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Science Teachers' Perception of ICT Capacity Building Workshop in Akwa Ibom State Secondary Schools, Nigeria

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Abstract

The study examined science teachers' perception of ICT capacity building workshop in Akwa Ibom State secondary schools. The design for the study was a descriptive survey. The census of 295 science teachers from Uyo Local Government Area that attended a 3-day ICT capacity building workshop was used for the study. One research question and two hypotheses guided the study. The instrument for data collection was a questionnaire on ICT capacity building workshop. The instrument reliability was Cronbach's alpha coefficient: .86. Data for answering the research question was

analysed using mean and standard deviation while t-test was used for testing the hypotheses at .05 level of significance. Findings revealed that science teachers' perception of ICT capacity building workshop was low as most science teachers lacked clear understanding of what benefits ICT capacity building workshop may afford them. The findings also indicated that facilities were grossly inadequate to effectively equip science teachers with knowledge of ICTs during capacity building workshops. The findings also showed that the frequency of use of ICT capacity building workshop was a once- in-a-year event and this was too short a duration for any meaningful utilization of ICT technologies in instructional delivery to adequately enhance ICT knowledge among learners. Based on these findings, recommendation amongst others; was that ICT capacity building workshop should be more frequently organized in the state to update science teachers' knowledge on ICTs for lesson delivery.

Key Words: Capacity building workshop, ICTs, Perception, Science teachers

Introduction

ICT Resources and Increasing Application

The need to revise and update existing educational curricula to respond to multifaceted changes occurring globally in the scientific world cannot be overemphasized. Scientific knowledge is rapidly expanding with the use of Information Communication Technology (ICT) resources and services. These resources include computers, digital cameras, multimedia software applications, internet, television and videos affording services of exchange of information and knowledge, skills and ideas. ICT resources come in many forms and are applied in a variety of ways such as in computational analysis, creation of data bank, storage of management of educational data, communication via internet, instructional materials, easy access to information enhancement of innovation and invention (Bailey, 2013). ICT has changed the way people think and learn and has helped activities to run smoothly towards achieving educational objectives. ICT is transforming how, what and where learning can take place and the roles teachers and students can play to allow learning experiences flourish and be sustained. Individuals, institutions and nations are becoming more aware of the important role that teachers play in the utilization of ICTs to update classroom instructions. These resources are providing the pathway to easy access of information and changing the ways teachers teach and the ways students learn. These ICT resources are increasingly being put to use to enrich educational purposes. Utilizing these resources advance knowledge. Access to internet has improved greatly through cybercafé, but most individuals are not connected and the institution is yet to be well connected as to making internet available for students' use, hence they depend much on the cybercafé for any form of internet use. This slows learning. The Nigerian Policy on Education (FRN, 2013) supports the integration of ICT in its curriculum for learners benefit and describes the National Policy on Information Technology (2001) as any

equipment used in the acquisition, storage, manipulation, management, control, display and transmission of information. These include all forms of ICTs that enrich learning.

Goals of Science Teaching

Science education plays a vital role in the lives of individuals and a nation's sustainability. Its ultimate goal in science teaching in secondary school is to provide high quality teachers that prepare students with the knowledge and skills for self-reliance after school and be able to contribute productively in the workplace. For this reason, specified needs are to be met. Teachers must be adequately prepared for knowledge, skills and creativity using ICT technologies. Teachers must be good instructors using ICT tools to pursue this goal through generation and dissemination of skills, knowledge and ideas that will enable learners meet the manpower requirement of the country. Egbo (2011) stated that to achieve this goal as well as to stem the tide of teachers' under-performance, building teachers' capacity is not only critical to successful teaching and learning; it should also be the starting point for reconstituting the education system. Building teacher quality using ICT tools will go a long way in actualizing this goal.

Young students are discovering the popularity of the internet and many are yearly entering the workforce and online interest is growing in new market places and among consumers. Many more students are increasingly using online chats and browsing to learn and gain new knowledge and ideas. Interest has increased on how computers and the internet can best be harnessed to improve efficiency and effectiveness in science teaching. This is a great opportunity to advance teachers skills, knowledge and training on new and evolving ICT science teaching tools. Cerf (2013) asserted that ICT is the propelling force driving global competition, awareness, communication and interaction. Training teachers with ICT tools will enhance variety of knowledge and application of science learning to different environments. Use of ICT by teachers could be for the purposes of enhancing teaching and learning such as communicating, playing games, doing homework, searching for information, practice and drilling such as foreign language learning and mathematics (OECD, 2014). According to the European Commission (2013) teacher education institutions may either assume a leadership role in the transformation of education or be left behind in the swirl of rapid technological change.

Changing Trends of ICTS

With changing trends in science teaching and ICTs becoming increasingly available to schools, and many homes capable of affording one for themselves and children, the 21st century science teachers need large amount of information to perform maximally. This means that teachers have to learn to navigate information, analyse the information, make decisions and acquire new knowledge to accomplish tasks. According to Adigun and Zosu (2012) ICT is changing the way people learn and is offering new alternatives

to the traditional classroom. Demand for technological literacy, flexibility of knowledge and skills, and ability to adjust to new labour market needs, all require teachers to teach new things in new ways (Nwakonobi & Nnorom, 2013).

Researches show that ICT can lead to improved student learning and better teaching methods. A report made by the National Institute of Multimedia Education in Japan (2015), proved that an increase in student exposure to educational ICT through curriculum integration has a significant and positive impact on student achievement, especially in terms of knowledge, comprehension**,** practical skill and presentation skill in subject areas such as mathematics, science, and social study. Current trends in education requires a variety of learning styles and experiences by the teacher to nurture knowledge of students in science and make the learning process worthwhile. Acquiring skills and knowledge on evolving ICT technologies will enable the science teacher find creative ways to make science learning a pleasure. This will require training and retraining which may be achieved through capacity building workshops.

Capacity building is a form of training needed to improve teacher quality. Training equips and familiarizes a teacher with skills and experiences to perform better on his job. According to Mullins (2010) training increases the confidence, motivation and commitment of teachers. It helps to improve the availability and quality of teachers, gives a feeling of personal satisfaction, achievement and increase pay and promotion. It also broadens opportunities for career progression. Training a teacher affords him/her the opportunity to be equipped with appropriate knowledge, skills and attitude needed to perform better for maximum productivity. The training of teachers is very crucial because a trained teacher is more likely to be highly motivated, competent and productive (Obunadike & Nwankwo, 2012). Training becomes more evident as teachers face the challenges of learning new skills which will help them to maintain proficiency and prepare for future technology needs and advancement. In this regard, a big opportunity needs to be created using capacity building workshop as the instrument for training.

Capacity Building of Science Teachers

Capacity building is the training that aims at imparting information instructions to improve performance and attain a required level of knowledge/skill. Egbo (2011) defined capacity building as training needed by workers to enhance professional skills and improve attitudes and behaviours to excel on the job. Capacity workshops are formidable tools for developing teachers' potentials, knowledge and skills in order to reinforce already acquired ideas and to update on emerging ones. The 21st century thrives in knowledge-intensive-driven environment and skill acquisition economy that require teachers to be equipped with skills for problem-solving, self-sustenance and career progression pursuits in the workplace and for students' nurturing. For this to be achieved, teachers require extensive, ongoing exposure on capacity building in ICT

environments to be able to evaluate and select the most appropriate resources that will help their classroom instructions. This will enhance pedagogical possibilities in ways that influence teachers' perspective to science teaching and improve students' learning outcomes. Unfortunately, in Akwa Ibom State, many science teachers are not computer literate and do not have the knowledge and the pre-requisite skills to utilize ICTs for instructional delivery. If science teachers do not acquire skills and knowledge to transform the way teaching is done using ICTs, the future of science education in Nigeria may be bleak. To meet these new standards, science teachers will have to learn new teaching practices (Gulamhussein, 2013) and experiences. This will have to do on how teachers perceive capacity building workshops using ICTs.

Teachers' Perception of ICT for Capacity Building

Knowledge gap is wide among many science teachers regarding capacity building workshop. Teachers' perception on the use of ICTs is diverse and varied and this affects the way science teachers teach. This misconception has trailed capacity building workshops in Akwa Ibom State. Many science teachers are yet to come to terms with the scope, content and duration of capacity building workshops. Some erroneously view it as elitist education for those who want to change from teaching to an administrative career. Others believe that the organizers invite only the officials, friends and their cronies to attend the workshop because of the allowance that may be attached to it. Yet others believe that the same teachers are recycled to attend the workshop each time it is organized every year, so that only few teachers benefit at the end of the day. These misconceptions largely account for science teachers' lack of interest in attending capacity building workshops. The sorry state of capacity building workshop is reflected in the non-utilization of its effectiveness. In most secondary schools having large population of science teachers, ICT tools needed to update and facilitate capacity building workshops for teachers' competence are lacking. Where they exist, they are too few to go round and in most cases, electricity to power the tools cannot be assured.

Reacting to the unsatisfactory state of utilizing capacity building workshop in Akwa Ibom State, Etiubon (2011) and Nneji and Otaru (2016) asserted that capacity building workshops cannot yield the desired result because it is scorned for the following reasons:

- it is erroneously believed that science teachers can teach without the need for ICT tools
- it is believed that science concepts are concrete and hands-on-activities help teachers better than using ICT tools.
- again, it is erroneously believed that physical activities present vivid conceptualization than ICT concept presentations. To them, it is easier to

manipulate what is seen than what is presented using ICT tools. It is difficult to change from what has been in use to a new idea.

One of the major objectives of capacity building workshop is to assist the teacher to function more effectively in their present position by exposing them to the latest concept, information and techniques, such as the use of ICTs capacity building workshops and developing in them the skills required in their fields (FRN, 2013). The digital age teacher is expected to be a global teacher by functioning effectively in any part of the world (Samba, 2015). Teachers need the knowledge of ICT to correct the narrow outlook that may arise from educational imbalances and their own complacency.

The mastery of basic skills and concepts in a capacity building workshop are taught to assist teachers' learning and bring awareness, familiarity and ability to use new technologies. Ajayi, Yohanna and Uche (2014) posited that effective use of communication technologies require peculiar demands which teachers must be aware of and adequately perceive to put to effective use. The ICT trained teacher need to work with students to boost computer knowledge because the use of ICT strengthens teacher's repertoire of skills and opens up a wider array of learning resources for students to access. Ezeobi (2016) opined that the rich, interactive capacity of ICT-mediated learning resources motivate and engage weak students to learn at an appropriate pace, and teachers can adopt scaffolding strategies to engage students in higher order thinking activities. Teachers must therefore, change their perception towards ICT capacity building workshops and advance knowledge to make progress in all areas of instructional activities. Capacity building workshops for science teachers therefore, must be effective to accommodate a wide range of knowledge and pedagogical skills to actualize the objectives of science teaching.

Availability of ICTS Resources

Availability of ICT tools is needed as a major investment in capacity building workshops for science teachers to facilitate the objectives of science education. Among these demands are the need to have personal computers, access to internet facilities and services, sharing of information, integrating ICT into the instructional process, use of technology to evaluate learning performance and achievements. With availability of ICT tools like computers, videos, phones and laptops teachers can actively engage in the acquisition of scientific knowledge to improve their thinking and solve problems with ease. Thomas, Babatope and Jonathan (2013) noted that ICT facilities are mostly used for research and administrative purposes in Nigerian tertiary educational institutions than for teaching and learning. Most science teachers are not even aware of the different types of ICT tools that are available for lesson instruction as the institutions where these science teachers graduated from do not have these facilities. Limited ICT tools such as projectors, VCD-ROM, multimedia, hard and software

packages, computers, interactive whiteboard and broadband internet access are grossly inadequate to use for equipping teachers during their professional training and in particular for capacity building workshop.

Unfortunately, in most instances, pieces of equipment are borrowed from private firms and private institutions to execute capacity building workshops. This incapacitates adequate functioning of science teachers after the programme as they no longer come in contact with the tools used for the workshop after training. Huk (2013) observed that most teachers were not familiar with ICT tools and devices that simplify instructions and as such could not practice independently. This does not augur well for teachers' professional development. Teachers need new methods and strategies to update themselves and facilitate science teaching classrooms.

Frequency of Use of ICT

Capacity building workshop builds a teacher's confidence and affects the way lesson is conducted. Students' enthusiasm for online searches is proving to be a useful tool to develop their critiquing skills as they search from a variety of reliable sources (Rolfe, 2007) and so must the science teacher. The frequency of exposure of a teacher to ICT capacity building will make the teacher highly competent to evaluate his/her academic progress. Traditional one-time teacher training workshops have not been seen as effective in helping teachers to feel comfortable using ICTs, let alone in integrating it successfully into their teaching. Discrete, 'one-off' training events are seen as less effective than on-going professional development activities (Rolfe, 2007). The duration of exposure of a science teacher to ICT capacity training workshop greatly influences lesson output. This is crucial for connecting students to the wider global community. Okonkwo (2014) posited that teachers are not fully utilizing technologies advances, through frequent exposure to ICT workshops, questioning whether they will meet the needs of shifting-knowledge-based societies and increasingly diverse student populations. In the same vein, Agommuoh and Ndirika (2016) reported that although the importance of measuring the training that teachers receive to engage with ICT cannot be overemphasized, training programmes do not ensure that ICTs are used in the classroom regarding their potential. Teachers need frequent exposure on ICT capacity training to broaden their knowledge using support opportunities like training workshops.

Gender and ICT

There are differences in opinions regarding gender involvement with technologies. Some show that male students utilize internet services more than their female counterparts. Mwebaze (2011) opined that male and female teachers are not equally likely to be trained to use ICTs in classrooms, whereas male teachers are more likely to be trained to teach basic computer skills and computing. Gender barriers have been identified to hinder females in science and technology. Onwuegbuna and Onwuegbuna

(2006) insisted that this may still persist to this present era of information super-highway.

Statement of the Problem

Science teachers' perception to the use of ICTs is diverse with low computer use, awareness, willingness to change, and inability to invest in knowledge and skills. Many science educators do not see the need to engage in the learning of ICTs as they do not own personal computers and the schools they work do not have ICT facilities. Therefore, they do not see the need to attend capacity building workshops to equip them for skills and knowledge. This is worrisome, as ICT technologies are daily emerging and changing the ways people think, act and do things. It is in view of this, that the study sought to investigate science teachers' perception of ICT capacity building workshops in secondary schools in Akwa Ibom State.

Purpose of the Study

The purpose of the study was to investigate science teachers' perception of ICT capacity building workshop in secondary schools in Akwa Ibom State. Specifically, the study sought to:

1. examine the level of perception of science teachers on ICT capacity building workshop.
2. assess the availability of facilities for ICT capacity building workshops for science teachers instructional delivery.
3. examine the frequency of use of ICT capacity building workshop for science teachers.

Research Question

The research question that guided this study is:

1. What ICT facilities are available for science teachers' ICT capacity building workshop for science instructional delivery?

Research Hypotheses

1. Male and female science teachers do not differ significantly in their perception of ICT capacity building workshop for science instructional delivery.
2. There is no significant difference in the frequency of use of ICT capacity building workshop for male and female science teachers instructional delivery.

Research Methodology

The study adopted a survey design.

The population consisted of all the 295 science teachers in all the secondary schools in Uyo Local Government Area. The sample size was the 295 science teachers who attended a 3-day training workshop for ICT capacity building.

The instrument for data collection was a questionnaire on ICT capacity building workshop for science teachers. Instrument had 20 items: A 4-point mean rating scale of Strongly Agreed (SA=4), Agreed (A=3), Disagree (D=2) and Strongly Disagree (SD=1) elicited information on science teachers' responses on ICT capacity building workshop. One research question and two hypotheses tested at .05 level of significance guided the study. Two experienced secondary school science teachers and a lecturer in educational technology of the University of Uyo validated the instrument. Cronbach alpha was used for reliability testing which gave .86. The rating scale elicited information on teachers' responses on ICT capacity building workshop. All copies of instrument administered during the capacity building workshop were filled, completed and retrieved during the workshop.

The data collected was analyzed using mean (X) and Standard Deviation (SD) to answer the research question and t-test statistics to test the hypotheses. Items with response mean of 3.00 and above were accepted while those below 2.99 were rejected.

Table 1: Mean ratings of teachers' awareness on availability of facilities for ICT capacity building for science teachers

Availability of facilities for ICT capacity	**X**	**SD**	**Remarks**
Building workshop			
1. Internet for browsing lecture notes	1.61	0.52	Disagree
2. Computers for searching information	1.61	0.55	Disagree
3. Digital cameras	1.28	0.45	Disagree
4. Laptops/ipads/ virtual labs	1.84	0.38	Disagree
5. App store for information storage	1.78	0.17	Disagree
6. TV/Videos	1.32	0.46	Disagree
7. Light supply source	3.09	0.58	Agree
8. Electric white board	1.17	0.34	Disagree
9. Browsing phones	1.88	0.12	Disagree
10. CD/VCD Roms	1.89	0.33	Disagree
11. Headlights	1.93	0.25	Disagree
12. Printed materials	3.21	0.45	Agree

13. Projectors 2.68 0.57 Disagree

Results in Table 2 show that all items except items 14 and 19 had mean responses below 3.00. The result means that the availability of facilities for ICT capacity building workshop was perceived low by the participants.

Hypothesis 1: Male and female science teachers do not differ significantly in their perception of ICT capacity building workshop for science instructional delivery.

Table 2: t-test analysis of differences in the perception of ICT capacity building workshop for male and female science teachers.

S/N	Teachers' perception of ICT capacity building workshop	Male Mean(X)	Female Mean (X)	Tvalue	Pvalue	Decision Significant (S)/ Not Significant
1.	It is difficult operating ICT technologies	3.18	2.94	1.31	0.19	NS
2.	New ICTs applications are scary	3.13	2.59	2.20	0.03	S
3.	Capacity building workshop is waste of time	2.98	2.95	0.34	0.74	NS
4.	I cannot deliver instructions with ICTs	3.20	3.12	0.00	0.99	NS
5.	There are problems using ICT softwares for capacity building.	3.34	3.07	2.04	0.05	S
6.	Time is consumed downloading lesson notes	3.10	2.86	1.79	0.07	NS
7.	Few science teachers attend capacity building workshops	3.23	2.89	1.30	0.19	NS
8.	No interest in learning new technologies	3.19	2.47	2.80	0.01	S
9.	Can use ICT tools with minimal effort	3.16	2.92	1.63	0.11	NS
10.	Difficulty searching different environment to upload information	3.20	2.69	2.55	0.01	S

Results in Table 2 present the mean, calculated and critical t-values and P-values of male and female science teachers on level of perception of capacity building for science

teaching. The results show that the mean (X) of the males are greater than the mean of their female counterparts. The result also showed that the P-value of items 1, 3, 4, 6, 7 and 9 are not significant while items 2, 5, 8 and 10 are significant. The hypothesis 1 is accepted for items 1, 3, 4, 6, 7 and 9 and rejected for items 2,5, 8, and 10. There is therefore, a no significant difference in the level of perception of capacity building workshop of male science teachers and their female counterparts for items 1, 3, 4, 6, 7 and 9 while there is a significant difference in the level of perception of ICT capacity building workshop of male science teachers and their female counterparts for items 2, 5, 8 and 10.

Hypothesis 2: There is no significant difference on frequency of use of ICT capacity building workshop by male and female science teachers.

Table 3: t-test analysis of differences on frequency of use of ICT capacity building workshop for male and female science teachers.

S/N.	Frequency of use of ICT capacity building workshop for science teachers	Male Mean (X)	Female Mean (X)	tvalue	Pvalue	Decision Significant (S)/ Not Significant
1.	Three month period	3.43	2.51	4.69	0.00	S
2.	Bimonthly mentorship programme	3.31	2.29	5.49	0.00	S
3.	Monthly focused group discussion	3.09	2.19	4.17	0.00	S
4.	Short courses for 6 long weekends	3.31	3.27	0.23	0.73	NS
5.	Once-in-a year gathering event	2.81	2.61	0.87	0.37	NS
6.	Too short duration of 3 days	2.97	2.89	0.51	0.59	NS
7.	Regular ICT training workshop	3.09	2.71	2.25	0.03	S
8.	One day symposium	3.02	2.70	1.91	0.06	NS
9.	A week long outing	3.19	2.95	1.69	0.09	NS
10.	Two week duration	3.20	2.36	3.60	0.00	S

Results in Table 3 show that the mean (X) of the males are greater than the mean (X) of their female counterparts. The result also showed that the P-value of items 4, 5, 6, 8 and 9 are not significant while those on items 1, 2, 3, 7 and 10 are significant. The hypothesis 2 is therefore accepted for items 4, 5, 6, 8 and 9and rejected for items 1, 2,

3, 7 and 10. There is therefore, a no significant difference on frequency of use of ICTs capacity building workshop training received by male science teachers and that received by their female counterparts for items 4, 5, 6, 8 and 9. On the other hand, there is a significant difference in the frequency of use of ICTs capacity building workshop training received by male science teachers and that received by their female counterparts for items 1, 2, 3, 7 and 10.

Discussion of Findings

Results of findings in Table 1 revealed that capacity building workshop mounted for science teachers lacked adequate facilities as most teachers clustered around the few available ones. It was also found that most science teachers lacked awareness on tools available to enhance teacher-student online discussions. This does not help in the adequate preparation of teachers for integration of ICTs in lesson delivery. This finding agrees with Huk (2013) that most teachers were not familiar with ICT tools and devices that simplify instructions and as such could not practice independently. Students' uptake of ICT is growing and science teachers need to upgrade themselves with emerging technologies. Results of findings in Table 2 revealed that science teachers' perception of ICT capacity building workshop was low as most science teachers do not have clear understanding of ICT capacity building workshop that can enhance their knowledge and skills using required ICTs. This may be due to science teachers' lack of basic ICT literacy skills as well as use of ICTs as tools for teaching and learning practices. This finding agrees with Gibbons (2004) that experiments and laboratory simulations can be accomplished through using ICTs as this enhances teacher preparation of instructional delivery. Science teachers' willingness to avail themselves of ICT capacity building workshop will go a long way to equip their skills on ICTs. Findings in Table 3 showed that the frequency of use of ICT building capacity building workshop is too short and is mostly a-once-in-a-year event. This does not help science teachers to acquire the needed skills and knowledge to equip them to face the future with constantly changing ICTs. This finding is in agreement with Okonkwo (2014) that teachers are not fully utilizing technologies advances, through frequent exposure to ICT workshops, questioning whether they will meet the needs of shifting-knowledge-based societies and increasingly diverse student populations. With students' enthusiasm increasing on the use of ICTs, teachers need constant exposure to ICT capacity building workshops to come into mainstream and maximize the benefits that ICTs offer.

Conclusion

Adoption of n**ew** technologies is providing opportunities to improve teachers' performance and they are to be embraced. There must be a drive among science teachers to acquire ICT knowledge for relevance. Adequate facilities and tremendous amount of capacity building is required for science teachers to employ ICT tools for

quality instructional delivery. Frequency of use of capacity building workshop in a friendly and enabling environment will promote pedagogical skills among science teachers to facilitate instructional delivery.

Recommendations

Based on the findings of this study, the following recommendations are made:

1. ICT capacity training workshop should be more frequently organized to update science teachers' knowledge for ICT integration in science instructional delivery.
2. School administrations should procure ICT facilities to facilitate teachers' capacity building on integration of ICT tools into science instructional delivery.
3. Science teachers should be given opportunities through school-industry links, seminars, conferences and workshops to maximize the benefits that ICTs offer.
4. Male and female science teachers should be equally and adequately exposed to the digital curriculum with the same kind of ICT facilities to acquire skills and knowledge.
5. Government and all education stakeholders in ICTs should implement and legislate sustainable ICT programmes and policies.
6. The training and re-training of science teachers using capacity building workshops should be institutionalized.

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