Evaluation of the Implementation of Automotive Mechatronics Programme in Vocational Enterprise Institutions in Nigeria

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Abstract

The study was designed to evaluate the implementation of automotive mechatronics programme of the Vocational Enterprise Institutions (VEIs) in Nigeria. Two research questions and two null hypotheses guided the study. A descriptive survey research design was employed for the study. The study was conducted in three VEIs offering automotive mechatronics programme in FCT Abuja and Kaduna State. A total of 90 respondents comprising of 14 administrators 32 instructors and 44 technical staff drawn from the three National Board for Technical Education accredited Vocational Enterprise Institutions offering Automotive Mechatronics Programme in Federal Capital Territory, Abuja and Kaduna State was used as a total population for the study. A structured questionnaire titled: Automotive Mechatronics Programme Evaluation Implementation Questionnaire (AMPEIQ) developed by the researchers and validated by three experts from Industrial and Technology Education Department, Federal University of Technology, Minna was used for data collected for the study. The reliability coefficient of the instrument was 0.78 using Cronbach Alpha statistics. Statistical Package for Social Science (SPSS Version 23) was used for the data analysis. Mean, standard deviation, frequency and percentage were the statistical tools used for answering research questions while ANOVA statistics was used to analyze the null hypotheses formulated for the study at 0.05 level of significant. The findings of the study revealed among others that: the available training equipment/facilities were rarely often used and most teaching methods needed for effective implementation of automotive mechatronics programme were rarely often used. Based on the findings it was recommended that: The VEIs in FCT Abuja and Kaduna State should adhere to the NBTE minimum requirement of training equipment/facilities for the implementation of the automotive mechatronics programmes, the available training equipment/facilities in the VEIs in FCT Abuja and Kaduna State should be effectively utilized for the implementation of the automotive mechatronics programmes, the automotive mechatronics instructors/technical staff of the VEIs in FCT Abuja and Kaduna State should be encourage to adopt wide range of teaching methods in teaching automotive mechatronics.

Keywords: Evaluation, Implementation, Automotive Mechatronics and Vocational Enterprise Institutions.

Introduction

The concerted effort on the part of the Federal Government of Nigeria of attaining the realization of largest economies in the world rest on her ability to transform its teeming youths into highly skilled and competent citizens capable of addressing the needs of the growing economy, technological advancement and competing favorably globally. Thus, the responsibility for preparing such citizens rests on higher education institutions which are constrained by several challenges which according to National Board for Technical Education (NBTE) include: lack of capacity to accommodate increasing number of applicants; low participation of the private sector in skills training and development; and mismatch between the training provided and needs of employers; These challenges according to NBTE (2007) poses serious threats to the attainment of this realization of the Federal Government of Nigeria. To address these challenges, the Government approved the establishment of the Vocational Enterprise Institutions (VEIs) with the major aim of widening access to Technical and Vocational Education and Training (TVET) to serve the needs of the industry and self-empowerment of the nation's citizens through VEIs.

Vocational Enterprise Institutions (VEIs) are institutions set up to provide an alternative route to higher education, as part of the on-going reform of the Vocational and Technical Education sector. The NBTE (2007) noted that VEIs are institutions which are established to provide competency based-skills in vocational, technical or professional education and training at post-basic and post-secondary levels to equip the youth as well as working class adults with vocational skills and knowledge to meet the

increasing demand for skilled manpower in the various sectors of the nation's economy. A number of programmes were introduced to aid in the attainment of this. According to Federal Republic of Nigeria (FRN) (2013) these programmes include: Welding and Sheet Metal Work, Agricultural, Electrical Wiring – domestic and industrial, Plumbing, Painting, Bricklaying, Motor-vehicle Mechanic Work, Panel Beating Work, Auto-Electrical, Vulcanizing, as well as Automotive Mechatronics trade.

Automotive mechatronics refers to a system of mechanical components with electronically based decision making (control circuitry). It involves the design and manufacturing of intelligent products or systems involving hybrid mechanical and electronic functions of the modern vehicles. Tanuja, Meenal and Guri (2016), identified the elements of mechatronics in the modern automobile to includes: sensors, hydraulic and pneumatic (actuators), mechanical couplings, electric motors, power electronic, assembly gear, control panels, computer hard and software to manage complexity, uncertainty and communication in modern vehicles. The Mechatronics Programme is in flexible modular form, and is structured to have three parts that is NVC Part I, NVC Part II, and NVC Part III respectively. Each part according to NBTE (2007) shall have a cogent and flexible structure and content that would allow the trainee to acquire practical working skill unit and the possibility to exit at any level. The NBTE clearly spelt out the components of automotive mechatronics programme at VEIs level to include 40 hours per week, with 6 hours allocated for core theory courses, 2 hours for general education, 32 hours for practical activities with three months Supervised Industrial Work Experience (SIWES) to achieve the above laudable objectives. However, these objectives appear not to have been achieved as many graduates of this programme from VEIs are unable to set up their own workshop and therefore unemployed (Jalani, 2016). The foregoing clearly revealed that implementation which is seen as a process of executing a policy so that a concept become reality or practical transformation rather than the design process of institutional plan seems to have been defeated. Hence, there is need for the available training facilities/equipment to be effectively utilized.

Effective utilization of training facilities/equipment is the process of using procured and accessible facilities, tools, components equipment and appliances to make teaching and learning processes easier, interesting and rewarding. Josephine, Mercy and Philister (2016) opined that non-effective use of training facilities create negative feeling in the trainees. It has thus, become inevitable to show concern with the use of equipment and facilities being made available to the VEIs centers across the country as continuous non used of available training facilities lead to material wastages. However, there is need for utilization of the available facilities to be accompanied with teaching methods.

Teaching method refers to the ways and means which an instructor adopts to guide the trainees teaching and learning activities in order to accomplish the desired goals. Nneji (1997) opined that teaching method itself could be seen as the manner in which the contents are presented to the learner. There are many teaching methods and techniques available to the instructors, these methods/techniques are designed for communicating with trainees and the choice of which is affected by many components such as content, time, ability of pupils, group size as well as the instructor personal preference (Theresa, 2016). Effective teaching and learning takes place when the instructors knows which method or technique to use in a particular situation to meet specific goals. Yinusa (2014) explained that the following methods are appropriate when the acquisition of practical skills are needed; these methods according to Yinusa include demonstration, project, field – trip, enquiry, close circuit television (electronics learning) and problem solving. Hence, the effectiveness of the right teaching method adopted for the implementation of automotive mechatronics programme by instructors depend on the evaluation.

Evaluation is a systematic process of determining to what extent aims and objectives of a programme has been achieved. Ekele, (2011) argued that, the purpose of evaluation is to measure the effectiveness of programmes against the goals they set-out to accomplish, also it is a means of contributing to decision making in order to plan for future. It is linked with auditing activities and assurance in achieving quality through compliance with standard and expectation in input, process, and product/output. However, evaluation model developed by Stufflebean in 1971 was adopted for this study. This model identified four types of evaluation representing the letters CIPP for context, input, process and product. The programme of automotive mechatronics at VEIs in Nigeria was designed to provide solutions to the service maintenance problems of high technology motor vehicles through the production of competent craftsmen who will be enterprising and self-reliant.

However, it has been observed that the implementation of this programme at VEIs seems not to be well implemented as evidences from the literature showed that graduates of automotive mechatronics programme from VEIs are graduating without pre-requisite skills as a results of these they are ill equipped and unemployable. Jelani (2016) noted that it is difficult to find skilled automotive mechatronics graduates that could hardly undertake the maintenance and repairs of modern mechatronics vehicles and even the few available ones undertake the maintenance and repairs of these vehicles on trial and error bases. Jelani further attributed the forgoing situation to the lack of adequate training facilities/equipment as well as ineffective use of the existing ones, as well as the use of irrelevant teaching techniques by the training instructors. This study is therefore designed to evaluate the implementation of automotive mechatronics programme in Vocational Enterprise Institutions in Federal Capital Territory, Abuja and Kaduna State.

Aim and Objectives of the Study

The aim of the study was to evaluate the implementation of automotive mechatronics programme of VEIs in FCT, Abuja and Kaduna State, Nigeria. Specifically, the study sought to determine:

1. The extent to which the training equipment/facilities are effectively utilize for the implementation of automotive mechatronics programme of the VEIs in FCT, Abuja and Kaduna State;
2. The teaching methods used for teaching automotive mechatronics by the instructors and technical staff of the VEIs in FCT Abuja and Kaduna State;

Research Questions

The following research questions guided the study:

1. To what extent are the training equipment/facilities put to effective use for the implementation of automotive mechatronics programme of the VEIs in FCT, Abuja and Kaduna State?
2. What are the teaching methods used in teaching automotive mechatronics by the instructors and technical staff of the VELs in FCT Abuja and Kaduna State?

Hypotheses

The following null hypotheses were formulated and were tested at 0.05 level of significant:

Ho_1: There is no significance difference in the mean responses of the administrators, automotive mechatronics instructors and the technical staff with regard to the extent to which the training equipment/facilities are put to effective use for the implementation of the automotive mechatronics programme at VEIs in FCT, Abuja and Kaduna State.

Ho_2: There is no significance difference in the mean responses of the administrators, automotive mechatronics instructors and the technical staff as regards the teaching methods used in teaching automotive mechatronics by the instructors and technical staff of VEIs in FCT, Abuja and Kaduna State.

Methodology

A descriptive survey research design was adopted for the study. The study was conducted in three NBTE accredited VEIs offering Automotive Mechatronics Programme in FCT Abuja and Kaduna State. The targeted population for the study was 90 respondents, comprising of 14 administrators, 32 instructors and 44 technical staff. Since the population is not too large, the entire population was used for the study. Hence, no sampling technique was employed. A structured questionnaire designed by the researchers and validated by three experts from the Department of Industrial and Technology Education, Federal University of Technology Minna was used for the study. The reliability coefficient of the instrument was 0.78 using Cronbach Alpha statistics. All sections of the research questions were structured on a four-point rating scale options of: most often (4), often (3), rarely often (2) and not use (1). Statistical package for social sciences was used for data analysis (SPSS version 23). Mean and Standard deviation were used to answer the research questions; while Analysis of Variance (ANOVA) was used to test the null hypotheses formulated for the study.

The decision for research questions were based on the resulting mean scores interpreted relative to the concept of real lower and upper limit of numbers as follows: most often (4) = 3.50-4.00, often (3) = 2.50-3.49, rarely often (2) = 1.50-2.49 and not use (1) = 1.00-1.49 respectively; while the null hypotheses were tested using Analysis of Variance (ANOVA) at 0.05 level of significance. Furthermore, decision on the null hypotheses formulated for the study were based on comparing the significant value with ($P<0.05$) level of significant, that is where significant value was less than ($P<0.05$) it was rejected and where it was equal or greater than ($P<0.05$) level of significant the hypotheses were upheld and accepted.

Results

Research Question 1

To what extent are the training equipment/facilities effectively utilize for the implementation of automotive mechatronics programme of the VEIs in FCT, Abuja and Kaduna State?

Table 1

Mean and standard deviation of the respondents on the extent to which the training equipment / facilities are effectively utilized.

S/N	Items	$X_{AN=90}$	SD_A	DECISION
1	Digital Multimeter (DMM)	2.09	0.59	Rarely Often
2	Potentiometer	2.19	0.39	Rarely Often
3	Ohmmeter	2.72	0.45	Often
4	Oscilloscope	2.10	0.30	Rarely Often
5	Independent Power supply panel	2.27	0.72	Rarely Often
6	Personal Computers	2.61	0.53	Often
7	Printers	2.34	0.58	Rarely Often
8	Scanner	2.39	0.49	Rarely Often
9	Functional Generator (a.c.)	2.24	0.43	Rarely Often
10	Functional Generator (d.c.)	2.73	0.47	Often
11	Multimedia Data acquisition & Control board	1.90	0.65	Rarely Often
12	Lab View Software (data acquisition & process control)	1.98	0.69	Rarely Often
13	MATLAB software	2.02	0.54	Rarely Often
14	Bench link software (HP, LG, IBM, etc.)	1.94	0.63	Rarely Often
15	Engine analysis, Part sourcing & assembling techniques tools	2.46	0.50	Rarely Often
16	Training board (Auto-electric)	2.08	0.43	Rarely Often
17	Plug-in-cables	2.88	0.36	Often
18	Pneumatic training unit	2.29	0.57	Rarely Often
19	Hydraulic board	2.27	0.51	Rarely Often
20	Bearing and Precision assembly kit	2.36	0.48	Rarely Often
21	Automatic crane	2.54	0.52	Often
22	Digital alignment unit	2.41	0.54	Rarely Often
23	Fuel Injection testing unit	2.67	0.47	Often
24	Live vehicles various models	2.69	0.61	Often
25	Model diesel & petrol engines	2.31	0.65	Rarely Often
26	Manual transmission units	2.29	0.66	Rarely Often
27	Automatic transmission units	2.31	0.65	Rarely Often
28	Assorted motor parts models	2.86	0.51	Often
29	Digital wheel balancing machines	2.33	0.56	Rarely Often
30	Mobile cranes	2.39	0.49	Rarely Often
31	Vulcanizing units	2.09	0.43	Rarely Often
32	D.C. charging kits	2.02	0.54	Rarely Often
33	Welding machines (AC, DC, Rectifier etc.)	2.32	0.65	Rarely Often
34	Mobile tool boxes	2.19	0.56	Rarely Often
35	Bench vices	2.84	0.36	Often
36	Column drilling machine	2.04	0.54	Rarely Often
37	Student Lathes	2.10	0.48	Rarely Often
38	Power saw	2.19	0.47	Rarely Often
39	Floor grinding machine	2.10	0.30	Rarely Often
40	Table grinding machines	2.96	0.21	Often
41	Table drilling machine	2.96	0.26	Often
42	Measuring and marking out tables	2.97	0.24	Often
43	Work benches with a.c. plug-in facilities	2.16	0.36	Rarely Often

44	Hydraulic brake testing unit	2.16	0.36	Rarely Often
45	Hydraulic jacks	2.58	0.49	Often
46	Hydraulic stands	2.12	0.54	Often
47	Floor jacks (6 ton capacity)	2.94	0.23	Often
48	Cable stands (mobile and stationary)	2.22	0.42	Rarely Often
49	Headlight alignment unit	2.91	0.32	Often
50	Modern training facilities (multimedia & overhead projectors, mobile board, board fax) 1each	2.16	0.36	Rarely Often
51	Fuel pressure gauge	2.16	0.36	Rarely Often
52	Engine stand	2.70	0.46	Often
53	Diagnostic equipment	2.49	0.50	Rarely Often
54	Drawing table complete with drafting machine/stools	2.97	0.18	Often
55	Drawing set complete with pens for ink work	2.16	0.36	Rarely Often
56	450 set squares	2.97	0.18	Often
57	600 set squares	2.12	0.49	Rarely Often
58	Blue printing machine	2.00	0.50	Rarely Often
59	Adjustable set squares	2.92	0.27	Often
60	Desk sharpener	2.94	0.23	Often
61	Triangular scale rule (30 mm)	2.33	0.50	Rarely Often
62	Flat scale rule (300 mm)	2.12	0.49	Rarely Often
63	Blackboard ruler (1m)	2.94	0.23	Often
64	Blackboard Tee squares	2.94	0.23	Often
65	Blackboard set square (450 600)	2.93	0.25	Often
66	Blackboard compasses	2.94	0.23	Often
67	Blackboard protractor	2.97	0.18	Often
68	French curve set	2.92	0.30	Often
69	Letter stencils (3 mm, 6 mm, 7 mm and 10 mm)	2.19	0.39	Rarely Often
70	Rubber stencils (3 mm, 6 mm, 7 mm, and 10 mm)	2.06	0.55	Rarely Often
71	Erasing stencils	2.97	0.18	Often
72	Drawing rack/shelves for 30 students	2.29	0.57	Rarely Often
73	Personal computers	2.87	0.40	Often
74	Plotter	1.98	0.64	Rarely Often
75	Printer to handle A3 size	2.08	0.48	Rarely Often
76	Comparator (Mechanical)	2.47	0.58	Rarely Often
77	Universal measuring microscope	2.00	0.58	Rarely Often
78	Bench testing centers	2.92	0.31	Often
79	Angle gauge	2.12	0.42	Rarely Often
80	Set of slip gauge	2.76	0.48	Often
81	Sine bars with centers	2.16	0.36	Rarely Often
82	Engineers level	2.86	0.38	Often
83	Micrometers (assorted denomination)	2.41	0.50	Rarely Often
84	Vee blocks (assorted sizes)	2.64	0.48	Often
85	Magnetic vee block	1.98	0.45	Rarely Often
86	Vernier calipers	2.98	0.15	Often
87	Vernier height gauge	2.11	0.41	Rarely Often
88	Angle plate	2.11	0.46	Rarely Often
89	Limit gauges for holes, shafts, and threads	2.09	0.47	Rarely Often
90	Surface plate	2.59	0.60	Often
91	Marking out table	2.93	0.33	Often
92	Parallel strips	2.10	0.50	Rarely Often
93	Bevel protractor	2.07	0.49	Rarely Often
94	Dial gauges and magnetic stand	2.08	0.43	Rarely Often
95	Engineers' square	2.10	0.30	Rarely Often
96	Thread gauge	2.10	0.43	Rarely Often
97	Radius gauge	2.02	0.54	Rarely Often
98	Feeler gauge	2.88	0.33	Often
99	Steel rule	2.29	0.57	Rarely Often
100	Combination set	2.81	0.42	Often
	Grand Mean/SD	**2.42**	**0.44**	**Rarely Often**

Key: X_A= Average mean of administrators, instructors and the technical staff, SD_A= Standard deviation of administrators, instructors and the technical staff.

Table 1 present the mean responses of the respondents on the 100 items posed to determine the extent to which the training equipment/facilities are effectively utilize for the implementation of the automotive mechatronics programme of the VEIs. The grand mean of 2.42 implies that the majority of the training equipment/facilities meant for the implementation of the automotive mechatronics programme of the VEIs in FCT Abuja and Kaduna State were not being effectively utilized for the implementation of the automotive mechatronics programme. The standard deviation of the items ranges from 0.18 to 0.72, this further implies that the respondents were not too far from the mean and were too closed to one another in their responses.

Research Question 2

What are the teaching methods used in teaching Automotive Mechatronics by the instructors/technical staff of the VEIs FCT, Abuja and Kaduna State?

Table 2

Mean and standard deviation of the respondents on the teaching methods used in teaching Automotive Mechatronics by the instructors/technical staff.

S/N	ITEMS	$X_{A\,N=90}$	SD_A	DECISION
1	Lecture method	3.23	0.43	Often Used
2	Demonstration method	3.72	0.45	Most Often Used
3	Exhibition method	2.01	0.25	Rarely Often Used
4	Questioning method	3.42	0.49	Often Used
5	Discussion method	2.53	0.55	Often Used
6	Project method	2.32	0.60	Rarely Often Used
7	Field trip method	2.20	0.40	Rarely Often Used
8	Assignment method	3.00	0.00	Often Used
9	Experiment method	2.17	0.38	Rarely Often Used
10	Inquiry and problem solving method	2.09	0.51	Rarely Often Used
11	Just in time method	2.17	0.40	Rarely Often Used
12	Individualized instruction method	2.11	0.44	Rarely Often Used
13	Brainstorming method	2.08	0.48	Rarely Often Used
14	Game and simulation method	1.67	0.47	Rarely Often Used
15	Programmed instruction method	2.09	0.47	Rarely Often Used
16	System approach instruction method	2.03	0.53	Rarely Often Used
17	Close Circuit method (E-learning)	2.18	0.39	Rarely Often Used
18	Concept mapping method	1.93	0.54	Rarely Often Used
19	Metal learning	2.02	0.54	Rarely Often Used
20	Cognitive apprenticeship	2.11	0.44	Rarely Often Used
21	Coaching	2.38	0.49	Rarely Often Used
22	Monitoring	2.22	0.42	Rarely Often Used
23	Practical monitoring and supervising method	3.43	0.50	Often Used
24	Drill method	2.21	0.41	Rarely Often Used
	Grand Mean/SD	**2.39**	**0.44**	**Rarely Often Used**

Key: X_A= Average mean of administrators, instructors and the technical staff, SD_A= Standard deviation of administrators, instructors and the technical staff.

Table 2 presents the mean responses of the respondents on the 24 items posted to determine the teaching methods used in teaching Automotive Mechatronics by the instructors/technical staff of the VEIs with a grand mean of 2.39 which implies that the respondents jointly agreed that 18 out of the 24 items posted are rarely often used, 5 are often used and 1 is most often used. This implies that many teaching methods were not being used by the instructors/technical staff in teaching automotive mechatronics in the VEIs. The standard deviation of the items ranges from 0.18 to 0.72, this further implies that the respondents were not too far from the mean and were too closed to one another in their mean responses.

Hypotheses 1

Ho_1: There is no significance difference in the mean responses of the administrators, automotive mechatronics instructors and the technical staff as regards the extent to which the training equipment/facilities are put to effective use for the implementation of the automotive mechatronics programme at VEIs in Abuja and Kaduna State.

Table 3
ANOVA Analysis of differences in the responses of the respondents on the extent to which the training equipment/facilities are put to effective use.

Difference	*Sum of Squares*	*df*	*Mean Square*	*F*	*Sig.*
Between Groups	0.08	2	0.04	0.32	0.73
Within Groups	10.56	87	0.12		
Total	10.64	89			

Table 3 revealed that there was no significant differences ($p<0.05$) in the mean score of the respondents on the extent to which the training equipment/facilities are put to effective use for the implementation of the automotive mechatronics programme at VEIs in Abuja and Kaduna State. The data is supported the hypothesis, $F(2, 87) = 0.32$, $P= 0.73$. The mean and standard deviation for administrators were 2.42 and 0.46 respectively. The mean and standard deviation for instructors were 2.33 and 0.37 respectively. The mean and standard deviation for technical staff were 2.37 and 0.29 respectively. Post-Hoc (Tukey HSD) was not conducted simply because there was no significant difference in the mean responses of the respondents.

Hypotheses 2

Ho_2: There is no significance difference in the mean responses of the administrators, automotive mechatronics instructors and the technical staff as regards to the teaching methods used in teaching automotive mechatronics by the instructors and technical staff of VEIs in Abuja and Kaduna State.

Table 4
ANOVA Analysis of differences in the mean responses of the respondents with regards to the teaching methods used in teaching automotive mechatronics.

Differences	*Sum of Squares*	*df*	*Mean Square*	*F*	*Sig.*
Between Groups	0.38	2	0.19	1.62	0.20
Within Groups	10.11	87	0.12		
Total	10.49	89			

Table 4 revealed that there was no significant differences ($p<0.05$) in the mean score of the respondents with regard to the teaching methods used in teaching automotive mechatronics by the instructors and technical staff of VEIs in Abuja and Kaduna State. The data supported the hypothesis, $F(2, 87) = 1.62$, $P= 0.20$. The mean and standard deviation for administrators were 2.50 and 0.36 respectively. The mean and standard deviation for instructors were 2.32 and 0.35 respectively. The mean and standard deviation for technical staff were 2.32 and 0.33 respectively. Post-Hoc (Tukey HSD) was not conducted simply because there was no significant difference in the mean responses of the respondents.

Discussion

Findings relating to research question 1 showed that the majority of the training equipment/facilities for the implementation of automotive mechatronics programme of the VEIs in FCT Abuja and Kaduna State were under-utilized. The findings revealed that most of the available training equipment/facilities for the implementation of automotive mechatronics programme of the VEIs in FCT Abuja and Kaduna State were rarely often used; this is indicated with a grand mean of 2.42. This implies that teaching and learning of automotive mechatronics can be very difficult to achieve without the effective utilization of the available training equipment/facilities in the VEIs. This coincides with the view of Offorma (2002) who stated that teaching is usually facilitated and is more effective through the active participation of the learners and utilization of appropriate resources (facilities/equipment). This is also in agreement with the view of Awobodu (2000) who noted that

teachers utilization of relevant equipment, materials and tools in teaching and learning enhances students' achievement. This is because usefulness of any available equipment/facilities depend on what the teacher makes out of it, as they do not achieve any of the attributed values on their own.

The findings relating to research question 2 showed that only few teaching methods were used in teaching automotive mechatronics programme by the instructors/technical staff of the VEIs in FCT Abuja and Kaduna State. The findings revealed that most of the teaching methods listed were rarely often used in teaching automotive mechatronics programme. Only Lecture method, Demonstration method, Discussion method, Questioning method, Assignment method, practical monitoring and supervision method were often used; this is indicated by their mean. This is in conformity with the findings of a study conducted by Research and Curriculum Development Department, Industrial Training Fund (RCDD, ITF, 2014) that the Instructors at the skills acquisition centres in Nigeria employed a number of Training Methods which include Lectures, Discussion, Questioning, Practical and Demonstration. However, the findings contrast the view of Odu and Biose (2003) who stressed that teachers should be able to use wide range of teaching methods to carter for the interest of diverse learners. According to Odu and Biose, some learners may understand a lesson through a certain type of teaching method, while others may understand through different teaching methods.

Conclusion

This study evaluated the implementation of automotive mechatronics programme of the VEIs in FCT, Abuja and Kaduna State Nigeria. The findings of the study serve as the basis for making the following conclusion: there is under utilization of the training equipment/facilities for the implementation of automotive mechatronics programme of the VEIs in FCT Abuja and Kaduna State and that the automotive mechatronics instructors/technical staff do not adopt wide range of teaching methods to enhance teaching and learning of automotive mechatronics.

Recommendations

Based on the findings of this study, the following recommendations were made.

1. The available training equipment/facilities in the VEIs should be properly utilized for the implementation of the automotive mechatronics programmes which will ensure trainees active participation and acquisition of skills
2. The automotive mechatronics instructors/ technical staff of the should adopt other teaching methods like Exhibition method, Project method, Field trip method, Experiment method, Inquiry and problem-solving method, Just in time method in order to fully implement the programme at that level of education

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