Innovations

Instructors' proficiency and employment of ICT in teaching through emerging technologies and innovations in delta state government secondary schools

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Abstract: *This study examined instructors' proficiency and employment of ICT in teaching through emerging technologies and innovations in Delta State government secondary schools. It is a correlation survey method of the ex-post-facto- research design. A purposive sampling method was used to sample 744 respondents from a population of 14,877 instructors in government secondary schools in Delta State and represented 5% of the entire population. The instrument for the study was a structured questionnaire titled "Instructors Proficiency and Employment of ICT in Teaching Questionnaire (IPEICTTQ) was utilised in obtaining information from respondents. In answering research questions, data was analysed using mean rating and standard deviation, and hypotheses were tested using Pearson r, at a.05 significance level. Findings established that the level of instructors' proficiency and employment of ICT in teaching was low among instructors in Delta State government secondary schools. It was also established that instructors' proficiency is related to their employment of ICT, but this relationship was not significant. The researcher suggested, amongst others, that, with the advent of ICT in conducting examinations, the government of Delta State through the Ministry of Education should provide ICT resources in schools.*

Keywords: *1.Instructors' proficiency, 2.Employment of ICT, 3.Emerging Technologies, 4.Innovations, 5.Delta State Government Schools.*

Introduction

Technologies and innovations are synonymous to 21st century development in the world and have spread to other sectors including education. According to Plessis and Webb (2012) there is an increase in information and knowledge in modern societies. As a result, government secondary school instructors are expected to be equipped with skills and knowledge of Information and Communication Technology (ICT) to handle information and implements a problem-solving method in order to create knowledge in learners (Akudolu, 2006). Technological improvement is part and parcel of educative processes, even when human beings are perceptively gifted to develop trending and latest applications, software, and devices utilized in several fields of endeavour. In education, there are various applications utilized, which facilitate school operation system. The employment of ICT in teaching certainly improves students' understanding of scientific ideas and facts (Briones, 2018). Accordingly, Hogarth, Bennett, Lubben, Campbell, and Robinson (2006) stated the important contribution of ICT in teaching includes but not limited to making learning more real, increase learners' motivation, improve learners' sense of achievement, provide rich sources of information to learners, help learners become autonomous and work at a speed, enhance literacy skills of learners and help instructors choose the best way to teach. The least important aspect of ICT in educative process provides the means for additional appraisal and improve technology in teaching process. According to Briones (2018) most instructors express that the main challenge encounter in teaching generally is unavailability and innovation of teaching materials. In reality, teaching materials are available and downloadable on the web using different ICT gadgets such as android phone, iPad, iPhone, laptop system and desktop computer as storage device thus solving the problem of teaching materials. The technology would support instructors to be innovative and competent knowing fully well that almost all learners have the soft-copy of the teaching materials since learners are habitual users of cell phones and in a single click the learners can effortlessly connect and explore the materials on web.

Government of Nigeria made computer studies compulsory and examination body like UTME and even universities Post-UTME have keyed into the use of ICT in conducting their examinations. Instructors' ICT application in teaching is a term in curriculum implementation which needs core competences and mandatory for instructors in government schools in order to keep well-informed with current technologies. The application of ICT in teaching is also contingent on the level to which instructors have acquired ICT competences to implement the curriculum. The governments (Federal and States) of Nigeria seem to have made computer studies compulsory in the entire curriculum. In spite of the addition of computer studies in Nigeria educational system, Tella, Tella, Toyobo, Adika, Adeyinka, (2007) discovered that insignificant numbers of schools are teaching the subject which is visible of its non-appearance from their timetables. One major obstacle influencing ICT implementation in Nigeria schools is lack of instructors' competencies in the use of ICT during teaching. Buabeng-Andoh (2012) emphasised that integration of ICT curriculum should be a serious issue which instructors' education training must reflect on. For instance, in Western world, ICT competence of

instructors has been labelled in European Digital Competence Framework for Educators (Caena & Redecker 2019). Chauhan (2017) suggested that digital technologies allow new prospects for instructors' instruction, and ICT usage has become progressively popular in education centres. In spite of its possible influence on teaching/learning, the presence of technologies does not automatically lead to student improvement (Li and Ma 2010). ICT implementation in educational settings requires technical infrastructure, and both instructors and students need to be encouraged and supported in using digital technologies.

According to Kaiser and König (2019), teacher competency is specifically defined as cognitive performance traits that are functionally sensitive to situations and demands in multiple domains. Pre-service instructors are exposed to this design and value of learning opportunities throughout their training. In general, instructors are expected to be proficient in ICT, especially those who have just graduated from a higher education institution where teaching and learning have become more digital. Most of these instructors graduated in digital age and having had explicit and innovative chances to advance their digital proficiency (Jäger-Biela, Kaspar, and König 2020). Although a study Badau and Sakiyo (2013) conducted in North Eastern Nigeria revealed that instructors' ICT proficiency was low. The low instructors' competency was a result of lack of hardware/software, electricity, funding and inadequate information mostly in rural areas. The proficiency of instructors in ICT is a requirement for ICT adoption and use in schools, (Archibong, Ogbiji, and Anijaobi-Idem 2010). According to Rogers (2003), a teacher's choice to accept and employ a new technology is tied to the knowledge and proficiency a person has about how to use technology appropriately. According to empirical research, instructors' ICT proficiency and attitude toward general computer use are positively correlated (Jegede et al. 2007). In support of the aforementioned research, Sa'ari, Wong, and Roslan (2005) found that the majority of instructors who showed high levels of computer proficiency thought information systems were beneficial. These instructors approached the information system with more confidence, showed less concern, and avoided using it. The same study's findings by Sa'ari et al. (2005), however, also showed a tenuous correlation between instructors' attitudes and their claimed computer proficiency. From the above, it can be inferred that computer proficiency is a more valuable asset than just having a positive outlook on using information systems. As a result, the growth of teacher acceptance and implementation of information systems is significantly influenced by instructors' ICT proficiency and attitude.

Leong, Chua, Sathiamoorthy, and Shafinaz (2016) found that instructors in Negeri secondary schools assessed their own ICT, acceptance, and SMS use as very proficient. The aforementioned authors' research also showed that instructors' ICT proficiency contributed for acceptability and SMS use. In a previous research, Liew (2007) discovered that some instructors were opposed to the ICT programme because of their lack of experience with ICT. Instructors will be helped to successfully integrate ICT in education via the implementation of ICT proficiency values and adequate training. It is widely acknowledged that ICT is expanding quickly, and if instructors are not equipped with the most up-to-date knowledge and skills, they may not be able to keep up with the rapidly evolving technological innovations and unavoidably

will fall behind and be vulnerable to picking up new ICT skills. In order to successfully prepare instructors for technology use, knowledge of their ICT proficiency is crucial.

Lack of most ICT resources in school have been a major challenge to instructors' employment of ICT during instruction (Ngwu 2014). This shows that despite having the necessary training and a desire to educate students using ICT, instructors are hindered from doing so owing to a lack of technical resources. Studies have shown that instructors use ICT for instruction only sometimes. (Sibanda, Mapenduka, & Furusa, 2016; Narinasamy and Wan Mamat (nd)). Study conducted in Cross-River State, Nigeria by Egomo, Enyi, and Tah, (2012) revealed relatively low availability/employment of ICT resources in teaching and the only available and utilized ICT tools were laptops, projectors and internet resources. The authors contend that it distresses quality of graduates of the institutions. Instructors ICT application during teaching is relatively new and at developing stage in Nigeria school and the pace at which it is developing in some schools is very slow, in other schools, it could be fast. Supporting the above statement, Kiptalam and Rodrigues (2011) discovered that some schools are fast adopting to ICT by developing automated content for teaching/learning.

According to Samuel and Bakar's (2006) study in Malaysia, some schools lack suitable labs, dependable internet, adequate computer systems for instructors, central databases, and learning management systems that are usable for electronic learning. Inadequate courses and training, a shortage of competent instructors, poor ICT integration, broken CD ROMs, a lack of administrative assistance, and instructors' unfavourable attitudes were all found to be issues with instructors using ICT during teaching, according to the results. The vast majority of studies have shown that inadequate infrastructural facilities are a major factor in the poor integration of ICT during instruction. ICTs are not widely accessible or used efficiently in classrooms, according to Sibanda et al. (2016). If schools are to completely benefit from the development and growth of ICT, resources that are already accessible but not being properly exploited must be improved immediately. Despite the proliferation of computer equipment in classrooms and the promises of educational technologies, researchers discovered that reviews of instructors consistently revealed reductions in the use of educational technology (Chen 2004; Wachira and Keengwe 2011). The human component has been identified as the most important aspect for the success or failure of ICT deployment during teaching, even if ICT use has been shown to increase organisational efficiency and effectiveness (Wahdain & Ahmad, 2014).

Statement of The Problem

ICT is absolutely necessary in the twenty-first century, and no industry, including the educational one, can thrive without it. The importance of ICT in educational processes is shown by the aforementioned remark. Despite the significance of ICT in teaching and learning, most government schools do not use it for instruction, according to the researchers' personal reflection. Some of the instructors, when questioned, expressed dissatisfaction about the absence of ICT infrastructure in most schools. Additionally, compared to their colleagues in private schools, it has been claimed in the society that instructors at government-run schools lack the necessary ICT

teaching skills. Studies have also shown that instructors are not very skilled at using ICT in the classroom. It may not be possible to generalise the status of instructors' competency and ICT employment in Delta State from the researchers' own observations and what has been speculated in society. Furthermore, studies which disclosed low proficiency of instructors in ICT were not conducted in Delta State. Therefore, it becomes crucial for the researchers to conduct a rigorous analysis of the instructors' proficiency and employment of ICT in teaching using emerging technologies and innovations in Delta State Government Schools. This study was designed to empirically examine instructors' proficiency and employment of ICT in teaching through emerging technologies and innovations in Delta State Government Schools. In explicit term, the study is targeted to;

1. Identify the degree of instructors' ICT proficiency in teaching.
2. Identify the degree of instructors' ICT employment in teaching.
3. Show the relationship between instructors' proficiency and ICT employment in teaching.

Research Questions

The following research questions gave the study a direction;

1. What is the degree of instructors' ICT proficiency in teaching?
2. What is the degree of instructors' ICT employment in teaching?
3. What is the relationship between instructors' proficiency and ICT employment in teaching?

Hypothesis

The hypothesis was tested at .05 significance level.

1. Instructors' proficiency is not significant to ICT employment in teaching.

Materials and Methods

This study adopted correlation survey method of the ex-post-facto research design. The correlation survey assists in determining the connexion between two variables of a study, to show the extent to which one variable account for the other. The study population was 14,877 instructors in government secondary schools in Delta State. From the population, a sample of 744 representing 5% of the entire population was sampled using purposive sampling method. The instrument for the study was structured questionnaire titled "Instructors Proficiency and Employment of ICT in Teaching Questionnaire (IPEICTTQ) was utilized in obtaining

information from respondents. The instrument was organized in two sections. Section A dealt with question items on level of instructors' ICT proficiency in teaching while section B dealt with question items on level of instructors' ICT employment in teaching, with a total sum of 20 items on the instrument. Thus, the instrument was organized bearing in mind the purpose, research questions and hypothesis of the study with a rating scale of 4-point (that is, very high (4), high (3), low (2) and very low (1). The instrument was authenticated using expert judgement thereby establishing the face and content validity of the instrument. The instrument was further subjected to Cronbach Alpha reliability test using 20 respondents excluded from the main study and a coefficient index of .82 was obtained, showing a high reliability index of the instrument. Data gathered was analyzed using mean rating, and standard deviation in answering research questions while hypothesis was tested using Pearson r at .05 significance level. The decision for accepting any question item was a benchmark mean rating of 2.50. This implies that any mean rating below 2.50 is weighted as low while mean rating above 2.50 is weighted as high.

Presentation of Results

Research Question 1: What is the degree of instructors' ICT proficiency in teaching?

Table 1: Analysis of mean rating and standard deviation on level of instructors' ICT proficiency in teaching

S/N	Level of instructors' proficiency in use of ICT in teaching	Mean	SD	Remark
1.	Use ICT to source for teaching materials online	3.05	.81	High
2.	Use ICT in sharing information with students	1.94	.81	Low
3.	Use ICT in keeping with current trends in education	2.96	.80	High
4.	Use ICT innovative content in teaching	3.00	.82	High
5.	Use of email to send educational information	2.01	.80	Low
6.	Use of stimulating objects in teaching	1.97	.80	Low
7.	Communicate with students through e-learning	2.00	.82	Low
8.	Ability to use desktop publishing in teaching	1.97	.81	Low
9.	Using of graphical representation in teaching	1.96	.82	Low
10	Ability to use educative software in teaching	1.99	.81	Low
Average mean rating		2.28	.81	Low

Data in Table 1 shows that the degree of instructors' ICT proficiency in teaching was low with an average mean rating of 2.28, SD=.81. This finding could as a result that instructors do not apply ICT to share information to students or use email to communicate educational matters nor use stimulating objects in teaching. Instructors in government schools do not communicate to with students through e-learning and desktop publishing/graphical representation and educative software were not used in teaching.

Research Question 2: What is the degree of instructors' ICT employment in teaching?

Table 2: Analysis of mean rating and standard deviation on level of instructors' ICT employment in teaching

S/N	Level of instructors' ICT employment in teaching	Mean	SD	Remark
1.	Smart board is used in teaching	2.02	.82	Low
2.	Lesson is been projected to learners	1.98	.82	Low
3.	Instructors use desktop computer when preparing lesson	2.97	.81	High
4.	Instructors use laptop computer when preparing lesson	2.99	.82	High
5.	Instructors use smartphone when preparing lesson	3.03	.80	High
6.	Instructors use tablet when preparing lesson	2.99	.82	High
7.	Electronic gadgets are connected to printer during lesson presentation	1.99	.82	Low
8.	Teaching is done online	1.97	.81	Low
9.	Students' assignment is accessed using electronic media	2.00	.83	Low
10	During teaching public address system is utilized	2.03	.80	Low
Average mean rating		2.40	.82	Low

Data in Table 2 shows that the degree of instructors' ICT employment in teaching was low with average mean rating of 2.40, SD=.82. This result signifies that smart board and projectors are not used in teaching, electronic gadgets were not connected to printer during lesson presentation, teaching is not done online, students' assignment is not accessed using electronic media and during teaching public address system is not utilized.

Research Question 3: What is the relationship between instructors' ICT proficiency and employment in teaching?

Table 3: Relationship between instructors' proficiency and ICT employment in teaching

Variables	Mean Scores	SD	r	r^2	Remark
Instructors ICT Proficiency in teaching ICT Employment in teaching	2.28 2.40	.81 .82	.030	.001	Positive Relationship

Data in Table 3 shows relationship between instructors' proficiency and ICT employment in teaching. The result shows instructors' ICT proficiency in teaching with mean score of 2.28, SD=.81 and ICT employment in teaching with mean score of 2.40, SD=.82. The relationship that exists between instructors' proficiency and ICT employment in teaching is r=.030. The r^2=.001 shows that a positive relationship exists between instructors' proficiency and ICT employment in teaching. Also, r^2 of .001 shows that instructors ICT proficiency account for ICT employment in teaching by 0.1%.

Hypothesis 1: Instructors' proficiency is not significant to ICT employment in teaching.

Table 4: Relationship between instructors' proficiency and employment of ICT in teaching

		Instructors Proficiency	ICT Employment in teaching
Instructors Proficiency	Pearson Correlation	1	.030*
	Sig. (2-tailed)		.414
	N	744	744
ICT Employment in teaching	Pearson Correlation	.030*	1
	Sig. (2-tailed)	.414	
	N	744	744

**Not significant at .05 level of significance*

Data in Table 4 shows the relationship between instructors' proficiency and ICT employment in teaching with r=.030 and significance p=.414. Therefore, the null hypothesis which states that instructors' proficiency is not significant to ICT employment in teaching was retained.

Discussion of Results

Findings show that the degree of instructors' ICT proficiency in teaching was low. This finding emphasized that instructors are not ICT competent in teaching because the necessary ICT is lacking in the school. An individual cannot be proficient with what is not available. Thus, instructors in government schools do not communicate with students through e-learning, desktop publishing/graphical representation, and educative software were not used in teaching. Also, instructors do not use ICT to share information with students, use email to communicate educational matters, or use stimulating objects in teaching. This finding is consistent with Mas Nida, Wong, and Ayub (2011), who discovered that if instructors are not equipped with appropriate and up-to-date knowledge and skills, they may be unable to keep up with ever-changing technological innovations and, as a result, will be left behind and vulnerable to learning new ICT skills. Liew (2007), who found that some instructors were not in favour of the ICT programme due to a deficiency in dealing with ICT. Badau and Sakiyo (2013), who established that in North Eastern Nigeria, instructors' ICT proficiency was low. This finding did not support Leong, Chua, Sathiamoorthy, and Shafinaz (2016), who revealed that instructors rated themselves as highly competent on ICT, acceptance, and SMS usage.

Findings show that the degree of instructors' ICT employment in teaching was low. This result signifies that smart boards and projectors are not used in teaching because of the unavailability of ICT resources, electronic gadgets are not connected to printer during lesson presentation, teaching is not done online; students' assignments are not accessed using electronic media; and during teaching, the public address system is not utilized. This finding is in connection with

Sibanda, et al., (2016) who established that globally, ICTs are neither available nor effectively utilised in schools, and ICT resources that are available, in some cases, are not fully utilized. Chen (2004); Wachira and Keengwe (2011) propagated the computer equipment available in schools and promises of educational technology. A review of instructors steadily showed drops in usage of educational technology. Egomo et al (2012) revealed relatively low availability/employment of ICT resources in instruction, and the only available and utilized ICT tools were laptops, projectors, and internet resources. Sibanda, Mapenduka, & Furusa, 2016; Narinasamy and Wan Mamat (nd) revealed low ICT employment by instructors during teaching. This finding did not correspond with Kiptalam and Rodrigues (2011) who discovered that some schools are fast adapting to ICT by developing automated content for teaching/learning.

Findings show that instructors' proficiency is related to ICT employment, but this relationship is not significant. The reason for this finding is that proficiency is related to what an individual is familiar with. A teacher can be ICT competent with frequent employment of ICT in teaching when ICT resources are available for the teacher. This finding corresponds with Wahdain and Ahmad, (2014) who discovered that instructors' proficiency is insignificant to the employment of ICT during instruction. The reason the authors gave was that even when usage of ICT has been proven to enhance organisational productivity and effectiveness, human factors have been recognised as the most significant element for the success or failure of ICT implementation during instruction. Sa'ari, Wong, and Roslan (2005) also revealed a weak positive relationship between the attitude of instructors and their alleged proficiency in computer usage. This finding disagrees with Jegede et. al. (2007) who discovered a positive correlation between instructors' ICT proficiency and attitude towards general computer operation.

Conclusion and Recommendations

This study has established low degree of instructors' proficiency and ICT employment in government secondary schools in Delta State, Nigeria. This fact is true since ICT resources are lacking in schools. Instructors resort to the use of their personal ICT gadgets such as laptop systems, personal computers, and smartphones to get the necessary information or materials for teaching students. Most instructors even find it difficult to operate some of these gadgets, which makes them less proficient in ICT usage. Also, fundamental knowledge of ICT applications in instruction is lacking since most instructors do not undergo any formal ICT training prior to or during service. From the findings, the researchers suggested that with the advent of ICT in conducting examinations, the government of Delta State through the Ministry of Education should provide ICT resources in schools. Also, the government of Delta State, through the Ministry of Education, should ensure that ICT resources that are provided are functional and inspected occasionally. Furthermore, instructors in government secondary schools should be mandated to undergo training and re-training on ICT usage. Finally, instructors should be encouraged to use their personal ICT gadgets in teaching and learning.

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