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Work skills required for employment by motor vehicle mechanic graduates of technical colleges for sustainable national development

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Abstract

This study is designed to assess the work skills required for employment by motor vehicle mechanics graduates of technical colleges for sustainable national development. Descriptive survey design was used in carrying out the study. The respondents for the study consists of 27 motor vehicle mechanics work teachers in all the technical colleges in Niger State and 42 motor vehicle mechanics work master craftsmen working in Niger State selected through cluster sampling technique. A structured questionnaire was utilized to collect data for the study. Based on the findings conclusions were drawn amongst which are: that the development of generic skills should be integrated into the curriculum of motor vehicle mechanics programme to ensure that motor vehicle mechanics graduates from technical colleges graduate with the required skills for employment in different organisations for sustainable national development.

Introduction

Sustainable development has become a key concept which is now central to the programmes of many governments, businesses, educational institutions and non-governmental organisations around the world. Shan (2013) defined sustainable development as development that focuses on the management and conservation of the natural resources base and the orientation of technological and institutional change in such a manner as to ensure the attainment and continued satisfaction of human needs for present and future generation. Arokoya (2004) argued that sustainable development is inherently a value laden concept in that it implies responsibility for both present and future generations. Sustainable development is concerned with the development of the individuals and that of the economy at large. This is because sustainable development concerns a process of change and is heavily dependent upon local contexts, needs and interest. Researchers have shown that sustainable development in any country can only be achieved when the majority of citizens in a country are equipped with the relevant vocational and technical skills various occupational areas in the world of work. In Nigeria, the aspect of education saddled with the responsibility for equipping individuals with the relevant vocational and technical work skills in specific occupational areas is Technical Vocational Education and Training (TVET).

The TVET is the type of education whose major objective is to prepare individuals for employment in chosen occupations by equipping them with the vocational skills, knowledge and attitude necessary for employment. The Federal Republic of Nigeria (2013) defined TVET as a comprehensive term referring to those aspects of educational process involving in addition to general education, the study of technologies and related sciences and the acquisition of practical skills, attitudes, understanding and knowledge relating to occupations in various sectors of the economic and social life. The TVET gives individuals the skills to live, learn and work as a productive citizen. It reduces the over dependence of graduates on government for employment.

The NTA is the National Board for Technical Education. It is a statutory body established by the Federal Government of Nigeria in 1978 to coordinate and regulate technical education in the country. The NTA is responsible for the approval, accreditation, and regulation of technical colleges and polytechnics. It also oversees the curriculum and standards of technical education. The NTA is divided into several zones, each with a Zonal Office. The Zonal Offices are responsible for the day-to-day administration and regulation of technical colleges and polytechnics within their respective zones. The NTA also has a Technical Education Council (TEC) which is a body of representatives from the technical education sector. The TEC is responsible for the development and review of technical education curricula and standards. The NTA also has a Technical Education Research Institute (TERI) which is responsible for research and development in technical education. The NTA also has a Technical Education Development Fund (TEDF) which is a fund established to provide financial support for technical education. The NTA also has a Technical Education Quality Assurance Commission (TEQAC) which is responsible for the accreditation and quality assurance of technical education institutions.

However, Okeke (1985) observed that technical college graduates of MYM lack practical skills and are not carrying out meaningful work to the expectations and satisfaction of their employers. Okeke (1985) attributed the trend to the mismatch between skills demanded in the workplace and those provided by the schools. Therefore, there is the need to assess the extent to which MYM work students in technical colleges are performing with respect to work skill requirements in the school. Okeke and Akin (1986) observed that Nigeria has been making several efforts to keep pace with other developed nations of the world through her emphasis on Science and Technology Education (STE). However, the present situation of unemployment in this country among technical college graduates is an indication that the self-reliance aspect of the national objectives has not been achieved. It is a well-known fact that effective training in skill acquisition has substantially contributed to the technological excellence and economic self-reliance of the industrialized nations.

Therefore, it is for this reason that Enuf and Olorin (1988) stressed the importance of skill acquisition in nation growth, emphasizing that Nigeria's social and economic problems will be drastically reduced if people are given adequate vocational training in skills, raw materials, machinery and equipment. Okeke (1988) defined skill as the ability to perform expertly, facilitate performance during employment. With reference to Nigerian needs, he said he assess the level of work skills required by of strength and weaknesses of the products of technical colleges in order to enhance their competency on the job and to also make necessary improvement in future training of technicians at the technical college level.

Technical college graduates especially MYM graduates to need acquire both generic and technical skills. Generic skills are those essential skills necessary for getting, keeping and doing well on a job. These are group of skills which help in supporting the skills of actions that enable workers to get along with their fellow workers and superiors and to make sound, critical decisions. Unlike the occupational or technical skills, generic skills are general in nature rather than job specific and cut across all industry types (Robinson and Garton, 2004). Technical skills are very job specific and are measured and quantified, in the world of work technical skills are hard skills (Robinson and Garton, 2004).

an organisation or industry. For instance, in MVM work repair or replace wheel bearings and components, replace or repair components of transmission system, working of the fuel injection system and diagnose faults to mention but a few. However, as the number TVET graduates especially MVM graduates increases significantly, the unemployment rate among youths increases in many countries especially in the developing countries (Audu et al 2013). Robinson (2008) reveals that employers find it difficult to recruit potential workers who have generic or job readiness skills that enable them to fit and remain in the organization. Both technical skills and people skills (generic skills) play significant roles in employment. Therefore, the study designed assess the work skills required for employment by motor vehicle mechanics graduates of technical colleges with respect to both generic skill and technical skills.

Research questions

- What are the work skills required for employment by MVM work graduates at technical college level with respect to generic skills?
- What are the work skills required for employment by MVM work graduates at technical college level with respect to technical skills?

Methodology

descriptive survey research design was adopted for this study. Descriptive survey research design in the view of Nworgu (2006) is the study which aims at collecting data and describing in a systematic manner the characteristics, features or facts about a given population. The study was carried out in all the technical colleges in Niger State. The population of the study consisted of all the 27 MVM work teachers from all the technical colleges in Niger State. Since the number of the teachers are not too large, the entire population was used for the study. A Sample of 42 MVM Mater Craft-men that are working in the private sector of Niger State were selected through Cluster sampling technique also served as respondents for the study. The total respondents for the study were 69 respondents. A structured questionnaire was the instrument for data collection. The instrument was face and content validated by two experts from the department of Industrial and Technology Education Automobile Technology Option, Federal University of Technology Minna, Niger State Nigeria and one expert from Peugeot Automobile Nigeria (PAN) Kaduna, Kaduna State Nigeria. To determine the reliability of the instrument, it was pilot-tested on twelve respondents from Federal Science and Technical College Orozo, Abuja that were not part of the study. Cronbach alpha was used to determine the internal consistency of the instrument and it yielded a reliability coefficient of 0.88. Thus, the instrument was considered appropriate for use by the researcher. The questionnaires were administered by the researcher and the entire instruments were retrieved and analysed. A five (5) point rating scale was used to determine the level of work skills required by MVM students to be able to perform effectively on the job. The decision rule was based on theory of true class limits of numbers with numerical values:

- 4.50 - 5.49 = Very Highly Required (VHR),
- 3.50 - 4.49 = Highly Required (HR),
- 2.50 - 3.49 = Required (R),
- 1.50 - 2.49 = Moderately Required (MR) and
- 0.50 - 1.49 = Not Required (NR).

Therefore, the mean responses of the respondents were interpreted based on the true class limits of numbers highlighted above. The data collected from the study were analyzed using frequency count, mean and standard deviation. The mean was used for answering the research questions; standard deviation was used to indicate the extent of homogeneity of the responses to the items

Results

Table 1: Mean and Standard Deviation of the Respondents on the Work Skills Required for Employment by NVM Graduates With Respect to Gender Skills

| S/N | Item | \bar{X}_1 | SD ₁ | \bar{X}_2 | SD ₂ | \bar{X}_3 | SD ₃ | Remarks |
|-----|---|-------------|-----------------|-------------|-----------------|-------------|-----------------|-----------------|
| 1 | Solving problems | 3.58 | 0.95 | 3.70 | 0.61 | 3.64 | 0.78 | Highly Required |
| 2 | Allocating time efficiently | 3.11 | 0.78 | 3.48 | 0.62 | 3.30 | 0.70 | Required |
| 3 | Communicating ideas verbally to groups | 3.75 | 1.10 | 3.82 | 1.01 | 3.79 | 1.56 | Highly Required |
| 4 | Responding positively to criticism | 3.09 | 0.90 | 3.37 | 0.85 | 3.23 | 0.88 | Required |
| 5 | Functioning well in stressful situations | 3.02 | 1.33 | 3.26 | 0.89 | 3.14 | 1.11 | Required |
| 6 | Keeping up-to-date on developments | 3.68 | 0.91 | 3.50 | 0.81 | 3.59 | 0.86 | Highly Required |
| 7 | Identifying problems | 3.38 | 1.50 | 3.41 | 0.75 | 3.40 | 1.13 | Required |
| 8 | Recognizing the effects of decisions made | 3.40 | 0.77 | 3.46 | 0.70 | 3.43 | 0.74 | Required |
| 9 | Assessing long-term effects of decisions | 3.17 | 0.82 | 3.35 | 0.86 | 3.26 | 0.84 | Required |
| 12 | Identifying components of problems | 3.21 | 0.83 | 3.30 | 0.79 | 3.26 | 0.81 | Required |
| 11 | Prioritizing problems | 3.02 | 0.86 | 3.44 | 0.63 | 3.23 | 0.75 | Required |
| 12 | Functioning at optimal performance | 3.30 | 0.91 | 3.39 | 0.79 | 3.35 | 0.85 | Required |
| 13 | Sorting out relevant data to solve problems | 3.55 | 0.81 | 3.52 | 0.48 | 3.54 | 0.81 | Highly Required |
| 14 | Revising plans to include new information | 3.00 | 0.96 | 3.33 | 0.65 | 3.17 | 0.81 | Required |
| 15 | Gaining new knowledge everyday | 2.91 | 0.97 | 2.35 | 0.99 | 2.63 | 0.97 | Required |
| 16 | Combining relevant information from sources | 3.21 | 1.02 | 3.86 | 1.06 | 3.54 | 0.54 | Highly Required |
| 18 | Ability to work independent | 3.66 | 0.52 | 2.99 | 0.63 | 3.33 | 0.56 | Required |
| 19 | Monitoring progress against the plan | 3.23 | 1.03 | 3.44 | 0.78 | 3.34 | 0.91 | Required |
| 20 | Assigning/delegating responsibility | 2.94 | 1.17 | 2.85 | 0.90 | 2.90 | 1.04 | Required |
| 21 | Gaining new knowledge outside the job | 3.02 | 0.94 | 2.63 | 0.88 | 2.83 | 0.91 | Required |
| 22 | Maintaining a high | 3.19 | 0.92 | 2.88 | 0.66 | 3.04 | 0.79 | Required |

| S/N | Item | \bar{X}_1 | SD ₁ | \bar{X}_2 | SD ₂ | \bar{Y}_t | SD _t | Remarks |
|-----|---|-------------|-----------------|-------------|-----------------|-------------|-----------------|-----------------|
| | energy level | | | | | | | |
| 23 | Giving direction and guidance to others | 2.87 | 0.99 | 2.98 | 1.00 | 2.93 | 1.00 | Required |
| 24 | Meeting deadlines | 2.87 | 1.04 | 3.00 | 0.77 | 2.94 | 0.91 | Required |
| 25 | Monitoring progress toward risky ventures | 3.40 | 0.97 | 3.70 | 0.61 | 3.55 | 0.76 | Highly Required |
| 26 | Responding to others' comments | 3.17 | 0.91 | 2.58 | 0.70 | 2.88 | 0.81 | Required |
| 27 | Establishing good rapport with subordinates | 3.30 | 1.12 | 3.07 | 0.87 | 3.19 | 1.00 | Required |
| 28 | Re-conceptualizing roles of the corporation | 3.13 | 0.66 | 3.24 | 0.73 | 3.19 | 0.51 | Required |
| 29 | Knowing ethical implication of decisions | 3.02 | 1.03 | 3.50 | 0.50 | 3.26 | 0.77 | Required |
| 30 | Applying information to new or broader contexts | 3.21 | 0.93 | 3.67 | 0.67 | 3.44 | 0.80 | Required |
| 31 | | 3.50 | 1.04 | 3.73 | 0.89 | 3.62 | 0.97 | Highly Required |

Notation: \bar{X}_1 = Mean of MVM Teachers, \bar{X}_2 = Mean of MVM Master Craftsmen, \bar{Y}_t = Average Mean of Both Respondents, SD₁ = Standard Deviation of MVM Teachers, SD₂ = Standard Deviation of Master Craftsmen, SD_t = Average Standard Deviation of both.

Table 1 revealed that all items were adjudged as required with mean values ranging between 2.63 to 3.59. From the analysis it implies that solving problems, communicating ideas verbally to groups, keeping up-to-date on developments, sorting out relevant data to solve problems, combining relevant information from source, monitoring progress toward risky ventures and working well with fellow employees are the generic work skills that were highly required by MVM graduates. The standard deviations indicate the degree of homogeneity of the respondents' responses to the items in the Table with values from 0.51 to 1.13

Table 2: Mean and Standard Deviation of the Respondents on the Work Skills Required for Employment by MVM Graduates With Respect to Technical Skills

| S/N | Item | \bar{X}_1 | SD ₁ | \bar{X}_2 | SD ₂ | \bar{Y}_t | SD _t | Remarks |
|----------------------------|---|-------------|-----------------|-------------|-----------------|-------------|-----------------|-----------------|
| Spark Ignition (SI) | | | | | | | | |
| Engine Tune-up | | | | | | | | |
| 1 | Check fuel system and diagnose faults | 3.58 | 0.90 | 3.21 | 0.88 | 3.40 | 0.89 | Required |
| 2 | Check and adjust drive belt | 3.33 | 1.32 | 3.29 | 0.60 | 3.31 | 0.96 | Required |
| 3 | Check spark ignition engine compression | 3.60 | 0.90 | 3.71 | 0.46 | 3.66 | 0.48 | Highly Required |
| 4 | Check and adjust engine speed | 3.43 | 1.49 | 3.21 | 0.63 | 3.32 | 1.06 | Required |

| S/N | Item | \bar{X}_1 | SD ₁ | \bar{X}_2 | SD ₂ | \bar{X}_1 | SD ₁ | Remarks |
|---|--|-------------|-----------------|-------------|-----------------|-------------|-----------------|---------------------|
| 5 | Check valve tappet clearance and set | 3.40 | 0.77 | 3.36 | 0.95 | 3.38 | 0.86 | Required |
| Diesel Engine Tune-up | | | | | | | | |
| 6 | Check fuel injection system, and diagnose faults | 3.44 | 0.83 | 4.00 | 0.50 | 3.72 | 0.67 | Highly Required |
| 7 | Check drive belt and adjust | 3.54 | 0.85 | 3.07 | 0.72 | 3.31 | 0.79 | Required |
| 8 | Check compression ignition engine compression. | 3.55 | 0.98 | 3.48 | 0.50 | 3.52 | 0.84 | Highly Required |
| 9 | Check valve tappet clearance and set | 3.50 | 0.81 | 3.36 | 0.49 | 3.43 | 0.65 | Required |
| Power or Drive Train | | | | | | | | |
| 10 | Diagnose transmission failure. | 3.42 | 0.97 | 3.68 | 0.72 | 3.55 | 0.83 | Highly Required |
| 11 | Replace or repair components of transmission. | 3.48 | 0.98 | 3.68 | 0.86 | 3.58 | 0.92 | Highly Required |
| 12 | Test transmission | 3.44 | 1.03 | 3.21 | 0.63 | 3.33 | 0.83 | Required |
| 13 | Repair and replace components of propeller shaft. | 3.54 | 0.97 | 3.36 | 0.49 | 3.45 | 0.73 | Required |
| 14 | Repair or replace components of final drive and differential. | 3.55 | 0.91 | 3.61 | 0.50 | 3.58 | 0.71 | Highly Required |
| 15 | Repair or replace wheel bearings and components | 3.50 | 1.12 | 3.32 | 0.67 | 3.41 | 0.90 | Required |
| 16 | Replace components of drive or axle shaft. | 3.45 | 0.65 | 3.46 | 0.74 | 3.46 | 0.70 | Required |
| Electrical System Faults and Diagnosis | | | | | | | | |
| 17 | Conducting initial battery charge and recharge | 3.64 | 0.93 | 3.29 | 0.60 | 3.47 | 0.77 | Required |
| 18 | Breaking down acid to obtain the correct electrolyte | 3.01 | 1.04 | 3.64 | 0.73 | 3.33 | 0.89 | Required |
| 19 | Measuring specific gravity of electrolyte using hydrometer | 2.14 | 0.98 | 2.50 | 0.51 | 2.32 | 0.75 | Moderately Required |
| 20 | Measuring voltage of cells on open circuit using battery testing equipment e.g. high rate discharge tester | 3.82 | 1.03 | 2.68 | 0.72 | 3.25 | 0.88 | Required |
| 21 | Measuring voltage of cells under load using battery | 3.91 | 0.81 | 2.54 | 0.88 | 3.23 | 0.85 | Required |

| S/N | Item | \bar{X}_1 | SD ₁ | \bar{X}_2 | SD ₂ | \bar{Y}_1 | SD _A | Remarks |
|-----|--|-------------|-----------------|-------------|-----------------|-------------|-----------------|-----------------|
| | testing equipment for example high rate discharge tester | | | | | | | |
| 22 | Determining the serviceability of components e.g. armature on the growler, starter motor | 3.27 | 1.03 | 2.89 | 0.79 | 3.08 | 0.91 | Required |
| 23 | Assembling starter motor components appropriately | 3.62 | 0.97 | 2.68 | 0.61 | 3.15 | 0.79 | Required |
| | Braking System | | | | | | | |
| 24 | Diagnose faults in brake system | 3.63 | 0.93 | 3.57 | 0.50 | 3.60 | 0.72 | Highly Required |
| 25 | Overhaul and service or repair brake system components | 3.89 | 0.88 | 3.36 | 0.49 | 3.63 | 0.67 | Highly Required |
| 26 | Adjust brake system. | 3.70 | 1.05 | 3.04 | 0.84 | 3.37 | 0.95 | Required |
| | Clutch System | | | | | | | |
| 27 | Diagnose clutch failures. | 2.9 | 0.84 | 3.25 | 0.70 | 3.11 | 0.77 | Required |
| | 6 | | | | | | | |
| 28 | Overhaul and service clutch mechanism. | 3.29 | 0.98 | 2.43 | 0.63 | 3.27 | 0.81 | Required |
| 29 | Adjust clutch system. | 3.93 | 0.94 | 3.32 | 0.48 | 3.63 | 0.71 | Highly Required |
| | Steering System | | | | | | | |
| 30 | Perform wheel alignment. | 3.8 | 0.81 | 3.64 | 0.73 | 3.73 | 0.77 | Highly Required |
| | 2 | | | | | | | |
| 31 | Service steering system. | 3.49 | 0.97 | 3.54 | 0.69 | 3.52 | 0.83 | Highly Required |
| 32 | Perform wheel balancing | 3.15 | 0.96 | 3.39 | 0.50 | 3.27 | 0.73 | Required |
| 33 | Analyze kingpin condition | 2.83 | 0.93 | 3.19 | 0.65 | 3.01 | 0.79 | Required |
| 34 | Check steering linkages in accordance with standard practices | 3.10 | 0.88 | 3.86 | 0.76 | 3.48 | 0.82 | Required |
| 35 | Adjustments of steering geometry according to the manufacturer's specification. | 3.73 | 1.05 | 3.43 | 0.50 | 3.58 | 0.78 | Highly Required |
| 36 | Dismantle and replace defective steering components as per the standard practices. | 2.98 | 0.95 | 2.54 | 0.88 | 2.76 | 0.92 | Required |
| 37 | Assemble and install the steering components as per standard procedures. | 3.00 | 0.84 | 3.39 | 0.94 | 3.20 | 0.89 | Required |

Table 2 revealed that all items were adjudged as required with mean values ranging between 3.30 to 3.72. From the analysis it implies that check engine compression, petrol engine, check fuel injection system and diagnose faults, check engine compression in diesel engine, diagnose transmission failure, replace or repair components of final drive and differential, diagnose faults in brake system, overhaul and service or repair brake system components, adjust clutch system, perform wheel alignment and adjustments of steering geometry according to the manufacturer's specification are the technical skills that were highly required by MVM graduates based on the respondents' opinion. The standard deviations indicate the degree of homogeneity of the respondents' responses in all items in the Table with values from 0.48 to 1.28.

Findings and discussion

Table 1 focused on the generic skills required by MVM work students for job placement. The findings of the study revealed that all the generic skills are required by MVM students for work. The generic skills that highly required for work by MVM students includes solving problems, communicating ideas verbally to groups, keeping up to date on developments, sorting out relevant data to solve problems, combining information from source, monitoring progress toward risky ventures and working with fellow employees. This is in agreement with Yeo (2009) who stated that generic skills are the competencies required to solve problems, communicate ideas and think creatively, therefore, technical college students especially MVM students are supposed to be encouraged to develop these competencies to be able to adapt to different work and life environments. World Bank (2011) observed that generic skills are soft skills, life-long learning skills and interpersonal skills that help people make informed decisions, solve problem, think critically and creatively, communicate effectively, build healthy relationship, empathize with others and cope with and manage their lives in a healthy and productive manner. Adu (2013) stated that generic skills must be emphasized in Technical Vocational and Training (TVET) institutions because these skills can accelerate employment among youths and school leavers. Without these skills, youths can be considered handicapped in competing for employment. Wani (2004) investigated the different effects of various skill requirements with the assumption that generic skills were separate from the actual work contexts in which they are learned and developed. Kwok found out that the competitiveness of individuals in the labor market depends not only on their vocational competence but also on whether these individuals have generic competences that they can continue to acquire. Generic competence must be developed to the extent that an individual can find a suitable job and can acclimatize to social, technological and organizational changes (Burgaz, 2008). Students should acquire generic skills while they are at TVET institutions or in school. The skills can be learned through classroom instruction in the field or outside the classroom.

However, Table 2 focused on the technical skills required by MVM work students for job placement. The findings of the study revealed that all the technical skills are required by MVM students for work. The technical skills that highly required for work by MVM students includes check engine compression in petrol engine, check fuel injection system and diagnose faults, check engine compression in diesel engine, diagnose transmission failure, replace or repair components of transmission, repair or replace components of final drive and differential, diagnose faults in brake system, overhaul and service or repair brake system components, adjust clutch system, perform wheel alignment and adjustments of steering geometry according to the manufacturer's specification. The findings of the study are in line with the provisions of the National Education Policy of the Federal Republic of Nigeria (FRN, 2004) recognizes technology education of which

... is a part of the total system of the total educational system which leads to the acquisition of technical and applied skills as well as basic cognitive competencies. The ...

Conclusion

Technical vocational education and training institutions especially technical colleges must make a greater effort to help students acquire the generic skills required by every ...

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