

## STRATEGIES FOR IMPROVING THE USE OF INFORMATION AND COMMUNICATION TECHNOLOGY (ICT) FACILITIES IN THE TEACHING AND LEARNING OF ELECTRONICS WORKS IN TECHNICAL COLLEGES IN RIVERS STATE

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### **Abstract**

*The purpose of the study was to determine the strategies for improving the use of ICT facilities in the teaching and learning of Electronics Works in Technical Colleges in Rivers State. Two research questions in line with the purpose of the study were formulated while two null hypotheses were tested at 0.05 level of significance. The study adopted a survey research design. The population for the study was 10 Electronics Works teachers and 80 Electronics Works students from the four Technical Colleges in Rivers State. There was no sampling as the population was manageable. A twenty item questionnaire was designed to collect data for the study. The instrument was validated by three experts. Cronbach Alpha reliability coefficient was used to determine the internal consistency of the instrument which stood at 0.96. The data collected for the research questions which guided the study were answered using mean with standard deviation, whereas hypotheses were tested with *t*-test. The result of the study showed the extrinsic and intrinsic related strategies for improving the use of ICT facilities in the teaching and learning of Electronics Works in Technical Colleges in Rivers State. It was recommended that technical, especially, Electronics Works workshops should be adequately equipped with ICT facilities.*

**Keywords:** *Strategies, ICT Facilities, Teaching, Learning, Electronics Works.*

### **Introduction**

A Technical College is an education institution that prepares students for a career in a specific field. Students are taught skills that are relevant to their vocational area only, (Albiriamuro, 2015). If one attends a Technical College with hope to be a plumber, one will focus on plumbing activities only. Technical Colleges offer practical education for the acquisition of skills as well as basic scientific knowledge. According to Excellence and Education Network (EEN, 2016), the Technical Colleges play vital roles in Nigeria. They train and produce technicians for industry, they impart vital technical skills in the youths, and they help towards the goal of self-employment and job creation and in the struggle towards

technological advancement and acquisition. Through the Technical Colleges, youths acquire such skills as skilled bricklayers, carpenters, electrical/electronic technicians, etc. The courses offered in the Technical Colleges are Auto-mechanics, Plumbing, Bricklaying, Electronics Works, etc.

Electronics works is a fascinating and skilled base subject. Electronics is the science of study, design and use of devices that depend on conduction of electrons through vacuum, gas or semiconductors (Bhardwaj, 2007). National Business and Technical Examinations Board (2004) specified that Electronics Technology modules should be as follows:

CRT 12	-	Electronics devices and circuits
CRT 13	-	Radio and audio frequency amplifiers
CRT 14	-	Radio System
CRT 15	-	Television

It is expected that these modules will serve as avenues for laying strong Electronics Education for learners in that vocation. Electronics works as a subject is not necessarily narrow, but also involves the total environment in which the workers work as well as the intellectual process involved in making a living in the world of paid employment. It is important that the Electronics Works instructors believe in their learners' ability to learn. In Electronics Works, teachers encourage learners to experience events rather than regurgitating them in examinations. Based on the foregoing, the Electronics Works teachers are required to use a variety of stimulating learning resources while presenting lessons in the classrooms or workshops to challenge the learners in participating in the activities so as to have the relevant experience of what they are doing, thus learning effectively. Learning is relatively enduring permanent change in behaviour of the learners which occurs as a result of practice, training or experience.

There are teaching methods and instructional strategies which take cognizance of the learners' interest, needs, problems, hopes, and aspirations while providing adequately for their full engagement or active participation in learning activities. Wali (2005) defined teaching as an intentional activity in form of inter-personal influence aimed at changing the behaviour of another person in the desired direction. There have been vigorous searches for strategies to improve the quality of instruction in schools and subsequent students learning outcome. The extrinsic and intrinsic related strategies are always employed to gain huge success in teaching and learning in schools. The extrinsic related strategies are those strategies teachers adopt to make teaching and learning interesting and appreciative while intrinsic related strategies are the attributes and attitudes of students to make teaching and learning effective. Strategies mean various measures that could be used by teachers including Electronics Works teachers to improve the use of ICT facilities to achieve success. This implies that the Electronics Works teachers should plan, organize and control the available human and material resources of the school in order to achieve success, (Idenyi & Owo, 2010). One of the strategies in the teaching of Electronics Works is the use of ICT facilities.

Ali (2004) defined information communication technology (ICT) as the physical structure of network of computer-based systems for the purpose of organizing, processing, communicating, accessing, presenting, storing, retrieving and simplifying information, when need and in the form it is needed. ICT has a wide spectrum of applications with enormous

relevance to Technical Colleges teaching and learning activities. If appropriately used, ICT is capable of enhancing the quality of the teaching/learning process, and in so doing, support education in ways that have not been possible before now (Dawes 2001). The use of computers to support face-to face teaching and learning in the classroom reduces the amount of direct instruction given to students and gives teachers the opportunity to help students with particular needs. ICT software packages like simulations, expert systems and computer models can now bring the real life situations in the world of science and technology into the classroom thereby, linking concept to real life experiences.

Generally, ICT facilities have the potential of creating learner-centred learning conditions, by innovating teaching that can stimulate learners to learn actively and independently in a self-directed way and/or in collaboration with others (Kirschner & Davis, 2003). Successful Technical Colleges are progressively becoming those that provide integrated ICT experience for their students. Schools and colleges need to adapt through inevitable changes in the way teachers deliver the curriculum making use of available ICT resources, as well as the way current classroom and buildings are being adapted to integrate ICT. The facilities that make up the ICT families include:

1. **Computer:** This is an electronic device that has the ability to compute and analyze data. It is also used to teach any subject in the school curriculum and to store vital information.
2. **Television:** This is a medium that can be used to educate the public on various topics and subjects. Its operation is less complex when compared with computers. Mass media and notably, televisions have significant impact on informal learning processes. It is more economical than the computer.
3. **Radio:** This medium is used to reach out to larger population at a time than the other two aforementioned. The advantage of radio over television and computer lies in its easy accessibility, cheapness, and portability. Radio could also be operated with dry leclanche-cells. This makes it useful in the rural areas where electric power supply is not available (Onabajo, 2000).
4. **Video tapes and VCD:** These can be used along with the television. These could be used to project images to a wide audience.
5. **The use of cinema van:** It has been argued that film bus (van) is designed to have self-contained projection and sound equipment. Film that is relevant to the topic/subject is shot for students to watch.
6. **Projector:** This includes video projector, opaque projector, overhead projector, slide projectors and multi-media projectors. These facilities are meant to enlarge the tiny images that the teacher wants to show to the learners (Afolabi, Adedapo, & Adeyanju, 2005).

There is the need therefore, to assess how extrinsic and intrinsic related strategies are being arranged to improve the use of ICT facilities in the teaching and learning of Electronics Works in Technical Colleges in Rivers State.

### **Purpose of the Study**

This study aimed at determining strategies for improving the use of ICT facilities in the teaching and learning of Electronics Works in Technical Colleges in Rivers State. Specifically, the study sought to:

1. Determine the extrinsic related strategies for improving the use of ICT facilities in teaching and learning of Electronics Works in Technical Colleges in Rivers State.
2. Determine the intrinsic related strategies for improving the use of ICT facilities in teaching and learning of Electronics Works in Technical Colleges in Rivers State.

### **Research Questions**

The following research questions guided the study

1. What are the extrinsic related strategies for improving the use of ICT facilities in teaching and learning of Electronics Works in Technical Colleges in Rivers State?
2. What are the intrinsic related strategies for improving the use of ICT facilities in teaching and learning of Electronics Works in Technical Colleges in Rivers State?

### **Research Hypotheses**

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

**H<sub>01</sub>:** There is no significant difference in the mean responses of teachers and students with respect to extrinsic related strategies for improving the use of ICT facilities in the teaching and learning of Electronics Works in Technical Colleges in Rivers State.

**H<sub>02</sub>:** There is no significant difference in the mean responses of teachers and students with respect to intrinsic related for improving the use of ICT facilities in teaching and learning of Electronics Works in Technical Colleges in Rivers State.

### **Method**

Survey research design was adopted for the study. Survey research is one in which a group of people or items are considered to be representative of the entire group. The study adopted survey research design because the opinion of Electronics Works teachers and students were sought to collect data for the study.

The population of the study was 10 Electronics Works teachers and 80 Electronics Works students in the Technical Colleges that offer Electronics Works. Purposive sampling was used to select 2 Technical Colleges out of the 4 Technical Colleges. No sampling was done as the identified population was within reach and manageable.

A twenty item structured questionnaire developed by the researcher was used to collect data from the respondents. It consisted of two parts-part A and Part B. Part A was designed to elicit information on the background of the respondents using such information as the status of the respondents. Part B was made up of two sections: section 1 and section 2. Section 1 contained 10 items and section 2 contained 10 items as well. The instrument was face validated by three experts, one expert from the Department of Science and Computer Education (Measurement and Evaluation) and two experts from Department of Technology and Vocational Education (Electrical/Electronic Technology Option) all in the Faculty of Education of Enugu State University of Science and Technology (ESUT), Enugu. The

comments of the validates guided the modification of the final instrument. The reliability of the instrument was obtained using Cronbach Alpha and the coefficient of reliability computed from result of a pilot study conducted with 10 Electronics Works teachers and 20 students in Government Technical College in Abia State and the reliability index of section 1 yielded 0.97 and the reliability index of section 2 yielded 0.95. The reliability index of the two clusters stood at 0.96.

All the items were responded to, by subjects using a four point scale of Strongly Agree (A), Agree (A), Disagree (D) and Strongly Disagree (SD); the responses were weighted -4, 3, 2 and 1 respectively.

The instrument was administered and collected by the researcher. Out of the 90 copies of the questionnaire distributed, all were properly completed, collected and used for data analysis representing 100% return rate. Mean with standard deviation was used to answer the research questions. For decision rule, the upper and lower limits of the mean were used. Thus:

Strongly Agreed (SA)	-	3.50	-4.00
Agree (A)	-	2.50	- 3.49
Disagree (DA)	-	1.50	- 2.49
Strongly Disagree (SD)	-	0.50	-1.49

The null hypotheses were tested using t-test. Where the value of the obtained t-test was equal or greater than table value at 0.05, reject otherwise, do not reject.

### **Results:**

The finding of the two research questions and two hypotheses are presented in tables 1 to 4.

### **Research Question 1**

What are the extrinsic related strategies for improving the uses of ICT facilities in teaching and learning of Electronics Works in Technical Colleges in Rivers State?

## Data Analysis

**Table 1: Mean Ratings With Standard Deviation Of The Respondents' Responses On The Extrinsic Related Strategies For Improving The Use Of ICT Facilities In Teaching And Learning Of Electronics Works In Technical College In Rivers State.**

S/N	Extrinsic related strategies	Teachers N=10		Students N=80		Overall		Decision		
		X	SD	X	SD	X	SD			
1	Ability of teachers to create module of courses for Electronics Works students.	4.00		0.00		3.88	0.27	3.94	0.14	SA
2	Skill in preparation of lecture notes for students through ICT facilities.	3.30		0.46		4.00	0.00	3.65	0.23	SA
3	Teachers’ ability to create forum for students and teacher interactions.	4.00		0.00		3.75	0.43	3.88	0.22	SA
4	Ability of teachers to carry out tasks in workshop with ICT facilities.	4.00		0.00		3.75	0.43	3.88	0.22	SA
5	Ability to connect video output devices and other presentation system to computer and video source for large screen play.	4.00		0.00		3.75	0.43	3.88	0.22	SA
6	Competent in designing drill/practice and tutored for students.	4.00		0.00		4.00	0.00	4.00	0.00	SA
7	Availability of internet connectivity should be ensured.	3.20		0.40		3.88	0.27	3.54	0.34	SA
8	Every teacher should own a computer to use in teaching and learning of electronics works.	3.50		0.50		3.56	0.62	3.53	0.56	SA
9	Controlling of available human and material resources of the college should be prioritized.	3.60		0.49		4.00	0.00	3.80	0.25	SA
10	Teacher should have a backup plan in case of equipment facture during instructional programme.	4.00		0.00		3.88	0.27	3.94	0.14	SA
	Cluster Mean/SD	3.76		0.19		3.85	0.27	3.80	0.23	SA

Table 1 shows the result of data analysis on the extrinsic related strategies for improving the use of ICT facilities in teaching and learning of Electronics Works in Technical Colleges in Rivers State. The respondents strongly agree that items 1, 2, 3, 4, 5, 6, 7, 8, 9 and 10 with means rating ranging from 3.53 to 4.00 as the extrinsic related strategies for improving the use of ICT facilities in teaching and learning of Electronics Works in Technical Colleges in Rivers State. The grand mean of 3.80 with standard deviation of 0.23 was obtained from all the items thereby indicating that the items are the extrinsic related strategies for improving the use of ICT

facilities in teaching and learning Electronics Works in Technical Colleges in Rivers State. The low standard deviation of 0.23 shows that the respondents did not differ significantly in their views regarding the extrinsic related strategies for improving the use of ICT facilities in teaching and learning of Electronics Works in Technical Colleges in Rivers State.

### Hypothesis 1

There is no significant difference in the mean responses of teachers and students with respect to extrinsic related strategies for improving the use of ICT facilities in the teaching and learning of Electronics Works in Technical Colleges in Rivers State.

**Table 2: T-Test Result Of Mean Responses Of Teachers And Students In The Extrinsic Related Strategies For Improving The Use Of ICT Facilities In The Teaching And Learning Of Electronics Works In Technical Colleges In Rivers State.**

Status	X	SD	N	Df	t-cal	t-tab	P	Decision
Teachers	3.76	0.19	10	88	1.34	1.96	0.05	N.S
Students	3.85	0.27	80					

Note x= mean SD = standard deviation, N= number of respondents, df = degree of freedom, t-cal = t-calculated, t-tab = t-table, NS = not significant.

The analysis in table 2 shows that t-value at 0.05 level of significance and 88 degree of freedom for 10 items had their t-calculated value is 1.34, while the critical t-value is 1.96. Since the critical t-value is more than the t-calculated, the null hypothesis is therefore not rejected for these items. This implies that no significant differences exist between the mean rating of teachers and students in the extrinsic related strategies for improving the use of ICT facility in the teaching and learning of Electronics Works in Technical Colleges in Rivers State.

## Research Question 2

What are the intrinsic related strategies for improving the use of ICT facilities in teaching and learning of Electronics Works in Technical College in Rivers State?

**Table 3: Mean Ratings With Standard Deviation Of The Respondents' Responses On The Intrinsic Related Strategies For Improving The Use Of ICT Facilities In Teaching And Learning Of Electronics Works In Technical Colleges In Rivers State.**

S/N	Intrinsic related strategies	Teachers N=10		Students N=80		Overall		Decision
		X	SD	X	SD	X	SD	
1	Inform students ahead of time the task to be performed and facilities required.	3.61	0.49	3.58	0.51	3.60	0.50	SA
2	Students should listen to the teacher during lesson delivery.	3.65	0.64	2.63	1.27	3.14	0.96	A
3	Equal opportunity of class participation should be given to both sexes based on the benefit of the use of ICT facilities in teaching and learning of Electronics Works.	3.54	0.63	3.26	0.94	3.40	0.79	A
4	Detailed instruction should be provided for students and their roles before the lesson.	3.56	0.68	3.32	0.79	3.44	0.74	A
5	Encourage students' active participation in discussion.	3.47	0.96	3.55	0.73	3.51	0.85	SA
6	There should be clear idea of features to use and reasons for using them.	3.41	1.01	3.01	1.00	3.21	1.01	A
7	ICT facilities can be used to strengthen the classroom discussion through role playing, simulation when encouraged to use.	3.42	0.71	3.26	1.07	3.34	0.89	A
8	Students' ability to carry out tasks in workshop with ICT facilities.	3.20	0.97	2.85	1.09	3.03	1.03	A
9	Students should be in co-operative attitudes by assisting one another in the absence of the teacher in the classroom.	2.74	1.08	3.47	0.94	3.11	1.01	A
10	Students should be motivated to ask questions to the teachers during lesson delivery.	3.19	0.91	3.57	0.61	3.38	0.76	A
<b>Cluster Mean/SD</b>		<b>3.38</b>	<b>0.81</b>	<b>3.26</b>	<b>0.90</b>	<b>3.32</b>	<b>0.86</b>	<b>Agree</b>

Note: X= means SD=standard deviation.

The data analysis in table shows that items 1 and 5 were identified as strongly agree by the respondents while items 2,3,4,6,7,8,9 and 10 were identified as agree on the intrinsic related strategies for improving the use of ICT facilities in teaching and learning of Electronics Works



in Technical Colleges in Rivers State. A grand mean of 3.32 with stand deviation of 0.86 was obtained in all the items thereby revealing that the items are the intrinsic related strategies for improving the use of ICT facilities in teaching and learning of Electronics Works in Technical Colleges in Rivers State. The relatively low standard deviation of 0.86 indicated that the respondents had similar views on all the items that, intrinsic related strategies for improving the use of ICT facilities in teaching and learning of Electronics Works in Technical Colleges in Rivers State.

## **Hypothesis 2**

There is no significant different in the mean responses of teachers and students with respect to intrinsic related strategies for improving the use of ICT facilities in the teaching and learning of Electronics Works in Technical Colleges in Rivers State.

***Table 4: T-Test Result Of Mean Responses On The Intrinsic Related Strategies For Improving The Use Of ICT Facilities In Teaching And Learning Of Electronics Works In Technical Colleges In Rivers State.***

Status	X	SD	N	df	t-cal	t-tab	P	Decision
Teachers	3.38	0.81	10	88	0.44	1.96	0.05	N.S
Students	3.26	0.90	80					

The analysis in table 4 above reveals that the calculated t-value at 0.05 level of significance and 88 degree of freedom for the 10 items is 0.44 while the critical value is 1.96. Since the critical t-value is higher than the t-calculated, the null hypothesis is therefore, not significant. This decision means that no significant difference exists between the mean responses of Electronics Works teachers and students on the intrinsic related strategies for improving the use of ICT facilities in the teaching and learning of Electronics Works in Technical Colleges in Rivers State.

## **Discussion of Findings**

The findings of the study in line with research question one revealed the extrinsic related strategies for improving the use of ICT facilities in the teaching and learning of Electronics Works in Technical Colleges in Rivers State. The result showed that the itemized are the extrinsic related strategies for improving the use of ICT facilities in the teaching and learning of Electronics Works. Some of the identified extrinsic related strategies are ability of teachers to create module of courses for Electronics Works, skill in preparation of lecture notes for students through ICT facilities, teachers' ability to create forum for students and teachers interactions, availability of internet connectivity to be ensured, among others. This agreed with the findings of Bennett, Wise, Woods and Harvey (2003) that the extrinsic related strategies for improving the use of ICT facilities in teaching and learning should include that teacher should have the ability to create forum for students and teachers interaction, teacher should have a backup plan in case of equipment failure during instructional programme and teacher should be able to carry out tasks in workshop with ICT facilities.

The test of hypothesis 1 showed that the null hypothesis was not significant. This means that there is no significant difference between the opinion of the teachers and the students on

the extrinsic related strategies for improving the use of ICT facilities in teaching and learning Electronics Works in Technical Colleges.

Further, the result of research question two revealed that respondents agreed that the itemized are the intrinsic related strategies for improving the use of ICT facilities in the teaching and learning of Electronics Works. The identified intrinsic related strategies according to the finding include: informing the students ahead of time the task to be performed and facility required, students' ability to listen to the teachers during lesson delivery, giving of equal opportunity of class participation to both males and females on the benefit of the use of ICT facilities in teaching and learning of Electronics Works among others. These findings are in consonance with the findings of Afolabi, Adedapo and Adeyanyu (2005). Afolabi *et al* stated that the intrinsic related strategies for improving the use of ICT facilities in the teaching and learning include: students should be motivated to ask questions to the teachers during lesson delivery, students should be in co-operative attitude by assisting one another in the absence of the teacher in the classroom, and encouragement of students' active participation in classroom discussion. The findings were further supported by Engida (2011) that intrinsic related strategies for improving the use of ICT facilities should be that detailed instruction should be provided for students and their roles before the lesson.

The result of null hypothesis two revealed no significant difference. This implies that there was no significant difference between the responses of teachers and students on the intrinsic related strategies for improving the use of ICT facilities in teaching and learning of Electronics Works in Technical Colleges. Also, from the findings of the study, it was revealed that the use of ICT facilities in the teaching and learning of Electronics Works in Technical Colleges in Rivers State would enable the teachers and students to teach and learn effectively.

## **Conclusion**

Education trains the mind, brightens up the innate abilities of persons who are eager to attain self-actualization and instills in them the ability to think three-dimensionally as well as moderates character. The study identified that teaching and learning of Electronics Works would be improved if teachers motivate students' interest and also plan their lesson well. Co-operative attitude and positive perception of ICT by students will enhance the use of ICT facilities in the teaching and learning of Electronics Works in Technical Colleges.

## **Recommendations**

From the findings of the study, the following recommendations were made:

1. Technical, especially, Electronics Works workshops should be adequately equipped with ICT facilities.
2. All Electronics Works teachers should be re-trained from time to time to refresh their minds on all important needs for the use of ICT facilities.
3. Students should be motivated by encouraging those who perform excellently well in the use of ICT facilities in learning.

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