Improving Teaching Effectiveness through Teachers' Use of ICT Devices in Public Secondary Schools in Uyo Education Zone, Akwa Ibom State

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ABSTRACT

This study investigated improving teaching effectiveness through teachers' use of ict devices in public secondary schools in Uyo education zone, Akwa Ibom State. The descriptive survey was adopted as the research design for the study. The target population of the study comprised 3,178 teachers in the 86 public secondary schools in Uyo education zone. A sample of 318 secondary school teachers were selected using multistage sampling. Two researcher-constructed instruments: Teachers' use of ICT Devices Questionnaire (TUIDQ) and Teaching Effectiveness Questionnaire (TEQ) were used for data collection. Cronbach's Alpha reliability method was used to establish the internal consistency reliability of the instruments. Data obtained from the field were analyzed using Mean and Standard Deviation to answer research questions, while hypotheses were tested at .05 level of significance using One-way Analysis of Variance (ANOVA). Result showed significant difference in teaching effectiveness of public secondary school teachers in Uyo education zone based on their use of ICT devices for instructional purpose. The study therefore concluded that the use of ICT devices enhances the teaching effectiveness of public secondary school teachers in Uyo education zone. It is therefore recommended, among others, that government and other relevant authorities should provide adequate computers to secondary school teachers and that training and retraining on computer usage should be organized on regular basis for all teachers.

Keywords: Teaching Effectiveness, ICT Devices.

INTRODUCTION

Teaching in secondary school nowadays has gone beyond the traditional method of teaching whereby a teacher stands in front of students and disseminates information to them without students' adequate participation. In fact, observable evidence reveals that, teaching in most Nigerian secondary schools is gradually shifting from the teacher-centred to learner-centred (i.e. a more interactive pattern of teaching and learning between teachers and the students). Furthermore, the rate of expansion in knowledge and the technological development around the world has also put teachers on their toes. All these have led to the development of modern teaching techniques that will enable school teachers meet up with the present reality even as the world is becoming a global village. This underscores the use of informational and communication technology devices in teaching and learning process.

Moreover, the rapid development of computer technology in recent time has indicated that the era where teachers teach without ICT skills and use of information and communication technology is gone. Information and Communication Technology (ICT) involves the use of computers and other electronic devices to process information. Nworgu (2018) stated that ICT refers to a whole range of facilities or technologies involved in information processing and electronic communication to be handled with skills and expertise for effective achievement and realization of its potentials in Education. In the view of Valasidou (2018), ICT is an innovative instrumental tool that enables the educators to modify the teaching and learning processes in order to increase students' interest. Brown (2019) explained that ICT is considered very crucial for the achievement of various educational objectives in terms of expanding the citizenry's access to education at all levels and improving the quality of teaching and learning.

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According to Daniels (2012), the use of Information and Communication Technology in the educative process can be divided into two broad categories: ICT for education and ICT in education. ICT for education refers to the development of ICT specifically for teaching and learning purposes, while ICT in education involves the adoption of general components of ICT in the teaching and learning process. Although, ICT is very crucial in teaching and learning, the ability to realize its full benefits depends on the teacher (Effiong, 2015). This is because a teacher is an individual who is trained in pedagogy and teaching areas of a particular subject to impart knowledge, skills, and attitudes to students in an institution. Olaitan, Alaribe, and Nwobu (2019) emphasized that a teacher is a person who passes on knowledge and skills to someone in a school. Okute and Agomuo (2010) noted that a teacher is a facilitator of learning; who helps students to realize their full potentials educationally, emotionally, and socially in career selection and transition. The use of ICT makes teaching and learning process interactive and collaborative as teachers and learners are given the opportunity to explore ideas and have knotty problems solved.

Operationally, Information and Communication Technology (ICT) comprise digital devices either hardware or software for transferring information. ICT also comprised digital devices like computer sets, radio, projectors, television sets, videos, slides, film trips, Interactive White Board (IWB), handsets or mobile phones, computer software, social media (Facebook, twitter, 2go, LinkedIn among others), internet, disc player, computer software among others devices. These devices are needed for an effective teaching in secondary schools. For instance, the internet could enhance teaching effectiveness by giving the teacher access to teaching material which may not be available in the school library. The internet could help teachers to develop or improve lesson plans, exchange ideas, obtain information, and find free animations and simulations to enliven their lessons.

Computer can be used to diversify, develop and improve the pedagogical relation of teaching and learning (Bada, 2009). Gomes (2015) explained that in the classroom, a computer can present words to be spelled, sound to be made, instructions to be followed, images and symbols to be responded to by touching. Computer can be used to evaluate students' performance and direct students backward, forward, and sideways for appropriate learning activities. Its patience, memory and endless capacity for details are assets that defy competition from a human teacher (Gomes, 2015). In the word of Ferry (2019), modern mobile phones can be used to help teachers to access web based contents, remix it, share it, collaborate with others and create media rich deliverable for effective teaching and learning. Social media as an ICT device has also been proven to help in engaging and motivating students to learn (Ebner, Lienhardt, Rohs, and Meyer, 2010). Therefore, the importance of the use of ICT devices in enhancing teaching effectiveness in secondary schools cannot be overemphasized.

Statement of the Problem

Traditionally, teaching was more of a teacher-centered activity, where the teacher stands in front of the students and disseminate informative without students' active participation. However, as the society progresses, there has been a shift from this traditional pattern of teaching to a more contemporary means of impacting knowledge through the use of computer and other related ICT devices. In spite of this paradigm shift in teaching technique, Nigeria is yet to fully embrace this contemporary means of teaching, and this is also visible in Schools in Uyo education zone.

Observable evidences have shown that majority of teachers in Uyo education zone are still relying on traditional "chalk and talk" method of teaching, sourcing for materials from textbooks, and libraries which often times are not up- to-date, instead of embracing the opportunities in the use of ICT devices to tutor their students. This has affected the students in their learning process, and as well put them at a disadvantage position when competing with their contemporaries who are taught with ICT devices.

Furthermore, most students of this jet age usually view the traditional method of teaching as being obsolete and not capable of meeting their educational needs. This could be one of the reasons responsible for low level of students' motivation towards learning. Most times, students do not even understand what the teacher is teaching. This has gotten to the extent that some students even prefer to stay outside the classrooms while classes are ongoing. This is a problem, and it requires academic inquiry and explanations. Despite the rapid development in computer usage and its related devices, very few secondary school teachers in Uyo education zone have adopted this contemporary technology to aid their teaching practice. For the few of them, who have adopted this modern

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way of teaching, the effectiveness of their teaching method is yet to be adequately assessed, particularly as it affects the learning process of their students.

There is also dearth of studies on this subject of investigation, particularly as it concerns Uyo education zone. Based on this hindsight, this study therefore seeks to investigate improving teaching effectiveness through teachers' use of ict devices in public secondary schools in Uyo education zone, Akwa Ibom State.

Research Questions

This study was guided by the following research questions:

1. What difference exists in teaching effectiveness of public secondary school teachers in Uyo education zone based on their use of computer for instructional purpose?

2. What difference exists in teaching effectiveness of public secondary school teachers in Uyo education zone based on their use of internet for instructional purpose?

Research Hypotheses

This study was guided by the following hypotheses: -

1. There is no significant difference in teaching effectiveness of public secondary school teachers in Uyo education zone based on their use of computer for instructional purpose.

2. There is no significant difference in teaching effectiveness of public secondary school teachers in Uyo education zone based on their use of internet for instructional purpose.

LITERATURE REVIEW

Teachers' Use of Computer and Teaching Effectiveness

Computer encompasses almost all facets of human endeavours. Today, computer technology in schools is one of the most far-reaching and fast-growing developments in education. Like maize in a plantation during a storm, countries all over the world are bending towards the fad of computer education (Aliyu, 2016). The incursion of the electronic computer system into the educational parlance, according to Effiong (2015) provides the wherewithal to solve teaching and learning problems even more rapidly and accurately than hitherto conceived. This has eventually made the computer system the doyen of humanity as it continues to exert greater acceptance. In schools, computers are widely used; and the need for computer technology and literacy in the educational system has become more relevant. Computer has been found to be an effective device for presenting an instructional programme.

In the view of McCathy (2010), computers can be used to diversify, develop and improve the pedagogical relation of teaching and learning. Teachers' use of computers increases the flexibility of delivery of education so that learners can access knowledge anytime and from anywhere. It can influence the way students are taught and how they learn as now the processes are learner driven and not by teachers. This in turn would better prepare the learners for lifelong learning as well as to improve the quality of learning (Young, 2012). Another major contribution of teachers' involvement and use of computer in the field of education is - Easy Access to Learning (Ferry, 2019). With the help of computer, teachers' can now browse through e-books, sample examination papers among others and can also have an easy access to resource persons, mentors, experts, researchers, professionals, and peers-all over the world. This flexibility has heightened the availability of just-in-time learning and provided learning opportunities for many more learners who previously were constrained by other commitments (Young, 2012). Wider availability of best practices and best course material in education, which can be shared by means of Computer, can foster better teaching. Teachers are also finding the capabilities of teaching at any time to be opportunistic and able to be used to advantage. Thus, the utilization of computer can lead to the democratization of education. Hence, facilitate effective teaching and learning.

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Furthermore, teachers' involvement and use of computer in teaching and learning can help presents an entirely new learning environment for students, thus requiring a different skill set to be successful. It also helps the teacher to think more critically. This is because the teacher has access to volumes of information from a variety of sources. Computer is changing processes of teaching and learning by adding elements of vitality to learning environments including virtual environments for the purpose. Computer is a potentially powerful tool for offering educational opportunities. The use of computer provides the teacher the opportunities to access an abundance of information using multiple information resources and viewing information from multiple perspectives, thus fostering the authenticity of learning environments. Teachers' involvement and use of computer can enhance the quality of education in several ways, by increasing learner motivation and engagement, by facilitating the acquisition of basic skills, and by enhancing teacher training. Computer is also transformational tools which, when used appropriately, can promote the shift to a learner centered environment. Teachers' involvement and use of computer can help expand access to education, strengthen the relevance of education to the increasingly digital workplace, and raise educational quality. Computer helps contribute to students' effective learning by improving the communication between them and the instructors (Valasidou, 2018). Research has shown that the appropriate use of computer can catalyze the paradigmatic shift in both content and pedagogy that is at the heart of education reform in the 21st century (Valasidou 2018). Today, computer provides knowledge-based system that includes knowledge acquisition, knowledge incubation, knowledge amplification and knowledge dissemination. It is evident that information is a key resource which permeates teaching, learning, research and publishing. Supporting conventional classroom work; the teacher could ask his/her students to use computer approach;

- Helping in the design and development of learning materials. A lot of materials can be downloaded from the Internet. Such materials must however be adapted to suit the specific instructional objectives;
- Accessing electronic teaching materials such as books, journals. These can be accessed, stored and analyzed by the use of computer;
- Accessing virtual library "stocks" electronic versions of books' journals;
- Giving or providing access to the world of resources especially in electronic form;
- Playing a key role in educational administration. Students' data, personnel administration, purchasing and supplies, advertisement, etc can be handled with ease using computer;
- Facilitating independent study and individual instruction especially on the open distance-learning programme;
- Making learning more vivid and engaging;
- Assisting the teacher in assessment and testing; and
- Bringing a permanent solution to brain drain problems as we now live in a global village.

Teachers' Use of Internet and Teaching Effectiveness

The internet is one of the computer and multi-media platform that have brought revolution to entire educational system in recent times. It enables the user to interact with another via the computer if he or she is connected. The internet is a global collection of many different types of computers, computer operators and computer networks that are linked together through telephone lines, satellites, microphones, and all other possible devices. It channels each computer by taking a common language or protocol called transmission control protocol/internet protocol. In addition, Oyedum (2017 noted that the internet provides access to more information than a librarian could dream of. A teacher can also use the Web to access journals, magazines, speeches of prominent personalities etc. The internet has broken down barriers of communications access from anywhere in the world. It is fast, reliable and does not have restrictions on content or formats; it also has a limitless range of facilities, which assist user to access almost infinite information on the net. The internet is today almost one and the same thing and one cannot be mentioned without the other tagging along (Njie, 2009). One will need to harness the

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internet in all types of work whether it is research on any topic or plain sorting for information. Internet provides teachers with information valley that they can find and learn about information from the virtual library, subscribes the article and journal from the electronic journal (e-journal), communicates with friend and other people from different a city and town using the forum application or download and upload the tutorial from and into the portal or web.

One area where the internet enhances teaching effectiveness is in the area of lesson planning. Lesson planning is considered a critical but complex task in providing effective instruction (Wang and Wedman, 2003). Experienced teachers create lesson plans in an effort to determine their instructional activities regarding specific subject matter and new teachers can utilize effective lessons to prepare and organize the content, materials, and methods for their teaching" (He and Hartley, 2010). In the past, teachers are taught the importance of lesson planning and they spend a significant number of hours of their career preparing lessons. The development of the World Wide Web has had a significant impact on education, especially the lesson planning process: the internet has provided a setting for teachers to find and share lesson plans (He and Hartley, 2010). Currently, thousands of lesson plans are available online and increasingly, "general and special educators consult the internet as a resource to supplement lesson preparation and access relevant information to be used in instruction (Arcehmbault and Crippen, 2007).

RESEARCH METHODS

Survey design was used for this study while the area of the study was Uyo education zone. The population of this study comprised all 3,178 teachers in public secondary schools in Uyo education zone. A sample of 318 teachers was selected from schools in Uyo education zone using a multi-stage sample technique. Two researcher-developed instruments namely: Teachers' Use of ICT Device Questionnaire (TUIDQ) and Teaching Effectiveness Questionnaire (TEQ) were used for this study. The TUIDQ was designed to elicit data from teachers who used ICT devices for instructional purpose in the study area while the TEQ was designed to elicit data from students on the teaching effectiveness of their teachers who used ICT devices for instructional purpose in the study area. After thorough assessment and moderation of items that make up the instruments by experts, they were adjudged to be valid.

Results also indicated that the instruments were reliable for use in data collection. The instruments were administered within two weeks. Out of the 318 copies of the questionnaire administered to the respondents, 307 copies were retrieved and used in data analysis. The hypotheses were tested at .05 level of significance using One-way Analysis of Variance.

RESULTS AND DISCUSSIONS

Research Question 1

What difference exists in teaching effectiveness of public secondary schools teachers in Uyo educational zone based on their use of computer for instructional purpose?

Table 1: Teaching Effectiveness of Public Secondary School Teachers in Uyo Education Zone Based on their Use of Computer for Instructional Purpose

Use of computer	N	$\overline{X}$	SD
Always	11	43.18	12.55
Often	108	26.72	5.20
Rarely	152	27.70	6.24
Never	36	27.92	6.25

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Result in Table 1 reveals that secondary school teachers who use computer always for instructional purpose has a higher mean ($\overline{X}$ = 43.18) score on teaching effectiveness than their counterpart teachers who often ($\overline{X}$ = 26.72), rarely ($\overline{X}$ = 27.70) or never ($\overline{X}$ = 27.92) use computer to enhance their teaching. The result also reveals that most of the respondents (152) rarely make use of computer for instructional purposes. Therefore, there is a difference in teaching effectiveness of teachers in public secondary schools in Uyo education zone based on their use of computer for instructional purpose with those who use always having highest score on teaching effectiveness, while those who never used it scoring the least on teaching effectiveness. Furthermore, this result implies that the use of computer by secondary school teachers enhances their teaching effectiveness.

Research Question 2

What difference exists in teaching effectiveness of public secondary school teachers in Uyo educational zone based on their use of internet for instructional purpose?

Table 2: Teaching Effectiveness of Public Secondary School Teachers in Uyo Education Zone Based on their Use of Internet for Instructional Purpose

Use of the internet	n	$\overline{X}$	SD
Always	11	37.55	12.56
Often	88	27.75	5.77
Rarely	170	27.79	6.82
Never	38	26.24	5.11

Result presented in Table 2 shows that secondary school teachers who were able to use internet always to enhance their teaching had a mean teaching effectiveness score of 37.55 while those who often, rarely or never use the internet for this purpose had mean teaching effectiveness score of 27.75, 27.79 and 26.24 respectively. Hence, there is a difference in teaching effectiveness of public secondary school teachers in Uyo education zone based on their use of the internet for instructional purpose. From this result, it is clear that teachers who use internet always for instructional purpose had better teaching effectiveness than their counterparts who use internet often, rarely or never. This result implies that when secondary school teachers make use of internet, it enhances their teaching effectiveness.

Hypothesis 1

There is no significant difference in teaching effectiveness of public secondary school teachers in Uyo education zone based on their use of computer for instructional purpose.

Table 3: Result of One-way ANOVA of Teaching Effectiveness of Public Secondary School Teachers in Uyo Education Zone Based on Use of Computer for Instructional Purposes

Source of variation	Sum of Squares	Df	Mean Square	F-calc.	F- crit.	Remarks
Between Groups	2724.093	3	908.031	23.480	2.63	Reject Ho
Within Groups	11717.731	303	38.672			
Total	14441.824	306				

*Significant at .05 (p<.05)

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Results in Table 3 reveal that the calculated F value of 23.480 is greater than its corresponding critical F value of 2.63 at .05 level of significance. Therefore, the null hypothesis is rejected. This means that there is a significant difference in teaching effectiveness of public secondary school teachers based on their use of computers for instructional purpose. Also, since significant difference was found to exist between the groups, the Post Hoc test was done using Duncan test and the result obtained are as shown in Table 4.

Table 4: Post Hoc Test Using Duncan Showing where significant difference lies in teaching effectiveness based on the use of computer

Use of computer	N	Subset for alpha = 0.05	
		1	2
Often	108	26.7222[a]	
Rarely	152	27.7039 [a]	
Never	36	27.9167 [a]	
Always	11		43.1818 [b]
Sig.		.490	1.000

Similar letters means not significantly different at 5% ($p>0.05$), different letters means not significantly different at 5% ($p<0.05$).

Result in Table 4 reveals that there is no significant difference in teaching effectiveness among teachers who often, rarely and never use computer. It also shows that the level of teaching effectiveness of teachers who use computer always (43.1818 [b]), is significantly higher than teachers who use computer either often (26.7222[a]), rarely (27.7039 [a]) or never (27.9167 [a]).

Hypothesis 2

There is no significant difference in teaching effectiveness of public secondary school teachers based on their use of internet for instructional purpose.

Table 5: Result of One-way ANOVA of Teaching Effectiveness of Public Secondary School Teachers in Uyo Education Zone Based on Use of Internet for Instructional Purpose

Source of variation	Sum of Squares	Df	Mean Square	F	F- Crit.	Remarks
Between Groups	1131.934	3	377.311	8.590	2.63	Reject Ho
Within Groups	13309.890	303	43.927			
Total	14441.824	306				

*Significant at .05 ($p<.05$)

Result in Table 5 reveals that the calculated F value (8.590) is greater than its corresponding critical F value of 2.63 at 0.05 level of significance. Based on this result, the null hypothesis is rejected. Hence, there is significant difference in teaching effectiveness of public secondary school teachers in Uyo education zone based on their use of internet for instructional purpose. This result indicates that the use of internet for instructional purpose will significantly enhance the teaching effectiveness of public secondary school teachers in Uyo education zone. Moreover, for the fact that there is a significant difference in teaching effectiveness, the Post Hoc test using

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Duncan test was used to determine where the significant different lies and the result obtained is presented in Table 6.

Table 6: Duncan's Post Hoc Test showing where significant difference lies in teaching effectiveness based on the use of internet

Use of the Internet	N	Subset for alpha = 0.05	
		1	2
Never	38	26.2368[a]	
Often	88	27.7500 [a]	
Rarely	170	27.7941 [a]	
Always	11		37.5455 [b]
Sig.		.397	1.000

Similar letters means not significantly different at 5 % ($p>0.05$), different letters means not significantly different at 5% ($p<0.05$).

Result in Table 6 reveals that there is no significant difference in teaching effectiveness among teachers who never, often and rarely use the internet but for teachers that use the internet always (37.5455 [b]), they reported significantly better teaching effectiveness than their counterparts who use the internet often (27.7500 [a]), rarely (27.7941 [a]) or never (26.2368[a]).

DISCUSSION OF FINDINGS

The finding of this study has shown that there is a significant difference in teaching effectiveness of public secondary school teachers in Uyo education zone based on their use of computers for instructional purpose. Result revealed that secondary school teachers who used computer always, secured better teaching effectiveness than their counterparts who used the computer often, rarely or never. This result indicated that the use of computer enhanced the teaching effectiveness of secondary school teachers in Uyo education zone. This result could be explained in the sense that, when teachers use the internet regularly, they would have access to adequate information on how to improve their teaching skills. Such teachers would be well informed on how best they could carry out their teaching practice effectively. They would also be able to share information with others teachers which invariably will make them to be good teachers. Through the use of internet, teachers will be able to receive or send information within a shortest time frame. It makes communication possible over the globe. This means that a teacher who uses computer will be well informed on the latest trend in teaching.

This finding agrees with that of Tufte, (2003) who investigated the effectiveness of teachers' use of internet and teaching effectiveness in English Language. Tufte, (2003) established that, secondary school teachers who are highly involved in the use of internet reported better effectiveness in teaching than other teachers who were not actively involved in the use of internet. Also, it corroborates with that of Okute and Agomuo (2010) who found out that, the use of internet by secondary school teachers for instructional purposes, enhanced teaching effectiveness in Chaing Mai, Thailand. Furthermore, it is in line with the finding by Kabilan (2010) in secondary schools in Edo State and that of other researchers such as: Oyedum (2017); Archambault and Crippen (2007) which also established significant difference in teaching effectiveness of secondary school teachers on the basis of their use of internet.

The study also showed a significant difference in the teaching effectiveness of secondary school teachers based on their use of the computer for instructional purpose. Result revealed better level of teaching effectiveness among secondary school teachers in Uyo educational zone who used the computer always than those that used

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the computer often, rarely or never made use of it. This result implies that, regular use of the computer has the ability to enhance the teaching effectiveness of secondary school teachers in the study area. The finding could be explained in the sense that teachers' use of computer helps in increasing learners' motivation and engagement, as well as facilitates the acquisition of basic skills. Teachers who use the computer were more effective in teaching probably because computer could promote the expansion of knowledge and also serve as a form of training for teachers on the trend in teaching when the teachers access such information and put into practice, it will definitely help in improving their teaching effectiveness.

The finding is in line with that of Owa (2005) in Delta State where teaching effectiveness was found to be promoted by teachers' use of computer. Similarly, the finding corroborates that made by Brown (2019) among secondary school students in Anambra State where the use of computer by teachers was found to be a potent tool for better teaching effectiveness. Furthermore, it also agrees with other similar study (Safahielu and Aseni, 2008).

CONCLUSION

The study appraised teachers' use of ICT devices and teaching effectiveness in public secondary schools in Uyo education zone. Result revealed that regular use of computer, internet, mobile phones, computer software packages and social media enhances the teaching effectiveness of public secondary school teachers in the study area. Result also revealed that teachers who always use these ICT devices for instructional purposes secured better rating on teaching effectiveness than other teachers who make use of these ICT devices either often, rarely or never. Therefore, this study concludes that the use of ICT devices enhances the teaching effectiveness and therefore should be encouraged among secondary teachers in the study area.

RECOMMENDATIONS

Based on the findings, the following were recommended.

1. Adequate computers should be provided by government, non-governmental organization, and school authorities for secondary school teachers and that training and retraining on computer usage should organized on regular basis for all teachers.

2. Government at all levels should endeavour to provide internet facilities in all public secondary schools including rural and urban areas in Uyo education zone for effective teaching and learning.

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