International Journal of Global Affairs , Research and Development (IJGARD) Vol.3, No.2, 2025, 43-55
ISSN 2992-2488

CONSTRAINTS TO COMPUTER USAGE IN TEACHING ELECTRICAL AND ELECTRONICS IN SECONDARY SCHOOLS IN VANDEIKYA LOCAL GOVERNMENT AREA, BENUE STATE, NIGERIA

Lan, D. K and Amiase, S.S
Department of Industrial Technology Education, Federal University of Technology, Minna, Niger State, Nigeria

(Corresponding Author : Lan, D.K: Lankelvin3@gmail.com)

ABSTRACT

The study aimed at investigating constraints to the use of computer in teaching electrical and electronics to secondary school students in Vandeikya local Government Area of Benue State. Three objectives and three research questions guided the study. The population of the study was twenty (20) electrical/ electronics teachers that teach the subject in fourteen (14) secondary schools that offer the course in Vandiekya local government area of Benue State. A structured questionnaire titled Constraints to the use of Computer in Teaching Electrical/ Electronics was used to obtain information from teachers. The data collected was analyzed using descriptive statistic (mean and standard deviation was used to answer the research questions.) The findings from the study revealed the importance of use of computer in teaching electrical/electronics to secondary school students. That it enables the development of both cognitive affective and psychomotor skills in students, makes learning concrete instead of abstract among others. The study further revealed constraints to the use of computer to include, the teacher characteristics, inadequate classroom space that will accommodate a large number of computers, inadequate infrastructure among others. The study again identified ways that the identified problems can be solved such as continuous training and retraining of teachers in the new emerging technologies, technical staff should assist teachers in handling the ICT gadget while teaching, formation of public-private partnership to purchase, install, maintain the ICT gadgets among others. It was concluded that computers are vital in teaching and learning. However, many factors inhibit the use of computers and such constraints can be solved by provision of electricity in rural areas and other ways. It was therefore recommended that use of computer in teaching in secondary schools should be emphasized to enable the development of cognitive,affective and psychomotor skills in students. Technical staff should be employed to assist teachers in the use of computers while teaching and necessary infrastructure such as electricity, ICT gadgets and teachers trained and retrained for effective use of these gadgets.

1.0 INTRODUCTION

Teaching and learning are continuous processes an individual undergo as long as he/she is alive irrespective of age, class, ethnicity and so on. The more knowledgeable individual teaches the less knowledgeable person. Teaching is viewed by Afzal and Abul Kalam (2021) as a transformation process of knowledge from teachers to students. They further stated that it is the practice of identifying objectives, gathering materials, methods and implementing the teaching process. According to Sequerira (2012) teaching is a set of events, outside the learners which are designed to support internal process of learning, teaching in the views of the author is outside the learner while learning is internal to the learner. In the context of this study, teaching is the art of transmitting information from the more knowledgeable person (teacher) to the less knowledgeable person (learner) with the aid of materials using appropriate methods to effect a change in the learner. The importance of teaching in learning cannot be over emphasized. Teachers are indispensable human resources in the school, they initiate the learning process, facilitate learning skills, assess the learning efficiency and are the pivotal element in the entire educational development (Nwajioba, 2014).

Teaching can be done using different instructional media, the media used depends on the topic, environment, knowledge of the teacher, age of the learners and availability of materials. The appropriate media when used enable comprehensive and concrete learning instead of abstract learning. Several media such as chalkboard, textbooks, overhead projectors, and mass media such as newspapers, movies, radio and television can be used. Others include electronic instructional media like computer, interactive video and multimedia systems, though there are many electronic instructional media, computer is most easily accessible for use in Nigeria.

A computer is an electronic device that accepts user inputs or data and process it under the influence of a set of instructions referred to as programs to produce the desired information (output) (Mugivane, 2014). Computer is an important tool in everyday operations in areas such as engineering where it is used for designing, modelling and testing processes, manufacturing processes, ease of communication. Computers are used in education as teaching aids, storage of information for researchers, scholars and teachers among others. According to a report by the Organization for Economic Cooperation and Development (OECD), the use of computers in education has increased significantly in recent years (OECD), 2013). Many educators have embraced the use of computers in the classroom, as they can provide a wide range of educational benefits (Glass, 2013). Some of the advantages of using computer in teaching electrical electronics include increased engagement, greater accessibility, improved communication, enhanced problem-solving skills, greater convenience, and improved efficiency (Koponen, 2011). Research has also shown that the use of computers in education can lead to improved students' outcomes, such as increased achievements on standardized tests (Means *et al*.,2010). However, it is important to note that the effectiveness of computers in education depends on how they are used and integrated into the curriculum (Mean *et al*., 2010) especially at the secondary school level.

Though computer usage in teaching and learning is advantageous, there are constraints that deter its use in the class. According to Mustapha *et al* (2020), the teacher is a major factor that influence the use of computers in teaching. The teacher knowledge, attitude and teaching philosophy determine the teachers use of computer in teaching. Mustapha, *et. al*.(2020) further stated other factors that affect the use of computer in teaching such as. Inadequate classroom space that can accommodate the computers, non-availability of electricity amongst others.

Ndyer (2020), again pointed out problems affecting the use of computers in teaching in the Secondary School to included; problems in training teachers who can effectively use ICT gadgets to deliver lessons in the class, no public-private partnership in the acquisition, installation and utilization of ICT in curriculum implementation among others.

Secondary school students are pupils who have passed through primary education and are into post primary institutions of learning. They study various subjects at junior secondary school level and choose subjects of study according to their course of interest at the senior secondary school level. In developed countries, most teaching is done electronically using computers and other media but in Nigeria, only a limited number of schools use computer while teaching. The present study is aimed at determining the constraints to the use of computer in teaching electrical electronics with a view to proffering possible solutions to the problems.

In Benue State to which Vandeikya Local Government belong there are insignificant number of schools that has adopted the use of computer in teaching and learning process. Most schools use other media and methods, despite the numerous benefits of using electronic media such as, simulation of the real life situation in the work place thus making the teaching and learning concrete instead of abstract. Even vocational subjects such as electrical and Electronics are taught without the use of computer in secondary schools offering this subject. Thus, the need to find out why and how this phenomenon can be changed for technological advancement arose.

The thrust of the study was to determine the constraints to the use of computer in teaching electrical/ electronics to secondary schools students in Vandeikya local Government Area of Benue State. The study was guided by the following objectives.

(I) Identify the importance of computer in teaching electrical/ electronics to secondary school students.

(II) Identify constraints or factors affecting the use of computer technology in teaching electrical electronics to secondary school students.

(III) Determine ways these problems can be solved.

The following research questions were asked :

i. What are the importance of computer in teaching electrical/ electronics to secondary school students?

ii. What are the constraints or factors affecting the use of computer technology in teaching electrical and electronics to secondary school students?

iii. What are the ways these problems can be solved?

2.0 METHODOLOGY

The design for this study was descriptive survey research design. The survey design was employed for the study because the researcher collected data for this study from a representative sample of the teachers who teach electrical/ electronics in secondary schools in Vandeikya Local Government Area of Benue States.

There was no, sampling the entire population was used for the study since it could be effectively managed by the researcher. The instrument for the study was a structured questionnaire titled constraints to the use of computer in Teaching Electrical/ Electronics Questionnaire (CUCTEEQ) , it was validated by three lectures in the Department of Industrial and Technology Education, Federal University of Technology , Minna and the internal consistency of the instrument was determined using Cronbach alpha techniques. A reliability coefficient of 0.70 was obtained. Twenty (20) copies of the instrument were distributed to the respondents with the aid of two (2) research assistants familiar with the study area. Mean and

standard deviation were used to analyze the data since no hypothesis was formulated. Any value of 2.50 and above were considered as agreed while those items whose value was below 2.50 was considered as disagreed.

The population of the study was twenty (20) electrical /electronics teachers that teach the subject in fourteen (14) schools that offer the subject in Vadeikya Local Government Area of Benue State.

3.0 RESULTS AND DISCUSSION

3.1 Results

The results of the study was obtained from the research questions answered as seen in Tables 1-3 below

3.1.1 Research Question One

What are the importance of Computer in Teaching Electrical Electronics to Secondary School Students in Vandeikya Local Government? Table one shows the responses of teachers on importance of computer in teaching electrical electronics to secondary school students in Vandeikya Local Government. The teachers all agreed that computer enhances the development of psychomotor skills in learners, make teaching easier and other. The data presented shows that all the items had their mean ranged from 2.64-3.42 > 2.50. The standard deviation ranging from 0.47 – 098 indicates that the opinion of teachers did not vary largely from one another.

Table 1: Mean and Standard Deviation of Responses of Teachers on Importance of Computer in Teaching Electrical Electronics to Secondary School Students in Vandeikya Local Government

SN	Item	Mean	SD	Remark
1	It enhances the development of psychomotor skills in learners	3.42	0.97	Agreed
2	It makes teaching easier than the traditional method	2.72	0.74	Agreed
3	It allows the students to learn in severe environment	2.89	0.55	Agreed
4	It enable the learner to practice what has been taught to him/her at any time that is self-learning	2.94	0.52	Agreed
5	It maximizes the learning potential of the learner and develops problem solving skills in the learner	3.02	0.55	Agreed
6	It makes learning concrete instead of abstract learning	2.95	0.52	Agreed
7	Visualization of complex objects that are nearly impossible to view is made possible through the use of computer in teaching	3.02	0.98	Agreed
8	Dangerous or costly experiments are simulated using computer in virtual laboratories thereby reducing the danger or cost of physically carrying out the experiment	2.64	0.52	Agreed
9	Unlimited learning resources are made available to the learner, who can easily download and save for future use.	2.87	0.47	Agreed
10	A large group of learners living in different areas, towns or countries can be taught the same course at the same time without any difficulty using computers	2.82	0.97	Agreed
	Grand Mean	2.93	0.68	Agreed

3.1.2 Research Question Two

What are the factors affecting the use of computers in teaching electrical electronics to secondary school students in Vandeikya Local Government Area? Table 2 shows the responses of teachers on factor affecting the use of computer in teaching electrical electronic to secondary school students in Vandeikya local Government. All teachers agreed that cost of computer and ICT hardware and software has made it impossible for most schools' management to purchase and install computer in their schools for use in teaching among others. The data presented shows that their mean ranged from 2.59 – 3.17 > 2.50. The standard deviation ranged from 0.47 – 0.77 indicating that the opinion of the teachers did not l vary greatly from one another.

Table2: Mean and Standard Deviation factors affecting the of use of computer in teaching electrical electronics to secondary school students in Vandeikya Local Government Area of Benue State.

SN	Item	Mean	SD	Remark
1	Cost of computer and ICT hardware and software has made it impossible for most schools managers to purchase and install computers in their schools for use in teaching.	3.09	0.77	Agreed
2	Educational level of the teacher, age, educational experiences, determine the extent of usage of computer in teaching by the teacher.	2.59	0.58	Agreed
3	Parent and community support affect the availability and use of computer in the school environment.	2.67	0.42	Agreed
4	Non availability of electricity in most villages where the schools are situated makes it impossible for the few schools that have computers to use while teaching.	2.93	0.58	Agreed
5	No ICT centre in the whole local government area, thus teaching with computer becomes a mirage	3.07	0.49	Agreed
6	Inadequate classroom space that can accommodate large number of computers	2.87	0.21	Agreed
7	Inadequate or lack of computer technologists/professional that can assist teachers while teaching	2.89	0.74	Agreed

8	Lack of maintenance and improper handling of the available computers leads to break down	2.62	0.47	Agreed
9	Time required to successfully integrate computer technology into the lesson is not enough	3.17	0.58	Agreed
10	Brain drain is also a major factor affecting the use of computer in teaching in the classroom. Most professionals migrate to developed countries with high wage rate thereby leaving an insignificant number in the country.	2.99	0.50	Agreed
	Grand Mean	2.99	0.59	Agreed

3.1.3 Research Question Three

What are the ways that can be used to solve problems affecting the use of computer technology in the teaching of electrical /electronics to secondary school students? Table three shows the responses of teachers' on ways that can be used to solved problems affecting the use of computer technology in teaching electrical electronics to secondary schools. The teacher all agreed that training and retraining of teachers in the use of computer in the classroom is necessary, all employed teachers should be ICT compliant etc. The data presented shows that all the items had their mean value range from 2.70 – 3.85 > 2.50. And the standard deviation ranging from 0.12 – 0.65 indicating the respondents did not vary greatly from one another.

Table 3 Mean and Standard of Response of Teachers on ways that can be used to solve problems affecting the use of computer technology in the teaching electrical electronics to secondary school students

SN	Item	Mean	SD	Remark
1	Training and retraining of teachers in the use of computers in the classroom teaching with the assistance of educational software companies will make them conversant with the new developed technologies.	2.79	0.12	Agreed
2	Teachers should be assisted in the classroom by technical staff while teaching using computers to build their confidence in handling the gadgets.	2.95	0.28	Agreed
3	Educators should be given chance to choose the kind of technology they can successfully adopt for teaching in the classroom.	2.74	0.22	Agreed
4	Public-private partnership can help in the provision, maintenance and safety of the computer hard wares provided.	2.73	0.47	Agreed
5	All employed teachers should be ICT compliance before they can be employed.	2.89	0.42	Agreed
6	Brain drain can be mitigated by the government providing sustainable wage to its staff, this will stop migration of professional to other countries with better wages.	3.29	0.36	Agreed
7	Education policy should encourage frequent utilization of ICT infrastructure during teaching-learning process	3.10	0.45	Agreed
8	Information and communication technology should be part and parcel of the curriculum of the teacher training throughout the years of study of the programme.	2.70	0.62	Agreed
9	Parent's teachers associations of each school should be encouraged to provide ICT infrastructure in their wards schools, this will reduce over dependence on the government all the times.	3.85	0.65	Agreed
10	Parents can also be encouraged to provide their wards with computers to enable them use ICT gadgets and manipulation while young, and when they become teachers they will not hesitate to use it in the class.	3.39	0.57	Agreed
	Grand mean	3.04	0.42	Agreed

3.2 Discussion of Findings

The findings in Table I revealed that computer enhances psychomotor skill in learners, makes teaching easier, makes teaching concrete, encourages self in learning among others. This is in consonant with the opinion of Iyo and Dasu (2017) that the use of computer in teaching and learning maximizes the learning potential and instill the locus of control into learner which enable meaning, understanding and problem solving, skill development learner. Abduran himovna, *et.al.,* (2020) reiterated that use of computer in teaching improves the quality of education due to the novelty of activities and interest in working with a computer.

The findings in Table 2 again revealed that non availability of electricity in most villages where the schools are situated makes it impossible for the few schools that have computers to utilize while teaching, non -availability of ICT gadgets in schools, no public private partnership in acquisition and installation of ICT infrastructure, non-availability or in adequate computer technologists among other factors impede the use of computer for teaching and learning electrical electronics in Schools. This agrees with Mustapha *et al* (2020) that the teachers knowledge, altitude and teaching philosophy are amongst the factors that determines the Utilization of technology in education. The findings also aligns with those of Ndyer (2020) that high cost of ICT infrastructure, improper handling of available computers and others are constraints to the use of computer in teaching and learning.

The findings in Table 3 revealed that training of teachers in the use technology in the class, getting into public private partnership to jointly acquire and handle the infrastructure, provision of electricity in the rural areas and many other ways can enable the use of ICT in teaching learning. This is in line with the findings of Iyo and Daagu (2017) that non-governmental agencies should corroborate with the government to procure ICT infrastructure in schools, education policy should encourage frequent use of ICT infrastructure in teaching and learning,

teachers should be trained and retrained among others. The result also conforms with that of Johnson *et al* (2016), that technical support to teachers by professionals while in class will boost the confidence of the use of ICT gadgets in teaching and learning.

4.0 CONCLUSION AND RECOMMENDATIONS

4.1 Conclusion

Computer is a vital ICT infrastructure that aid teaching and learning. Use of computer in teaching and learning enable learning to be concrete instead of abstract, it encourages the skill development in learners and makes the process of teaching and learning easier through easy communication. However, the use of computer in teaching learning is faced by constraints such as non- availability of resources to purchase ICT gadgets, lack of technological skill by teachers, poor management to purchase ICT infrastructure and many other problems. Those constraints can be overcome by going into public-private partnership to acquire and install these ICT infrastructures, maintenance culture instilled in the handlers, training and retaining of teachers, provision of electricity among others will enable use of computer in teaching and learning in secondary schools.

4.2 Recommendations

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

i. Use of computer in teaching should be emphasized at the secondary schools level to enable the development of cognitive, affective and psychomotor skills in students
ii. Technical staff should be employed to assist teachers in the use of computers to teach in the classroom to develop confidences in handling ICT gadgets.
iii. The necessary infrastructure such as electricity, ICT gadgets and teachers trained and retrained for effective use of these gadgets.

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