



**COMPETENCIES NEEDED BY MOTOR VEHICLE MECHANIC WORKS
TRADE TEACHERS FOR EFFECTIVE TEACHING IN TECHNICAL COLLEGES
IN NIGER STATE, NIGERIA**

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Abstract

The study identified the competencies needed by motor vehicle mechanic works teachers for effective teaching in technical colleges in Niger State, Nigeria. Two research questions were raised and answered as well as two null hypotheses were formulated and test at 0.05 level of significant. The study adopted cross sectional survey research design. The study was conducted in Niger State, Nigeria. The targeted population for the study was 46 respondents comprising of 25 MVM works teachers and 21 administrators. The study utilized the whole population of the study. The instrument used for data collection was a structured questionnaire titled Motor Vehicle Mechanics Work Teachers Competency Needs Questionnaire (MVMWTCNQ). The instruments were subjected to face and content validation by three experts. The reliability Coefficient of (MVMWTCNQ) was established using Cronbach's Alpha statistics and yielded overall reliability coefficient of 0.83. Data were collected by administering copies of the instruments through hand delivery. The data collected were analyzed using mean, standard deviation and z-test. Findings from the study revealed that: 33 items ($\bar{X}=3.61$) were found to be subject matter competency needs, 29 items ($\bar{X}=3.98$) were found to be ICT competency needs, 32 items ($\bar{X}=3.95$) were found to be pedagogical competency needs, and 28 items ($\bar{X}=3.77$) were found to be affective competencies needed by MVM works teachers for effective teaching in technical colleges in Niger

State, Nigeria. Findings from the study also revealed that there is no significance difference between the mean responses of MVW work teachers and administrators on the subject matter and pedagogical competencies needed by MVM work trade teachers for effective teaching in technical colleges in Niger State, Nigeria. Based on the findings, the study recommended among others that: Niger State Science and Technical Schools Board should organize capacity building training for Motor Vehicle Mechanic works teachers in the area of Subject matter Competencies and Pedagogical Competencies competencies in order to enhance effective teaching of Motor Vehicle Mechanic works in technical colleges in Niger State, Nigeria. Keywords: Competencies, Motor Vehicle Mechanic Work, Teachers, Technical college

Introduction

Technical colleges are post basic institutions established to offer technical training to equip students with technical skills to earn a living. According to Osidipe (2017), technical colleges in Nigeria are organized institutions where specialized type of education aimed at providing skills and knowledge required for employment in an occupation is provided. According to Federal Republic of Nigeria (FRN, 2013), the aim of technical college is to produce craftsmen with saleable skills, knowledge and attitude necessary for effective employment in various trades. According to Adebayo and Jimoh (2015), MVM works is a trade intended for the acquisition of basic knowledge and skills necessary for diagnosing and repairs of mechanical defects in motor vehicle. Teachers play vital role in shaping the future of the younger generation. The primary function of MVM works teachers is to ensure the attainment of the objectives of MVM works at technical college level. Sung, Chang and Liu (2016) reported that, teachers have positive effect on students learning which have direct implications on their ability to solve problem in real life. Thus, teachers are the key elements that determine the quality of MVM works graduates and should be prioritized by technical college administrators.

The technical college administrators are persons saddled with the professional responsibility of piloting the general affairs of technical colleges. According to Adebayo and Jimoh (2015), the major responsibility of technical college administrators is to ensure the supervision of teaching and learning processes. Competency refers to the theory, practical knowledge and skills necessary for execution of tasks in an area of specialization such as teaching MVM works. Asmani (2019) defined competency of teachers as a series of knowledge, abilities, skills, experiences and behaviours, which leads to the effective delivery of instruction in the classroom. Hence, effective instructional delivery of the learning contents by MVM works teachers largely depends on knowledge of subject matter and pedagogy.

Subject matter competencies are the most important expertise required by MVM works teachers in the modern workplace which involve the understanding, use, and application of various technologies in the workplace. Ezeama, A.O, Obe *et al.* (2016) revealed that, the lack of subject matter competencies among MVM works teachers centres on the use of On Board Diagnostic (OBD) II scan tools to diagnose, troubleshoot and maintain automobile emerging areas that include: electronic fuel injection, engine management, transmission control, Antilock Brake System (ABS), Traction Control System (TCS), Vehicle Dynamic Control System (VDCS), electronic suspension among others. These emerging areas of automobile could be easily understood by MVM works teachers with pedagogy competencies.

Pedagogical competencies relate to the ability and willingness of teacher to carryout instructional activities to in the classroom. According to Usman, H.N (2012), pedagogical competencies are the capacities of teacher to practice effective classroom management, classroom assessment, use novel teaching methods, questioning techniques among others. The foregoing clearly revealed that, the implication for the lack of requisite competencies among MVM works teachers may have on MVM works students as they may likely graduate from technical colleges without requisite skills for employment in the automobile world of work. Therefore, this study sought to identify the competencies needed by MVM

works trade teachers for effective teaching in technical colleges in Niger State, Nigeria.

Statement of the Research Problem

Despite the Government efforts, the graduates of MVM works find it difficult to display skill proficiency in the automobile world of work after graduation. Idris, Binni, Arah *et al.* (2020) attributed lack of skills among these graduates to lack of competencies amongst MVM works teachers. The lack of competency in terms of knowledge, skills and attitudes amongst MVM works teachers has numerous negative effects that may hinder the realization of the programme objective. Mamman, Idris, Mustapha *et al.* (2016) disclosed that, lack of competencies in subject matter, and pedagogy among technical college teachers in Nigeria is responsible for the manifested ineffective and inefficient instructional delivery and shortage of skilled craftsmen. The persistence of these shortcomings signals the tendency of increasing to the existing statistics of unskilled MVM works graduates of technical colleges in Nigeria.

purpose of the study

the purpose of the study was to determine the competencies needed by MVM works trade teachers for effective teaching in technical college in Niger State, Nigeria. Specifically the Objectives of the study are

- 1 Identify the Subject matter competencies needed by MVM work teachers for effective teaching in technical colleges
- 2 Identify the pedagogical competencies needed by MVM work teachers for effective teaching in technical colleges.

Research Questions

The following research questions were raised to guide the study:

1. What are the subject matter competencies needed by MVM works trade teachers for effective teaching in technical colleges in Niger State, Nigeria?
2. What are the pedagogical competencies needed by MVM works trade teachers for effective teaching in technical colleges in Niger State, Nigeria?

Hypotheses

The following hypotheses formulated were tested at 0.05 level of significance:

HO₁: There is no significance difference between the mean responses of MVW work teachers and administrators on the subject matter competencies needed for effective teaching of MVM works in technical colleges in Niger State, Nigeria

HO₂: There is no significance difference between the mean responses of MVW work teachers and administrators on the pedagogical competencies needed for effective teaching of MVM works in technical colleges in Niger State, Nigeria

Methodology

The study adopted cross sectional Survey research design. Maninder (2016) described cross-sectional study as the type of research design that involves collection of data from a population at one specific point in time. The study was conducted in Niger State, Nigeria. The population of the study was 46 respondents comprising of 25 MVM works teachers and 21 administrators from the seven technical colleges in Niger State offering MVM works. The study utilized the whole population due to its manageable size. The reliability coefficient of the instrument was determined using Cronbach's Alpha statistics and found to be 0.82 and 0.84 for the two sections of the instruments and overall reliability coefficient value of 0.83. Data collected for this study were analyzed using Mean standard deviation and z-test. Mean was used to answer the research questions while Z-test was used to test the null hypotheses at 0.05 level of significance. Decision regarding the research questions was based on real limit of numbers from 3.50-4.49 = Highly Needed (HN), 2.50-3.49 = Needed (N), 1.50-2.49 = Moderately Needed (MN), 0.50-1.49 = Not Needed (NN), respectively. Moreover, decision regarding the test of hypotheses was based on comparing P-value (Sig 2 tailed value) with significant level stated (0.05). P-value below 0.05 signifies there is significant and P-value above 0.05 signifies no significant difference.

Results

Research Question 1

What are the subject matter competencies needed by MVM works trade teachers for effective teaching in technical colleges in and Niger State, Nigeria?

The data for answering research question one is presented in Table

Table 1: Mean Responses of Respondents on the Subject Matter Competencies Needed by MVM works trade teachers for Effective Teaching in Technical Colleges in Niger State, Nigeria N1=27, N2=28

S/N	Items	\bar{X}_1	SD ₁	\bar{X}_2	SD ₂	\bar{X}_A	SD _A	Remark
	Subject Matter Knowledge							
1	Knowledge of on Board Diagnostic (OBD) II scan tools	3.88	.57	3.92	.60	3.90	.58	HN
2	Knowledge of electronic fuel injection	4.00	.48	4.10	.49	4.05	.48	HN
3	Knowledge of engine management system	3.92	.54	3.96	.57	3.94	.55	HN
4	Knowledge of Antilock Brake System (ABS)	4.07	.47	4.10	.41	4.09	.44	HN
5	Knowledge of Traction Control System (TCS)	3.88	.50	3.96	.57	3.92	.53	HN
6	Knowledge of Vehicle Dynamic Control System (VDCS)	4.11	.50	4.10	.41	4.10	.45	HN

7	Knowledge of electronic suspension	3.92	.61	4.03	.63	3.98	.62	HN
8	Knowledge of electronic ignition system	4.11	.50	4.21	.49	4.16	.50	HN
9	Knowledge of power steering system	4.07	.61	4.07	.60	4.07	.60	HN
10	Knowledge of electronic throttle control	4.22	.57	4.14	.44	4.18	.51	HN
11	Knowledge of electronic principles	4.25	.59	4.28	.53	4.27	.55	HN
12	Knowledge of Electronic Control Unit	4.07	.54	4.03	.50	4.05	.52	HN
13	Knowledge of actuators	3.96	.58	4.07	.53	4.01	.56	HN
14	Knowledge of sensors	3.96	.51	4.14	.52	4.05	.52	HN
	Subject Matter Skills							
15	Ability to use on Board Diagnostic (OBD) II scan tools	3.96	.58	4.00	.60	3.98	.59	HN
16	Ability to carry out maintenance on electronic fuel injection	4.07	.54	4.07	.46	4.07	.50	HN
17	Ability to carry out maintenance on	3.85	.53	3.92	.60	3.89	.56	HN

	engine management system							
18	Ability to carry out maintenance on Antilock Brake System (ABS)	4.14	.53	4.14	.44	4.14	.48	HN
19	Ability to carry out maintenance on Traction Control System (TCS)	3.74	.52	3.64	.67	3.69	.60	HN
20	Ability to carry out maintenance on Vehicle Dynamic Control System	3.88	.57	3.92	.60	3.90	.58	HN

Table 4.1: Continue

S/N	Items	\bar{X}_1	SD ₁	\bar{X}_2	SD ₂	\bar{X}_A	SD _A	Remark
21	Ability to carry out maintenance on electronic suspension	4.00	.48	4.10	.49	4.05	.48	HN
22	Ability to carry out maintenance on electronic ignition system	3.92	.54	3.96	.57	3.94	.55	HN
23	Ability to carry out maintenance on power steering system	4.07	.47	4.10	.41	4.09	.44	HN
24	Ability to carry out maintenance on	3.88	.50	3.96	.57	3.92	.53	

	electronic throttle control							
	Ability to apply electronic							
25	principles in the maintenance of electronic systems	4.11	.50	4.10	.41	4.10	.45	HN
	Ability to carry out maintenance on Electronic Control Unit							
26		3.92	.61	4.03	.63	3.98	.62	HN
	Ability to carry out maintenance on actuators							
27		4.03	.43	4.25	.51	4.14	.48	HN
	Ability to carry out maintenance on sensors							
28		4.07	.61	4.07	.60	4.07	.60	HN
	Attitudes Towards Subject Matter							
	Spending much time studying the contents of subject matter							
29		3.29	.86	3.17	.72	3.23	.79	NN
	Finding the tasks on the subject matter interesting							
30		3.22	.93	3.00	.66	3.10	.80	NN
	Finding the topics of the subject matter innovating							
31		3.11	.89	3.07	.66	3.09	.77	NN
	Finding the organization of contents in the							
32		3.96	.58	4.07	.53	4.01	.56	HN

	subject matter are appealing								
33	Enjoying updating skills on subject matter	3.96	.51	4.14	.52	4.05	.52	HN	
34	Involving in practical activities on subject matter	2.81	.48	3.07	.60	2.94	.55	NN	
35	I am curious in learning more on subject matter	4.07	.54	4.07	.46	4.07	.50	HN	
36	I would like to know much on my subject matter	3.85	.53	3.92	.60	3.89	.56	HN	
37	Knowledge of subject matter makes me confident	4.14	.53	4.14	.44	4.14	.48	HN	
	Grand Mean	3.60	.65	3.62	.57	3.61	.61	HN	

Keys: \bar{X}_1 = Mean of Technical College Administrators, SD_1 = Standard Deviation of Technical College Administrators, \bar{X}_2 = Mean of MVM works Teachers, SD_2 = Standard Deviation of MVM works Teachers, \bar{X}_A = Average Mean of Technical College Administrators and MVM works Teachers, SD_A = Average Standard Deviation of Technical College Administrators and MVM works Teachers.

Table 1 reveals that 33 out of the 37 items had average mean values between 3.89 and 4.14 while the remaining four items had average mean values of 2.94 and 3.23 with grand mean of 3.61 and standard deviation of .61. This indicated that the 33 items to be the subject matter competencies are highly needed by MVM works trade teachers for effectivel teaching in technical colleges in Niger State, Nigeria without much variability between

the mean responses. The remaining four items are the needed subject matter competencies by MVM work teachers

Research Question 2

What are the pedagogical competencies needed by MVM works trade teachers for effective teaching in technical colleges in Niger State, Nigeria? The data for answering research question three is presented in Table 2.

Table.2: Mean Responses of Respondents on the Pedagogical Competencies Needed by MVM works trade Teachers for Effective Teaching in Technical Colleges in Niger State, Nigeria

S/N	Items	\bar{X}_1	SD ₁	\bar{X}_2	SD ₂	\bar{X}_A	SD _A	Remark
1	Knowledge of classroom management	4.00	.39	3.89	.31	3.94	.35	HN
2	Knowledge of classroom assessment	3.88	.42	3.89	.41	3.89	.41	HN
3	Knowledge of novel teaching methods	4.03	.43	4.07	.46	4.05	.44	HN
4	Knowledge of questioning techniques	4.03	.43	3.96	.42	4.00	.43	HN
5	Knowledge of learning process	3.92	.47	3.78	.41	3.85	.44	HN
6	Knowledge in lesson planning	3.92	.38	3.92	.46	3.92	.42	HN
7	Knowledge of principles of teaching	3.92	.47	3.85	.35	3.89	.41	HN

8	Knowledge of instructional materials	3.88	.57	3.85	.44	3.87	.51	HN
9	Knowledge of improvisation of instructional materials	3.92	.54	3.89	.49	3.90	.51	HN
10	Knowledge of logical presentation of learning contents	3.96	.51	3.92	.46	3.94	.48	HN
11	Knowledge of reward and punishment in teaching	3.81	.48	3.78	.49	3.80	.48	HN
Pedagogical Skills								
12	Ability to ensure adequate classroom management	3.85	.45	3.89	.49	3.87	.47	
13	Apply a variety of instructional materials and/or technology	4.07	.47	3.92	.37	4.00	.43	HN
14	Application of a variety of questioning techniques	3.96	.51	3.92	.46	3.94	.48	HN
15	Use of teaching strategies to refocus off-task behaviors	4.11	.50	4.00	.47	4.05	.48	HN

16	Use of variety teaching approaches	4.11	.50	4.00	.47	4.05	.48	HN
17	Able to design lesson plans that include clearly defined, measurable objectives	3.88	.57	3.85	.52	3.87	.54	HN
18	Ability to practical application of teaching principles	3.92	.54	3.96	.50	3.94	.52	HN
19	Ability to utilize variety of instructional materials	3.81	.55	3.85	.59	3.83	.56	HN
20	Ability to improvise instructional materials	3.81	.48	3.89	.56	3.85	.52	HN
21	Ability to present learning contents logically	4.03	.51	3.89	.41	3.96	.46	HN
22	Ability to reward and punish students accordingly in teaching	3.92	.54	3.89	.49	3.90	.51	HN
Attitudes Towards Pedagogy								
23	Finding it fascinating using	4.03	.51	3.89	.41	3.96	.46	HN

new instructional
techniques

Table 2: Continued

S/N	Items	\bar{X}_1	SD ₁	\bar{X}_2	SD ₂	\bar{X}_A	SD _A	Remark
24	Joining discussion about teaching techniques	3.92	.54	3.89	.49	3.90	.51	HN
25	Using of instructional materials makes teaching easier and meaningful	3.92	.47	3.85	.35	3.89	.41	HN
26	Using different teaching techniques in the classroom	3.88	.57	3.85	.44	3.87	.51	HN
27	Enjoying using students' centered lesson plans	3.81	.48	3.89	.56	3.85	.52	HN
28	Practical application of teaching principles is interesting	4.00	.55	3.92	.46	3.96	.50	HN
29	It is appealing to utilize variety of instructional materials	4.07	.61	4.03	.50	4.05	.55	HN
30	I enjoy improvising instructional materials	4.22	.57	4.03	.50	4.12	.54	HN
31	Presenting learning contents	4.07	.61	3.89	.56	3.98	.59	HN

	logically is stimulating								
32	Using reward and punishment in teaching is something I enjoy	4.03	.64	4.00	.54	4.01	.59	HN	
	Grand Mean	3.99	.55	3.92	.48	3.95	.51	HN	

Table 2 shows that all the 32 items had average mean values between 3.80 and 4.12 with a grand mean value of 3.95 and standard deviation of .51. This indicated that 32 items are pedagogical competencies that are highly needed by MVM works trade teachers for effective teaching in technical colleges in Niger State, Nigeria without much variability between the mean responses.

Hypothesis One

There is no significance difference between the mean responses of MVW work teachers and administrators on the subject matter competencies needed for effective teaching of MVM in technical colleges in Niger State, Nigeria. The data for testing the null hypothesis one is presented in Table 3

Table 3 Z-test Analysis for the Test of Significance Difference Between the Mean Responses of MVW Work Teachers and Administrators on the Subject Matter Competencies Needed for Effective Teaching of MVM Works in Technical Colleges in Niger State, Nigeria

	Levene's Test for Equality of Variances		z-test for Equality of Means					95% Confidence Interval of the Difference	
	F	Sig.	T	Df	Sig. (2-tailed)	Mean Difference	Std. Error Difference	Lower	Upper
Equal variances assumed	.016	.899	.361	53	.719	-.03507	.09706	-.22974	.15960
Equal variances			.362	52.996	.719*	-.03507	.09701	-.22964	.15950

not assumed

Table 3 shows the significant (2-tailed) value of z-test for equality of means with variance not assumed was 0.71 which is greater than the stated level of significance. Since 0.71 is greater than 0.05, the difference between the mean responses of MVW work teachers and administrators on the subject matter competencies needed for effective teaching of MVM works in technical colleges in Niger State, Nigeria is not significant. Hence, the null hypothesis one is upheld

Hypothesis Two

There is no significance difference between the mean responses of MVW work teachers and administrators on the pedagogical competencies needed for effective teaching of MVM works in technical colleges in Abuja and Niger State, Nigeria. The data for testing the null hypothesis three is presented in Table 4

Table 4: Z-test Analysis for the Test of Significance Difference Between the Mean Responses of MVW Work Teachers and Administrators on the Pedagogical Competencies Needed for Effective Teaching of MVM Works in Technical Colleges in Niger State, Nigeria

		Levene's Test for Equality of Variances		t-test for Equality of Means		Sig. (2-tailed)	Mean Difference	Std. Error Difference	95% Confidence Interval of the Difference	
		F	Sig.	t	df				Lower	Upper
Equal variances assumed		.080	.778	.694	53	.491	.05006	.07214	-.09464	.19476
Equal variances not assumed				.694	52.895	.491*	.05006	.07215	-.09467	.19479

Table 4 shows the significant (2-tailed) value of z-test for equality of means with variance not assumed was 0.491 which is greater than the stated level

of significance. Since 0.491 is greater than 0.05, the difference between the mean responses of MVW work teachers and administrators on the pedagogical competencies needed for effective teaching of MVM works in technical colleges in Niger State, Nigeria is not significant. Hence, the null hypothesis three is accepted.

Discussion of Finding

Finding on research question one regarding the subject matter competencies needed by MVM works teachers for effective teaching in technical colleges in Niger State, Nigeria revealed competencies of on Board Diagnostic (OBD) II scan tools, electronic fuel injection, engine management system, ABS, TCS, VDCS, electronic suspension, electronic ignition system, power steering system, electronic throttle control, electronic principles, Electronic Control Unit, actuators and sensors. The findings entailed that for effective teaching of MVM works in technical colleges in Niger State, Nigeria, MVM works teachers highly needed competencies in the identified subject matter areas. The finding is in agreement with the findings of Igwe (2011) that revealed teachers of MVMW in technical colleges in South-East states of Nigeria need skill improvement training in On-Board Diagnostic (OBD) systems for effective teaching of petrol engine maintenance.

However, finding on the test for significance difference between the mean responses of MVW work teachers and administrators on the subject matter competencies needed for effective teaching of MVM works in technical colleges in Niger State, Nigeria revealed that there was no significant difference. This clearly revealed similarity between the responses of MVW work teachers and administrators on the subject matter . The finding is similar with the finding of Machief , P.E (2021) that revealed there was no significant difference between the mean responses of technicians and mater technicians on the technical skills improvement needs for effective maintenance of modern automobile in Plateau State.

Finding on research question two regarding the pedagogical competencies needed by MVM works teachers for effective teaching in technical colleges in Niger State, Nigeria revealed competencies on classroom management,

classroom assessment, of novel teaching methods, questioning techniques, learning process, lesson planning, principles of teaching, instructional materials, improvisation of instructional materials, logical presentation of learning contents and reward and punishment in teaching. The findings indicated that effective teaching of MVM works in technical colleges in Niger State, Nigeria is achievable if MVM works teachers are equipped with the identified pedagogical competency. Similar findings was revealed by Audu, Inti, M.M *et al.* (2014) that MVM teachers in the technical colleges need retraining in terms of pedagogical skills as well as practical skills areas in MVM identified the areas of retraining needed by Motor Vehicle Mechanics (MVM) teachers in technical colleges in Niger State Nigeria.

However, finding on the test for significance difference between the mean responses of MVW work teachers and administrators on the pedagogical competencies needed for effective teaching of MVM works in technical colleges in Niger State, Nigeria revealed that there was no significant difference. This indicated that the responses of MVW work teachers and administrators are not different regarding the pedagogical competencies needed for effective teaching of MVM works in technical colleges in Niger State, Nigeria. The finding is in agreement with the finding of Audu, Aede, H.M *et al.* (2014) that revealed there was no significant difference between the mean responses of MVM teachers in Niger State Nigeria on the pedagogical skills retraining needs. Hence, there was agreement between the responses of MVW work teachers and administrators on the pedagogical competencies needed for effective teaching of MVM works in technical colleges in Niger State, Nigeria.

Conclusion

The findings of the study provided empirical insights on the competencies needed by MVM works trade teachers for effective teaching in technical colleges in Niger State, Nigeria. The study identified the subject matter and pedagogical competencies needed by MVM works teachers for effective teaching in technical colleges in Niger State, Nigeria. These findings provide solid basis for retraining MVM works teachers in the identified

subject matter and pedagogical competency for effective teaching of MVM works in technical colleges in Niger State, Nigeria.

Though, the findings of the study is limited to the responses of MVM work teachers and technical administrators. Therefore, it is concluded that equipping MVM works teachers with the identified subject matter and pedagogical competencies are capable competence ng effective teaching of MVM works in technical colleges in Niger State, Nigeria.

Recommendations

Based on the findings of the study, the following recommendations were made:

1. Niger State Science and Technical Schools Board should organize capacity building training for Motor Vehicle Mechanic works teachers in the areas of subject matter competencies identified in order to enhance effective teaching of Motor Vehicle Mechanic works in technical colleges in Niger State, Nigeria.
2. Technical college administrators should collaborate with stakeholders in education such as Federal and State ministries of education to organize workshop for Motor Vehicle Mechanic works teachers in the areas of pedagogical competencies identified in order to foster effective teaching in technical colleges in Niger State, Nigeria.

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