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Relationship Between Teacher Characteristics and ICT Competence in The Context Of COVID-19 Pandemic in Nigeria.

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Abstract- ***Adaptation to technological and digital tools in teaching is a worrisome situation in Nigerian education sector despite the advancement and development of technology in the country. This study investigated the relationship between biology teacher characteristics and ICT competence in Enugu Education Zone. One (1) research question and three (3) null hypotheses guided the study which was tested at 0.05 level of significance. The study adopted the descriptive survey research design. The entire 105 public and 151 private biology teachers in Enugu Education zone were investigated given the total number of 256 biology teachers. The main instrument; structured questionnaire was validated and the reliability of the instrument was assessed using Cronbach Alpha, which yielded 0.849 showing high reliability. The research question was answered using mean and standard deviation while the null hypotheses were tested using Analysis of Covariance (ANCOVA). In conclusion, this study's findings suggest that ICT competence among teachers is not significantly influenced by gender, years of teaching experience, or type of school. The absence of significant differences across these variables implies that ICT training and professional development should focus on individual teacher needs, rather than demographic characteristics, schools and policy makers should prioritize inclusive, equitable ICT integration strategies, future research should explore other factors influencing ICT competence, such as teacher motivation, school culture, and resource availability.***

I. INTRODUCTION

Teaching is the process of facilitating learning, usually in a structured way. It is about guiding students to acquire knowledge, skills, values, and attitudes. Isola (2019) defines teaching as an interactive process it mainly concerns classroom conversations between teachers and students, and it takes place in specific definable activities. Teaching is interaction with students, enable them to understand and apply knowledge, concepts and processes (Eze, 2016). In fact, teaching is considered a conscious action. The purpose of learning promotion is to help students get information. Teaching is a process that helps meet the needs of students. Wants and questions often cause students to learn more than just specific things. But let's go beyond the norm. Teaching is one of the oldest professions in the world. Teaching is a diverse, dynamic and complex process that requires a pragmatic approach, Method. While teaching is a very rewarding profession, it is also very demanding.

People's feelings, needs and experiences, if expected, change noticed or demonstrated by students (Olabode, 2012). In recent years the classroom has changed radically. As long as distance learning continues, education and teaching will become possible. Distance learning is a way to provide teachers and students with have the opportunity to stay connected and engaged with teaching and learning content, while working from home. Remote learning makes teaching more flexible and allows students build their own ideas. Distance/Remote learning opportunities are often regarding an emergency situation that threatens student safety.

Transition to remote learning Education keeps students on track so that when they return to the physical school environment, they do not need to do intensive preparation to prepare for scheduled assessments. The teaching and learning environment includes various platforms, such as Google Classroom, Zoom, Platforms like Google Meet allow users to interact and learn new skills. This means that teachers decide whether to attend courses in person or suddenly online. Teachers will hold synchronized lessons via video conference Platforms such as Zoom, Google Classroom, whatsapp.com, classdojo,

Edmodo. Students will interact in the virtual classroom just as they would in person actual physical classroom.

According to Hodges, Moore, Lockee, Trust, and Bond (2020), distance/remote learning it involves teaching or instruction using a completely remote learning solution, which otherwise, the course will be taught i n person or in hybrid mode and will return to formed after the end of the crisis or emergency.

The main objectives of these measures are the issue is not to rebuild a strong educational ecosystem, but to provide temporary access to teaching and learning support with quick setup and in case of emergency or crisis such as the coronavirus (COVID-19 epidemic, home quarantine, kidnappings, supply shortages and rising fuel prices. Keep students off the streets and keep them safe, broadcast education and DVDs will be used to maintain and expand educational opportunities and to promote Education in Nigeria: Researchers Studied Biology Teacher's Remote Teaching Competence and responses to the COVID-19 pandemic: implications for teaching in emergency Situations, it is necessary to find creative solutions to problems in case of emergency.

According to Edeh, Nwafor, Obafemi, Shuvro, Atonye, and Omar (2020), a good Internet connection and access to technology are the enabling tools of online Education. Adeoye, Adanikin and Adanikin (2020), Interactive Competence and students' and teachers' confidence in the use of technology in education has also increased. Factors influencing the effective use of distance learning in education department. A willingness to embrace change is the key to successful integration of technology because it provides students with the 21st century skills of the century. Given the emergence of ICT in education, its role in improving the teaching method has been widely discussed and adopted in many research works around the world. As technology acts as a catalyst, supporting teachers and staff in preparing lessons delivery, Wings (2020)

Technology is a very important tool in 21st century education. Educational technology has changed teachers' traditional teaching methods. They are often seen as disseminators of knowledge, acting more flexibly act as a guide, mentor and motivator to encourage students to participate and learn (Onyema & Deborah, 2019). Technology makes distance learning, remote learning, and virtual learning more convenient. Blended learning, active learning, distributed learning, machine learning, ubiquitous learning, deep learning, cooperative learning, and collaborative learning. Most aspects of education in the process of digitalization, educational stakeholders, including students and teachers, are faced with the challenges of moving to online education. Technology has increased the accessibility of learning resources, such as Massive Open Online Courses (MOOCs) and multiple learning methods to meet the needs of different students (Onyema et al., 2019)

In line with Onyema and Deborah, Edeh et al. (2020) highlighted that online Education is the general concept of online teaching and learning with the help of technology, Tools and platforms. The success of online education depends on factors such as good internet access. Connectivity, learning software, digital skills, technology availability and accessibility. Educational platforms are important tools to support inclusive education and online learning. Online education was born from the advent of distance learning and digital technology facilitate efficient and reliable lessons, virtual classroom courses and other teaching materials and activities are available online. With the global application of the Internet and mobile technology, online education platforms can minimize disparities in education and thus reduce global illiteracy rates (Edeh et al., 2020)

There are various online educational tools/platforms that can facilitate Online training, especially during an epidemic like the coronavirus. Need to develop knowledge and skills to strengthen, improve and explore their teaching career. Educational goals change rapidly based on current needs. This requires teachers to have greater skills. These needs have a direct impact on the education system. Teachers are responsible for managing the education system and must be strong and highly efficient professional skill.

According to Nabina (2012) in Selvi (2020), competence is a set of knowledge, skills, and the experiences embodied in activities, Baloran (2020)

defines competence as “The knowledge, skills, attitudes, values, motivations and beliefs that people need to work successfully. "Ability refers to the ability of teachers to become to maximize student learning outcomes, teachers must possess a range of skills in extremely complex environments, hundreds of critical decisions need to be made every day. Skills are observable and measurable, they are the ability to evaluate teacher performance. Teaching skills may require equivalent levels of knowledge, skills and attitudes. Teachers' competence is divided into three main areas: field competence, teaching competence Capacity and cultural capacity. The professional capacity of teachers, according to Selvi (2007), it is composed of different dimensions in addition to the three main areas; in a study titled “English Teachers' Skills” are: Content Capacity, research capacity, course capacity, lifelong learning ability, socio-cultural ability, emotional ability, communication ability capacity, information and communication technology (ICT) capacity and environmental capabilities.

Information and Communication Technologies (ICT) Competence only is the focus of this work because it is related to remote teaching which is the thrust of this work. Information and Communication Technologies (ICT) Competence involves being alert to the latest updates and innovations of educational technology and software. They include any technology that helps to produce, manipulate, store, communicate, and/or disseminate information. Bailie, 2011 stated that teachers should use modern technology in managing, processing and communicating information in different formats to improve communication in teaching and learning.

A professional biology teacher should possess the following skills: professional and personal ability. Professional ability includes both academic and teaching ability. Academic competence refers to a teacher's knowledge of their subject. Teaching competence It is the art of teaching a subject by following the principle of teaching from the known to the unknown. From the unknown to the concrete, from the abstract to the simple, from the simple to the complex (Hussin, 2002). A teacher's success in the classroom depends largely on his education process.

So, what does it take to be a good biologist? Staff with professional qualifications and training in teaching biology, who have the necessary qualities or skills and demonstrate appropriate competence in the teaching process (Kin & Kareem, 2017). Other skills required of teachers include subject knowledge, teaching methods, Skills, processes, resources, behavioral motivation, and evaluation. Training Technology has changed the role of teachers and may require new skills. Teachers' skills in information and communication technologies (ICT skills) include:

Knowledge, skills, methods, values and other personal qualities determine the effective application of information and communication technologies in educational practice (Isola, 2019; Baloran, 2020). In emergency situations like the COVID-19 pandemic, distance learning is necessary.

The coronavirus outbreak is deepening the gap in the Ministry of Education globally. Although the coronavirus pandemic is new, it has already caused serious physical and mental harm, the mental damage suffered by humanity. The COVID-19 pandemic has disrupted the education system. It has proven difficult for the global health system to cope with these global health problems. No country in the world is immune to the impact of the new coronavirus epidemic. The world seems overwhelmed by the speed of the spread and the devastating impact of the coronavirus -19.

The coronavirus pandemic knows no borders and its impact is enormous and rapid. In just a few months since the outbreak of the epidemic, lifestyles around the world have changed radically. Billions of people are forced to "stay at home", "self-isolate", work and studying at home. This limits people's freedom of movement, trade, or association. COVID-19 has led to a total lockdown in many countries around the world, but i t has also led to thousands of people, including women and elderly people, died. Knowing the reports from Nigeria, America, Africa, Asia and other continents, Europe says the number of new cases and deaths due to COVID-19 is increasing every day. The COVID-19 pandemic has affected all aspects of human activities around the world, from education, research, sports, entertainment, transportation, worship, social gathering/interactions, economy, businesses, and politics. The pain caused

by the threat of the coronavirus pandemic is too much to bear. The education sector remains one of the sectors most affected by the COVID-19 pandemic.

(Edeh, Nwafor, Obafemi, Shuvro, Atonye, Sharma and Omar, 2020) In Nigeria, Lassa fever, avian influenza, monkeypox, Ebola and other epidemics have not exerted the same pressure on socioeconomic and educational systems as the new coronavirus. It has represented a heavy burden for the country, the education system and the population.

Those concerned are well aware of the impact this challenge can have, as the Nigerian government has ordered the closure of all schools, churches, and markets, and various social gatherings. This decision has been widely recognized by the country.

The Nigerian Universities Commission (NUC), the regulatory body for all universities in Nigeria, has also provided subsequently, an order was issued to close all universities nationwide. The government also suspend other forms of social gathering and ask employees to work from home. Italy confirms first coronavirus case in Nigeria. The patient was discharged from the hospital in accordance with government regulations, but new cases have since occurred. The country needs to do more in terms of disaster preparedness and response. It is worth noting that while many countries have closed schools, some, like Singapore, Sweden, Brazil, and Australia are keeping schools open to contain the spread of the virus illness. Timely school closures are a good support measure to control the spread of the epidemic. But it also has negative effects on millions of students around the world. They face multiple challenges in their educational journey (Edeh et al., 2020).

The urgent interruption of the education system in Enugu Nigeria as a result of the pandemic has led the government, parents, individuals, ministries of education at various levels and other concerned personnel to shift in the plans and strategies of financing the education of their children and the education system at large. The school academic calendar was changed, and, there were extra payments at various levels of the educational system. Some parents were forced to purchase laptops, android phones, television cables and other items of ICT, this is to ensure that their wards move with the new innovation of the online classes at various levels designed for teachers to reach out to their students.

Based on the report from UNICEF (2020), the coronavirus response monitoring plans, stated that, Nigerian education sector maintains a Response Monitoring Tool named 5W Matrix “Who is doing What, Where, When and for Whom” for monitoring Education Sector partners activities under the COVID19 contingency response. While the pandemic was still on, monitoring teams were submitting their reports on a monthly basis to the Education Sector secretariat team that appointed them. Based on the submissions, the Education Sector Secretariat team on a regular basis created maps and other tools to strengthen the coordination on the response; they ensured proper documentation in identifying gaps in order to prevent duplication of educational activities during and after this pandemic period. The Monitoring System also desires to minimize reporting requirements to partners while at the same time provide regular required information about the progress of programme implementation and ensure alignment with the amended Humanitarian Response Plan (HRP). Regular organization participating in this monitoring plans is critical to maintaining strong coordination because it was observed that it is through joint efforts that we can end the continuous grip of coronavirus. (Adelakun, 2020)

According to UNICEF's Coronavirus Response Monitoring Plan (2020), the Nigerian Ministry of Education maintains a matrix called the 5W Matrix (Who is What, where, when and for whom) is used to monitor the Ministry of Education's partners Various activities as part of the ongoing response to the COVID-19 emergency. During the epidemic, the monitoring team sends monthly reports to the Ministry of Education, appoint your secretarial team.

Based on the proposals, the Ministry of Education, the Secretariat team regularly produces maps and other tools to improve coordinate responses; ensure that appropriate documentation is available when gaps are identified so that to avoid duplication of teaching activities during and after the epidemic. The

monitoring system also seeks to minimize reporting requirements on partners while it the same time, regularly provide the necessary information on the progress of the project implement and ensure alignment with the revised Humanitarian Response Plan (HRP). Regular participation by organizations in these monitoring programs is essential to maintain momentum. coordination, because it has been observed that through joint efforts, the coronavirus will end. (Adelakun, 2020)

COVID-19 highlights socioeconomic inequalities in education in Nigeria system; many wealthy families in Nigeria send their children to private schools, because the application of technology in teaching is more practical than in public schools. Children attending private schools may experience only minor disruptions to their studies, because most of the standardized private school authorities ensure that their schools have a solid IT and communications infrastructure and be able to afford distance l earning.

From vulnerable groups who have never been exposed to viruses and do not have computers and other equipment. However, devices outside of school are forgotten. Students living in poor communities or you may find yourself at home with no internet connection, unstable power, or even no power at all.

Look, and those whose parents may not be able to afford an Android phone or use technology as the only means to transition to distance learning during the coronavirus pandemic or other circumstances requiring distance learning, such as homeschooling, Family, increased traffic, insecurity, biology teachers are equipped with such innovation? How many biology teachers are capable of modern applications? Do they have the skills/abilities necessary to teach in emergency situations? How's it going? Is it appropriate for science (biology) teaching? More below, this study, " Relationship between Teacher Characteristics and ICT Competence in the context of COVID-19 pandemic in Nigeria.

Among the factors that can affect biology teachers' remote teaching competence and response, Teachers teaching experience is one factor identified by Baloran, (2020), that can affect teacher's remote teaching competence and response. Baloran stated that the length of teaching experience affects the competence and response of teachers' to online learning education since teachers who have taught for several years have more experience dealing with difficult times like the pandemics or natural calamities, so also Kini & Podolsky, (2016) because teachers who have served for a long time have had the opportunity to attend seminar workshops needed in offering distance learning education. Koehler and Mishra, (2009) as well as Tondeur et al., (2012) also found that years of teaching experience significantly contribute to teachers' Information and Communication Technology (ICT) competence, as prolonged exposure to educational technologies enhances familiarity and proficiency.

Experienced teachers develop better pedagogical integration of ICT, effectively utilizing technology to support learning outcomes (Koehler & Mishra, 2009). However, research also suggests that continuous professional development and training are essential to maintain ICT competence, regardless of teaching experience.

It is however expected that digital natives (Prensky, 2001) would possess greater ICT competence than non-digital natives. This is because they are Tech-savvy, comfortable with digital tools, prefer interactive, visual, and networked learning and constantly connected and multitasking. Research however, suggests that ICT competence is not solely determined by age or digital nativeness; teaching experience and continuous professional development significantly impact ICT competence (Koehler & Mishra, 2009) and digital natives may require guidance on effective ICT integration in education (Tondeur et al., 2012).

Moreover, school types also affect teachers' remote teaching competence and response according to Eziuzo, (2022). School types refer to the various categories of educational institutions that differ based on factors such as age groups they serve, curriculum focus, governance, and educational philosophy examples: public schools, private schools, charter schools, magnet schools, online schools, Montessori schools, waldorf schools, religious schools, homeschooling, special education schools etc, Eziuzo, (2022). Each type of school provides various

approaches to education, catering to diverse needs and preferences of students and their families, also determines the type of teacher to be employed, quality teaching materials and school environment.

Furthermore, another factor that seems very closely related to school type as a determinant of teachers' remote teaching competence and response is gender.

Alea et al (2020) revealed that female respondents are more ready to offer online learning education to their students. These results agree with other studies where it was reported that as per the international technology education standards in higher institutions, female respondents significantly differ in terms of technology literacy, which is a requirement for offering online learning education (Alwraikat, 2017).

Finally, disparity in teachers' competence and response to teaching as a result of knowledge has been a source of worry. Al-Fudail & Mellar, (2008) reported that teachers lack of digital knowledge and competence, teachers experience so-called Technostress meaning a situation where technology has to be used to support the learning process, but the individual faces an internal (e.g. skills and experience in working with digital tools and platforms) or an external barrier (e.g. lack of computer, android phone, internet steady power supply). Skietniece, (2020), & Harris, (2020) in their separate studies reported that 80.5% of teachers lack technical means, as well as insufficient support for students in their use of technology, thereby creating inequalities in the acquisition of content. As the pandemic continues, persistent dissatisfaction with the quality of the learning process, individual digital competence, lack of technical and teaching resources and workload can lead to professional burnout. Teachers who burn out have more conflicts with students who may achieve lower results (Collie &Martin, 2017).

How has Enugu state fared regards to the factors discussed above? This study is therefore focused to fill the gap by investigating Biology Teachers' Remote Teaching Competence and Response to Coronavirus (COVID-19) Pandemic in Enugu Education Zone: Implications for teaching in emergency situations.

Study Rationale

The COVID-19 pandemic has accelerated the adoption of digital technologies in education, highlighting the urgency for teachers to develop robust ICT competence. The sudden shift to remote learning has exposed existing gaps in teacher ICT skills, emphasized the need for effective online teaching methods, and increased reliance on digital tools for student engagement and assessment. In this new landscape, understanding the relationship between teacher characteristics (gender, years of experience, and school type) and ICT competence is crucial. This study aims to:

1. Identify factors influencing teacher ICT competence in Enugu Educational zone.
2. Inform targeted interventions for improved ICT integration.
3. Make recommendations in line with the findings

Research Question

The following research question guided the study:

1. What is the level of relevant ICT competence possessed by biology teachers for remote teaching in Enugu Education zone by gender, school type and their year of teaching experience?

Null Hypotheses

The following formulated null hypotheses guided the study and were tested at 0.05 level of significance:

HO1 There is no significant difference between male and female biology teachers
ICT competence for remote teaching in Enugu Education zone.

HO2 There is no significant difference between private and public biology teachers
ICT competence for remote teaching in Enugu Education zone.

HO3 There is no significant difference between biology teachers with different years of experience on ICT competence for remote teaching in Enugu Education zone.

II. METHODS

Design of the Study:The research design was Descriptive Survey research design. The study was conducted in both public and private secondary

schools in Enugu Education Zone, Enugu state. Enugu Education Zone has a total of 32 public and 56 private secondary schools located across three local government areas that make up the zone namely: Enugu East, Enugu North, and Isi-Uzo LGA. The reason for choosing to work in the zone is because of the past observed lockdown that affected both teachers and students, schooling activities and the current sit-at-home and increase in transportation cost.

Population and Sample: The population for this study was one hundred and five (105) biology teachers teaching in all the thirty two (32) public Secondary Schools which comprised twenty (20) coeducation schools, eight (8) female schools and four (4) male schools in Enugu Education Zone, Enugu State for 2022/2023 academic session (Statistics unit, Post Primary School Management Board, Enugu, 2023) and one hundred and fifty one (151) biology teachers in the fifty six (56) private schools both in Enugu Education zone which comprised thirty nine (39) coeducation schools, twelve (12) female schools and five (5) male schools in Enugu Education Zone (Record unit, National Association of Proprietors Private Schools (NAPPS) Enugu State Chapter, 2024).

Instrument for and Method of Data Collection: A Questionnaire titled BiologyTeachers' Remote Teaching Competence and Response to Coronavirus (COVID-19) Pandemic in Enugu Education Zone: implications for teaching in Emergency Situations were used for the collection of data.

The Questionniare was divided into two sections. Section A consists of the respondent's bio data while section B contained statements and characteristics of a competent biology teacher in response to COVID-19 pandemic. The responses in sections B are scaled equally giving a scale of 4 points for each item. The questionnaire was given to one lecturer in Measurement and Evaluations and two lecturers in Biology Education for validation. The essence is to make sure that the complexity of the language is adequate for this group of teachers and that the instrument is sensitive to competence, biology teachers' teaching years of experience, school types and gender since these are variables in this study.

Face validity will be checked by the experts in biology education.

To determine the reliability of the instrument, a trial sample of 20 respondents was drawn from Agbani Educattion zone, 20 structured questionnaires was shared among the teachers which was filled and collected at the spot and Cronbach Alpha was used to check the internal consistency of relevant aspects of the instrument. The analysis gave coefficient of: 0.678, 0.693, 0.750, 0.797, 0.718 for clusters under section B and a coefficient of 0.849 for the whole section.

Copies of the questionnaire was administered to biology teachers after getting the right permission to do so and the teachers was encouraged to give their best opinion in filling the questionnaire. The questionnaire was given out according to the number of biology teachers in each school. This was done by the researcher who also collected the copies filled by the teachers on the spot.

Data Analysis: Descriptive statistics (Mean and Standard Deviation) was used to analyze the response in sections B while ANCOVA was used to test the differences between categories in each variable to biology teachers' response to coronavirus COVID-19 pandemic in Enugu Education Zone. This will be tested at 0.05 level of significance.

If the significant value obtained from the analysis is higher than 0.05, then the calculated F is deemed not significant meaning that the hypotheses is not rejected. If on the other hand, it is less than 0.05, then the hypothesis of no association/ independence is rejected as stated.

III. RESULTS

Research Question 1: What is the level of relevant ICT competence possessed by biology teachers for remote teaching in Enugu Education zone by gender, school type and their year of teaching experience?

Table 1: Mean and standard deviation on the level of relevant ICT competence possessed by biology teachers for remote teaching in Enugu Education zone by gender, school type and their year of teaching experience

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Table 1a ICT competence possessed by biology teachers for remote teaching by gender

SN	Information and Communication Technology ICT Competence/Technological skill	MALE = 45			FEMALE = 211			Total = 256		
		Mean	SD	Dec.	Mean	SD	Dec.	Mean	SD	Dec.
1	I have the ability to;									
	produce,	4.04	0.601	A	4.14	0.477	A	4.13	0.501	A
	manipulate,	3.67	1.066	A	3.45	1.113	A	3.49	1.106	A
	store,	3.67	1.087	A	3.55	1.104	A	3.57	1.100	A
	record	3.69	1.104	A	3.44	1.171	A	3.48	1.161	A
	communicate,	3.44	1.198	A	3.52	1.114	A	3.51	1.127	A
	disseminate information using social media	3.27	1.074	A	3.55	1.092	A	3.50	1.092	A
2	I have the knowledge and ability to access various technological resources and tools, such as;									
	email,	4.00	0.564	A	4.09	0.433	A	4.07	0.458	A
	Google,	3.44	1.159	A	3.53	1.084	A	3.52	1.095	A
	Internet browsers,	3.67	1.108	A	3.51	1.152	A	3.54	1.144	A
	Youtube,	3.47	1.160	A	3.38	1.158	A	3.39	1.157	A
	text and video chat applications,	3.58	1.196	A	3.59	1.119	A	3.59	1.131	A
	productivity software and applications	3.60	1.074	A	3.42	1.166	A	3.45	1.150	A
3	I have the ability to understand the learning and teaching capabilities and limitations of these tools mentioned above	3.89	0.532	A	4.14	0.524	A	4.10	0.533	A
4	I am aware of the technical potential of, and procedures used to create, e-content, such as;									
	email,	3.82	0.535	A	4.06	0.544	A	4.02	0.549	A
	Google classroom,	3.47	1.236	A	3.50	1.062	A	3.49	1.092	A
	telegram,	3.56	1.119	A	3.46	1.092	A	3.48	1.095	A
	whatsapp,	3.80	1.100	A	3.39	1.104	A	3.46	1.113	A
	zoom,	3.44	1.216	A	3.51	1.148	A	3.50	1.158	A
	e-books and	3.82	1.134	A	3.55	1.147	A	3.60	1.147	A
	instructional videos	3.84	0.562	A	4.07	0.548	A	4.03	0.556	A
5	I have the ability to be alert to the latest updates and renovations of educational technology and software	3.84	0.475	A	4.05	0.567	A	4.01	0.556	A
		3.67	0.97	A	3.66	0.95	A	3.66	0.95	A

Table 1a shows that the mean score of male biology teachers is 3.67 with standard deviation of 0.97 while the mean score of female biology teachers is 3.66 with standard deviation score of 0-95. This suggests that both genders have almost the same level of relevant ICT competence possessed.

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Table 1b ICT competence possessed by biology teachers for remote teaching by school type

		PUBLIC SCHOOL = 105			PRIVATE SCHOOL = 151			Total = 256		
SN	Information and Communication Technology ICT Competence/Technological skill	Mean	SD	Dec.	Mean	SD	Dec.	Mean	SD	Dec.
1	I have the ability to;									
	produce,	4.07	0.640	A	4.17	0.373	A	4.13	0.501	A
	manipulate,	3.63	1.068	A	3.40	1.126	A	3.49	1.106	A
	store,	3.52	1.084	A	3.61	1.113	A	3.57	1.100	A
	record	3.51	1.110	A	3.46	1.199	A	3.48	1.161	A
	communicate,	3.58	1.175	A	3.46	1.094	A	3.51	1.127	A
	disseminate information using social media	3.52	1.110	A	3.48	1.082	A	3.50	1.092	A
2	I have the knowledge and ability to access various technological resources and tools, such as;									
	email,	3.94	0.534	A	4.17	0.373	A	4.07	0.458	A
	Google,	3.43	1.134	A	3.58	1.067	A	3.52	1.095	A
	Internet browsers,	3.43	1.151	A	3.61	1.137	A	3.54	1.144	A
	Youtube,	3.40	1.132	A	3.39	1.177	A	3.39	1.157	A
	text and video chat applications,	3.73	1.171	A	3.49	1.095	A	3.59	1.131	A
	productivity software and applications	3.33	1.124	A	3.54	1.165	A	3.45	1.150	A
3	I have the ability to understand the learning and teaching capabilities and limitations of these tools mentioned above	3.98	0.604	A	4.18	0.463	A	4.10	0.533	A
4	I am aware of the technical potential of, and procedures used to create, e-content, such as;									
	email,	3.96	0.664	A	4.06	0.451	A	4.02	0.549	A
	Google classroom,	3.48	1.084	A	3.50	1.101	A	3.49	1.092	A
	telegram,	3.56	1.117	A	3.42	1.079	A	3.48	1.095	A
	whatsapp,	3.56	1.082	A	3.39	1.131	A	3.46	1.113	A
	zoom,	3.54	1.201	A	3.46	1.130	A	3.50	1.158	A
	e-books and	3.75	1.150	A	3.49	1.136	A	3.60	1.147	A
	instructional videos	3.98	0.679	A	4.06	0.451	A	4.03	0.556	A
5	I have the ability to be alert to the latest updates and renovations of educational technology and software	3.94	0.677	A	4.06	0.451	A	4.01	0.556	A
		3.66	0.99	A	3.67	0.92	A	3.66	0.95	A

Table 1b shows that school type is not a critical factor in the level of relevant ICT Competence possessed by biology teachers since both public and private biology teachers had similar mean scores

(3.66, 3.67) and standard deviations (0.99, 0.92 respectively).

Table 1c: ICT competence possessed by biology teachers for remote teaching years of teaching experience

SN	Information and Communication Technology ICT Competence/Technological skill	1 - 5YEARS = 68			5 - 10YEARS = 44			10 - 15YEARS = 58			15YEARS AND ABOVE = 86			Total = 256		
		Mean	SD	Dec.	Mean	SD	Dec.	Mean	SD	Dec.	Mean	SD	Dec.	Mean	SD	Dec.
1	I have the ability to;															
	produce,	4.07	0.467	A	4.11	0.443	A	4.09	0.388	A	4.20	0.610	A	4.13	0.501	A
	manipulate,	3.29	1.134	A	3.66	1.077	A	3.55	1.127	A	3.52	1.082	A	3.49	1.106	A
	store,	3.68	1.043	A	3.48	1.171	A	3.88	1.109	A	3.34	1.058	A	3.57	1.100	A
	record	3.60	1.174	A	3.39	1.185	A	3.60	1.184	A	3.36	1.126	A	3.48	1.161	A
	communicate,	3.26	1.128	A	3.20	1.112	A	3.60	1.138	A	3.79	1.064	A	3.51	1.127	A
	disseminate information using social media	3.44	1.111	A	3.66	1.098	A	3.57	1.094	A	3.42	1.079	A	3.50	1.092	A
2	I have the knowledge and ability to access various technological resources and tools, such as;															
	email,	4.07	0.467	A	4.11	0.443	A	4.09	0.388	A	4.05	0.507	A	4.07	0.458	A
	Google,	3.44	1.013	A	3.50	1.210	A	3.38	1.057	A	3.67	1.121	A	3.52	1.095	A
	Internet browsers,	3.51	1.086	A	3.64	1.222	A	3.36	1.055	A	3.62	1.209	A	3.54	1.144	A
	Youtube,	3.32	1.215	A	3.45	1.190	A	3.43	1.078	A	3.40	1.161	A	3.39	1.157	A
	text and video chat applications,	3.62	1.107	A	3.45	1.150	A	3.76	1.144	A	3.52	1.135	A	3.59	1.131	A

	productivity software and applications	3.59	1.136	A	3.27	1.149	A	3.45	1.187	A	3.44	1.144	A	3.45	1.150	A
3	I have the ability to understand the learning and teaching capabilities and limitations of these tools mentioned above	4.16	0.563	A	4.16	0.568	A	4.17	0.500	A	3.97	0.496	A	4.10	0.533	A
4	I am aware of the technical potential of, and procedures used to create, e-content, such as;															
	email,	4.10	0.522	A	3.95	0.645	A	4.14	0.511	A	3.91	0.523	A	4.02	0.549	A
	Google classroom,	3.54	1.071	A	3.48	1.000	A	3.64	1.055	A	3.36	1.177	A	3.49	1.092	A
	telegram,	3.34	1.154	A	3.64	1.059	A	3.33	1.066	A	3.60	1.077	A	3.48	1.095	A
	whatsapp,	3.75	1.098	A	3.43	1.087	A	3.57	1.078	A	3.17	1.108	A	3.46	1.113	A
	zoom,	3.38	1.172	A	3.45	1.302	A	3.47	1.080	A	3.63	1.128	A	3.50	1.158	A
	e-books and	3.60	1.108	A	3.91	1.235	A	3.52	1.158	A	3.49	1.114	A	3.60	1.147	A
	instructional videos	4.12	0.533	A	3.95	0.645	A	4.16	0.523	A	3.91	0.523	A	4.03	0.556	A
5	I have the ability to be alert to the latest updates and renovations of educational technology and software	4.10	0.493	A	3.91	0.640	A	4.14	0.511	A	3.91	0.566	A	4.01	0.556	A
		3.67	0.94	A	3.66	0.98	A	3.71	0.93	A	3.63	0.95	A	3.66	0.95	A

Table 2c shows that years of teaching experience is a number when it comes to the level of relevant ICT competence possessed by biology teachers in Enugu education zone, their mean scores and standard

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deviation (SD) are extremely close by 1-5 years, mean score = 3.67 and SD = 0.94, 5-10 years, Mean score =3.66 and SD = 0.98, 10-15 years, Mean score = 3.66 and SD = 0.93, 15 years and above; Mean score = 3.63 and SD = 0.95.

Null Hypothesis

The following null hypotheses were tested at 0.05 level of significance:

HO1 There is no significant difference between male and female biology teachers ICT competence for remote teaching in Enugu Education zone.

Table 6: ANCOVA analysis of the mean ratings of male and female biology teachers on ICT competence for remote teaching in Enugu Education zone

Source	Type III Sum of Squares	Df	Mean Square	F	Sig.	Dec.
Corrected Model	.508[a]	1	0.508	0.019	0.891	
Intercept	878793.977	1	878793.977	32724.085	0.000	
GENDER	0.508	1	0.508	0.019	0.891	NS
Error	6821.082	254	26.855			
Total	1521721.000	256				
Corrected Total	6821.590	255				
a. R Squared = .000 (Adjusted R Squared = -.004)						

Table 6 shows that the f-value on the mean ratings of male and female biology teachers on ICT competence for remote teaching in Enugu Education zone is 0.0.019, and this is significant at 0.891, which is greater than 0.05 level of significance set for the study. The hypothesis is therefore not rejected as stated.

HO2 There is no significant difference between private and public biology teachers ICT competence for remote teaching in Enugu Education zone.

Table 7: ANCOVA analysis of the mean ratings of private and public biology teachers on ICT competence for remote teaching in Enugu Education zone

Source	Type III Sum of Squares	Df	Mean Square	F	Sig.	Dec.
Corrected Model	.622[a]	1	0.622	0.023	0.879	
Intercept	1465643.778	1	1465643.778	54577.815	0.000	
TYPE	0.622	1	0.622	0.023	0.879	NS
Error	6820.968	254	26.854			
Total	1521721.000	256				
Corrected Total	6821.590	255				
a. R Squared = .000 (Adjusted R Squared = -.004)						

Table 7 shows that the f-value on the mean ratings of private and public biology teachers on ICT competence for remote teaching in Enugu Education zone is 0.023, and this is significant at 0.879, which is greater than 0.05 level of significance set for the study. The hypothesis is therefore not rejected as stated.

HO3 There is no significant difference between biology teachers' year of experience on ICT competence for remote teaching in Enugu Education zone.

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Table 8: ANCOVA analysis of the mean ratings of biology teachers' year of experience on ICT competence for remote teaching in Enugu Education zone

Source	Type III Sum of Squares	Df	Mean Square	F	Sig.	Dec.
Corrected Model	91.055[a]	3	30.352	1.136	0.335	
Intercept	1430587.723	1	1430587.723	53563.070	0.000	
YEARS	91.055	3	30.352	1.136	0.335	NS
Error	6730.535	252	26.708			
Total	1521721.000	256				
Corrected Total	6821.590	255				
a. R Squared = .013 (Adjusted R Squared = .002)						

Table 8 showed that the f-value on the mean ratings of biology teachers' year of experience on ICT competence for remote teaching in Enugu Education zone is 1.136, and this is significant at 0.335 level of significance, which is greater than 0.05 level of significance set for the study. The hypothesis is therefore not rejected as stated.

IV. DISCUSSION OF THE FINDINGS

Gender and Biology Teachers' Remote Teaching Competence (ICT, Communication Competence)

The study showed that there is no significant difference between male and female biology teachers ICT competence for remote teaching in Enugu Education zone. This is because gender does not inherently determine competence in any field, including ICT (Information and Communication Technology). According to Hill, Corbett, and Rose (2010) competence is based on skills, knowledge, experience, and attitude, which are not determined by gender. Gender refers to the socially and culturally constructed characteristics and roles which are ascribed to males and females in any society. This means that one's gender do not affect his/her abilities.

Influence of School Type on Biology Teachers' Remote Teaching ICT Communication Competence

The result of the analysis showed that there is no significant difference between private and public-school biology teachers ICT competence for remote teaching in Enugu Education zone. This finding indicated that both private and public schools have ICT centers but the quality and quantity of this center depend on the availability of technical tools, applications to link content with different communication tools with access to stable internet and steady electricity depends on the type of school and the competencies of their teachers.

Influence of year of Teaching experience on Biology Teachers' Remote Teaching ICT Communication Competence

The result of this study recorded no significant difference between biology teachers' year of experience on ICT competence for remote teaching in Enugu Education zone. All the biology teachers in both private and public schools agreed to all the items in the questionninar. Gossin, (2014) defines Years of teaching experience as the total time a teacher has spent in the profession, often measured in full academic years and provides a foundation for understanding student needs, curriculum development and effective teaching strategies. While more years of experience can contribute to teaching competence, it is not the sole factor. Ali, (2020), Koehler and Mishra (2009 noted that continuous professional development, reflective practice, and staying updated with educational research and trends plays crucial roles in enhancing teaching competence.

However, remote teaching competence is teacher's abilities to effectively deliver instruction and manage a classroom in an online or virtual environment and not about how many years a teacher have been in the field. This competence includes familiarity with

digital tools and platforms, the ability to engage and motivate students remotely, managing virtual classroom, adapting lesson plans for online delivery, and addressing the unique challenges of distance learning, such as ensuring student participation and accessing learning outcomes in non-traditional setting. The findings suggest that whereas digital natives may have the above to their advantage, training and experience play a crucial role in the ICT competence of teachers.

CONCLUSION

In conclusion, the intersection of teaching experience, ICT competence, and digital nativeness underscores the imperative of training and continuous professional development for educators. While digital natives may possess inherent technological familiarity, effective ICT integration in education requires pedagogical expertise, content knowledge, and contextual understanding. Embracing training and continuous professional development will ensure teachers stay abreast of emerging technologies, pedagogies, and student needs, ultimately transforming teaching and learning for the digital age in readiness for emergencies and remote teaching whenever needed.

To enhance teachers' readiness for remote teaching, schools and policymakers should prioritize ongoing teacher training and professional development programs, contextualize ICT training, addressing specific teaching needs, encourage collaborative learning communities, promoting peer support and knowledge sharing and carry out regular evaluation and updating of ICT infrastructure and resources.

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