# Innovations

## ICT Competence among Secondary School Teachers during COVID - 19 Pandemic: Implication for Teaching and Learning in Delta state

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*Abstract*

*The study examined ICT competence among secondary school teachers during COVID 19 pandemic and its implication in teaching and learning in Delta state. As a guide for the study, two research questions and two hypotheses were used. The ex-post-facto research design and descriptive survey method was adopted for the study. The purposive sampling technique was used to draw 450 teachers from public and private secondary schools in Delta state. The instrument for data collection was a questionnaire titled "Teachers competence in ICTs in secondary schools (TCICTSSQ)". The instrument was subjected to face validity and a reliability test with the use of Cronbach Alfa statistical technique which yielded a coefficient of 0.74. The data were analyzed using descriptive and inferential statistics of t-test. The hypotheses were tested at 0.05 level of significance. Findings revealed that teachers' competence in ICT is important because it improves the quality of teachers work; it enables teachers to be in tune with the latest development in their field and enhances online learning. The study also revealed among others, that teachers' competence in ICT is low. It recommended that the government should organize regular training programmes to enhance teachers' competence, encourage secondary school female teachers to develop a more positive attitude in using ICTs among others.*

*Keywords: 1.ICT, 2.Teachers, 3.Competence, 4.Secondary schools, 5.COVID-19*

## Introduction

Education is regarded as the engine that propels growth and socio-economic development in any nation. Hence, successive governments established schools at all levels with policies and objectives to realize stated goals. However, the sudden outbreak of COVID-19 has exposed certain deficiencies which could undermine the achievement of quality teaching and learning as observed in Delta state, Nigeria.

COVID- 19 originated in Wuhan, China in December 2019 and spread to virtually all the continents in the world. (Davidson, 2020). By January 30th 2020 the World Health Organization (WHO) declared the disease a public health emergency of international concern and declared it a pandemic on March 11th 2020 (WHO, 2020). By 28th February 2020, it had spread to Nigeria, and by March 2020, all educational institutions were ordered to close by the Federal and State Ministries of Education as a measure to curb the rapid spread of the disease. (Azubuike,2021).

Educational institutions have re-opened but the effects and experiences of COVID-19 have been profound on education and its stakeholders. On a global scale, it led to school closures, unemployment and increase in economic hardships especially in leisure and hospitality sectors and the devastation of core industries. According to World Bank, (2021), COVID -19 is the worst shock to educational systems in decades with the longest school closures combined with looming recession. In addition, lessons learnt from the pandemic have provided a clearer picture of existing inequalities within and between countries, and what steps to be taken. The major one among them is addressing the education of more than 1.5 billion students whose learning has been hampered due to school closures, ( UNESCO, 2021).The Pandemic has equally forced a massive shift from learning and teaching in traditional settings with physical interaction to remote learning with the use of ICTs.

During COVID-19 the World Bank documented reports in different countries on their efforts to utilize multi modal techniques to provide remote learning opportunities for students during the lockdown. In Austria, learning platforms like Moodle and LMS, Cloud solutions from Microsoft and Google and other platforms on learning and exercise materials among others were provided. In Brazil, the Funtura Channel had some curated content in their YouTube Channel and guidelines were provided for systems managers, teachers, students and parents, In Bulgaria, the ministry of education and science launched an e-learning system and publishers provided online textbooks from grade 1-10 for free. Regional and educational institution supported 65,000 teachers and over 700,000 students through videos and webinars as well as broadcasts in TV channels. In France, an online portal, Ma Classe a la Maison (My class at home) provided access to educational content learning. While in Kenya, resources and programmes were delivered using Television, radio, Youtube and other learning platforms, and in Liberia, there was free access to online educational content to students and teachers via a website called "Orange campus Africa".

In Nigeria, as well as in Delta state, it was observed that some private secondary schools continued learning with ICTs, radio and television, while others who could not afford either were left out. However, the use of radio and television had some setbacks. Faturoti (2022) noted that some Ministries of education were confused about subjects to cover, duration of classes, inclusion of slow learners, the level to prioritize, inadequate feedback from learners. In addition, radio learners had to rely solely on their imagination making the technology a doubtful devise for learning in some subjects. Aside these issues, there were some other underlining challenges in the education sector that affected the use of ICTs for virtual learning during COVID-19 pandemic.

Obiako and Adeniran (2020) posited that issues such as poverty, poor health system, high population densities, hunger, limited funds and government persistent deficiencies in planning. This lead to the inability of government to announce any official plans for providing distance learning opportunities especially in public schools. In fact, Nigeria was caught unprepared and close to 98% of the nation's tertiary institutions could not offer online learning. (Olawunmi and Osakwe, 2021) Against this background, adoption of online teaching and learning with the use of ICTs was haphazard. In this regard, Egede and Awuja (2021) noted that teachers and lecturers in government institutions were directed by their respective education authorities to switch to on-line teaching using Television, Radios and multimodal ICTs. It was a novel and challenging experience for many, especially for those who were not competent in the use of ICTs for teaching.

**Development of ICTs in Secondary Schools**
The Federal government of Nigeria recognizes that national development is premised on quality teaching and learning at all levels of education and ICTs are critical tools for the achievement of this goal. In this respect, series of concerted efforts have been made to integrate ICTs in teaching and learning at all educational levels. For example, the first National policy on ICT was in 1988. Its main objective was the introduction of basic computer skills in primary and secondary curriculum. At the tertiary level, emphasis was more on the provision of ICT infrastructure, training and development of human resources. Others include;

1) School NET project in 2001: A partnership project between the public and private sector to enhance teaching and learning in primary and secondary schools

2) The ICT Teacher development policy in 2007: The emphasis was to develop a vision to produce knowledgeable, quality, highly skilled and creative teachers who will be able to raise a generation of students who can compete globally.

3) NEPAD e-school initiative: It championed by the e-African commission. Its objective was to ensure full participation of young Africans particularly at the primary and secondary schools, in global information society and knowledge economy.

4) Interactive Radio Programme: The objective was to provide access to open and distance education through radio and television for pastoral nomads.

5) National Virtual Library: Initiated by the Federal Ministry of Science and Nigerian Information and Telecommunication Development Agency. It developed standards for ICT use in the primary, secondary schools and the public sector.

6) The Nigerian Education Tax Fund (ETF) project: An initiative in which 2% profit tax for development and research is distributed to all levels in the education sector.

7) One Laptop-per-Child: launched in 2006, was targeted at producing a laptop infused with the Nigerian curriculum of Universal basic education (UBE) for primary and secondary schools.

   Although these policies and programmes aroused a kin interest in ICTs among teachers and students, the progress made so far has not really actualized the lofty objectives of the government. In this regard Adeosun (2010), emphasized that the initiatives were short term, piloted and donor- funded projects. They did not give room for continuity and sustainability. In addition, infrastructure on digital learning in Nigeria and Delta state in particular has not been significantly developed to cope with the current trend in teaching and learning. (Nkedishu, Egwuyenga and Nworgu 2021).


**ICT Competence in teaching and learning during COVID 19 pandemic**

 Delta state is one of the oil rich states in  Niger Delta region of Nigeria with an estimated  population of 5.6million as at  2016,  the fourth largest human development index in the country, with over 1204 secondary schools both public and private (Wikipedia) With such a huge number of human resources, teaching and learning in schools with ICT would empower the state for a better education service delivery and equip learners for skills needed in the 21$^{st}$ century and beyond. To this end, it is crucial for secondary school teachers to be competent with digital skills. The various competency skills which the teacher should posses according to Mmesoma, Obododike, and Okekeosisi (2020), Nwabueze and Nwokedi  (2015), include, the use of computers, magnetic and interactive boards, emails, basic micro soft word document,   networking, administration of tests, creation of new knowledge using computers, browse and print materials needed for lesson note preparation, use of learning apps such as Zoom, Teams, hangout (Meet), Skype, Goggle classroom, Adobe, whatsapp among others.

The teacher is at the center of teaching with the sole purpose of equipping the learner with the needed knowledge for survival in an ever changing environment. It is imperative for teachers to have the skills to maximize the use of computers as a teaching resource to enhance students learning. Teachers' competence in ICTs may aid distance teaching and learning, reduce bureaucracy in administration and enhance the management of important records in the school thus increasing efficiency of schools to provide quality education. Teachers' competence in ICTs may aid access to information in the internet and ensure that the content taught to students is in line with latest development. It further aids on line collaboration with peers, makes work easy, fast, stress free and allows ample time for other tasks. (Buladaco, 2020), (Sithulisiewe and Bhebhe,2016). It forces staff to be proactive, future oriented, attract and retain employees and increases a school's reputation. (Peretomode and Denzei 2019)

 A cursory look at secondary schools in Nigeria shows that there are no functional internet facilities, most secondary schools do not have functional computers especially in the rural areas, some teachers do not have android phones, functional emails, some cannot operate the computer, no internet facilities, lack of electricity and innovativeness on the part of government. (Ajayi and Ekundayo,(2009). Besides, ICT competency is not a requirement for teaching in

secondary schools and so the teachers are complacent to acquire ICT skills. Also, training of secondary school teachers in ICTs is random, deficient in scope and content required to meet the capacity needed.

Research findings have pointed at the ICT competence level among teachers in secondary schools in Nigeria and Delta state during COVID 19 pandemic. A study by Alasoluyi (2021) on the appraisal on ICT competence among teachers in secondary schools in Lagos state during the COVID-19 pandemic revealed that ICT competence among the teachers is low and that poor knowledge of ICT skills posed a significant challenge to its use. Nwachukwu, Ugwu and Wogu (2021) in a study on the impact of COVID-19 pandemic on education in Nigeria, discovered that 74% of parents and 64% of teachers identified that poor knowledge or skills posed a significant challenge to the use of ICTs for learning in primary and secondary schools to the extent that most teachers are novices in the use of computer and android phones. In a similar study by Omoniyi and Quadri (2013), in Ogun state, Nigeria, on the perceived competence of secondary school teachers, maintained that70% of the teachers have low competence because they are not adequately trained to use modern information media.

 Research studies have also shown that there are other factors that affect competences in ICT, for example, Bhebhe and Maphosa (2018) found out that there is a nexus between competency in the use of Smart phones and the computer. They stated that the possession and use of smart phones was related to internet access and this encourages teachers to use smart phones as a source of information in learning and instructional materials. In addition, the exhibition of certain negative attitude of teachers affects competence according to Olewele and Nzeadibe (2015), resistance to change is one of the reasons for low competence in ICTs. The teachers see the computer as an increase in their job task in the classroom. Similarly, Legg-Jack (2021) found out that ICT materials are not adequately available in primary, secondary and tertiary institutions and when they are absent the competence of teachers is doubtful.

 ICT competency may depend on school type and gender. For example, ThankGod and Innocent (2021) in a study of the availability and utilization of ICT in secondary schools in Rivers state found that there was a significant difference between public and private schools utilization of ICT facilities in teaching.   Likewise, gender may also influence competence of teachers in ICT. Male teachers manifested to be more competent in ICTs than female teachers because they appear to have more manipulative skills and more in tune with ICT gadgets than females. Looking at the place of ICTs as a powerful force of change in all aspects of life and especially in teaching and learning, it becomes imperative to investigate ICT competence among secondary school teachers in Delta state for quality teaching and learning.


 **Statement of the Problem**

The outbreak of Covid-19 has remained a propelling force that has helped to redefine teaching and learning with ICTs. They enrich learning through a combination of videos, texts and animation as well as being able to reach a large number of learners irrespective of distance or time. ICT is the new frontier and teachers' competence is the key in equipping learners with the knowledge and skills needed in today's digital world. Their integration into the teaching and learning process depends on teachers' competence.

Delta state has the fourth largest human development index in Nigeria and a large population of students. At the secondary school level, teachers are expected to demonstrate a good knowledge of ICT in the classroom especially at the period of the pandemic when that was the only option available.

This paper examines the importance of ICTs, its level of competence among teachers and its implication in teaching and learning in Delta state.


 **Purpose of the Study**

The purpose of the study is to determine the importance of ICT and its level of competence among secondary school teachers during the COVID- 19 pandemic and its implication in teaching and learning in Delta state. The study also sought to determine if there is a significant difference between the mean scores of public and private school teachers, male and female school teachers on competency of ICT skills during COVID 19 Pandemic in Delta state.

**Research Questions**

i) What are the perceived benefits of ICT competence among secondary school teachers during COVID -19 Pandemic

ii) What is level of ICT competence among secondary school teachers in Delta state during COVID 19-Pandemic.

**Hypotheses**

i) There is no significant difference between public and private school teachers on ICT competence in secondary schools in Delta state during COVID-19 pandemic

ii) There is no significant difference between male and female teachers on ICT competence in secondary schools in Delta state during COVID -19 pandemic

**Methodology**

The study examined ICT competence among secondary school teachers in Delta state during the COVID -19 pandemic. The descriptive survey design was used because, according to Peretomode (2015), it enables systematic gathering of information from respondents with the aid of a questionnaire on a prevailing circumstance with the aim of ascertaining and interpreting the phenomenon under investigation.

The population of the study comprised all teachers in public and private secondary schools in Delta State. The study covered all the secondary schools in the three Senatorial Districts of the state, namely; Delta North, Central, and South. The purposive sampling technique was used. Ten schools from each District (30 public and 30private schools) and fifteen respondents (9 teachers from public and 6 teachers from private schools). This gave a figure of 270 public and 180 private school teachers giving a sample size of 450 (205male and 245 female teachers) for the study.

The research instrument used for the study was a questionnaire titled Teachers Competence in ICTs in Secondary Schools (TCICTSSQ). It was divided into two main sections, A and B. Section A sought information on the demographic variables, while section B was made up of nineteen questions which was further subdivided into subsections: (i), Importance of ICTs ( ii) Competence in using ICTs. A four point rating scale of High competence, Average competence, Low competence and No competence was used.

The draft instrument was scrutinized by two experts in the Department of Educational Management and Foundations and their comments and corrections were incorporated into the final draft of the questionnaire, thus the face validity was established. The Cronbach Alfa statistics technique was used to determine the reliability of the instrument. This was done by using a sample of 30 respondents in two secondary schools outside the study area and it yielded a coefficient of 0.74. This confirmed the suitability of the instrument for the study. The researcher employed four trained research Assistants to facilitate the distribution of the instrument.

At each of the schools visited, permission was sought from the Principals or Vice Principals before the teachers were approached in their respective offices or staffrooms. The questionnaires were administered and collected soon after. Only 417 questionnaires were valid for analysis, representing 92% return rate.

Data collected was collated and analyzed using mean scores and standard deviation. This provided answers to the research questions while the t- test statistical tool was used to test the hypotheses at 0.05 level of significance.

**Research Question I**

What are the perceived benefits of ICT competence among secondary school teachers in Delta state during COVID-19 pandemic?

**Table I: Mean and standard deviation on the perceived importance of ICT competence among secondary school teachers**

| S/N | Perceived Benefits of ICTs | Mean | SD | Decision | |
|---|---|---|---|---|---|
| 1 | It makes teaching more interesting | 2.86 | 0.93 | Agree | |
| 2 | It improved the quality of Teachers work | 2.94 | 0.78 | Agree | |
| 3 | It creates easy access to reach out to other colleagues | 2.99 | 0.81 | Agree | |
| 4 | It helps to reduce administrative tasks | 3.49 | 0.50 | Agree | |
| 5 | It enables fast dissemination of information | 3.34 | 0.47 | Agree | |
| 6 | It enables teachers to be updated in latest development in their various disciplines | 3.72 | 0.70 | Agree | |
| 7 | It enhances on line learning | 2.73 | 0.63 | Agree | |
| | **Total Grand Mean** | **3.15** | **0.69** | | |

Table I revealed that items 1-7 had a mean range of 2.73-3.72 and a grand mean of 3.15 that is above the cut off mark of 2.50. However, all the items under the perceived benefits of ICT competence among secondary school teachers were above the benchmark. This indicates that the secondary school teachers perceived the benefits of ICT competence in Delta state during the COVID-19pandemic.This shows that competence in ICT is beneficial to teachers.

**Research Question II**

What is the level of ICT competency among secondary school teachers during COVID-19 pandemic?

| S/N | Level of Competence | Mean | SD | Decision |
|---|---|---|---|---|
| 8 | Ability to use Microsoft word | 2.11 | 0.85 | Disagree |
| 9 | Ability to use e-mail | 2.33 | 0.97 | Disagree |
| 10 | Ability to use the e-library | 2.36 | 0.48 | Disagree |
| 11 | Competency to give students notes online | 1.66 | 0.47 | Disagree |
| 12 | Skill to use video conferencing | 2.06 | 0.85 | Disagree |
| 13 | Capacity to use PowerPoint | 2.39 | 0.49 | Disagree |
| 14 | Knowledgeable in the use of Modems | 2.47 | 1.02 | Disagree |
| 15 | Skill in Browsing the internet with the computer | 2.12 | 0.87 | Disagree |
| 16 | Ability to Store information | 2.17 | 1.05 | Disagree |
| 17 | Knowledgeable in setting examination online | 2.18 | 0.96 | Disagree |
| 18 | Ability to use mobile phones for browsing | 2.13 | 1.12 | Disagree |
| 19 | Competency in the use of slides | 1.70 | 0.05 | Disagree |
| | **Total Grand Mean** | **2.14** | **0.80** | **Disagree** |

The result presented in table 2 shows that items 8-19 had a mean score range of 1.66-2.47 and a grand mean of 2.14 which was below the cut off mark of 2.50. Hence it revealed that the level of ICT competence of teachers is low in Delta State secondary schools during COVID-19 Pandemic

**Hypothesis I**

There is no significant difference between public and private secondary school teachers on ICT competence in Delta state during COVID-19 pandemic.

**Table 3**: **t-test analysis on public and private secondary school teachers on ICT competence**

| Variable | N | Mean | SD | Df | t- value | Sig |
|---|---|---|---|---|---|---|
| Public school Teachers | 270 | 36.40 | 3.11 | 448 | -3.038 | 0.003 |
| Private School Teachers | 180 | 37.32 | 3.18 | | | |

**Table 3** indicates the t-value of -3.038 and a p-value of 0.003. The null hypothesis was tested at an alpha level of 0.05. However, the null hypothesis which states that there is no significant difference between public and private secondary school teachers on ICT competence in Delta state during COVID-19 pandemic was rejected. This shows that there was a significant difference between public and private secondary school teachers on ICT competence during COVID-19 pandemic.

**Hypothesis 2**
There is no significant difference between male and female secondary school teachers on ICT competence during COVID-19 pandemic

**Table 4: t-test analysis on male and female secondary school teachers on ICT competence**

| Variable | N | Mean | SD | Df | t- value | Sig |
|---|---|---|---|---|---|---|
| Male Teachers | 205 | 45.70 | 2.31 | 448 | 5.764 | 0.000 |
| Female Teachers | 245 | 43.81 | 4.19 | | | |
| | | | | | | |

**Table 4** shows the t-value of 5.764and the p-value of 0.000, The null hypothesis was tested at an alpha level of 0.05. Thus, the null hypothesis was rejected. This indicates that there was a significant difference between male and female teachers on ICT competence in Delta state during C OVID-19 pandemic.

**Discussion of Findings**
The results on the perceived importance of ICT competence among secondary school teachers in Delta state revealed that it was beneficial to teachers because it made teaching more interesting, it improved the quality of teachers' work, enhanced collaboration among colleagues, enabled online teaching, fast dissemination of information and enabled teachers to be abreast with the latest development in their various disciplines. The finding is in line with Gracicio (2021), Buladaco (2020) Peretomode and Dinzei (2019) who submitted that it enhances the quality of teachers job through collaboration, ensures that teachers get latest information with regards to their various disciplines and encourages teachers to be proactive and future oriented.
The result of the finding on the level of ICT competence among secondary school teachers in Delta state shows that ICT competence was low in teachers' ability to use Microsoft word, power point, modems, browsing the internet, use of e-library, competency in the use of slides and storing information with the computer. This finding agrees with Alasoluyi (2021) who affirmed that ICT competence among teachers is low. This finding could be informed by lack of ownership of computers, android phones and training. The ownership of a computer affords one unlimited access and use of the devise at his/her convenience thereby enhancing ones competence. Although some teachers have and use Android phones they are mainly for personal use and not necessarily for academic purposes. Besides, ICTs are not a part of teaching and learning in most secondary schools in Delta state and neither is it a requirement for employment for employment. Hence some teachers are unconcerned about their low competence status in ICTs. This also explains why secondary school teachers could not rise up to the challenge of teaching with ICTs during the COVID-19 pandemic. This finding is in consonance with Nwachukwu, Ugwu and Wogu (2021) who stated that teachers' poor knowledge of skills in ICTs was a significant challenge in using e-learning facilities in primary and secondary schools during COVID-19 pandemic.
The study revealed that there was a significant difference in ICT competence between teachers in public and private schools in Delta state. Private school teachers were more competent in the use of computers during COVID -19 pandemic in Delta state. This finding supports Azubuike (2021), Olelewe and Nzeadibe (2015) that private school

teachers were better equipped and by extension more competent with ICTs facilities for teaching and learning during the COVID-19 pandemic. This could be as a result of provision of laptops, data, and training on how to use learning apps for teaching. Similarly, Legg -Jack (2021) reported that private schools invest more in teachers' professional development than in public schools and this has helped to improve the quality of teaching and learning.

The result of this study further showed that there was a significant difference between male and female secondary school teachers on ICT competence in Delta state during COVID-19. This finding could be attributed to the fact that women have less positive attitude to use ICTs as it concerns teaching tasks. Also during the COVID -19 pandemic, women were more predisposed to domestic chores and on how to keep their families and loved ones safe from contracting the virus. This finding could also be informed by the fact that males have greater self confidence in dealing with computers. This finding corroborates with Emelogu, Nwafor,Chigbu, Okoyeukwu and Eze (2022 ) and Emelogu, Nwafor, Chigbu, Okoyeukwu and Eze ( 2022) that male lecturers are more proficient than female lecturers in the use of ICTs for teaching. However, this finding is at variance with Owan, Asuquo , Ekaette, Aslam and Obla (2021) who submitted that, female lecturers showed a higher rate of preparedness to the use of ICTs for teaching during COVID -19 pandemic. The difference could be as a result of the location and the category of respondents (university lecturers) used in the study.

**Implications of the Study-**
It is evident from the findings of the study that the Nigerian educational system needs urgent and effective reformation in ICTs. The lukewarm implementation of ICT policies has not yielded the expected outcome in ICT development in schools. Teaching and learning have gone beyond the four walls of the classroom. Teachers' low competence in ICTs means that they are unable to access the internet, collaborate and get the latest information in their various disciplines. Teachers' lack of innovativeness and low competence in ICT also indicates that students are not exposed to the development of critical skills for higher education and 21ˢᵗ century skills needed for employment and socio economic development, and cannot compete favorably with their counterparts on the global platform. Teachers' skills need urgent improvement through a periodic and planned in service and pre service training. Furthermore, a gap in knowledge and development of ICTs exists between public and private schools in Delta state signifying inequality in access to quality education. This gap is further amplified between Delta state and the global community.

**Conclusion**
Teachers Competence in ICTs holds the key to knowledge and development in almost all aspects of human endeavor and education is not an exception. It is essential for equipping students for quality learning in today's dynamic and digital space. The study revealed that most teachers in Delta state secondary schools do not have the requisite skills, knowledge and capacity to meet the ICT needs in secondary schools.

**Recommendations**
Based on the findings of the study, the following recommendations were made:
1) Delta state government should provide adequate and regular training programmes for teachers in public schools. The programme should be relevant to the needs of teaching and learning in secondary schools
2) The Government should encourage teachers to own a personal computer by granting soft loans which could be repaid within one and half years. This would encourage teachers to use the computer constantly and gain the needed competence.
3) Female secondary school teachers should be encouraged to develop a more positive attitude towards the use of computers for teaching and learning.

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