



An Appraisal of the Objectives of Motor Vehicle Mechanics' Work Curriculum vis-à-vis the Strategies Adopted in Implementation for self-sustainability in Technical Colleges in North Central Nigeria

Dr. Danladi Mamman

Nigerian Defence Academy Kaduna

&

Dr. Usman David Auta

Federal Government Girls' College

Bwari–Abuja

Abstract

The study examined the appropriateness of the objectives of technical colleges Motor Vehicle Mechanics' Work Curriculum (MVMWC) vis-à-vis the strategies adopted in implementation for self-sustainability in technical colleges in North Central Nigeria. The descriptive survey research design was adopted for the study. Two research questions and hypotheses guided the study. The population for the study was 465 male and female MVMW graduating students and 9 self-employed MVMW graduates of technical colleges. The study utilized both qualitative and quantitative techniques in data collection and analysis with questionnaire and focus group discussion as main instruments. The reliability coefficient of the questionnaire yielded 0.85. The research questions were analyzed using mean. The findings of this study revealed that the objectives of MVMWC are adequate in producing competent and enterprising motor vehicle mechanics; but instructions in technical colleges today in North Central Nigeria have remained more of theory than practical. Hence, it was recommended that teachers and instructors should adopt teaching strategies that engage students in high-level cognitive activities which stimulate thought, practical work, analysis and reflection during curriculum implementation.

Keywords: Objectives, Teaching strategies, Technical Colleges, Self-sustainability, Curriculum.

Introduction

Automobile maintenance personnel, commonly known as Motor Vehicle Mechanics (MVM), must be equipped with the relevant knowledge, skills and attitude for effective maintenance of modern automobiles, owing to the challenges of maintaining them. Today's MVM is expected to diagnose faults, service and completely repair any problem in the automobile. The MVM must be specially trained and equipped for On-Board Diagnostics technology to avoid potential errors in diagnosing car trouble codes and making appropriate repairs (Malone, 2006). The MVM faces the challenges of understanding each of the systems found in the automobile and the interrelationship of these systems, as well as the need to stay current with changes on modern automobiles (Schwaller, 1993). The MVM must understand not only the parts, nomenclature and operation, but also understand the diagnosis and service procedure for each system in the vehicle. United States Bureau of Labor Statistics (USBLS) (2012) stated that, MVM must have an increasingly broad knowledge of how vehicles' complex components work interchangeably.



Furthermore, MVM must be able to work with electronic diagnostic equipment and digital manuals as well as reference materials. According to Manitoba Advance Education and Training (MAET) cited in Audu, Musta'amal, Musta'amal and Inti (2014), MVM also need to have: an interest in mechanical/electronic systems in motor vehicle, good problem solving ability, good vision, hearing and sense of smell, manual dexterity and mechanical aptitude, ability to communicate well in English, physical fitness and strength, ability to drive a range of vehicles, ability to read technical diagrams and illustrations, have concern for safety and responsible work attitude; and in keeping up to date with evolving motor technology. The above requirements, therefore, do not only make the training of MVM highly tasking and demanding, but would require a very rich curriculum with adequate facilities. Furthermore, adoption of a wide-ranging principles, pedagogy and management strategies are needed; to transmit the contents of the curriculum to trainees, for the realization of the objectives towards gainful employment and self-sustainability.

The components of the Motor Vehicle Mechanics Work Curriculum (MVMWC) include: aim, objectives, contents, teaching strategies, instructional facilities, and method of evaluation. The aim of the curriculum is to give insight and equip the students with knowledge, attitude and skills in automobile work that can enable them to be gainfully employed after they graduate (Nigerian Educational Research and Development Council (NERDC), 2009). Aruku (2007) and Audu et al (2014) paraphrased this to mean that, the programme in Nigeria technical colleges is designed to produce competent motor vehicle craftsmen for Nigeria's technological and industrial development. The general objectives of the course as embedded in the MVWC are for the learner to develop familiarity with the automobile, develop proper attitude towards its use appreciate the various changes in technologies that are applicable to the automobile, perform simple fault diagnosis and to effect simple routine automobile repairs (NERDC, 2009).

Curriculum contents refer to the subject matter, and various topics (including skill, knowledge, attitude, among others), that help in achieving the objectives of programmes. It is the subject matter, the professional skills, knowledge, and attitude to be learned during a programme or course (Ayeni, 1990). In this study, curriculum contents refer to the various topics (including skills, knowledge, attitude, and other learning activities) that will help trainees achieve the aim and objectives of the MVMWC. The contents of the MVMWC which are designed and organized in modules for training of MVM using appropriate teaching strategies are: safety and maintenance, engine system, fuel system, cooling system, transmission and braking system, electrical systems (lighting system, ignition system), charging system, exhaust system, heating and ventilation system, steering and suspension system, lubrication system, and auto-air conditioning system (NERDC, 2009).

Teaching strategies refer to the general principles, pedagogy and management strategies used for instruction. Teaching strategies, according to Fhinaarshad (2013), are the ways that a teacher/instructor adopts to transmit contents to students/trainees. In this study, teaching *strategies* refer to the general principles, pedagogy and management strategies used to transmit contents of the MVMWC to trainees for the realization of its aim and objectives. Nwiyi and Okorie (2014) stated that the MVMWC is very practical in nature and should ideally be taught through methods that maximize the active participation of the learner. Kumazhege and Egunsola (2014) however observed that, instructions in technical colleges today have remained essentially devoid of practical skills in the different trades. Instructions are more of theory than practical; and also more of lecture



than demonstration. Idris (2012) posited that, the lecture method being predominantly used in teaching automobile technology is based on the behavioural learning theories which emphasize knowledge transmission from the teacher to passive students and encourage rote memorization of facts. Consequently, the students are unable to retain their learning to apply it to new situations. The shortcomings of this teaching method, according to Idris, partly accounts for the poor performance of students in automobile technology certificate examinations in recent years. This, according to Kumazhege and Egunsola (2014), also result to students graduating with inadequate or complete lack of practical skills in the MVMW trade area. Bandele and Faremi (2012) stated that more work needs to be done to let go of the outdated modes of knowledge accumulation such as rote learning, and adopt methods that engage the students in high-level cognitive activities which stimulate thought, practical work, analysis and reflection during curriculum implementation to achieve the set objectives.

The term curriculum implementation has been defined in different ways by different scholars. Garba (2004) viewed curriculum implementation as the process of putting the curriculum into work for the achievement of the goals for which the curriculum is designed. Okebukola (2004) described curriculum implementation as the translation of the objectives of the curriculum from paper to practice. In this study, curriculum implementation is the process of putting the planned MVMWC document into practice in the classroom/workshop; through the combined effort of the teachers/instructors, students, administrators and parents towards the realization of the set objectives. The National Policy on Education was well structured and the contents were adequately defined but the implementation calls for question (Babafemi, 2007; Dike, 2009). Furthermore, several studies have revealed that despite the curriculum was well structured, products of the programme still lacked the basic skills needed for gainful employment and self-sustenance in today's automobile industry (Puyate, 2008; Fadairo, 2009; Odigiri & Ede, 2010; Idris, 2012; Adekunle, 2013; Inti, Latib & Rufai, 2014; Audu et al, 2014; Udogu, 2015). Ayeni (2006) stated that a poorly implemented curriculum will produce half-baked graduates.

The preceding researches depict the situation experienced by graduates of technical colleges in North-Central, Nigeria and revealed that there is an important link between the quality of MVMWC implementation and the graduates' sense of being effective and self-sustainable after school. Nyapson (2015) observed that the MVMWC in North Central States of Nigeria prepares graduates of technical colleges to have irrelevant and inadequate skills in MVMW, which has rendered most of them jobless and not able to contribute to the national economy. Nyapson stated that they neither set up their own workshops nor being employed by automobile industries in Nigeria. Jika (2010) posited that, such half-baked auto craftsmen in the society often cause more damages to vehicles than repairs, when contracted to work on them. Jika further said that many serviced/repared vehicles by these craftsmen, have sent many people to their early graves due to inaccurate or faulty work carried out on such vehicles. Hence, this situation calls for a critical appraisal of the objectives of the MVMWC vis-à-vis the teaching strategies for the implementation of the curriculum for self-sustainability in North Central, Nigeria.

Statement of the Problem



Today's motor vehicle mechanic is expected to diagnose service and completely repair any problem on the automobile. Furthermore, MVM must be able to work with electronic diagnostic equipment and digital manuals as well as reference materials. The achievement of these objectives would require the adoption of a wide-ranging principles, pedagogy and management strategies needed to transmit the contents of the motor vehicle mechanics' work curriculum effectively to trainees by qualified teachers and instructors.

Unfortunately, this feat may not be achieved, as it appears that products of motor vehicle mechanic work programme in technical colleges lacked the basic skills, knowledge and attitude required for the job. Consequently, they found it difficult to establish their own workshops or gain employment in the automobile industries. This is because they are not well equipped with necessary skills to be relevant in the world of work. The training acquired at the end of programme seems inadequate to make them competent and self-reliant, hence cannot contribute to nation building.

Hence, it becomes pertinent to appraise the appropriateness of the objectives of the MVMWC vis-à-vis the teaching strategies adopted in implementing the contents of the curriculum for self-sustainability.

Purpose of the Study

The main purpose of this study was to appraise the objectives of the MVMWC vis-à-vis the teaching strategies adopted in implementing the contents of the curriculum for self-sustainability in technical colleges in North Central Nigeria. The Specific objectives were to:

1. Determine the appropriateness of the objectives of MVMWC in producing motor vehicle mechanics for self-sustainability upon graduation.
2. Identify the teaching strategies used in implementing the contents of MVMWC in technical colleges in North Central Nigeria.

Research Questions

1. How appropriate are the objectives of the MVMWC in producing motor vehicle mechanics for self-sustainability upon graduation?
2. What are the teaching strategies used in implementing the contents of MVMWC in technical colleges in North Central Nigeria?

Null Hypotheses

The following null hypotheses were used to guide the study and tested at 0.05 level of significance:

1. There is no significant difference between the mean responses of MVMW (NTC III) graduating students of State Government owned Technical Colleges and those of Federal Science and Technical Colleges on the appropriateness of the objectives of MVMWC in producing motor vehicle mechanics for self-sustainability.
2. There is no significant difference between the mean responses of MVMW (NTC III) graduating students of State Government owned Technical Colleges and those of Federal Science and Technical Colleges on the teaching strategies adopted in the implementation of MVMWC.

Methodology



The study adopted the descriptive survey research design. The study was carried out in North-Central Nigeria; comprising of: Kogi, Niger, Benue, Kwara, Plateau, Nassarawa and the Federal Capital Territory. The population for this study was 465; consisting of 418 male and 38 female MVMW NTC III graduating students for the 2017/2018 session in the 22 accredited technical colleges in North-Central Zone of Nigeria, and 9 MVMW graduates who were operating functional workshops. The study adopted Multi-stage Sampling Technique. The subjects for the study comprised two sample groups – graduating students and graduates of MVMW. A sample size of 189 was used for the study, comprising of 165 male and 15 female MVMW NTC III graduating students, and 9 MVMW graduates who were operating functional workshops. In stage one, a purposive sampling technique was adopted to select (based on school type) two Federal Science and Technical Colleges and six State owned Technical Colleges. In stage two, a proportionate stratified random sampling technique was adopted to sample the 165 male and 15 female MVMW NTC III graduating students from the selected schools representing ratio 11:1 based on the proportion of the population of male and female. Some 9 other MVMW graduates who were operating functional workshops in the area of the study were also selected for Focus Group Discussion (FGD).

The study utilized qualitative and quantitative techniques for the purpose of enriching the findings. A structured Questionnaire was used for data collection. The questionnaire answered the two Research Questions (RQs) of the study. The questionnaire was divided into three sections (A, B & C). Section A solicited information on demographic data of the respondents. Section B contains nine items designed to elicit information on the appropriateness of the objectives of the Motor Vehicle Mechanics' Work Curriculum (MVMWC) in producing motor vehicle mechanics for gainful employment upon graduation. Section C contained 29 items, which were used to find out the teaching strategies adopted in implementing the curriculum contents of the MVMWC. All the 38 items of the questionnaire were rated on a five-point Likert scale of strongly agree (5), agree (4), undecided (3), disagree (2), and strongly disagree (1).

Cronbach Alpha (α) reliability technique was used to establish internal consistency of the instrument. The reliability coefficient for the instrument was 0.85. The Focus Group Discussion (FGD) was conducted with nine graduates of technical colleges in the area of the study who were operating functional workshops. This was with a view to find out from them, based on their experience on the job after school and the tools and equipment used on the job after leaving school; the quantity and quality of the tools and equipment that were available and effectively utilized during their school programme in training them; and comparing them with those gainfully employed in automobile industries.

Method of Data Collection

Copies of the questionnaire were administered to the respondents by the researcher through personal contact and with the help of MVMW teachers from each of the sampled schools, who served as Research Assistants (RAs). Adequate copies of the instrument were administered accordingly and retrieved from the respondents for analysis. Thereafter, the nine graduates selected in the area of the study who were operating functional workshops were assembled in a designated location, and the focus group discussion conducted.

Method of Data Analysis



Data collected were subjected to appropriate quantitative and qualitative analysis using descriptive statistics. The research questions were analyzed using mean. Decision for the research questions were based on real limit of numbers as follows:

5 Point Scale

4.50 – 5.00	Very Appropriate/Strongly Agree Respectively
3.50 – 4.49	Appropriate/Agree Respectively
2.50 – 3.49	Moderately Appropriate/Undecided Respectively
1.50 – 2.49	Not Appropriate/Disagree Respectively
0.50 – 1.49	Very Inappropriate/Strongly Disagree Respectively

Result

Research Question 1: How appropriate are the objectives of the MVMWC in producing motor vehicle mechanics for self-sustainability upon graduation?

The data for answering this research question are provided in Table 1 below.

Table 1: Mean Responses of MVMW (NTC III) Graduating Students on the Appropriateness of the Objectives of the MVMWC in Producing Motor Vehicle Mechanics for Self-sustainability upon Graduation

SN	Aims and Objectives	\bar{X}	SD	Remarks
1	Give senior secondary school leavers insight into the knowledge, attitude and skill in automobile work that can enable them be self-sustenance	4.47	0.50	Appropriate
2	Equip senior secondary school leavers with knowledge, attitude and skill in automobile work that can enable them be enterprising and self-reliant	4.62	0.47	Very Appropriate
3	Learners should develop familiarity with the automobile	4.48	0.50	Appropriate
4	Learners should develop proper attitude towards automob	4.66	0.45	Very Appropriate
5	Learners should appreciate the various changes in technologies that are applicable to the automobile	4.42	0.48	Appropriate
6	Learners should perform simple fault diagnosis	4.41	0.46	Appropriate
7	Learners effect simple routine automobile maintenance	4.44	0.39	Appropriate
8	Learners should perform minor automobile repairs	4.47	0.49	Appropriate
9	Learners should perform major automobile repairs	4.72	0.51	Very Appropriate
	Grand/Overall	4.49	0.49	Appropriate

Analysis of mean responses of the respondents from Table 1 revealed that 3 items were very appropriate with their mean from 4.62 to 4.72, while 6 items were appropriate with their mean ranged from 4.42 to 4.48. Since the grand/overall mean is 4.49, this shows that the objectives of the MVMWC are appropriate in producing motor vehicle mechanics for self-sustenance upon graduation. The qualitative data obtained via Focus Group Discussion [FGD] also revealed that the objectives of the MVMWC appropriate.



Research Question 2: What are the teaching strategies used in implementing the curriculum contents of the MVMWC in technical colleges in North-Central Nigeria?

The data for answering this research question are provided in Table 2 below.

Table 2: Mean Responses of MVMW (NTC III) Graduating Students on the Teaching Strategies used in implementing the Curriculum Contents of MVMWC in Technical Colleges in North Central Nigeria

SN	Teaching Strategies Used	\bar{X}	SD	Remarks
1	Lecture Method	4.60	0.47	Strongly Agree
2	Group discussion	4.23	0.49	Agree
3	Fieldtrips/excursions	2.40	0.70	Disagree
4	Demonstration	4.21	0.40	Agree
5	Practical activity based approach	2.47	0.12	Disagree
6	Problem based learning	3.60	0.80	Agree
7	Tutorial	1.82	0.41	Disagree
8	Use of brainstorming	1.80	0.40	Disagree
9	Simulation	1.60	0.46	Disagree
10	Discovery or inquiry	2.00	0.12	Disagree
11	Resource persons – Employment of experts to teach some specialized areas	1.85	0.40	Disagree
12	Project	2.20	0.75	Disagree
13	The use of concept mapping	1.45	0.56	Strongly Disagree
14	Quiz	1.84	0.45	Disagree
15	The use of questioning technique to stimulate learning and understanding (Constructivist)	4.57	0.46	Strongly Agree
16	Cooperative Learning: The Jigsaw strategy	1.44	0.48	Strongly Disagree
17	Debates	2.00	0.00	Disagree
18	Use of Computer Assisted Instructions	1.80	0.44	Disagree
19	Learning by Teaching – where students assume the role of teacher (Peer tutoring)	2.21	0.89	Disagree
20	Synectics- The use of specific techniques to foster creativity in students.	1.40	0.47	Strongly Disagree
21	Using case studies	1.61	0.48	Disagree
22	Utilizing Technology – Multimedia presentations (video, animation, utilizing a tablet, or an iPad, etc.)	2.40	0.47	Disagree
23	Assignment	4.56	0.45	Strongly Agree
24	Coaching – special assistance provided for students having difficulty in the course	1.76	0.45	Disagree
25	Use of prototype models for teaching practical lessons	2.45	0.47	Disagree



26	Learning by imitation	4.40	0.48	Agree
27	Use of observation in teaching practical lessons	4.20	0.40	Agree
28	Employing learning and doing in practical lessons	3.78	0.80	Agree
29	Use of mnemonics for improving memory	1.60	0.49	Disagree
	Grand/overall	2.74	0.477	Disagree

The data presented in Table 2 above revealed that 2 teaching strategies (lecture, questioning technique and assignment strategies) were strongly agreed upon as being used in implementing the curriculum contents of the MVMWC in technical colleges in North Central Nigeria with their mean ranging from 4.56 to 4.6. Seventeen others with their mean ranging from 1.60 to 2.47 were dis-agreed upon by the respondents; while 3 others (concept mapping, jigsaw and synectics) with their ranging from 1.40 to 1.45 were strongly disagreed upon by the respondents. The grand/overall mean was 2.74. This showed that respondents generally disagreed with the teaching strategies adopted in the implementation of the MVMWC. It is worth noting that, the teaching strategies that were disagreed and strongly disagreed upon are actually those that engage the students in high-level cognitive activities which stimulate thought, practical work, analysis, and reflection during curriculum implementation; while those that were agreed upon were predominantly theoretical. FGD also corroborated above table result as they reported that teaching in technical colleges is more of theory than practical.

Discussion of the Findings

The findings of the study showed that the aims and objectives of the motor vehicle work curriculum are appropriate in producing competent and enterprising motor vehicle mechanics for self-employment. Similarly, qualitative data obtained via Focus Group Discussion revealed that the aims and objectives of MVMWC were appropriate. The findings are in line with the view of Babafemi (2007), Aruku (2007), Dike (2009) and Audu, Musta'amal, Musta'amal & Inti (2014) who posited that, MVM curriculum in Nigeria technical colleges is designed to produce competent motor vehicle craftsmen for Nigeria's technological and industrial development. Therefore, the aim and objectives of the curriculum are in cognizant of the nature and structure of modern motor vehicle mechanic work programme.

It was also revealed that instructions in technical colleges are more of theory than practical, and predominantly the lecture method. The focus group discussion also corroborated the above result as they reported that the adopted teaching strategies by teachers and instructors are more of theory than practical. Hence, the strategies are not good enough for the implementation of the curriculum and acquisition of practical skills in technical colleges. This finding is in line with the views of Kumazhege and Egunsola (2014) who observed that, instructions in technical colleges today have remained essentially devoid of practical skills in the different trades. Instructions are more of theory (Lecture) than practical (demonstration). Idris (2012) posited that, the lecture method being predominantly used in teaching automobile technology is based on the behavioural learning theories; which emphasized knowledge transmission from the teacher to passive students and encourage rote memorization of facts. This, according to Idris, partly accounts for the poor performance of students in automobile technology certificate examinations in recent years; also resulting to students graduating with inadequate or complete lack of practical skills in the motor vehicle work trade area (Kumazhege & Egunsola, 2014). More work needs to be done to let go of



the outdated modes of knowledge accumulation, and adopt methods that engage the students in high-level cognitive activities which stimulate thought, practical work, analysis and reflection during curriculum implementation (Bandebe & Faremi, 2012).

Implications of the Findings

The implication of findings of this study is that, even though the aim and objectives of the MVMWC are appropriate in producing competent and enterprising motor vehicle mechanics, instructions are more of theory than practical, and predominantly the lecture method. Therefore, unless affirmative action is taken to ensure the use of instructional strategies that engage students in high-level cognitive activities which stimulate thought, practical work, analysis, and reflection during curriculum implementation; technical colleges will continue to produce unskilled, unemployable, MVMW graduates, who cannot even own their workshop for lack of relevant knowledge, skills and attitude required for successful career in the MVMW vocation.

Conclusion

The objectives of the curriculum are broad and good enough for the acquisition of MVMW maintenance skills by technical college Students, however, the adopted strategies by teachers and instructors is a major impediment to the implementation of the curriculum and acquisition of skills.

Recommendation

Based on the findings of the study, it was recommended that teachers and instructors should employ teaching strategies that engage students in high-level cognitive activities which would stimulate thought, practical work, analysis and reflection during curriculum implementation should be adopted by teachers/instructors.

References

- Adekunle, A. A. (2013). *Development and validation of auto-mechanics intelligent tutor for teaching auto-mechanics concepts in technical colleges (Doctoral dissertation)*. Retrieved 3 September 2014 from <http://www.unn.edu.ng/.../development%20and%20validation%20of%20auto-mechanics>.
- Aruku, A. S. (2007). The relevance of motor mechanics curriculum to the entrepreneurial needs of motor mechanic graduates of technical colleges in Enugu State (unpublished Master's theses). University of Nigeria, Nsukka.
- Audu, R., Musta'amal, A. H., Musta'amal, B. & Inti, M. M. (2014). Retraining needs of motor vehicle mechanics teachers, *Journal of Technical Education and Training (JTET)* 6 (1) 1-11, Jun 2014/ ISSN 2229-8932.
- Ayeni, O. O. (1990). Curriculum development for developing countries. Retrieved 3 September, 2014 from http://www.isprs.org/proceedings/xxix/congress/part6/227_XXIX-part6.pdf.
- Ayeni, O. (2006). *Curriculum development in geomatics education: new challenges of digital technology*, Paper Presented at FIG Regional Conference, March 8-11, 2006, Accra Ghana.
- Babafemi, T. O. A. (2007). An assessment of the implementation of the 6-3-3-4 system of



education in Nigeria: a case study of Ilorin, Kwara State.

- Bandele, S. O. & Faremi, Y. A. (2012). An investigation into the challenges facing the implementation of technical college curriculum in South West, Nigeria, *Journal of Education and Practice* 3(16), 14 – 20, ISSN 2222-1735
- Dike, V. E. (2009). Technical and Vocational Education: Key to Nigeria's Development. Retrieved 20 June 2014 from <http://www.nigeriavillagesquare.com/articles/victor-dike/technical-and-vocational-educationkey-to-nigerias-development.html>.
- Fadairo, O. O. (2009). Strategies for improving the interest of automobile technology students in technical colleges in Ogun State. Retrieved 14 June 2014 from University of Nigeria, Virtual Library.
- Phinaarshad, I. (2013). Teaching methodology. Retrieved 14 April 2015 from <http://www.slideshare.net/Phinaarshad3551/teaching-methodology-17084030>.
- Garba, M. (2004). The critical role of educational resources on curriculum implementation, In Noah, A. O. K., Shonibare, D. O., Ojo A. A. & Olujuwon, T. (Eds) *Curriculum implementation and professionalizing teaching in Nigeria*. Lagos: Central Educational Services.
- Idris, A. M. (2012). Effect of cognitive apprenticeship instructional method on auto-mechanics students, *AU Journal of Technology*, 16 (2): 89-98 (Oct. 2012).
- Inti, M. M., Latib, A. B. A. & Rufai, A. (2014). An appraisal of technical skills possessed by technical college auto-mechanics graduates in Nigeria. Retrieved 23 June 2015 from <http://www.iiste.org>.
- Ivowi, U.M.O. (2004). Curriculum implementation: implication for school administration. In Noah, A. O. K., Shonibare, D. O., Ojo, A. A. & Olujuwon, T. (Eds) *Curriculum implementation and professionalizing teaching in Nigeria*. Lagos: Central Educational Services.
- Jika, O.F. (2010). *Effect guided discovery method of instruction on students' performance on auto mechanics in technical colleges in Benue state* (Master's theses), Retrieved 20 June 2014 from <http://www.maintenance.edu/manautomotive.com>.
- Kumazhege, S. Z. & Egunsola, A. O. E. (2014). Technical teachers' perception of factors affecting practical skill acquisition among technical college graduates in Adamawa State Nigeria, *Educational Research International* Vol. 3(3), 43-52 June 2014.
- Malone, R. (2006). Wisconsin natural resources magazine, auto-log. Retrieved 23 June 2014 from <http://www.wnrmag.com/excite/AT-wnrquery.htm>.
- Nigerian Educational Research and Development Council (NERDC), (2009). Motor vehicle mechanics, senior secondary school curriculum.



- Nwiyi, G. U. & Okorie, F. S. (2014). Problems militating against curriculum implementation on vocational/technical subject in secondary schools in Nigeria, *African Education Indices* 7(1), 7-12 August, 2014.
- Nyapson, C. G. (2015). *Skill improvement needs of self-employed technical college motor vehicle mechanic graduates in Plateau State* (Master's thesis), University of Nigeria, Nsukka.
- Odigiri, M. A. & Ede, E. O. (2010). Integration of new technological innovations in automobiles into the curriculum for Nigerian technical college programmes, *International Journal of Vocational and Technical Education*, 2(5), 89-94, September 2010.
- Okebukola, P.A.O. (2004). Curriculum implementation in Nigeria, strategies for the 21Century, In Noah, A.O.K., Shonibare, D. O., Ojo, A.A. and Olujuwon, T. (Eds) *Curriculum implementation and professionalizing teaching in Nigeria*. Lagos: Central Educational Services.
- Onyeachu, J.A.E. (2008). Management of primary education in Nigeria, *Journal of Curriculum Studies*, 13(3), 191 –201.
- Puyate, S. T. (2008). Constraints to the effective implementation of vocational education program in private secondary schools in Port-Harcourt Local Government Area, *Asia-Pacific Journal of Cooperative Education*, 9(1), 59-71, 2008,
- Schwaller, A. E. (1993). *Motor automotive technology*, USA: Delmar Publisher.
- Udogu, K. C. (2015). *Emerging technology skills required by technical college graduates of motor vehicle mechanic's work (MVMW) in establishing automobile enterprises in Anambra and Enugu States of Nigeria* (Master's theses), Retrieved 14 July 2017 from www.unn.edu.ng/publications/files/Udogu.pdf.
- United States Bureau of Labour Statistics (USBLS). (2012). Auto mechanics need high-tech skills. Retrieved 16 August 2016 from <http://www.careerbuilder.com/.../CB-3020-Transportation-Auto-mechanics-nee...%E2%80%8E>.