Impact of Autotronic Technology Skills Acquisition in Upskilling Automobile Technology Graduates for Workplace Transformation in Rivers State, Nigeria

[1]Saue, P. Baritule; [2]Bassey, S. Imaobong; [3]Nnadi, J. Kizito; & [4]Onyeaju, A. Ifeanyichukwu

[1]Department of Technical Education, Ignatius Ajuru University of Education Port Harcourt, Rivers State, Nigeria.
sauegodleads@gmail.com
[2]Department of Metal Work Technology, Federal College of Education (Technical) Omoku, Rivers State, Nigeria.
basseydew@yahoo.com
[3]Department of Building Technology, Federal College of Education (Technical) Umunze, Anambra State, Nigeria.
nnadikizito@gmail.com
[4] Department of Automobile Technology, Federal College of Education (Technical) Omoku, Rivers State, Nigeria

Correspondence Email: sauelebe1@gmail.com

Abstract: The study determined the impact of autotronic technology skills acquisition in upskilling automobile technology graduates for workplace transformation in Rivers State, Nigeria. Specifically, the study investigated three (3) objectives, three (3) research questions were posed and answered while three (3) hypotheses were formulated and tested at .05 level of significance. The study adopted a survey. The population of the study consisted of ninety-one (91) respondents (11 motor vehicle mechanic work teachers and 80 registered automobile industries workers in Rivers State. The entire population was studied due to its' manageable size. A questionnaire was issued for data collection. The questionnaire was titled "Autotronic Technology Skills Questionnaire (ATSQ)". The questionnaire was designed on a 5 point likert scale and assigned an ordinal value such as Very High Impact (VHI)= 5, High Impact (HI)=4, Moderate Impact (MI)=3, Low Impact (LI)=2 and Very Low Impact (VLI)=1 respectively. The 39-items questionnaire was subjected to face and content validity by three (3) experts in the field of industrial technical education. A reliability coefficient of .88 was established using Cronbach Alpha. Data collected was analyzed using mean and standard deviation while t-test was used to test the null hypotheses. A criterion mean of 3.50 was used in decision making; that is any mean value equal or less than 3.49 is regarded as "Not required" while mean value equal or greater than 3.50 is regarded as "Required". The study found that auto-electrical/electronic technology skills, auto-engine technology skills and auto-ignition technology skills have high impact in upskilling automobile technology graduates for workplace transformation in Rivers State. The researchers recommended amongst others that auto-electrical/electronic technology skills, auto-engine technology skills and auto-ignition technology skills should be integrated into automobile technology curriculum of tertiary institutions in Nigeria.

Keywords: Automobile Technology, Autotronic and Upskilling

Introduction

Tertiary institutions in Nigeria and like any other country is mainly intended for the development of technocrat and the high-manpower that will be responsible for the operations of the wheels and machines of the economy. Tertiary institution as emphasized by the Federal Republic of Nigeria (NPE, 2004), in her National policy on Education as revised, is any education given to an individual after secondary education in formal institution (university, colleges of education, polytechnic and monotechnics) including those running correspondence courses. Tertiary institutions as part of the educational institutions are purposely established to meet the educational manpower and development needs of the nation. Tertiary institution in Nigeria implies the kind of education offered subsequent to secondary education in dedicated institutions such as universities, colleges of education, polytechnics, monotechnics and other allied and specialized institutions (Modebelu & Joseph, 2012). Tertiary institutions have the responsibility to interrogate the frontiers of knowledge, moral sovereignty and the development challenges that face society where they are located. More so, National Policy on Education (2004) described higher education as education given after secondary education in Universities, Colleges of Education, Polytechnics, Monotechnics, including those institutions offering correspondence courses. The institutions train beneficiaries in welding and fabrication, electrical/electronic engineering technology, civil/building engineering technology, mechanical/automobile engineering technology amongst others.

Automobile technology is one of the technology skill programmes operated basically through the informal setting with apprenticeship mode of instruction. It is designed to produce competent technicians and technologists for technological and industrial development of the society. In Nigeria, automobile technology is offered as trade subject in vocational training colleges and centers is offered in technical colleges, companies and designated skills acquisition centers of automobile technology workshops across the

Nigeria. It is expected that those who acquired automobile technology skills will be gainfully employed or self-employed after their training. However, automobile technology students still are graduating with skills that seen to be obsolete or not conforming to the demand of the 21st century. Hence, it is necessary for these graduates to upskill.

Therefore, upskilling is the process of improving workers in order to advance their performance in their place of work. Upskilling implies improving automobile skills by equipping them with the requisite diagnostic and applied skills for effective maintenance and repairs of modern vehicle. According to Muhammad et al., (2014) automobile industry has been shifted from pure mechanical system to mechatronics. Upskilling has become a necessity because several innovations in vehicle inform of increasing the use of computerized and electronic system, sub-system, sensors and actuators to achieve better engine performance, lower the rate of emission, safety and fuel economy. The technological complexity of today's vehicle has created an extensive demand for upskilling in automotive industry. One of the major modern skills required by Motor Vehicle Mechanic Works (MVMW) technicians for the maintenances and services of modern motor vehicles is autotronic skill.

Hence, autotronic is a compound word of auto-mobile and elec-tronic (Auto-tronic) referring to modern automobile technology designs in the field of automobile engineering. Significantly, it has many applications in motor vehicles technology. Autotronics as an aspect of automobile engineering presents basics, advantages, layout and components and functional operation of various computer controlled motor vehicle systems. In addition, it clarifies how to use recent diagnostic tools and equipment for fault finding and analysis. Willliam (2004) noted that autotronic technology deals with computer controlled motor vehicle systems like; engine management, ABS (Anti Brake Skid), TCS (Traction Control), SCS (Stability Control) and others. The self-diagnosis and fault codes are also included. Modern car has several control modules, which monitor and manage most of the major systems in the vehicle. According to Robert (2004), the most common types are engine and drive line control, cruise control, suspension control, anti-lock braking and airbag control, climate control, GPS-based navigation system, stability management system, instrumentation, infotainment, etc. Systems such as steering systems, collision warning, voice recognition, internet access, night vision enhancement and collision avoidance systems.

Recently, automotive technology has developed rapidly as technology and business disruption is introduced in the 21st century. In the same vein, Soni (2018) stated that autotronic skills are the skills an individual requires to effectively make use of autotronic principles to design, diagnose, fix and carry out maintenance services on the automotive innovated vehicles. Robert (2007) explains that "the amount of electronics in the vehicle has risen in recent years and is set to increase yet further in the future. Hence, autotronic skills in automobiles is required in the designing and fixing of the automotive electronic control, which is a combination of mechanical and electrical/electronic devices that include, On Board Diagnosis, electronic automatic transmission, electronic power steering among others (Ezeama, Oguejiofor & Uzoejinwa, 2016). Cars on the road are being equipped with danger-warning applications, traffic information services, and host of infotainment features and increased safety features as well (Schwab, 2016).

Statement of Problem

The establishment of motor vehicle and maintenance work trade in technical colleges according to the Federal Republic of Nigeria (2013) as revised is geared towards imparting entrepreneurial, technical and vocational job specific skills for self-reliance. However, the researchers noted that the advances in science and technology have rendered many motor vehicle maintenance work skills in technical colleges gradually deteriorating leaving graduates with little or no skill that enable him/her to maintain modern or hybrid vehicle currently in the 21st century, hence, such vehicle is taken out of the state or sometime back to the manufacturers for repairs. Agreeing with the above, Nna (2011) stated that modern vehicles contain more embedded electronic components and controls that require a higher degree of sophistication for testing and servicing as well as special On-Board Diagnose tools and instruments. Furthermore, Sarıcoban, et. al., (2019) deposited that technological development in the current era of Industry Revolution 4.0 has changed people's lifestyles; every individual must follow technological developments and know how to use them to make everyone's life easier. Hence there is need to upskill motor vehicle and maintenance work students for autotronic competencies in technical colleges in Rivers State.

Purpose of the Study

The purpose of the study was to determine the impact of autotronic technology skills acquisition in upskilling automobile technology graduates for workplace transformation in Rivers State, Nigeria. Specifically, the study sought to determine;

1) Auto-electrical/electronic skills acquisition in upskilling automobile technology graduates for workplace transformation in Rivers State, Nigeria
2) Auto-engine skills acquisition in upskilling automobile technology graduates for workplace transformation in Rivers State, Nigeria

3) Auto-ignition skills acquisition in upskilling automobile technology graduates for workplace transformation in Rivers State, Nigeria

Research Questions

The following three (3) research questions were posed to guide the study

1) What is the impact of auto-electrical/electronic skills acquisition in upskilling automobile technology graduates for workplace transformation in Rivers State, Nigeria?
2) What is the impact of auto-engine skills acquisition in upskilling automobile technology graduates for workplace transformation in Rivers State, Nigeria?
3) What is the impact of auto-ignition skills acquisition in upskilling automobile technology graduates for workplace transformation in Rivers State, Nigeria?

Hypotheses

Three (3) hypotheses were formulated to guide the study at .05 level of significance.

Ho1: There is no significant difference between the mean responses of Automobile Technology Teachers (ATT) and Automobile Mechanic (AM) on the impact of auto-electrical/electronic skills acquisition in upskilling automobile technology graduates for workplace transformation in Rivers State, Nigeria

Ho2: There is no significant difference between the mean responses of Automobile Technology Teachers (ATT) and Automobile Mechanic (AM) on the impact of auto-engine skills acquisition in upskilling automobile technology graduates for workplace transformation in Rivers State, Nigeria

Ho3: There is no significant difference between the mean responses of Automobile Technology Teachers (ATT) and Automobile Mechanic (AM) on the impact of auto-ignition skills acquisition in upskilling automobile technology graduates for workplace transformation in Rivers State, Nigeria

Methods

The study adopted a survey design. The population of the study consisted of ninety-one (91) respondents (11 Automobile Technology Teachers (ATT) and 80 Automobile Mechanic (AM) across Rivers State). The entire population was studied due to the manageable size of the population. A questionnaire titled "*Autotronic Technology Skills Questionnaire (ATSQ)"* was used to collect data from the respondents. The instrument was designed on a 5-point likert scale and assigned an ordinal value such as Very High Impact (VHI)= 5, High Impact (HI)=4, Moderate Impact (MI)=3, Low Impact (LI)=2 and Very Low Impact (VLI)=1 respectively. The instrument which contains 39-items was subjected to face and content validity by three (3) experts in the field of industrial technical education. The reliability of the instrument was determined after pilot testing for an interval of three (3) weeks; thereafter, Cronbach Alpha was used to establish a reliability coefficient of .88 on the instrument. Data collected for the study was analyzed using mean and standard deviation while t-test was used to test the null hypotheses at .05 level of confidence. It was decided that mean score equal or less than 3.49 is regarded as "Not Required" while mean score equal or greater than 3.50 is regarded as "Required". SPSS version 13.0KM was used to aid the computation.

Results

Research Question 1: What is the impact of auto-electrical/electronic skills acquisition in upskilling automobile technology graduates for workplace transformation in Rivers State, Nigeria?

Table 1: Mean and standard deviation of ATT and AM on auto-electrical/electronic technology skills for workplace transformation in Rivers State

S/N	Items	ATT N=80			AM N=11		
		$\bar{X}_1$	SD_1	Rmk.	$\bar{X}_1$	SD_1	Rmk.
1.	Identifying unit components, diagnose and correct Car Entertainment System (CES)	4.10	.49	HI	3.99	1.27	HI
2.	Identifying and analyzing symptoms of damage on Climate Control System (ClCS)	3.56	1.14	HI	3.66	1.21	HI
3.	Diagnose, correct and Caring for units and components Power Windows System (PWS)	3.89	.87	HI	3.74	1.42	HI
4.	Identifying and testing unit work and care of Power Sunroof System (PSRS)	4.12	.83	HI	3.90	.98	HI
5.	Diagnosing damage Power Door (open/close) System (PDS)	3.70	.61	HI	3.56	.73	HI
6.	Identify working principles, diagnose and unit components of Power Sunroof System (PSRS)	4.23	.90	HI	4.38	.68	HI

S/N	Item	ATT $\bar{X}$	SD	Rmk	AM $\bar{X}$	SD	Rmk
7.	Repairing damage on Electronic Control Seat System (ECTSS)	3.63	.84	HI	3.56	.79	HI
8.	Identifying unit components and functions of Electronic Control Pedal Adjusment System (ECPAS)	4.09	1.02	HI	4.13	.67	HI
9.	Diagnosing damage to Park Assist Control System (PACS)	3.88	1.53	HI	3.54	.10	HI
10.	Identify, diagnose, correct damages and care for Panel Instrument System (PIS)	3.95	.58	HI	3.78	.63	HI
11.	Identify, diagnose, correct damages and care of Lighting Control System (LCS)	3.96	.74	HI	3.77	.58	HI
12.	Identify, diagnose and correct damages on Central Door Lock System (CDLS)	3.68	1.65	HI	3.67	.79	HI
13.	Identifying unit components, diagnose and correct damages on Alarm & Immobilizer System (AIS)	3.64	1.19	HI	4.03	.86	HI
14.	Identifying unit components and functions of Supplemental Restraint System (SRS) Airbag & Safety Belt	4.05	.60	HI	4.18	.31	HI
15.	Identify, diagnose, correct damages and care of Tire Pressure Monitoring System (TPMS)	3.92	.69	HI	3.88	.76	HI
16.	Identify, diagnose, correct damages and care of Multifunction Information Display (MID)	3.94	.71	HI	4.13	.67	HI
	Grand Mean/SD	**3.89**	**.89**	**HI**	**3.86**	**.77**	**HI**

Source: Researchers (2023)   **Key:** *HI =High Impact*

Table 1 above summarizes the mean responses of Automobile Technology Teachers (ATT) and Automobile Mechanic (AM) on the impact of auto-electrical/electronic technology skills acquisition in upskilling automobile technology graduates for workplace transformation in Rivers State Nigeria with an average grand mean value of 3.89 for technicians and 3.86 for teachers and an average standard deviation value of .89 for technicians and .77 for teachers respectively. The responses indicated that the auto-electrical/electronic technology skills identified in the table have *high impact* in upskilling automobile technology graduates for workplace transformation in Rivers State, Nigeria. Finally, the closeness in their standard deviation value revealed the homogeneity of their various opinions.

Research Question 2: What is the impact of auto-engine technology skills acquisition in upskilling automobile technology graduates for workplace transformation in Rivers State, Nigeria?

Table 2: Mean and standard deviation of ATT and AM on auto-engine technology skills for workplace transformation in Rivers State, Nigeria

S/N	Items	ATT N=80			AM N=11		
		$\bar{X}_1$	SD$_1$	Rmk.	$\bar{X}_1$	SD$_1$	Rmk.
1.	Identifying, diagnosing, analyze symptoms unit components, repairing damage, taking care of Electronic Control Ignition System (ECIS)	3.82	1.23	HI	3.67	1.29	HI
2.	Identifying, diagnosing, analyze symptoms unit components, repairing damage, taking care of Electronic Starter Control System (ESCS)	3.63	1.07	HI	3.54	.88	HI
3.	Identifying, diagnosing, analyze symptoms unit components, repairing damage, taking care of Gasoline Engine Management System (GEMS)	3.90	.98	HI	3.96	.74	HI
4.	Identifying, diagnosing, analyze symptoms unit components, repairing damage, taking care of Diesel Engine Management System (GEMS)	4.13	.88	HI	3.95	.31	HI
5.	Identifying, diagnosing, analyze symptoms unit components, repairing damage, taking care of Emission Control System (ECS)	3.88	.89	HI	3.89	.82	HI

S/N	Items	$\bar{X}_1$	SD	Rmk.	$\bar{X}_1$	SD	Rmk.
6.	Identifying, diagnosing, analyze symptoms unit components, repairing damage, taking care of Electronic Control Valve System (ECVS)	3.86	1.22	HI	3.90	.77	HI
7.	Identifying, diagnosing, analyze symptoms unit components, repairing damage, taking care of Variable Cylinder Management System (VCMS)	4.35	.83	HI	3.68	.80	HI
8.	Identifying, diagnosing, analyze symptoms unit components, repairing damage, taking care of Hybrid Powertrain System (HPS)	3.77	.75	HI	3.58	.74	HI
9.	Identifying, diagnosing, analyze symptoms unit components, repairing damage, taking care of Electric Vehicle Powertrain System (EVPS)	4.60	1.01	HI	4.09	.82	HI
10.	Identifying, diagnosing, analyze symptoms unit components, repairing damage, taking care of Cruise System Control (CCS)	4.07	.93	HI	3.75	.82	HI
	Grand Mean/SD	**4.00**	**.97**	**HI**	**3.80**	**.79**	**HI**

Source: Researchers (2023)   **Key:** *HI =High Impact*

Table 2 above summarizes the mean responses of Automobile Technology Teachers (ATT) and Automobile Mechanic (AM) on the impact of auto-engine technology skills acquisition in upskilling automobile technology graduates for workplace transformation in Rivers State, Nigeria with an average grand mean value of 4.00 for technicians and 3.80 for teachers and an average standard deviation value of .97 for technicians and .79 for teachers respectively. The responses indicated that auto-engine technology skills identified in the table have *high impact* in upskilling automobile technology graduates for workplace transformation in Rivers State, Nigeria. Finally, the closeness in their standard deviation value revealed the homogeneity of their various opinions.

Research Question 3: What is the impact of auto-ignition technology skills acquisition in upskilling automobile technology graduates for workplace transformation in Rivers State, Nigeria?

Table 3: Mean and standard deviation of ATT and AM on auto-ignition technology skills for workplace transformation in Rivers State

S/N	Items	ATT N=80			AM N=11		
		$\bar{X}_1$	SD$_1$	Rmk.	$\bar{X}_1$	SD$_1$	Rmk.
1.	Identify the on-board diagnostic port in modern vehicles	4.00	1.10	HI	3.64	1.22	HI
2.	Carry out throttle cable inspection and adjustment	4.09	1.03	HI	4.04	.93	HI
3.	Retrieve transmission Diagnostic Trouble Codes (DTC's)	3.84	1.09	HI	4.08	.81	HI
4.	Interpret ignition Diagnostic Trouble Codes (DTC's)	3.98	.97	HI	3.84	1.06	HI
5.	Check crankshaft and camshaft sensors using diagnostic tool	3.84	1.01	HI	3.76	.77	HI
6.	Record ignition timing using digital multimeter	3.80	1.19	HI	4.32	.85	HI
7.	Perform magnetic sensor testing	3.73	1.12	HI	4.04	.79	HI
8.	Test and diagnose defective reluctor sensor	3.95	.93	HI	4.00	1.00	HI
9.	Inspect, repair and replace faulty electronic ignition components	4.07	.97	HI	3.96	1.06	HI
10.	Conduct engine performance test using engine analyzer	4.00	1.14	HI	3.80	1.19	HI
11.	Check supply voltages and signals with multimeter and oscilioscope	4.07	1.16	HI	4.24	.83	HI
12.	Use plug wire or adapter to check for spark	4.16	.93	HI	4.08	1.07	HI
13.	Check the crank sensor using diagnostic tool	4.02	.95	HI	4.16	.80	HI
	Grand Mean/SD	**3.96**	**1.04**	**HI**	**3.99**	**.95**	**HI**

Source: Researchers (2023)   **Key:** *HI =High Impact*

Table 3 above summarizes the mean responses of Automobile Technology Teachers (ATT) and Automobile Mechanic (AM) on the impact of auto-ignition technology skills acquisition in upskilling automobile technology graduates for workplace transformation in Rivers State, Nigeria with an average grand mean value of 4.00 for mechanics and 3.80 for teachers and an average standard deviation value of .97 for technicians and .79 for teachers respectively. The responses indicated that auto-ignition technology skills identified

in the table have *high impact* in upskilling automobile technology graduates for workplace transformation in Rivers State, Nigeria. Finally, the closeness in their standard deviation value revealed the homogeneity of their various opinions.

Test of Hypotheses

Hypothesis (Ho$_1$): There is no significant difference between the mean responses of Automobile Technology Teachers (ATT) and Automobile Mechanic (AM) on the impact of auto-electrical/electronic technology skills acquisition in upskilling automobile technology graduates for workplace transformation in Rivers State, Nigeria

Table 4: t-test analysis of respondents on auto-electrical/electronic technology skills for workplace transformation in Rivers State

Categories	N	X	SD	Df	P-value	t-cal	t-tab	Decision
ATT	80	3.89	0.89					
				89	.05	.11	1.98	**Accept**
AM	11	3.86	0.77					

Source: *Researchers (2023)*

From table 4 above, the calculated value of t = .11 is less than the table value = 1.98. Hence, the responses of Automobile Technology Teachers (ATT) and Automobile Mechanic (AM) do not differ significantly from each other on the impact of auto-electrical/electronic technology skills acquisition in upskilling automobile technology graduates for workplace transformation in Rivers State, Nigeria. Therefore, the null hypothesis which states thus "there is no significant difference between the mean responses of Automobile Technology Teachers (ATT) and Automobile Mechanic (AM) on the impact auto-electrical/electronic technology skills acquisition in upskilling automobile technology graduates for workplace transformation in Rivers State, Nigeria" was accepted.

Hypothesis (Ho$_2$): There is no significant difference between the mean responses of Automobile Technology Teachers (ATT) and Automobile Mechanic (AM) on the impact of auto-engine technology skills acquisition in upskilling automobile technology graduates for workplace transformation in Rivers State, Nigeria

Table 5: t-test analysis of respondents on auto-engine technology skills for workplace transformation in Rivers State

Categories	N	X	SD	Df	P-value	t-cal	t-tab	Decision
ATT	80	4.00	0.97					
				89	.05	.76	1.98	**Accept**
AM	11	3.80	0.79					

Source: *Researchers (2023)*

From table 5 above, the calculated value of t = .76 is less than the table value = 1.98. Hence, the responses of Automobile Technology Teachers (ATT) and Automobile Mechanic (AM) do not differ significantly from each other on the impact of auto-engine technology skills acquisition in upskilling automobile technology graduates for workplace transformation in Rivers State, Nigeria. Therefore, the null hypothesis which states thus "there is no significant difference between the mean responses of Automobile Technology Teachers (ATT) and Automobile Mechanic (AM) on the impact of auto-engine technology skills required for upskilling automobile technology graduates for workplace transformation in Rivers State" was accepted.

Hypothesis (Ho$_3$): There is no significant difference between the mean responses of Automobile Technology Teachers (ATT) and Automobile Mechanic (AM) on the impact of auto-ignition technology skills acquisition in upskilling automobile technology graduates for workplace transformation in Rivers State, Nigeria

Table 6: t-test analysis of respondents on auto-engine technology skills for workplace transformation in Rivers State

Categories	N	X	SD	Df	P-value	t-cal	t-tab	Decision
ATT	80	3.96	1.04					
				89	.05	-.09	1.98	**Accept**
AM	11	3.99	0.95					

Source: *Researchers (2023)*

From table 6 above, the calculated value of t = -.09 is less than the table value = 1.98. Hence, the responses of Automobile Technology Teachers (ATT) and Automobile Mechanic (AM) do not differ significantly from each other on the impact of auto-ignition technology skills acquisition in upskilling automobile technology graduates for workplace transformation in Rivers State, Nigeria. Therefore, the null hypothesis which states thus "there is no significant difference between the mean responses of Automobile Technology Teachers (ATT) and Automobile Mechanic (AM) on the impact auto-ignition technology skills acquisition in upskilling automobile technology graduates for workplace transformation in Rivers State, Nigeria" was accepted.

Discussion of Findings

Objective One (1)

Table 1 above summarizes the mean responses of Automobile Technology Teachers (ATT) and Automobile Mechanic (AM) on the impact of auto-electrical/electronic technology skills acquisition in upskilling automobile technology graduates for workplace transformation in Rivers State Nigeria with an average grand mean value of 3.89 for technicians and 3.86 for teachers and an average standard deviation value of .89 for technicians and .77 for teachers respectively. The responses indicated that the auto-electrical/electronic technology skills identified in the table have *high impact* in upskilling automobile technology graduates for workplace transformation in Rivers State, Nigeria. Finally, the closeness in their standard deviation value revealed the homogeneity of their various opinions. From table 4 above, the calculated value of t = .11 is less than the table value = 1.98. Hence, the responses of Automobile Technology Teachers (ATT) and Automobile Mechanic (AM) do not differ significantly from each other on the impact of auto-electrical/electronic technology skills acquisition in upskilling automobile technology graduates for workplace transformation in Rivers State, Nigeria. Therefore, the null hypothesis which states thus "there is no significant difference between the mean responses of Automobile Technology Teachers (ATT) and Automobile Mechanic (AM) on the impact auto-electrical/electronic technology skills acquisition in upskilling automobile technology graduates for workplace transformation in Rivers State, Nigeria" was accepted. This finding is corroborated by Ezeama, Oguejiofor and Uzoejinwa (2016) whose study posited that autotronic skills are required in the designing and fixing of the automotive electronic controls. The present finding is further supported by Soni (2018) who maintained that autotronic skills are required to effectively make use or design, diagnose, fix and carry out maintenance services on the automotive innovated vehicles.

Objective Two (2)

Table 2 above summarizes the mean responses of Automobile Technology Teachers (ATT) and Automobile Mechanic (AM) on the impact of auto-engine technology skills acquisition in upskilling automobile technology graduates for workplace transformation in Rivers State, Nigeria with an average grand mean value of 4.00 for technicians and 3.80 for teachers and an average standard deviation value of .97 for technicians and .79 for teachers respectively. The responses indicated that auto-engine technology skills identified in the table have *high impact* in upskilling automobile technology graduates for workplace transformation in Rivers State, Nigeria. Finally, the closeness in their standard deviation value revealed the homogeneity of their various opinions. From table 5 above, the calculated value of t = .76 is less than the table value = 1.98. Hence, the responses of Automobile Technology Teachers (ATT) and Automobile Mechanic (AM) do not differ significantly from each other on the impact of auto-engine technology skills acquisition in upskilling automobile technology graduates for workplace transformation in Rivers State, Nigeria. Therefore, the null hypothesis which states thus "there is no significant difference between the mean responses of Automobile Technology Teachers (ATT) and Automobile Mechanic (AM) on the impact of auto-engine technology skills required for upskilling automobile technology graduates for workplace transformation in Rivers State" was accepted. The finding of this study is in agreement with Okwelle and Joseph (2021) whose study indicates that autotronic skills have high impact for efficient automatic transmission system for entrepreneurship development of automobile trade students of Technical Colleges in Rivers State. Also, this finding supports that of Erjavec, (2010) who stated that automobile technicians need the technical skills in order to diagnose transmission problems such as checking the various linkage adjustments, oil and filter changes, conducting a thorough visual inspection, retrieving all Diagnostic Trouble Codes, using the On-Board Diagnostics (OBD) and checking basic engine operations.

Objective Three (3)

Table 3 above summarizes the mean responses of Automobile Technology Teachers (ATT) and Automobile Mechanic (AM) on the impact of auto-ignition technology skills acquisition in upskilling automobile technology graduates for workplace transformation in Rivers State, Nigeria with an average grand mean value of 4.00 for mechanics and 3.80 for teachers and an average standard deviation value of .97 for technicians and .79 for teachers respectively. The responses indicated that auto-ignition technology skills identified in the table have *high impact* in upskilling automobile technology graduates for workplace transformation in Rivers State, Nigeria. Finally, the closeness in their standard deviation value revealed the homogeneity of their various opinions. From table 6 above, the

calculated value of t = -.09 is less than the table value = 1.98. Hence, the responses of Automobile Technology Teachers (ATT) and Automobile Mechanic (AM) do not differ significantly from each other on the impact of auto-ignition technology skills acquisition in upskilling automobile technology graduates for workplace transformation in Rivers State, Nigeria. Therefore, the null hypothesis which states thus "there is no significant difference between the mean responses of Automobile Technology Teachers (ATT) and Automobile Mechanic (AM) on the impact auto-ignition technology skills acquisition in upskilling automobile technology graduates for workplace transformation in Rivers State, Nigeria" was accepted.

Conclusion

From the responses of Automobile Technology Teachers (ATT) and Automobile Mechanic (AM), the researchers noted that the autotronic skills are lacking in automobile curriculum thereby still graduating students with skills that are obsolete in the present 21ˢᵗ century.

Recommendations

Based on the findings of the study, the researchers recommended the following:
1) Integration of auto-electrical/electronic skills, auto-engine skills and auto-ignition skills into automobile technology curriculum of tertiary institutions in Nigeria.
2) Government and Non-Governmental Organizations (NGOs) should collaborate to equip tertiary institutions with autotronic equipment, gadgets, machines, tools amongst others for both students and teachers training in Rivers State
3) Adequate and regular training should be given to automobile workshop technologists/teachers on the use of these autotronic gadgets and machines by the management or government through TETfund and other agencies.

References

Erjavec, J. (2010). *Automotive technology: A system approach. (5th ed.)*. Cengage Learning Inc. https://www.amazon.com

Ezeama, A. O., Victor, I., Oguejiofor, V. I. & Uzoejinwa, B. B. (2016). Integration of mechatronics and autotronics in technical education for greater technological innovation in Nigeria. *International Technology Research Journal, 4*(1) 805 - 813.

Federal Republic of Nigeria (2013). *National policy on education*. NERDC press.

Modebelu, M. N., & Joseph, A. (2012). strategic planning procedure: an imperative for effective management of higher education in Nigeria. *Mediterranean Journal of Social Sciences 8*(23), 1023 - 1033

Nna, K. P. (2011). The marketing of management by objectives (MBO) transit liner. *News Agency of Nigeria, 6*(2), 14-21.

Okwelle, P. C. & Abigo, J. B. S. (2021). Autotronic skills for entrepreneurship development of automobile trade students of technical colleges in Rivers State. *International Journal of Modern Innovation & Knowledge*, *2*(4), 101 - 114

Robert, B. G. (2004). *Automotive handbook, 6th edition*. Bentley Publishers

Robert, B. G. (2004). *Diesel-engine management, 3th edition*. Bentley Publishers

Sarıçoban, A. Tosuncuoğlu, I. & Kırmizi, O. (2019). A technological pedagogical content knowledge (TPACK) assessment of preservice EFL teachers learning to teach English as a foreign language. *Journal of Language and Linguistic Studies 15*(3), 1122–1138

Schwab, K. (2016). *The forth industrial revolution*. https://www.weforum.org/about/the-fourth-industrial-revolution-by-klaus-schwab.

Soni, V. (2018). *What is Autotronic, what are its Applications*? www.mechanicalclasses.com.

Willliam, B. R. (2004). *Understanding automotive electronics, 6th Ed*. Elsevier Printer

Yakubu, S. (2011). The roles and challenges of automobile technology education teacher in teaching NCE (Technical) Courses in Colleges of Education. Sahel, *4*(2), 33-41.