills, good diagnostic skills, problem-solving skills, solid work ethic, strong technical aptitude, up-to-date technology, leadership, and personal tool inventory skill. These MTE skills are hidden and are not mostly noticed by VTE students while in school as skills they can earn a living. Hence, this study tends to X-ray

skills in each of the five chosen components of MTE for the purpose of aiding VTE students' private enterprise development.

Statement of the Problem

MTE has a wider scope of application in diverse processes, services, and systems that can be applied in the production of goods and services as explained in the literature above. That is why the course is designed to guide students on both technical and practical skills for entrepreneurship development in Engineering Drawing, Machine Tools Processes, Motor Vehicle Repairs, Refrigeration, and Air-Conditioning Repairs, and others.

But unfortunately, the teaching and learning of this course in VTE schools are not done with the motive of bringing out the required professional skills associated with the components of MTE for the purpose of building an entrepreneurial base of knowledge and skills among VTE students upon graduation. According to Ogbuanya and Kpabep (2013), VTE students graduate from the technological course without identifying the prerequisite private enterprise skills embedded in their area of study. This problem has been blamed on the lecturers in this field who taught the students, for failing to link the skills and concepts of MTE to private enterprise development of the students after school.

Hence, the problem of this study was that the actual professional skills contained in MTE for entrepreneurship development of VTE graduates are not mentioned and presented to the students as to skills for self-employment after their school career.

Purpose of the Study

The purpose of this study was “professional skills in mechanical technology education for VTE students' private enterprise development after school”. Specifically, the study sought to uncover skills in four component areas of MTE as follows:

1. Skills in Engineering Drawing
2. Skills in Refrigeration and Air-Conditioning
3. Skills in Machine Tools Processing and
4. Skills in Motor Vehicle Repair.

Research Questions

1. What are the professional skills in Engineering Drawing for VTE students' private enterprise development after school?
2. What are the professional skills in Refrigeration and Air-Conditioning for VTE students' private enterprise development after school?
3. What are the professional skills in Machine Tools Processing Technology for VTE students' private enterprise development after school?
4. What are the professional skills in Motor Vehicle Repairs for VTE students' private enterprise development after school?

Significance of the Study

This study will be significant to Universities, Polytechnics, and Colleges of Education for setting up technical skill development centers for further training of MTE graduates on entrepreneurial skills. Specifically, the study will be beneficial to students of Industrial Technical Education with an option in Mechanical Technology. Also, the study will serve as a guide to program regulatory bodies like the National Board for Technical Education

(NBTE); and the National University Commission (NUC) in the case of Nigeria for the selection of appropriate skills in MTE for entrepreneurship development programs.

Methodology

A descriptive survey design was used for this study. The research was conducted in Port Harcourt, Omoku, and Bori all in Rivers State, Nigeria. The total population for this study was 45 respondents (20-MTE lecturers and 25-MEIP (Mechanical Engineering Industry Practitioners)) drawn from Federal College of Education (Tech), Omoku; Ken Sarow-Wiwa Polytechnic, Bori; and Ignitus Ajuru University of Education, Rumolumini, Port Harcourt. There was no sampling because the entire population was studied. The only data collection instrument for the study was the “Professional Skills in Mechanical Technology Education Questionnaire” (PSMTEQ). The instrument was designed in a Five-point Likert scale with response categories: Most Appropriate (MA); Appropriate (A); Undecided (U); Not Appropriate (NA); and Strongly Not Appropriate (SNA). The PSMTEQ was face validated by three experts. Comments and suggestions from the experts were finally included in the final edition of the questionnaire. The Reliability Index of the instrument for the skills in MTE was established using Cronbach Alpha Coefficient as follows: Engineering Drawing (0.89), Refrigeration and Air-Conditioning (0.87), Machine Tools Processing (0.81), Motor Vehicle Repair (0.90); and the entire instrument (0.87). Thirty copies of the instrument were trial-tested at the University of Calabar, Uyo, Akwa Ibom State outside the study institutions. The instrument for data collection was personally administered to the respondents. There was a 100% return on the instrument. All the 45 copies administered were all returned and were used for data analyses for this study. The SPSS software was employed to ease data computation. The statistical instrument used for analyzing the RQs was the Mean. The decision rule holds that any Mean rating of 3.50 and above was regarded as “Appropriate skill” in MTE for VTE students' private enterprise development after school; whereas a Mean rating below 3.50 was regarded as “Not-Appropriate skill”.

Presentation and Analysis of Data

The data presented in Tables 1-4 below are the results of the stated research questions that guided the study.

Research Question 1

What are the professional skills in Engineering Drawing for VTE students' private enterprise development after school?

The results answering RQ₁ above are contained in table1. It shows the Mean and Standard Deviation of respondents on skills in Engineering Drawing for VTE students' private enterprise development after school.

Table 1: Mean and Standard Deviation Responses of MTE-Lecturers and MEIP on Skills in Engineering Drawing

| Item | Skills in Review of Blueprint Notes and Dimensions | Mean | SD | Decision |
|--|---|-------------|-------------|-------------|
| 1. | Explain basic blueprint terminology | 3.52 | 0.50 | Appropriate |
| 2. | Identify types of dimensions | 4.01 | 0.77 | Appropriate |
| 3. | Identify general note symbols | 4.50 | 0.69 | Appropriate |
| 4. | Locate notes on a print | 3.77 | 0.95 | Appropriate |
| 5. | Interpret most used abbreviations and terminology | 3.60 | 0.89 | Appropriate |
| 6. | Determine the surface finish for a given part | 3.87 | 0.87 | Appropriate |
| 7. | List essential components found in general drawing notes | 3.91 | 0.79 | Appropriate |
| Skills in Identification of Basic Layout of Drawings | | | | |
| 8. | Identify types of lines within a drawing | 3.55 | 0.50 | Appropriate |
| 9. | Identify item number symbols | 3.53 | 0.77 | Appropriate |
| 10. | Identify general note symbols | 4.10 | 0.69 | Appropriate |
| 11. | List the essential components found in the title block | 3.71 | 0.95 | Appropriate |
| 12. | Locate bill of materials in a drawing | 3.69 | 0.89 | Appropriate |
| 13. | List the components found in the revision block | 3.51 | 0.83 | Appropriate |
| 14. | Identify types of lines within a drawing | 3.72 | 0.77 | Appropriate |
| 15. | Identify item number symbols | 3.59 | 0.53 | Appropriate |
| Skills in Identification of Basic Types of Drawings | | | | |
| 16. | Identify orthographic views | 4.59 | 0.63 | Appropriate |
| 17. | Identify positions of views (top, front, side, and auxiliary) | 3.74 | 0.93 | Appropriate |
| 18. | Visualize one or more views from a given view | 3.30 | 0.87 | N/A |
| 19. | Identify isometric views | 3.84 | 0.83 | Appropriate |
| 20. | Identify exploded isometric drawings | 3.56 | 0.78 | Appropriate |
| 21. | Identify assembly drawings | 3.77 | 0.75 | Appropriate |
| Skills for listing Purpose of Each Type of Drawing | | | | |
| 22. | Identify the purpose of orthographic (3 views) drawings | 3.59 | 0.56 | Appropriate |
| 23. | Identify the purpose of isometric drawing | 3.09 | 0.76 | N/A |
| | Identify the purpose of exploded isometric drawing | 4.57 | 0.67 | Appropriate |
| 25. | Identify the purpose of assembly drawings | 3.70 | 0.92 | Appropriate |
| Skills for Verification of Drawing Elements | | | | |
| 26. | Determine the scale of the view or section | 3.54 | 0.83 | Appropriate |
| 27. | Check for revisions | 4.03 | 0.77 | Appropriate |
| 28. | Recognize out-of-date blueprints | 4.58 | 0.53 | Appropriate |
| Skill for Geometric Dimensioning and Tolerance (GD&T) Methodology | | | | |
| 29. | Identify the purpose of GD&T | 4.03 | 0.74 | Appropriate |
| 30. | Identify symbols for controlling location of part features | 4.52 | 0.62 | Appropriate |
| 31. | Identify symbols for controlling form (or alignment) of part features | 3.70 | 0.54 | Appropriate |
| 32. | Identify symbols for showing datum and basic dimensions | 3.53 | 0.76 | Appropriate |
| 33. | Identify symbols for Maximum Material Size (MMS) and Regard | 3.80 | 0.66 | Appropriate |
| Skills for Analyses of Bill of Materials (BOM) | | | | |
| 34. | Discuss components found on BOM | 4.55 | 0.87 | Appropriate |
| 35. | Determine materials needed to produce the part | 4.41 | 0.82 | Appropriate |
| 36. | Determine quantities necessary to produce the part | 4.57 | 0.76 | Appropriate |
| 37. | Submit completed stock request form as required | 3.74 | 0.54 | Appropriate |
| 38. | Submit completed tool request form as needed | 3.62 | 0.51 | Appropriate |
| 39. | Discuss components found on BOM | 3.73 | 0.74 | Appropriate |
| Skills to Understand and Use Quality Systems | | | | |
| 41. | Understand and apply quality principles, including control | 3.73 | 0.96 | Appropriate |
| 42. | Document paper trails for part revisions | 3.62 | 0.82 | Appropriate |
| | Grand Mean and SD | 3.56 | 0.74 | Appropriate |

Table 1 above showed a grand mean and standard deviation score ($\bar{X}= 3.56, SD = 0.74$) for professional skills in Engineering Drawing for VTE students' private enterprise development after school. Among the skills, identification of orthographic views ($\bar{X}= 4.59, SD = 0.65$) was ranked higher than any other skill in Engineering Drawing. This was followed by recognition of out-of-date blueprints ($\bar{X}= 4.58, SD = 0.53$). Identification of the purpose of isometric drawing ($\bar{X}= 3.09, SD = 0.76$) was the least of the skills and was marked Not-Appropriate. Although, the finding indicated that despite the rejection of items 18 and 23 from the list of items, the rest identified skills in Engineering Drawing for VTE students' private enterprise development after school is all appropriate.

Research Question 2

What are the professional skills in Refrigeration and Air-Conditioning for VTE students' private enterprise development after school?

The results answering RQ₂ above are contained in Table 2. It shows the Mean and Standard Deviation of respondents on professional skills in Refrigeration and Air-conditioning for VTE students' private enterprise development after school.

Table 2: Mean and Standard Deviation Responses of MTE-Lecturers and MEIP on Skills in Refrigeration and Air-Conditioning

| Item | Skills | Mean | SD | Decision |
|------|--------------------------|-------------|-------------|--------------------|
| 1. | Leak detection skill | 4.01 | 0.44 | Appropriate |
| 2. | Brazing skill | 3.74 | 0.72 | Appropriate |
| 3. | Flaring skill | 3.52 | 0.87 | Appropriate |
| 4. | Bending skill | 4.23 | 0.51 | Appropriate |
| 5. | Vacuuming skill | 3.55 | 0.81 | Appropriate |
| 6. | Recovery skill | 3.86 | 0.84 | Appropriate |
| 7. | Retrofitting skill | 3.71 | 0.11 | Appropriate |
| 8. | Troubleshooting skill | 3.57 | 0.43 | Appropriate |
| 9. | Commissioning skills | 3.61 | 0.77 | Appropriate |
| | Grand Mean and SD | 3.78 | 0.61 | Appropriate |

Table 2 indicated a Grand Mean and Standard Deviation score ($\bar{X}= 3.78, SD = 0.61$) for professional skills in Refrigeration and Air-Conditioning for VTE students' private enterprise after school. The finding showed that the respondents agreed that bending skill ($\bar{X}= 4.23, SD = 0.51$) was a major skill in Refrigeration and Air-Conditioning. This was followed by leak detection skill ($\bar{X}= 4.01, SD = 0.44$), and the least was flaring skill ($\bar{X}= 3.52, SD = 0.87$). The overall results showed that all the skills in Refrigeration and Air-Conditioning for VTE students' private enterprises after school are appropriate.

Research Question 3

What are the professional skills in Machine Tools Processing Technology for VTE students' private enterprise development after school?

The results answering RQ₃ above are contained in Table 3. It shows the Mean and Standard Deviation of respondents on skills in Machine Tools Processing for VTE students' private enterprise development after school.

Table 3: Mean and Standard Deviation Responses of MTE-Lecturers and MEIP on Skills in Machine Tools Processing

| Item | Skills | Mean | SD | Decision |
|------|---|-------------|-------------|--------------------|
| 1. | Communication skills | 3.52 | 0.47 | Appropriate |
| 2. | Use measurement tools | 3.70 | 0.52 | Appropriate |
| 3. | Use inspection devices | 4.80 | 0.66 | Appropriate |
| 4. | Basic knowledge of fasteners | 3.63 | 0.80 | Appropriate |
| 5. | Ability to work as part of a team | 3.62 | 0.89 | Appropriate |
| 6. | Converse in the technical language of the trade | 4.69 | 0.87 | Appropriate |
| 7. | Knowledge of occupational opportunities | 4.11 | 1.02 | Appropriate |
| 8. | Knowledge of employee/employer responsibilities | 3.29 | 0.59 | Appropriate |
| 9. | Knowledge of company quality assurance activities | 3.81 | 0.89 | Appropriate |
| 10. | Practice quality-consciousness in job performance | 3.72 | 0.92 | Appropriate |
| | Grand Mean and SD | 4.19 | 0.76 | Appropriate |

Table 3 indicated a Grand Mean and Standard Deviation score (\bar{X} = 4.19, SD = 0.76) for skills in Machine Tools Processing for VTE students' private enterprise development after school. The finding showed that skill item 3 which is "Use of inspection devices" (\bar{X} = 4.80, SD = 0.66) was indicated as the highest skill. This was followed by "Converse in the technical language of the trade" (\bar{X} = 4.69, SD = 0.87) and the least was "Knowledge of employee/employer responsibilities" (\bar{X} = 3.29, SD = 0.59). The results showed that the skills in Machine Tools Processing for VTE students' private enterprise development after school are all appropriate.

Research Question 4

What are the professional skills in Motor Vehicle Repairs for VTE students' private enterprise development after school?

The results answering RQ₄ above are contained in Table 4. It shows the Mean and Standard Deviation of respondents on skills in Motor Vehicle Repairs for VTE students' private enterprise development after school.

Table 4: Mean and Standard Deviation Responses of MTE-Lecturers and MEIP on Skills in Motor Vehicle Repair

| Items | Skills | Mean | SD | Decision |
|-------|--------------------------------|-------------|-------------|--------------------|
| 1. | Strong customer service skills | 3.90 | 0.79 | Appropriate |
| 2. | Strong communication skills | 4.01 | 0.80 | Appropriate |
| 3. | Good diagnostic skills | 3.60 | 0.81 | Appropriate |
| 4. | Problem-solving skills | 4.50 | 0.69 | Appropriate |
| 5. | Solid work ethic | 3.61 | 0.79 | Appropriate |
| 6. | Strong technical aptitude | 3.71 | 0.95 | Appropriate |
| 7. | Up-to-date technology | 3.66 | 0.79 | Appropriate |
| 8. | Leadership skill | 3.78 | 0.89 | Appropriate |
| 9. | Personal tool inventory | 3.79 | 0.66 | Appropriate |
| | Grand Mean and SD | 4.25 | 0.78 | Appropriate |

Table 4 showed a Grand Mean and Standard Deviation score of (\bar{X} = 4.25, SD = 0.78) for skills in Motor Vehicle Repair for VTE students' private enterprise development after school. "Problem-solving skills" (\bar{X} = 4.50, SD = 0.69) were agreed to be a key professional skill. This was followed by "strong communication skills" (\bar{X} = 4.01, SD = 0.80). The least skill was "good diagnostic skills" (\bar{X} = 3.60, SD = 0.81). In all, the results indicated that the identified skills in Motor Vehicle Repair for VTE students' private enterprise development after school are all appropriate.

Findings of the Study

The findings of the study are based on the data collected and analyzed for the study. The study finds 40-items as appropriate skills in Engineering Drawing; 9-Skills in Refrigeration and Air-Conditioning; 10-Skills in Machine Tools Processing; and 9-Skills in Motor Vehicle Repairs for VTE student's private enterprise development after school. Their corresponding Grand Means and Standard Deviation scores are: Engineering Drawing (\bar{X} = 3.56, SD = 0.74); Refrigeration and Air-Conditioning (\bar{X} = 3.78, SD = 0.61); Machine Tools Processing (\bar{X} = 4.19, SD = 0.76); and Motor Vehicle Repair (\bar{X} = 4.25, SD = 0.78).

Discussion of Findings

Table 1 showed analyzed data for RQ₁. It contains professional skills in Engineering Drawing for VTE students' private enterprise development after school. The findings agreed with the view of Hugh, Jon, Joe, Terry, Wallace, and Rosemary (2009) that skills for Engineering Drawing include: a review of blueprint notes and dimensions, identification of basic layout of drawings, identification of basic types of drawings, listing of the purpose of each type of drawing, verification of drawing elements, description of the relationship of engineering drawings to planning, use of standards to verify requirements, analyses of Bill of Materials (BOM), and understanding and use of quality systems.

Table 2 described the analyzed data for research question two. It indicated skills in Refrigeration and Air-Conditioning for VTE students' private enterprise development after school. This is in line with the assertions of Ogbuanya and Kpabep (2013) that skills in Refrigeration and Air-conditioning include skills in: leak detection, brazing, flaring, bending, vacuuming, recovery, retrofitting, troubleshooting, and commissioning.

The result in Table 3 is for research question three. It revealed the Mean ratings of the respondents on skills in Machine Tools Processing for VTE students' private enterprise development after school. The findings agreed with the taught of Hunter and Bryant (1991) that the necessary entrepreneurial and vocational skills associated with Machine Tools technology are: communication skills, use of measurement tools, use of inspection devices, mathematical skills, reading/writing skills, knowledge of safety regulations, practice safety in the workplace, organizational skills, knowledge of company policies/procedures, mechanical aptitude, ability to comprehend written/verbal instructions, knowledge of cutting fluids/lubricants, basic knowledge of fasteners, ability to work as part of a team, converse in the technical language of the trade, knowledge of occupational opportunities, knowledge of employee/employer responsibilities, knowledge of company quality assurance activities, and practice quality-consciousness in performance of the job.

The results found in Table 4 are for research question four. It settled with the position of Parker (2013) that the skills in Motor Vehicle Repairs for VTE student's private enterprise development after school include: strong customer service skills, strong communication

skills, good diagnostic skills, problem-solving skills, solid work ethic, strong technical aptitude, up-to-date technology, leadership, and personal tool inventory skill.

The Mean ratings from Tables 1– 4 indicated that 68 out of the 70 identified skill items for MTE, only two items fail to meet the stated cut-off benchmark for acceptance as professional skills for VTE students' private enterprise development after school.

Conclusion and Recommendation

The inference drawn from the entire study indicated that sixty-eight skills in MTE for VTE students' private enterprise development after school. Also, MTE was seen as a course designed to equip students with a solid background that attempts to bring out both technical and practical entrepreneurial skills in the students. So, this study concludes that the identified skills in MTE are the bedrock for the entrepreneurship development of VTE graduates. With this, the objectives of Vocational-Technical Education development as stipulated by the Nigerian Federal Ministry of Education on entrepreneurial skill acquisition of VTE graduates will be achieved with ease.

This study, therefore, recommends that to maximize the full benefits of the findings of this research, the identified skills in MTE should be developed into entrepreneurship development programs to be followed in VTE institutions and centers to teach students the skills for self-reliance.

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