ICT Competencies Required by Automobile Technology Educators for Effective Teaching of Petrol Engine Maintenance in Colleges of Education in South East, Nigeria

Wogu, S. N.[1], Okoye, P. I.[2], Nwankwo, C. O.[1]& Nwaorgu, O[3]
Correspondence: sundaywogu1@gmail.com

[1]DEPARTMENT OF AUTOMOBILE/METALWORK TECHNOLOGY EDUCATION, SCHOOL OF TECHNICAL EDUCATION, ABIA STATE COLLEGE OF EDUCATION (TECHNICAL), AROCHUKWU

[2]DEPARTMENT OF TECHNOLOGY EDUCATION, FACULTY OF TECHNOLOGY AND VOCATIONAL EDUCATION, NNAMDI AZIKIWE UNIVERSITY, AWKA

[3]DEPARTMENT OF ACCOUNTING EDUCATION, SCHOOL OF BUSINESS EDUCATION, ABIA STATE COLLEGE OF EDUCATION (TECHNICAL), AROCHUKWU

Abstract
The study was conducted to ascertain the ICT competencies required by automobile technology educators for effective teaching of petrol engine maintenance in colleges in education in South East, Nigeria. Two research questions and two null hypotheses guided the study. Descriptive survey research design was adopted. The entire population of 68 automobile technology educators in the eight public colleges of education in South East, Nigeria was studied without sampling. The instrument for data collection was validated by three experts and the reliability was established using Cronbach alpha statistic which yielded a coefficient of 0.83. Mean and standard deviation were used to answer the research questions while t-test was used to test the null hypotheses at 0.05 level of significance. Findings of the study revealed that the computer operational competencies and interactive whiteboard competencies are highly required by automobile technology educatorsfor effective teaching of petrol engine maintenance in colleges of education in South East, Nigeria.The study concluded that computer operational competencies and interactive whiteboard competencies are highly required by automobile technology educators for effective teaching of petrol engine maintenance in colleges of education in South East, Nigeria. Among others, it was recommended that automobile technology educators in colleges of education should be retrained frequently on the use of ICTs to acquire the requisite computer operational competencies and interactive whiteboard competencies to produce automobile graduates who can diagnose and repair vehicles on time in workshops.

Keywords: ICT competencies, Effective teaching, Petrol engine maintenance, Computer operational competencies and Interactive whiteboard competencies

Introduction

Education is one of the reliable pillars of development and transformation used by nations to build and improve the human capacities of citizens. In the same vein, the advancement of a nation depends on the quality of her tertiaryinstitutions. In Nigeria, tertiary institutions consist of universities, polytechnics, colleges of education and mono-technics. Objectively, the tertiary institution established to produce qualified and competent primary and secondary school teachers in Nigeria is college of education. Holistically, Onokpaunu (2023) posited that colleges of education are teacher training institutions that provide full-time and remedial courses in instructional methodologies, learning styles, school management, behavioural and sociological dispositions of children, adolescents and adults, philosophical and theoretical underpinning of subject matters as well as curriculum development of programmes across all areas of learning.

College of education is a three-year academic journey. Robinson and Njoku (2024) posited that some of the academic programmes in Nigerian colleges of

education are business education, chemistryeducation, physics education,mathematics education, computer education, integratedscience education, home economics education,electrical andelectronic technology education, woodwork technology education, agricultural science education, mechanicaltechnology education, building technology andautomobile technology education among others. Automobile technology education is a body of knowledge that is carefully designed to produce prospective auto-dealers, auto-mechanics, auto-electricians and auto-body workbuilders for the automobile industry in the society. According to Mustapha, Idris, Kutiriko and Ewugi (2016), automobile technology education is a programme that enable students to acquirespecialized knowledge and skills required for the construction, repair and maintenance of vehicles consisting of two, three and four wheels powered by engines.

In recent times, automobile technology education in colleges of education also exposes students to the evolution of intelligent automobiles that led to the emergence of self-driving cars, connected cars and electric vehicles. Upon graduation, graduates of automobile technology education in colleges of education are expected to efficiently carry out maintenance work and repairson different types of automobile engines such as petrol engines. Petrol or gasoline engines are also known as spark-ignition engines. Walter in Udogu and Igwe(2020) defined petrol engine as an automobile internal combustion engine with spark-ignition, designed to run on petrol and similar volatile fuels. Petrol engine is a class of automobile internal-combustion engine that generate power by burning a volatile liquid fuel (gasoline or a gasoline mixture such as ethanol) with ignition initiated by an electric spark (Giri, 2015).

Petrol engines take in a flammable mixture of air and petrol which is ignited by a timed spark when the charge is compressed. The major components of petrol engines are cylinder block, cylinder head, gasket, oil pan, pistons, piston rings,connecting rod, crankshaft, camshaft, flywheel, valves and valve train among others. Sincepetrol engine and its components are currently expensive in automobile marketplaces in Nigeria, to ensure their durability and usability among its users in the society, facilitated the teaching of petrol enginemaintenance in colleges of education. Okorafor and Onokpaunu (2023) affirmed that maintenance is an oversight function of preserving and extending the reliability and functionality value of resources, assets and objects to ensure their availability and utilization for real life engagements. With this in mind, petrol maintenance is the practice of keeping petrol engine and its components in a functional condition by regularly checking their operational status to ensure that they continue to function as designed for automobiles.

In colleges of education, petrol engine maintenance is one of the contents of automobile technology. Igwe, Ikenwa and Jwasshaka (2017) asserted that the goal of petrol engine maintenance is to produce petrol engine maintenance technicianswho can carry out general maintenance and reconditioningwork on petrol engines. Amos, Abdulkadir and Raymond (2022) opined thatthe teaching petrol engine maintenance will help students tounderstand the basic working principles of petrol engine and restore it to peak performance, and also understand theworking principles of the fuel system of the motor vehicle.The extent to which the objectives of teachingpetrol engine maintenance are achieved in colleges of education depends on the effective teaching of automobile technology educators. Thus, Olatoye in Oyerinde, Onajite and Aina (2020) stated that effective teaching occurs when students' performance improves after aperiod of instruction in a manner that consistent with the goals of instruction.

In this study, effective teaching happen in petrol engine maintenance when students have acquired the requisite skillsand complete knowledge of how to prevent automobiles from engine wear and other engine problems.The fact that today's automobile industry is experiencing advanced petrol engine technology to aid the monitoring and controlling of engine components, effective teaching of petrol engine maintenance can no longer be done within the four walls of the classroom but can as well be done outside the classroom through the use of information and communication technologies. Onodugo (2016) defined Information and Communication Technologies (ICTs)as the collection, retrieval, use and storage of information through the use of computers and micro electronic system for gathering and using information.Information and communication technologies cover an array of technological gadgets and software packages used to share and communicate digital information in real time from any location in the world.

In this study, ICTs are simple and sophisticated technological gadgets and software packages used by automobile technology educatorsfor effective teaching of petrol engine maintenance for students within and outside colleges of education. Thus, in order to make maximum the use of ICTsfor effective teaching of petrol engine maintenance, automobile technology educatorsmust be equipped with adequate ICT competencies. Competenciesdescribe a person's ability in performing a given task with excellent results (Oyerinde, Onajite & Aina, 2020). Competencies are the combination of knowledge, skills and attitudes required for carrying out professional and personal engagements. In the same vein, ICT competencies in education are collection of technological principles, tools and know-how used for effective teaching and learning.

Therefore, automobile technology educatorsneed to possess different ICT competencies such as computer networking competencies, internet media competencies, computer operational competencies andinteractive whiteboard competencies among others. However, the study focused on computer operational competencies and interactive whiteboard competencies because they are a set of fundamental technological competencies that are useful when integratingICTs into instructional processes. Computer operational competencies are basic ICTknow-how required for the use of generic toolssuch as word processing, statisticalanalysis packages, scanning anduploading of documents and pictures,spreadsheet analysis, graphical design,scanner, printer, digital cameras and PowerPoint presentation (Oyedokun, Oyewumi, Akanbi &Laaro, 2018).

Computer operational competencies are required by automobile technology educators to create image content in different formats, create video content in different formats and ability to modify content in different formats for effective teaching of petrol engine maintenance. On other hand, interactive whiteboard competencies are ICTknow-how required for the use ofelectronic boards with touch-screen sensitivity and serve as acomplement for classroom's conventional black and white boards. Atanda, Adediran and Adelekun (2023) remarked that interactive whiteboard displays images of the computer screen only when connected to a projector and computer, allowing teachers and students to interact with the computer and other technologies from the board. Interactive whiteboard competencies are required by automobile technology educators toclarify complex ideas, improve learners' interaction and communicationfor effective teaching of petrol engine maintenance.

Evidently, the acquisition of computer operational competencies and interactive whiteboard competencies by automobile technology educators will increase the capacity of graduates of automobile technology to conduct

maintenance tasks to keep petrol engine in proper working conditions. However, from personal experiences, the researchers observed that most automobile mechanics donot have a structured maintenance programme in their automobile workshops in South East, Nigeria. In addition, some of these auto-mechanics have a trial by error knowledge of how petrol engine system works and the required maintenance protocols required for detecting and remedying faultsin modern vehicles are missing. This situation questions the instructional delivery and competencies of automobile technology educators in the course of teaching petrol engine maintenance in colleges of education.

Researchers have made attempts to investigate the influence of institutional ownership on ICT competencies required by automobile technology educatorsfor effective teaching of petrol engine maintenance. In the context of this study, institutional ownership is limited to colleges of education that are established, owned and controlled by the federal and state governments. Hence, the researchers are of the opinion that automobile technology educatorsin federal colleges of education are in a better position to know the ICT competencies requiredfor effective teaching of petrolengine maintenancein South East, Nigeria than their counterparts in State colleges of education on the premise that they are better funded and equipped with ICT facilities in their disposal. However, this assumption needs to be supported by empirical evidence.Against this background, the researcher sought todeterminethe ICT competencies required by automobile technology educatorsfor effective teaching of petrolengine maintenancein colleges of education in South East, Nigeria.

Statement of the Problem

An investigative visitation by the researchers revealed that the rate at which automobilesare serviced or repaired in most automobile workshops in South East, Nigeriais very slow. No wonder, there are many abandoned vehicles in most automobile workshops in South East, Nigeria. Sadly, based on personal classroom experiences over the years, the teaching of petrolengine maintenance is mostly carried out without the application of ICTs by educators in Nigeria as a result of inadequate funding and poor appreciation of technical education by individuals and state governments. The reality of this neglect may result to the production of automobile technology graduates who may struggle to use ICTs to carry out timely maintenance and repairs of automobile engines in workshops in South East, Nigeria. On this note, the problem of the study is posed as a question thus: what are the ICT competencies required by automobile technology educatorsfor effective teaching of petrolengine maintenancein colleges of education in South East, Nigeria?

Purpose of the Study

Specifically, this study determined theICT competencies required by automobile technology educatorsfor effective teaching of petrolengine maintenancein colleges of education in South East, Nigeria.

Research Questions

The following research questions guided the study:

1. What are the computer operational competencies required by automobile technology educatorsfor effective teaching of petrol engine maintenancein colleges of education in South East, Nigeria?
2. What are the interactive whiteboard competencies required by automobile technology educatorsfor effective teaching of petrol engine maintenance in colleges of education in South East, Nigeria?

Hypotheses

The following null hypotheses were tested at 0.05 level of significance

1. Automobile technology educatorsin Federal and State colleges of education do not differ significantly in the mean ratings on computer

operational competencies requiredfor effective teaching of petrol engine maintenance in South East, Nigeria.

2. Automobile technology educatorsin Federal and State colleges of education do not differ significantly in the mean ratings on interactive whiteboard competencies requiredfor effective teaching of petrol engine maintenance in South East, Nigeria.

Methodology

The study adopted descriptive survey research design. Descriptive survey research design makes it possible for the researchers to have a broad view from a sample of automobile technology educatorson theICT competencies requiredfor effective teaching of petrolengine maintenancein South East, Nigeria. The population of the study comprised 27 automobile technology educators in three Federal colleges of education and 41 automobile technology educators in five State colleges of education in South East, Nigeria. There was no sampling because the entire population was studied. A structured and validated questionnaire containing 20 itemson a five-point rating scale of Very Highly Required(VHR), Highly Required (HR), Moderately Required(MR),Highly NotRequired (HNR) and Very Highly NotRequired (VHNR)was used for data collection.The reliability of the instrument was determined through a pilot test.Copies of the instrument were administered to 10 automobile technology educators in South South, Nigeria State who were not part of the research population.Data collected were analyzed using Cronbach's alpha statistic to determine the internal consistency of the instrument and co-efficients of 0.77 and 0.89 for clusters B1 and B2 respectively were obtained. This is high enough for the instrument to be considered reliable as suggested by Nworgu (2015) that a reliability co-efficient of 0.70 and above is an acceptable reliability value.

Copies of the questionnaire were administered to the respondents in their offices personally by the researchers with five research assistants. Out of the 68 copies of the questionnaire administered, only 59copies (representing 87 percent) were successfully retrieved and used for data analysis.Mean and standard deviation were used to answer the research questions and determine the homogeneity or otherwise of the respondents' views. Decisions on the research questions were based on the grand mean in relations to the real limits of numbers. Therefore, items with mean ratings of 1.00 - 1.49 are rated Very Highly NotRequired, those with 1.50 - 2.49 are Highly NotRequired, items with mean ratings of 2.50 - 3.49 are rated Moderately Required, those with 3.50 - 4.49 are rated Highly Requiredand items with mean ratings of 4.50 - 5.00 are rated Very Highly Required. T-test was used to test the null hypotheses at 0.05 level of significance. A hypothesis was accepted where the p-value is greater than the alpha level of 0.05 ($p > 0.05$), at an appropriate degree of freedom; otherwise, the null hypothesis was rejected.

Results

Research Question 1

What is the computer operational competencies required by automobile technology educatorsfor effective teaching of petrol engine maintenance in colleges of education in South East, Nigeria?

Data related to this research question are analyzed and presented in Table 1.

Table 1:Respondents' mean ratings on computer operational competencies requiredfor effective teaching of petrol engine maintenancein South East, Nigeria

S/N	Computer operational competencies	$\bar{X}$	SD	Remarks
1	Ability to switch on computers to teach petrol engine maintenance	4.01	.64	Highly Required
2	Ability to store documents in the computer to teach petrol engine maintenance	3.96	.41	Highly Required
3	Ability to print out images in the computer to teach petrol engine maintenance	3.89	.83	Highly Required
4	Ability to use multimedia portfolio to teach petrol engine maintenance	4.03	.50	Highly Required
5	Ability to create video content in different formats to teach petrol engine maintenance	4.27	.72	Highly Required
6	Ability to create image content in different formats to teach petrol engine maintenance	3.99	.46	Highly Required
7	Ability to scan documents in the computer to teach petrol engine maintenance	3.86	.88	Highly Required
8	Ability to enhance slide presentations by inserting images to teach petrol engine maintenance	4.15	.69	Highly Required
9	Ability to organize tables and charts into slides to teach petrol engine maintenance	4.03	.40	Highly Required
10	Ability to shut down computer after using it to teach petrol engine maintenance	3.74	.53	Highly Required
	Cluster Mean	**3.99**		**Highly Required**

Data in Table 1 show that the 10computer operational competencies have mean scores ranging from 3.74 to 4.27 which indicate that they are highly required by automobile technology educatorsfor effective teaching of petrol engine maintenance in South East, Nigeria. The cluster mean of 3.99indicates thatcomputer operational competencies are highly required by automobile technology educatorsfor effective teaching of petrol engine maintenance in colleges of education in South East, Nigeria. The standard deviations for all the items are within the same range showing that the respondents are not wide apart in their mean ratings.

Research Question 2

What are the interactive whiteboard competencies required by automobile technology educatorsfor effective teaching of petrol engine maintenance in colleges of education in South East, Nigeria?

Data relating to this research question are analyzed and presented in Table 2.

Table 2Respondents' mean ratings on interactive whiteboard competencies required for effective teaching of petrol engine maintenance in South East, Nigeria

S/N	Interactive whiteboard competencies	$\bar{X}$	SD	Remarks
11	Ability to connect interactive whiteboard with the internet to teach petrol engine maintenance	4.33	.60	Highly Required
12	Ability to connect interactive whiteboard with the projector to teach petrol engine maintenance	4.40	.44	HghlyRequired
13	Ability to manipulate text onthe interactive whiteboard with a pen to teach petrol engine maintenance	4.36	.72	HighlyRequired
14	Ability to manipulate image on the interactive whiteboard with hands to teach petrol engine maintenance	4.29	.57	Highly Required
15	Ability to produce 2D shapes on the interactive whiteboard to teach petrol engine maintenance	4.12	.81	Highly Required
16	Ability to produce 3D shapes on the interactive whiteboard to teach petrol engine maintenance	4.05	.63	Highly Required
17	Ability to use interactive whiteboard to enhance interaction between the teachers and students to teach petrol engine maintenance	3.98	.49	HighlyRequired

18Ability to use interactive whiteboard to enhance collaboration between the teachers and students to teach petrol engine maintenance	3.91	.88	Highly Required
19Ability to save notes written on interactive whiteboard to teach petrol engine maintenance	4.20	.54	HighlyRequired
20Ability to delete notes written on the interactive whiteboard to teach petrol engine maintenance	3.76	.75	HighlyRequired
Cluster Mean	**4.14**		**Highly Required**

Data in Table 2show that the 10interactive whiteboard competencies have mean scores ranging from 3.76 to 4.40 which indicate that they are highly required by automobile technology educatorsfor effective teaching of petrol engine maintenance in South East, Nigeria. The cluster mean of 4.14indicates thatinteractive whiteboard competencies are highly required by automobile technology educatorsfor effective teaching of petrol engine maintenance in colleges of education in South East, Nigeria. The standard deviations for all the items are within the same range showing that the respondents are not wide apart in their mean ratings.

Hypothesis 1

Automobile technology educators in Federal and State colleges of education do not differ significantly in the mean ratings on computer operational competencies requiredfor effective teaching of petrol engine maintenance in South East, Nigeria.

Table 3Summary of t-test analysis of respondents' mean ratings oncomputer operational competencies requiredfor effective teaching of petrol engine maintenance in South East, Nigeriabased on institutional ownership

Variable	N	$\bar{x}$	SD	df	t-value	p-value	Decision
State COEs	35	65.71	5.38	57	0.163	0.175	Not Significant
Federal COEs	24	53.90	4.54				

Table 3 shows that there is no significant difference in the mean ratings of automobile technology educators in Federal and State colleges of education on the computer operational competencies for effective teaching of petrol engine maintenance in South East, Nigeria. This is shown by the p-value of 0.175, which is greater than the significance level of 0.05. The null hypothesis of no significant difference between the two groups is therefore accepted.

Hypothesis 2

Automobile technology educators in Federal and State colleges of education do not differ significantly in the mean ratings on interactive whiteboard competencies requiredfor effective teaching of petrol engine maintenance in South East, Nigeria.

Table 4Summary of t-test analysis of respondents' mean ratings oninteractive whiteboard competencies requiredfor effective teaching of petrol engine maintenance in South East, Nigeria based on institutional ownership

Variable	N	$\bar{x}$	SD	df	t-value	p-value	Decision
State COEs	35	70.03	6.01	57	1.415	0.268	Not Significant
Federal COEs	24	66.59	5.94				

Table 4shows that there is no significant difference in the mean ratings of automobile technology educators in Federal and State colleges of education on the interactive whiteboard competencies for effective teaching of petrol engine maintenance in South East, Nigeria. This is shown by the p-value of 0.268, which is greater than the significance level of 0.05. The null hypothesis of no significant

difference between the two groups is therefore accepted.

Discussion of findings

Outcome of the study revealed that computer operational competencies are highly required by automobile technology educatorsfor effective teaching of petrol engine maintenance in colleges of education in South East, Nigeria. The study clearly showed that the ability to: print out images in the computer to teach petrol engine maintenance, scan documents in the computer to teach petrol engine maintenance, create video content in different formatsto teach petrol engine maintenance, to switch on computers and shut down computers after using them to teach petrol engine maintenance as well as to enhance slide presentations by inserting images to teach petrol engine maintenance among others are highly required by automobile technology educatorsin colleges of education in South East, Nigeria. This finding is in tandem with the studies of Dem, Anaele and Achanson (2016)and Mustapha, Idris, Kutiriko and Ewugi (2016) that ICT competencies are highly required by automobile teachersfor effective teaching of emerging technologies such as petrol engine maintenance.

Additionally, the study showed that there is no significant difference in the mean ratings of automobile technology educators in Federal and State colleges of education on the computer operational competencies requiredfor effective teaching of petrol engine maintenance in South East, Nigeria. This finding means that automobile technology educators, irrespective of their institutional ownershipshared the same position on the computer operational competencies requiredfor effective teaching of petrol engine maintenance in colleges of education in South East, Nigeria.This finding is in line with Igwe, Ikenwa and Jwasshaka (2017)and Thomas, Amaechi and Bassey (2023) which discovered that computer operational competencies are highly required by automobile teachers because they arenot proficient in using them for effective teaching of petrol engine maintenance. Summarily, automobile technology educatorsin colleges of education in South East, Nigeria need additional training on computer operational competencies to adequately expose students to the teaching of petrol engine maintenance.

Finding of the study disclosed that interactive whiteboard competencies are highly required by automobile technology educatorsfor effective teaching of petrol engine maintenance in colleges of education in South East, Nigeria. The study reported that the ability to: produce 2D and 3D shapes on the interactive whiteboardto teach petrol engine maintenance, manipulate text on the interactive whiteboard with a pen to teach petrol engine maintenance, connect interactive whiteboard with the projector to teach petrol engine maintenance, connect interactive whiteboard with the internet to teach petrol engine maintenance, use interactive whiteboard to enhance interaction and collaboration between the teachers and students to teach petrol engine maintenance and save notes written on interactive whiteboard to teach petrol engine maintenance among others are highly required by automobile technology educatorsin colleges of education in South East, Nigeria.The outcome of this study corroborates with Akpabio and Ogiriki (2017) and Ikwuka et al., (2021) which reported teachers are not conversant with interactive whiteboard competencies for teaching.

The study further disclosed thatthere is no significant difference in the mean ratings of automobile technology educators in Federal and State colleges of education on the interactive whiteboard competencies requiredfor effective teaching of petrol engine maintenance in South East, Nigeria. This means that automobile technology educators, irrespective of their institutional ownership shared the same views on the need to acquire interactive whiteboard competencies for effective teaching of petrol engine maintenance in colleges of education

in South East, Nigeria. This finding is consistent with Bakare, Okereke and Obe (2016) and Onokpaunu (2016) which reported that educators have low interactive whiteboard competencies required for effective utilization of interactive whiteboards in their teaching and learning practices. Summarily, automobile technology educatorsin colleges of education in South East, Nigeria need capacitybuilding on interactive whiteboard competencies to create digital lessons for effective teaching of petrol engine maintenance.

Conclusion

The penetration of ICTs in the automobile industry calls for the acquisition of ICT competencies by automobile technology educators for effective teaching of petrol engine maintenance and repairs. Based on the findings of the study, the researchers concluded that computer operational competencies and interactive whiteboard competencies are highly required by automobile technology educatorsfor effective teaching of petrol engine maintenance in colleges of education in South East, Nigeria.

Recommendations

The under listed recommendations were made with regards to the finding of the study.

1. The identified computer operational competencies and interactive whiteboard competencies required by automobile technology educatorsshould be packaged into a retraining programme and used to organizeseminars or workshops so that automobile graduates can have a workable petrol engine maintenance in their workshops
2. Automobile technology educators in colleges of education should be retrained frequently on the use of ICTs to acquire the requisite computer operational competencies and interactive whiteboard competenciesto produce automobile graduates who can diagnose and repair vehicles on time in workshops
3. Automobile technology educators in colleges of education should endeavour to attend conferences and workshops on ICTs in order to keep themselves abreast of current trend in computer operational competencies and interactive whiteboard competenciesthat can be utilized to improve the teaching of petrol engine maintenance.

REFERENCES

Akpabio, M.E., &Ogiriki, I.B. (2017). Teachers use of information and communication technology (ICT) in teaching English language in senior secondary schools in Akwa Ibom State. *Equatorial Journal of Education and Curriculum Studies, 2*(2), 28-33.

Amos, P., Abdulkadir, M., & Raymond, E. (2022). Generic and technical skills required by motor vehicle mechanics in maintenance and repairs of modern automotive in Niger State, Nigeria. *Journal of Information, Education, Science and Technology, 8*(1), 137 – 147

Atanda, J O., Adediran, A.A.,&Adelekun, J.G.(2023). Assessment of requisite skills for utilization of interactive white board towards repositioning social studies curriculum for 21st century technology in Ogun State. *Nigerian Journal of Social Studies,* 26(2), 113 – 124

Bakare, J., Okereke, G.K.O., & Obe, P.I.(2016). E-teaching competencies for capacity-building of lecturers for effective delivery of technical education courses in universities in

South East Nigeria. *Journal of Technical Vocational Education Training and Research, 1*(1), 1 – 13

Dem, I.I., Anaele, E.O.,&Achanson, C.R. (2016). ICT skill needs for teaching emerging technologies of automobile trade intechnical colleges in Benue State, Nigeria. *Journal of Technical Vocational Education Training and Research, 1*(1), 1 - 11

Giri, N.K. (2015). *Automobile technology*. Delhi India: Khana Publishers

Igwe, N., Ikenwa, M.O., &Jwasshaka, S.K (2017). Competences in on-board diagnostic actuators for effectiveteaching of petrol engine maintenance in technicalcolleges in Nigeria. *IOSR Journal of Computer Engineering, 19*(2), 11-15

Mustapha, A., Idris, A.M.,Kutiriko, A.A.,&Ewugi, A.M.(2016). Competencies required by automobile technology teachers towards the development of ICT for teaching-learning purposes. International Conference on Information and Communication Technology and Its Applications (ICTA 2016) Federal University of Technology, Minna, Nigeria November 28 – 30, 2016

Nworgu, B.G. (2015). *Educational research: Basic issues and methodology*. University Trust Publishers

Onodugo, I.C. (2016). Impact of information and communication technology on teaching and learning in Nigerian tertiary institutions. *International Journal of Multidisciplinary Education and Research, 1*(1), 1-6

Okorafor, A.O., &Onokpaunu, M.O. (2023). Improvement needs of business educators for maintenance of modern learning resources in business education programmein universitiesin Anambra and Delta States. *Unizik Journal of Education Graduates, 8*, 1 -11

Onokpaunu, M.O. (2016). *Analysis of web-based instructional technologies for use by business education lecturers in tertiary institutions in Delta State*. Unpublished masters' thesis, Department of Vocational Education, Faculty of Education, NnamdiAzikiwe University, Awka

Onokpaunu, M.O. (2023). *Needs assessment of the implementation of accounting education curriculum in federal colleges of education in South-South, Nigeria*. Unpublished Doctoral Dissertation, Department of Technology and Vocational Education, Nnamdi Azikiwe University, Awka, Anambra State

Oyedokun, T.T., Oyewumi, F.A., Akanbi, M.L. &Laaro, D.M. (2018). Assessment of ICT competencies of library staff in selected universities in Kwara State, Nigeria. *Library Philosophy andPractice (E-Journal).* 1797.

Oyerinde, D.O.,Onajite, O.G., &Aina, A.M. (2020). Competency needs of business educators in Osun state secondary schools, Nigeria. *International Education Studies,1*(2), 80 – 87

Robinson, R.N., & Njoku, N.A. (2024) Innovative strategies for enhancing the teaching of electrical/electronic education programmes for capacity building sustainability in colleges of education in Rivers State. *Journal of ContemporaryScience and EngineeringTechnology, 3*(4),66-75

Thomas, C.G., Amaechi, O.J., & Bassey, I.S. (2023). Technological skill

improvement needs of automobile engineering graduates to effectively maintain hybrid vehicles in Nigeria.*Iconic Research and Engineering Journals, 7*(6),139 – 146

Udogu, K.C., & Igwe, N. (2020). Learning automobile petrol engine from a computer simulation compared with direct experience of the engine.*Vocational and Technical Education Journal, 2*(2), 290 – 297.