CORE TECHNICAL SKILLS NEEDED BY AUTOMOBILE TECHNOLOGY EDUCATION STUDENTS FOR SELF-EMPLOYMENT IN ENUGU AND ANAMBRA STATES

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Abstract

The study is a survey research design conducted to investigate core technical skills needed by automobile technology education students for self-employment in Enugu and Anambra States. The study was conducted at Enugu and Anambra States. The population for the study was 35 respondents comprising of ten automobile technology lecturers and twenty-five automobile technology practitioners. The instrument for data collection was structured questionnaire constructed by the researchers. The return rate of the instrument was 100%. Three experts chosen among automobile technology lecturers and automobile technology practitioners in the study areas validated the instruments. A pilot study was conducted and Cronbach Alpha reliability indices of the instrument yielded 0.83 using SPSS version 22. This showed that the instrument was reliable and appropriate for administration. Four research questions and four null hypotheses guided the study. Mean and standard deviation were used to answer the research questions, while t-test was employed to test the null hypotheses at .05 level of significance. The study found that automobile technology education students needed all indentified core technical skills to great extent for self-employment and job creation. There was no significant difference between the mean responses of automobile technology lecturers and automobile technology practitioners on core technical skills that students needed for self-employment and job creation. The study recommended among other things that technical education administrators and curriculum developers in automobile technology education should revisit the curriculum and inculcate in the curriculum core technical skills for self-employment and job creation. In conclusion, the study showed that automobile technology education need core technical skills to a great extent for self-employment in automobile technology. Therefore, automobile technology education lecturers should be ready for core technical skills development in automobile technology to enhance self-employment among automobile technology education students upon graduation.

Keywords: Automobile, self–employment, technical skills, technology education

Introduction

The high rate of unemployment among Nigerian youths is alarming and scaring. The National Bureau of Statistics (2020) showed that there are over 64 % unemployment rate among Nigerian youths. The rising rate of youth unemployment in Nigeria could be attributed to the deficiency of core technical skills needed for self-employment in automobile technology among youths. The automobile core technical skills in the context of this study, refers to the automobile technology skills needed to diagnose faults and service them in automobile engine, suspension, wheel balancing and alignment and cooling system. The current hardship experienced in Nigeria demands that youths acquire these core technical skills and knowledge for self employment in the field of automobile technology.

Self-employment is the practice of earning income directly through one's own business or trade, rather than working as an employee for an employer. In self-employment, an individual is responsible for managing and financing their own business, including all aspects of marketing, sales, and financial management (Alfred, 2023). It is a form of work where an individual works for themselves instead of working for an employer. It provides individuals with the opportunity to pursue their passions and turn their hobbies into profitable businesses. In general, self-employment plays an important role in reducing poverty, nurturing innovation, developing entrepreneurial economy, promoting economic growth, expanding employment, improving the quality of employment, cultural exchange, taxation and self-efficacy. Self-employment works wonder in combination with relevant technology education.

Technology education is designed to provide students with relevant knowledge, skills and attitude that

will enable them work in the industry or places where applied science is required. It is a form of educational process involving, in addition to general knowledge, the study of technologies and related science and the acquisition of core practical skills and attitude to function effectively in the industry (UNESCO, 2015). It is a special type of education given to an individual to develop their creative and manipulative potentials for self-employment and job creation for the benefit of humanity (Adelakun & Osaigbovo, 2018). According to Eze, (2018), it is an aspect of education that exposes the students to the acquisition of demonstrable skills that could be transformed into economic benefits. It is the academic and vocational preparation of students for job involving applied science and modern technology. It is an education that provides special practical knowledge of technologies and skills for the students to make them technically fit for the industries and self-employment (Devendra 2018). It exposes technology education students to core technical skills needed for employability.

Core technical skills are qualities skills acquired by using and gaining expertise in performing physical or digital tasks. It is the core hard skills needed in performing a technical function. In automobile technology, core technical skills the skills needed to diagnose and service faulty automobile system. The programming language and common operating system that is relevant to diagnose and service a mechanical system. It is the technical and manipulative ability to diagnose and service faulty mechanical system. Core technical skills are very important skills in automobile technology education both in the universities and training institutions.

Despite the laudable objectives of the automobile technology education in universities and training institutions several youths graduating from automobile technology education programme are found jobless, unemployed and unable to set up their own automobile technology workshop upon graduation due to the prevalence of skill gaps. There appear to be a mismatch between what universities and training institutions teaches compared to what is needed in the automobile technology workplace. The prevailing skill mismatch makes it difficult for automobile technology education graduates to go into self employment upon graduation from the automobile technology education programme. Hence, this study investigated core technical skills needed for by automobile technology education students for self-employment in Enugu and Anambra States.

Purpose of the Study

The purpose of this study was to determine core technical skills needed by automobile technology education students for self-employment in Enugu and Anambra States**.** Specifically the study seeks to determine:

1. core technical skills to diagnose and service faulty automobile engine.
2. core technical skills to diagnose and service faulty automobile suspension.
3. core technical skills to diagnose and service faulty automobile wheel balancing and alignment problems.
4. core technical skills to diagnose and service faulty automobile engine cooling system.

Research Questions

The following research questions were posed to guide the study.

1. What are the cores technical skills need by automobile technology education students to diagnose and service common fault in automobile engine?
2. What are the technical skills needs by automobile technology education students to diagnose and service common fault in automobile suspension?
3. What are the cores technical skills need by automobile technology education students to diagnose and service common fault in automobile wheel balancing and alignment?
4. What the cores technical skills need by automobile technology education students to diagnose and service common fault in automobile cooling system?

Null Hypotheses

The following null hypotheses were tested at 0.05 level of significance.

HO1: There is no significant difference between the mean responses of automobile technology lecturers and automobile technology practitioners on the skills needed by automobile technology education students to diagnose and service common fault in automobile engine.

HO2: A significant difference does not exist between the mean responses of automobile technology lecturers and automobile technology practitioners on the skills needed by automobile technology education students to diagnose and service common fault in automobile suspension.

HO3: There is no significant difference between the mean responses of automobile technology lecturers and automobile technology practitioners on the skills needed by automobile technology education students to diagnose and service common fault in automobile wheel balancing and alignment.

HO4: A significant difference does not exist between the mean responses of automobile technology lecturers and automobile technology practitioners on the skills needed by automobile technology education students to diagnose and service common fault in automobile cooling system.

Methodology

The design adopted in this study was survey research design. The study was conducted at Enugu and Anambra States. The population for the study was 35 people**,** which comprised 10 automobile technology lecturers and 25 automobile technology practitioners. The instrument for data collection was twenty-eight structured items questionnaire tagged "Core technical skills needed by automobile technology education students for self-employment in Enugu and Anambra States" constructed by the researchers using a four point responses scale of very great extent (4), great extent (3), low extent (2) and very low extent (1).The instrument was face validated by three experts chosen among automobile technology lecturers and automobile technology practitioners in the study areas. Their corrections and suggestions such as bad alignment to incorrect alignment were used to produce the final instrument. Four research questions and four null hypotheses guided the study.

The instrument was administered by hand with the aid of two research assistants. All the 35 questionnaire administered to the respondents were returned. This represents a return rate of 100%. Mean and standard deviation was used to answer the research questions while t-test statistical tool was used to test the null hypotheses at 0.05 level of significance and 33 degree of freedom (df). To take decision on the items, real limit of numbers was assigned to response options as follows: very great extent (VGE) 4.00 -3.50, great extent (GE): 3.49-2.50, low extent (LE):2.49-1.50 and very low extent (VLE) 1.49 -1.00. Therefore any item with mean value of 2.50 and above was uphold and rejected if below 2.50.

The t-test was used to test the hypotheses at .05 level of significance. The t-test was considered suitable because according to Uzoagulu (2011) the t-test is more appropriate when the sample size (n) is less than or equal to 30. The t-critical (t-table) value for accepting or rejecting the null hypotheses was ±1.96 at 23 degree of freedom (df).

Results

Data for the study were presented and analyzed based on the research questions and hypotheses that guided the study. The details are contained in the tables 1-4.

Research Question 1 and Hypothesis 1

Table 1: Mean, Standard Deviation and t-test analysis of respondents on the extent of skills need by automobile technology education students to diagnose and service common fault in automobile engine

S/N	Item statement	Automobile Lecturers		Automobile Practitioners		Overall			Decision
		X1	SD1	X2	SD2	X3	SD3	t-cal	
	Skills to diagnose and service the following common faults in automobile engine								
1	Poor lubrication	3.90	0.30	3.87	0.34	3.88	0.32	0.29	N & NS
2	Failing oil pump	3.81	0.36	3.80	0.48	3.80	0.42	0.10	N & NS
3	Oil deposits	3.72	0.38	3.70	0.44	3.70	0.41	0.05	N & NS
4	Oil debris	3.65	0.55	3.64	0.46	3.64	0.50	0.05	N & NS
5	Inadequate fuel and air compression	3.62	0.55	3.60	0.41	3.60	0.48	0.10	N & NS
6	Leaking of engine coolant	3.70	0.38	3.60	0.41	3.65	0.39	0.60	N & NS
7	Prolong engine detonation	3.90	0.30	3.60	0.45	3.72	0.38	1.50	N & NS
8	Blocked engine radiators	3.80	0.36	3.53	0.45	3.67	0.41	1.64	N & NS
9	Damage oxygen sensors	3.70	0.38	3.60	0.41	3.65	0.37	0.63	N & NS
10	Ages spark plugs	3.90	0.30	3.67	0.46	3.80	0.38	1.50	N & NS
	Cluster mean	**3.77**	**0.35**	**3.66**	**0.43**	**3.71**	**0.41**	**0.65**	**N & NS**

Key: *N=Needed, NS=Not Significant, X1=Mean of automobile lecturers, X2= Mean of automobile practitioners, SD1 = standard deviation of automobile lecturers, SD2 = standard deviation of automobile practitioner, X3 = Average mean, SD3 = Average standard deviation, t-cal = t-test calculated, t- table (t-critical) value = ±1.96.*

Table 1 shows the response of the respondents on skills needed by automobile technology education students to diagnose and service common faults in automobile engine. The result revealed that all the items had their weighted mean values ranged from 2.62 to 3.90. Since the values are above the bench mark of 2.50; it indicates that the respondents agreed that all the items identified are the skills need by automobile technology education students to diagnose and service common faults in automobile engine. Also the cluster mean value is above the bench mark. The t-test analysis from table 1 shows that all the items had their t-calculated values less than the t-table value of ±1.96. This implies that there is no significant difference in the mean ratings of the responses of the respondents on skills needed by automobile technology education students to diagnose and service the common faults in automobile engine. Hence the null hypotheses for all the items were uphold.

Research Question 2 and Hypothesis 2

Table 2: Mean, Standard Deviation and t-test analysis of respondents on the extent of skills need by automobile technology education students to diagnose and service common fault in automobile suspension

S/N	Item statement	Automobile Lecturers		Automobile Practitioners		Overall			Decision
		X1	SD1	X2	SD2	X3	SD3	t-cal	
	Skills to diagnose and service the following common faults in automobile suspension								
11	Dipping when breaking	3.80	0.36	3.70	0.44	3.75	0.40	0.63	N & NS
12	Pulling to side when turning	3.90	0.30	3.87	0.34	3.89	0.32	0.23	N & NS
13	Unusually bumpy rides	3.60	0.55	3.53	0.45	3.57	0.50	0.24	N & NS
14	Shifting of one side of parked car to other side	3.80	0.36	3.60	0.41	3.70	0.39	1.24	N & NS
15	Continued bouncing after hitting bumps	3.90	0.30	3.87	0.34	3.89	0.32	0.03	N & NS
16	Difficult steering	3.80	0.36	3.70	0.44	3.75	0.40	0.63	N & NS
	Cluster mean	**3.80**	**0.37**	**3.71**	**0.40**	**0.39**	**0.38**	**0.39**	**N & NS**

The findings in Table 2 show the response of the respondents on skills needed by automobile technology education students to diagnose and service common faults in automobile suspension. The results shows that all the items presented had their weighted mean values ranged from 2.60 to 3.90. These values are above the bench mark of 2.50 indicating that the respondents agreed that all the items identified are the skills needed by automobile technology education students to diagnose and service common faults in automobile suspension. The cluster mean was above the bench mark of 2.50.The t-test analysis shows that all the items had their t-calculated values less than the t-table value of ±1.96. This implies that there was no significant difference in the mean ratings of the responses of the respondents on skills need by automobile technology education students to diagnose and service common fault in automobile suspension. Therefore the null hypothesis for all the items was accepted.

Research Question 3 and Hypothesis 3

Table 3: Mean, Standard Deviation and t-test analysis of respondents on the extent of skills need by automobile technology education students to diagnose and service common fault in automobile wheel balancing and alignment

S/N	Item statement	Automobile Lecturers		Automobile Practitioners		Overall			Decision
		X1	SD1	X2	SD2	X3	SD3	t-cal	
	Skills to diagnose and service the following common faults in automobile wheel balancing and alignment								
17	Unbalanced tire	3.70	0.38	3.67	0.46	3.69	0.43	0.17	N & NS
18	Incorrect alignment	3.80	0.36	3.60	0.41	3.70	0.39	1.30	N & NS
19	Worm wheel bearing (tie rods and control arms)	3.60	0.55	3.53	0.45	3.57	0.50	0.33	N & NS
	Cluster mean	**3.70**	**0.43**	**3.60**	**0.44**	**3.65**	**0.44**	**0.60**	**N & NS**

The finding in Table 1 shows the response of the respondents on skills needed by automobile technology education students to diagnose and service common faults in automobile wheel balancing and alignment. The result revealed that all the items had their weighted mean values ranged from 2.62 to 3.90. Since the values are above the bench mark of 2.50; it indicates that the respondents agreed that all the items identified are the skills need by automobile technology education students to diagnose and service common faults in automobile wheel balancing and alignment. The cluster mean value is above the bench mark. The t-test analysis from table 1 shows that all the items had their t-calculated values less than the t-table value of ±1.96. This implies that there is no significant difference in the mean ratings of the responses of the respondents on the skills needed by automobile technology education students to diagnose and service common faults in automobile wheel balancing and alignment. Hence the null hypothesis for all the items were uphold

Research Question 4 and Hypothesis 4

Table 4: Mean, Standard Deviation and t-test analysis of respondents on the extent of skills need by automobile technology education students to diagnose and service common fault in automobile cooling system.

S/N	Item statement	Automobile Lecturers		Automobile Practitioners		Overall			Decision
		X1	SD1	X2	SD2	X3	SD3	t-cal	
	Skills to diagnose and service the following common faults in automobile cooling system								
20	Radiation leakage	3.90	0.30	3.80	0.48	3.85	0.39	0.64	N & NS
21	Old radiator antifreeze	3.80	0.36	3.70	0.44	3.75	0.40	0.63	N & NS
22	Dirty water pump	3.70	0.38	3.67	0.46	3.69	0.42	0.19	N & NS
23	Poor lines	3.60	0.30	3.53	0.45	3.66	0.38	0.33	N & NS
24	Failing water pump	3.90	0.55	3.87	0.34	3.89	0.45	0.15	N & NS
25	Malfunctioning thermostat	3.70	0.38	3.67	0.46	3.69	0.42	0.20	N & NS
26	Damaged head gasket	3.90	0.30	3.70	0.44	3.80	0.37	0.50	N & NS
27	Warning lights	3.80	0.36	3.60	0.41	3.70	0.39	1.28	N & NS
28	Low coolant	3.90	0.30	3.70	0.44	3.80	0.37	1.35	N & NS
	Cluster mean	**3.80**	**0.39**	**3.69**	**0.43**	**3.75**	**0.40**	**0.59**	**N & NS**

The findings in Table 4 show the response of the respondents on skills needed by automobile technology education students to diagnose and service common faults in automobile cooling system. The results shows that all the items presented had their weighted mean values ranged from 2.70 to 3.90. These values are above the bench mark of 2.50 indicating that the respondents agreed that the items identified are the skills needed by automobile technology education students to diagnose and service the common faults in automobile suspension. The cluster mean was above the bench mark of 2.50.The t-test analysis from Table 4 shows that all the items had their t-calculated values less than the t-table value of ±1.96. This implies that there was no significant difference in the mean ratings of the responses of the respondents on skills need by automobile technology education students to diagnose and service common fault in automobile cooling system. Therefore, the null hypothesis for all the items was accepted.

Discussion of the Findings

Analysis of study with respect to the core technical skills needed by automobile technology education students for self-employment in Enugu and Anambra States showed that both the automobile technology lecturers and automobile technology practitioners agreed that automobile technology education students in Nigeria need core technical skills to diagnose and service common faults in automobile engine, automobile suspension, automobile wheel balancing and alignment and automobile cooling system to great extent. The study revealed that automobile technology education students in Enugu and Anambra States need skills to diagnose and service poor lubrication, oil pump failure, oil deposits, oil debris, inadequate fuel and air compression, leaking of engine coolant, prolong engine detonation, blocked engine radiators, damage oxygen sensors and ages spark plugs for self-employment in automobile technology. This finding agreed with Isaac (2018) that Nigerian youths need some technical skills for self-employment especially in this era of high rate of unemployment.

The study also found that automobile technology education students need skills to diagnose and service common faults in automobile suspension which include: dipping when breaking, pulling to side when turning, unusually bumpy rides, shifting of one side of parked car to other side, continued bouncing after hitting bumps and difficult steering. Findings on the skills need to diagnose and service automobile cooling system and automobile wheel balancing and alignment showed that automobile technology education students need skills on how to service unbalanced tire, incorrect alignment, worm wheel bearing (tie rods and control arms), radiation leakage, old radiator antifreeze, dirty water pump, poor lines, failing water pump, malfunctioning thermostat, damaged head gasket, warning lights and low coolant.

The finding is in consonance with, Alfred (2023) in a study on skills improvement needs of automobile craftsmen which showed that there is need for technical skills in automobile wheel balancing and alignment and automobile cooling system that can make the youths employable in automobile technology industries. The respondents agreed to great extent that automobile technology education students need all the core technical skills indentified in this study for self-Employment in Enugu and Anambra States.

On the analysis of hypotheses one and two the study found that there was no significant difference in the mean ratings of the responses of the respondents on the skills need by automobile technology education students to diagnose and service common fault in automobile engine and automobile suspension. On the analysis of hypotheses three and four the study also showed that a significant difference does not exist between the mean responses of the respondents on the skills need by automobile technology education students to diagnose and service common fault in automobile wheel balancing and alignment and automobile cooling system. The opinions of the respondents did not differ in all the items identified. This implies that core technical skills are needed to great extent by automobile technology education students for self-employment in Nigeria. Therefore, the four null hypotheses for the study were upheld.

Conclusion

Automobile technology education lecturers should show willingness and positive attitude towards core technical skills development in automobile technology to enhance self-employment among automobile technology education students upon graduation. The findings of the study showed that automobile technology education students need core technical skills to great extent for self-employment in automobile technology. The study also exposed the core technical skills needed for self employment among automobile technology education students in Enugu and Anambra States.

The study showed that there is no significant difference between the mean responses of the respondents on the skills need by automobile technology education students to diagnose and service common fault in automobile engine, automobile suspension, automobile cooling system and automobile wheel balancing and alignment.

Recommendations

Based on the findings from the study, it is recommended that:

1. Technical education administrators and curriculum developers in automobile technology education should revisit the curriculum and inculcate in the curriculum core technical skill for self- employment and job creation.
2. The government and private individuals should periodically organize workshops and seminars on the relevance of core technical skills in automobile technology.
3. Both the Federal and State ministries of education should build core technical skills centers for automobile technology training and empowerment of youth for self-employment

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