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## Application of ICT Facilities for Teaching Mechanical Trades in Technical Colleges in Adamawa State

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### ABSTRACT

The main purpose of the study was to examine the application of ICT facilities for teaching mechanical trades in technical colleges. Three research questions guided the study and two hypotheses were formulated and tested at 0.05 level of significance. The study adopted descriptive survey design. Three technical colleges were used for the study. The population of the study comprised 227 teachers and students of mechanical trades, in three technical colleges. The population is manageable; therefore, there is no sample of the study. The instrument used for data collection was 29 items structured questionnaires, based on five points rating scale. The instrument was validated by two specialists in Department of Technology, School of Technology and Science Education, Modibbo Adama University of Technology (MAUTECH) Yola. The reliability co-efficient of 0.65 was obtained after subjected the instrument to pre-test. The instrument was administered by the three research assistants and was collected after completion. Statistical package for social science (SPSS) was used to compute mean for each research question and z test for the two null hypotheses. The findings revealed that ICT facilities are unavailable for teaching mechanical trades in technical colleges in Adamawa state. Beside that Teachers are not having sufficient skills in using ICT packages and finally, there are constraints affecting the application of ICT packages in technical college Yola. Therefore, the researcher recommended that, Adamawa state government as a matter of urgency, should provide adequate ICT facilities and packages to the state technical colleges, and prepare a conducive atmosphere for the application of the above mentioned facilities.

### BACKGROUND OF THE STUDY

Technical college is an institution that provides courses in technology, science, business and crafts. It prepares students for careers at various

levels ranged from trade to lifelong craft and for educational furtherance in the field of engineering, technology and business (Oluwatumbi, 2015). Technical colleges in Nigeria are established purposely to produce craftsmen at the craft level and master craftsmen at advance craft level (Audu, Aede and Muhammad, 2014). The training programmes of technical colleges are classified into clusters of areas of specialization, termed as trades. National business and technical examination board (NABTEB, 2015) identified trades offered in Nigerian technical colleges which include building, electrical, welding and fabrication, agricultural implement and equipment mechanics work, auto electrical work, auto mechanics work, auto body building, auto parts merchandising, air conditioning and refrigeration, mechanic work, foundry craft practice, instruments mechanics work and mechanical engineering craft practice, among others. Amadi, Choirlu and Obed (2016) described mechanical trade as a general name used in describing trades that have direct bearing with metal welding, farming and servicing, repairs of machine, equipment and appliance. mechanical trades comprised welding and fabrication, agricultural implements and equipments mechanics work, air conditioning and refrigeration, auto parts electrical, auto body building, auto mechanics work, auto merchandising, foundry craft practice, instruments mechanics work and mechanical engineering craft practice (NABTEB, 2015).

Graduates of mechanical trades are expected to acquire practical skills as well as basic information and communication technology (ICT) literacy to enable them to maintain modern motor vehicles, machine tools, powered equipment, automation system, and to diagnose a variety of vehicle computer and computerized Components, replace faulty components and parts as needed (Robert, 2011). The above roles of craftsmen and technicians can only be realistic if information and communication technology is integrated in technical colleges, because the impact of ICT cannot be over emphasis in area of skills acquisition and self reliance. ICT has ability to enhance skills acquisition, quality

delivery, critical thinking and offers unlimited means of achieving academic goals (Gabriel Olaniyi and Saliu (2010). According to Oluwatumbi (2015) teaching and learning of technical trades demand engagement of students with array of ICT facilities that will arouse the interest of students. Adebemile (2012) identified ICT packages that can promote skill acquisition and self-reliance in mechanical trades include computer assisted instruction, web based system, computer aided design, auto-card, graphic package, power point application, tutorial, computer conferencing, internet, interactive video CD-ROM and others. Summak and Mustafa (2011) further confirmed that ICT facilities can accelerate, enrich and deepen basic skills, motivation and engage student's in academic experiences. Consequently, most of the graduates of mechanical trades are deficient and do not possess requisite skills, needed in the labour market, due to the recent increase of modern technology incorporation in motor vehicle and machine tools industries (Babalola and Yaduma, 2016). Therefore, this study examined the application of ICT facilities used for teaching mechanical trades in technical colleges in Adamawa State.

## STATEMENT OF THE PROBLEM

The recent increase of modern technology incorporated in the modern motor vehicles and mechanical tools has brought about enormous challenges on operation, repairs, and maintenance services. These challenges include lack of qualified craftsmen and technicians with requisite skills to test and diagnose certain trouble shouting and to carry out repairs and maintenance operation (Joseph. Olayinka and Oyenuga, 2010). Other challenges are poor services rendered by craftsmen and technicians, which let to increase of unemployment among the graduates of mechanical trades. These challenges are against the goals of technical and vocational education in Nigeria, as stated in national policy on education (FRN, 2013), because craftsmen and technicians are expected to have requisite skills, attitude and knowledge to meet the demand of society. Therefore, this study examined the application of ICT facilities

used for teaching mechanical trade, in technical college in Adamawa State.

## PURPOSE OF THE STUDY

The main purpose of the study is to examine the application of ICT facilities used for teaching mechanical trades, in technical colleges. This study specially examined:

1. The available ICT facilities for teaching mechanical trades in Technical Colleges in Adamawa State.
2. The teacher's skills in using ICT packages for teaching mechanical trades in Technical Colleges in Adamawa State.
3. The constraints affecting the application of ICT packages in Technical Colleges in Adamawa State

## Research Questions

This study answered the following questions:

1. What are the available ICT facilities for teaching mechanical trades in Technical Colleges in Adamawa State.
2. What are the teacher's skills in using ICT packages for teaching mechanical trades in Technical Colleges in Adamawa State.
3. What are the constraints affecting the application of ICT packages for teaching mechanical trades in Technical Colleges in Adamawa State.

## Hypothesis

The following null hypothesis were formulated and tested at 0.05 level of significance to guide the study.

**HO<sub>1</sub>:** There is no significant difference between the professional teachers and non- professional teachers on the constraints affecting the application of ICT packages for teaching mechanical trades in Technical Colleges in Adamawa State.

**HO<sub>2</sub>:** There is no significant difference between the professional and non-professional teachers on the constraints affecting the

application of ICT packages for teaching mechanical trades in Technical Colleges in Adamawa State.

## SIGNIFICANT OF THE STUDY

The findings of the study will be of great benefits to students, teachers, parents, school administrators and employers of labours. Students will benefit from the findings of the study, if ICT facilities are used for teaching mechanical trade. This will arouse the interest of the students on the subject matter and skill acquisition that will help them to have gainful employment in the labour market.

Parents will benefit from the findings of the study if ICT facilities are introduced in teaching mechanical trades. This will help the students to acquire modern skills in mechanical trade that will give them gainful employment, and in turn make the parents to feel happy and expect support from their children in nearby future.

Teachers will benefit from the findings of this study because it makes their lesson more interesting and practical orientation, this will help the teachers to achieve their objectives and good time management during lesson delivery.

School administrative will benefit from the findings of this study by knowing the strength, weakness and getting factual information on ICT integration in technical colleges. This will guide them on subsequent planning on ICT integration in schools.

Employers of labours will benefits from the findings of the study, by the time government improve from the weak areas identified and consider ICT integration in technical colleges as a priority. This will lead to the production of graduates with skillful knowledge that will improve labour market.

## METHODOLOGY

Descriptive survey research design was adopted for the study. The study used three Technical Colleges in Adamawa State namely: Yola, Numan, and Mubi Government Science Technical Colleges. The population for the study comprised 227 students and teachers of mechanical trades in Technical Colleges in Adamawa state. There is no sampling of the study, because the population is manageable. The instruments used for data collection was structured questionnaires of 29 items based on five points rating scales. The instrument was validated by two specialists in technology education department, school of technology and science education, Modibbo Adama University of technology (MAUTECH) Yola. Pre-test was conducted on a sample of 20 respondents from Federal Science Technical College, Jalingo, Taraba State.

The reliability coefficient of 0.65 was obtained, meaning that the instrument was reliable for study. The instrument was administered and retrieved after completion by three research assistants. Statistical package for social science (SPSS) was used to compute mean for each research question and z-test for testing the two null hypotheses at 0.05 level of significant. All items with mean rating of 3.50 and above were agreed, while items below 3.50 were disagreed. Likewise, Z-critical value less than z- calculated value made the null hypothesis to be rejected, otherwise accepted.

### Result and Analysis

The results were presented accordance with the research questions and the hypotheses.

*Research Question 1: what are the available ICT facilities for teaching mechanical trades in technical colleges in Adamawa State?*

**Table 1: Mean response of teachers and students on the available ICT facilities for teaching mechanical trade in Technical Colleges in Adamawa State**

S/N	Items	$X_1$	$X_2$	XG	Remarks
1.	Computer systems	3.59	4.303	3.95	Agreed
2.	Printer	2.10	2.26	2.18	Disagreed
3.	Scanner	2.04	2.12	2.25	Disagreed
4.	Photographic camera with accessories	2.18	2.04	2.51	Disagreed
5.	Public address system with accessories	2.00	2.49	2.25	Disagreed
6.	Video camera with accessories	2.42	2.18	2.30	Disagreed
7.	Closed circuit television	2.03	3.10	2.57	Disagreed
8.	Protector with accessories	2.43	2.33	2.88	Disagreed
9.	Voltage stabilizer	3.72	3.46	3.59	Agreed
10.	Internet connectivity	3.24	2.09	2.67	Disagreed
11.	Amplifier	2.10	2.57	2.34	Disagreed
12.	Source of electric power	3.68	2.50	3.09	Disagreed
	<b>Grand Mean</b>	<b>2.20</b>	<b>2.54</b>	<b>2.37</b>	<b>Disagreed</b>

$X_1$  = mean Responses of students       $X_2$  = mean Reponses of teachers  
 XG= grand mean Reponses

Table 1, revealed that 2 out 12 items on available ICT facilities for teaching mechanical trades in technical Colleges in Adamawa State are available, this is because the table shows that the 2 items were above 3.50 which is the cutoff point. This implies that ICT facilities are not available for the teaching of mechanical trades in technical Colleges in Adamawa State. This is evident because the value of the grand mean is 2.37, which disagreed the availability of ICT facilities in technical colleges in Adamawa State.

*Research Question 2: What is the teacher's skill in using ICT packages for teaching mechanical trades in technical Colleges in Adamawa State?*

**Table 2: Mean response of teachers and students on teacher's skills in using ICT packages for teaching mechanical trades in technical colleges in Adamawa State**

S/N	Items	$X_1$	$X_2$	XG	Remarks
13.	Presentation with the aid of power point packages	3.55	3.447	3.51	Agreed
14.	Use auto-CAD package for designing	2.04	2.07	2.06	Disagreed
15.	Use of ICT tutorial package	2.04	2.23	2.14	Disagreed
16.	Use of webs-base system	2.11	2.44	2.18	Disagreed
17.	Use of word process package	3.56	3.62	3.59	Agreed
18.	Use of spreadsheet package	3.12	2.90	2.61	Disagreed
19.	Use of computer assisted instrument package	2.05	2.11	2.08	Disagreed
20.	Access and retrieval of information on particular database system	2.17	2.32	2.25	Disagreed
21.	Browse and download document from internet	3.52	3.68	3.60	Agreed
	<b>Grand mean</b>	<b>2.68</b>	<b>2.85</b>	<b>2.76</b>	<b>Disagreed</b>

Table 2, shows that only 3 out of 9 items on the teachers skills in using ICT packages for teaching mechanical trades are possessed. But the grand mean is 2.79 which are below the cut-off point of 3.50. This suggest that teachers need to acquire more skills to enable them to use ICT packages in teaching mechanical trades in technical colleges in Adamawa State.

*Research Question 3: What is the constraint affecting the application of ICT packages for teaching mechanical trades in technical colleges in Adamawa State?*

**Table 3: Mean response of teachers and students on the constraint affecting the application of ICT packages for teaching mechanical trades in technical colleges in Adamawa State**

S/N	Items	$X_1$	$X_2$	XG	Remarks
22.	Lack of personnel ICT train personal	3.18	3.93	3.56	Agreed
23.	Lack Maintenance culture	3.25	3.52	3.39	Agreed
24.	Teachers resistance to change	3.52	4.10	3.81	Agreed
25.	Restriction from free access to ICT facilities	3.62	4.13	3.88	Agreed
26.	ICT facilities are only used during practical lesson	4.02	4.23	4.13	Agreed
27.	ICT package are not available	3.08	3.97	3.53	Agreed
28.	Teachers are not interested to use ICT facilities in classes	4.11	2.07	2.09	Disagreed
29.	Unstable electricity supply	4.10	4.38	4.24	agreed
	<b>Grand mean</b>	<b>3.61</b>	<b>3.79</b>	<b>3.70</b>	<b>agreed</b>



Table 3, revealed that 7 items were rated agreed while 1 item also were rated disagreed, out of 8 items listed on the constraints affecting the application of ICT packages for teaching mechanical trades in technical colleges in Adamawa state. However, the grand mean 3.70 implies that there are constraints affecting the application of ICT packages in technical colleges in Adamawa State.

### Hypothesis 1

There is no significant difference between the professional teacher and non-professional teachers on the skills in using ICT packages for teaching mechanical trades in technical colleges in Adamawa State.

Table 4: Z-test of the mean responses of teachers and students on the skills in using ICT packages for teaching mechanical trades by professional and non-professional teachers in technical colleges in Adamawa State

Respondents	X	SD	N	Z-cal	Z-Crit	Remarks
Teachers	3.44	0.98	16			
				0.06	1.72	Significant
Students	3.94	0.08	211			

Table 4 shows the z- calculated value 0.06 is less than z-critical of 1.72. Therefore, the null hypothesis is accepted. This implies that the view of teachers and students on the skills in using ICT packages has no significant difference between the professional and non-professional teachers in technical colleges in Adamawa state.

### Hypothesis 2

There is no significant difference between the professional teachers and non-professional teachers on the constraints affecting the application of ICT packages for teaching mechanical trades in technical colleges in Adamawa state.

Table 5: Z-test of the mean responses of teachers and students on the constraints affecting the application of ICT packages for teaching mechanical trade by professional and non-professional teachers in technical colleges in Adamawa state

Respondents	$\bar{X}$	SD	N	Z-cal	Z-crit	Remarks
Teachers	3.55	0.51	16			
				0.73	1.96	Significant
Students	3.97	0.22	211			

Table 5 shows that z-calculated value 0.73 is less than z-critical value of 1.96. Therefore, the null hypothesis was accepted. This means that the constraints affecting the application of ICT packages for teaching mechanical trades by professional and non-professional teachers in technical colleges are the same.

### Findings of the Study

The findings of the study were presented in accordance with the research questions and hypothesis that guides the study.

1. The grand mean of teachers and students on the available ICT facilities for teaching mechanical trades, in technical colleges in Adamawa state is below the cut off point. This means that ICT facilities are not available for teaching mechanical trade in the technical colleges.
2. The study revealed that teachers are not having sufficient skills in using ICT packages for teaching mechanical trades in technical colleges. Move especially in auto-CAD, tutorial, web base system, spreadsheet among others.
3. There are constraints affecting the application of ICT packages for teaching mechanical trades in technical colleges in Adamawa state. Such constraints include lack of trained manpower personnel's, poor maintenance culture, unstable electricity supply, unavailable ICT packages and others.

## DISCUSSION

The data presented in table 1 answered research question 1. The findings shows that the grand mean of teachers and students on the available ICT facilities needed for teaching mechanical trades rated 2.37. This means that there is need for technical colleges in Adamawa state to have more ICT facilities to enable the teachers and students to improve lesson delivery and skill acquisition respectively. Robert (2011) also reported that most of technical colleges in Nigeria have un-available ICT facilities for teaching technical trades, and also confirmed by Shambirna'ah (2016) who opined that computer is the only ICT facility mostly found in Nigerian institutions.

The findings with respect to research question 2 shown in table 2 revealed that teachers did not possessed sufficient skills in using ICT packages for teaching mechanical trades in technical colleges in Adamawa state. These findings agreed with Obakhume (2011) who reveled in that there are inadequate ICT man power personnel's in technical colleges in Adamawa state. This findings also confirmed by Adeosun (2010), who reported that technical in colleges have inadequate man power personnels that can implement ICT in technical colleges in lagos state.

The results shown in table 3 revealed that there are constraints affecting the application of ICT package for teaching mechanical trades in technical colleges in Adamawa state. Adomi and kpangban (2010) also identified factors which were found to be constraints affecting ICT application in schools. This includes; lack of maintenance culture, lack of electrical power supply, lack of trained personnel and others. Dankaro and Jude (2012) agreed with the findings. Obakhume (2011) also revealed that infrastructure, internet connectivity are some of the constraints that affects ICT application in schools and colleges.

## CONCLUSION

Based on the findings of the study, the following conclusions were made. Teachers and students were not having available ICT facilities for teaching mechanical trades in technical colleges in Adamawa state. This led to most of the mechanical trades graduates left unemployed because they do not possess sellable skills for the societal needs and development. Beside that, teachers are not having sufficient skills in using ICT packages for teaching mechanical trades in technical colleges. This has affected technical college's graduates, more especially mechanical trade's graduates, because they cannot solve complex problems that are related to new technology, due to the fact that they were not trained with ICT facilities.

Finally, there are constraints affecting the application of ICT facilities in teaching mechanical trades. These include lack of trained manpower personnel, lack of ICT facilities, poor maintenance culture and unstable electricity supply.

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