Research Paper

Effectiveness of ICT Integration in Nigerian Educational System

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Abstract

The integration of ICT will help both students and teachers meet the global requirement to replace traditional teaching methods with technology-based teaching and learning tools and facilities. In Nigeria, ICT is considered one of the main elements in transforming the country into future development. This study aims to analyze teachers' perceptions of ICT integration's effectiveness to support the classroom's teaching and learning process. A survey questionnaire was distributed randomly to 101 teachers from 10 public secondary schools in Delta State, Nigeria. These quantitative research data are analyzed for descriptive and inferential statistics using SPSS software. The Findings show that ICT incorporation is highly beneficial to both teachers and students. According to the findings, one of the most critical factors in technology-based teaching and learning is teachers' well-equipped training with ICT resources and facilities.

Keywords: *ICT, Teaching and learning, national policy, Nigeria, Information technology, technology integration, Technology effectiveness, education.*

I. INTRODUCTION

Information, communication, and technology (ICT) integration in education refer to incorporating computer-based communication into the regular classroom instructional process. Teachers are seen as critical players in using ICT in their regular classes and training students for the new digital age. This is because of ICT's ability to create a dynamic and proactive teaching-learning environment (Arnseth & Hatlevik, 2012). Although ICT integration seeks to enhance the consistency, accessibility, and cost-effectiveness of instruction delivery to students, it also refers to networking learning groups' advantages to resolve current globalization challenges (Albirini, 2006, p.6). Adopting ICT is not a single step, but it is an ongoing and continuous step that fully supports teaching and learning and information resources (Young, 2003).

The word "technology" has become an important topic in many fields, including education, in the twenty-first century. In most countries, technology has become the primary means of knowledge transfer in most countries. Our communities have been transformed by technological integration, which has changed the way people think, operate, and live (Grabe, 2007). As a result, schools and other educational institutions tasked with preparing students for life in a "knowledge society" must include ICT in their curricula (Ghavifekr, Afshari & Amla Salleh, 2012).

ICT is applied in numerous ways to help teachers and students learn about their respective subject areas. Educational images, stimulation, data storage, database use, mind-mapping, guided exploration, brainstorming, music, and the World Wide Web (www) are just a few of the exciting ways that technology-based teaching and learning can make the learning process more rewarding and meaningful (Finger & Trinidad, 2002). On the other hand, students will benefit from ICT incorporation because the curriculum or tools will not constrain them. Instead, in a technology-based course, hands-on exercises are designed to promote their comprehension of the subject. It also helps teachers design their lesson plans in a practical, creative and exciting approach that would result in students' active learning. Previous research has shown that integrating ICT into the classroom enhances the learning process and maximizes students' successful learning abilities (Finger & Trinidad, 2002; Jorge et al., 2003; Young, 2003; Jamieson-Procter et al., 2013).

In education, ICT incorporation refers to a technology-based teaching and learning process directly related to the use of learning technologies in classrooms. ICT integration in schools, especially in the classroom, is important because students are familiar with technology and perform better in technology-based environments. This is because the use of technology in education has a significant impact on pedagogical aspects. With the assistance and encouragement of ICT elements and components, ICT application can lead to

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successful learning (Jamieson-Procter et al., 2013). It is true to say that technology-based tools and equipment can help students learn almost any subject, starting with mathematics, science, languages, arts and humanities, and other vital fields. Besides, ICT provides help and complementary supports for both teachers and students where it involves effective learning with the computers' help to serve the purpose of learning aids (Jorge et al., 2003). Computers and technology are not intended to take the place of good teachers' tools; rather, they should be used in conjunction with better teaching and learning. The importance of ICT integration in education is critical since technology allows teaching and learning to occur in the classroom, even though teachers and students are physically separated. However, ICT integration is a continuous learning process that offers a proactive teaching-learning environment rather than a one-time learning process (Young, 2003).

Technology-based teaching and learning can make many school changes that require proper planning and policymaking. Both researchers and politicians must have the same interpretation of the strategy. National ICT policies, according to Dudeney (2010), may serve several essential functions. They provide a justification, a set of objectives, and a vision of how education systems can operate if ICT is fully incorporated into the teaching and learning process. Students, teachers, parents, and the general population of a country benefit from them.

However, ICT infrastructure and ICT facilities are then needed to supply schools throughout the nation. A critical factor in using ICT is good computer labs and ICT equipment. As a result, teachers will have easy access to ICT resources whenever they need them (Hennessy, Ruthven, & Brindley, 2005). One of the most severe issues that schools in rural areas face is insufficient ICT equipment and internet connectivity. For example, research findings indicate that some Kenyan schools have computers, but that this may be limited to a single computer in the office. Even in computer-equipped colleges, the student-to-computer ratio is high. The study also shows that ICT infrastructure is funded by parental initiative or community control in schools that have it (Chapelle, 2011).

Technical problems in most schools have grown to be a significant issue, a source of dissatisfaction for students and teachers, and have disrupted the teaching and learning process. Teachers cannot use the device temporarily if there is a shortage of technical support and no repair (Jamieson-Proctor et al., 2013). As a result of not receiving any assistance on the subject, teachers would be discouraged from using computers to fear equipment failure. According to Türel and Johnson's (2012) report, technical issues become a significant barrier for teachers. Poor communication, a virus attack, and a malfunctioning printer are examples of these issues. There are, however, a few exceptions. Schools in the Netherlands, the United Kingdom, and Malta have recognized the value of technical assistance in assisting teachers in using ICT in the classroom (Yang & Wang, 2012).

Teachers' readiness and expertise in using ICT are critical in implementing ICT in the classroom. Teachers must have ample ICT skills and a high degree of trust to integrate technology in the classroom. Furthermore, to use ICT effectively in their teaching process, teachers need to understand its pedagogical function (Hennessy et al., 2005). According to Winzenried, Dalgarno, and Tinkler (2010), teachers who have taken ICT courses are more successful at teaching with technology resources than those who have not. Teachers in an Irish school indicated that they stopped using ICT because they lacked trust. A similar situation arose in Canada, where some teachers confessed to being unwilling to use ICT because they were afraid of being humiliated if their students knew more about the technology than they did (Hennessy et al., 2005).

Schools had used various techniques to provide further professional development for teachers and fundamental skill instruction. According to Warwick and Kershner (2008), in order to deliver a good lesson using ICT, teachers must be aware of the value and benefits of ICT. Teachers can undergo training courses to learn how to integrate ICT into the teaching and learning process. Despite this, many schools used peer-tutoring services. A more experienced ICT instructor will support and mentor another teacher new to ICT and the preparation work for the teaching and learning process. As discussed, there are many factors to enable ICT use in classroom teaching and learning. Start with policy, complement all ICT hardware and software, and finally, the teacher's preparation and skills to incorporate it into the pedagogical process (Agbatogun, 2012). Also, technical assistance and ongoing professional development in ICT should be given regularly. In short, both parties must work together to transform the country into a technologically advanced nation.

This study's primary purpose is to analyze the effectiveness of ICT integration in Nigeria. Specifically, this study aims to identify;
- The effectiveness of ICT integration from teaching and learning perspectives and
- The practical elements of ICT integration in teaching in public schools in Delta State Nigeria.

Integration of ICT in the Nigerian Educational System: Challenges

As stated by Rowland (1996) and cited by Hafkin (2002), information and communication technology (ICT) policy can be divided into three categories: vertical, infrastructural, and horizontal policies. Vertical ICT legislation addresses sectoral needs such as education, health, and tourism. The project's infrastructure section is concerned with building national infrastructure, which is closely linked to telecommunication. The effect on broader facets of society, such as freedom of information, tariffs, pricing, privacy, and protection, is dealt with horizontally. The Nigerian IT policy adequately addresses these three aspects. It is now necessary to review the text because it affects education. The writer was motivated by four main questions when completing this review.

- What can we learn about education from Nigeria's national policy on information technology?
- How successful is Nigeria's strategy for incorporating ICT into the educational system?
- What are the implications for Nigeria's educational system?
- What agenda is needed to reshape national policy to meet the country's educational system's needs?

Solutions

The answers to these questions would be used to restructure and improve Nigeria's national information technology strategy (the Federal Republic of Nigeria, 2001). Next, the document's mission statement acknowledged the need to "Use IT for Education" (p. iii). Also, three of the 31 specified objectives (xv, xvi, and xxiv) stressed the importance of using information technology to:

- equipping young people with IT skills and preparing them for global competition.
- Integrate IT into the educational and training phase.
- To ensure Nigeria's competitiveness in international markets, create new multifaceted IT institutions as centers of excellence (pp. iv–v).

Twenty tactics were presented in order to achieve these goals. "Restructuring education at all levels to respond effectively to the challenges and anticipated consequences of the information age," the fifth strategy said, "including the allocation of a special IT development fund to education at all levels" (p. vi).

While the document's mission, general goals, and strategies acknowledge the importance of ICT in education, it does not refer to education on a sectoral (vertical) basis. Education-related concerns are included in the sectoral application for human resource growth. Objectives 1 to 4 in this sectoral application are related to education in the following way:

- To build a pool of information technology engineers, scientists, technicians, and software developers;
- To increase the number of qualified staff available;
- To offer appealing job opportunities; and
- To improve required IT skills in a variety of areas.

Nine main strategies are outlined to meet the goals of human resource development. These initiatives are aimed at improving information technology awareness and skills. This includes the following:

a. Making the use of ICT compulsory in all educational institutions;
b. ICT curricula for primary, secondary, and tertiary institutions are being developed;
c. use of ICT in distance education;
d. ICT companies investment in education;
e. study grant and scholarship on ICT;
f. National Youth Service Corps members may participate in a train-the-trainer program.
g. Creation of ICT capability at the zonal, national, and local levels;
h. development of dedicated ICT primary, secondary, and tertiary educational institutions in the private and public sectors; and
i. Collaborating on foreign and domestic ICT information transfer projects Despite these educational goals and plans, the paper falls short of addressing the country's educational system's needs. The following are a few of the flaws identified in the paper.

First, the proposal does not apply to education in any way. Health, agriculture, art, culture, tourism, and governance all have sectoral applications, but education falls under human resource development. The need for sectoral allocation dedicated to education is expressly stated in an ADF (1999) recommendation.

Second, the educational goals and strategies expressed in the sectoral application for human resource growth are motivated by market forces. Students are only being taught to learn knowledge and skills in preparation for potential jobs. The emphasis is solely on learning about ICT, a term known as 'Topicality.' The early stages of ICT usage in education are prioritized in primary and secondary schools, on the other hand (Cloke and Sharif, 2001). This mentality limits ICT's educational ability to a core economic competitiveness factor. As a result, its potential as a method for resolving teaching and learning issues and as a change agent is

overlooked (Culp, Honey, and Mandinach, 2003). ICT should be used to develop and administer teaching and learning in Nigerian schools to teach students how to use computers.

Third, teachers are essential for effective ICT learning and ICT learning and teaching. Computer education, which has been provided in Nigerian secondary schools since 1988, has failed mainly due to teacher incompetence (Yusuf, 1998). According to empirical studies, teachers' capacity and willingness to use ICT and incorporate it into their teaching are mainly dependent on the professional development they obtain, according to empirical studies (Watson, 2001; Davis, 2003; Pearson, 2003; Selinger and Austin, 2003). According to Culp et al. analysis, 's the Nigerian national IT policy is silent on teacher education and ICT professional growth (2003).

Learning with ICT necessitates the development of nationally specific background software for schools. The national strategy ignores the importance of developing high-quality applications. Seven key recommendations arise from a 20-year analysis of 28 key policy documents in the United States (Culp et al., 2003). The second focuses on the creation of higher-quality content and applications. The available program in Nigerian schools is imported and does not contain any local content. This is not addressed in the policy paper.

Culp et al. (2003) also recommend increasing testing, evaluation, and assessment. None of the issues concerning using ICT in the Nigerian educational system discuss testing, evaluation, or assessment, which are all essential for progress. Access, professional development, usage and competence, attitude, and other issues should be addressed in research, evaluation, and assessment.

Furthermore, there is no clear guidance on ICT or technology plans at the study's institutional level. ICT plans are unique in advanced countries. For example, in the United Kingdom and Northern Ireland, the National Grid for Learning Initiatives and Education Technology's strategy tackled ICT issues (Selinger and Austin, 2003). There are no guidelines for school technology plans in Nigerian national policy.

These inadequacies imply that the national policy cannot adequately take care of the Nigerian education system's needs. Its educational focus is limited to the market-driven goal. The importance of integration in teaching and learning and the need for high-quality preservice and in-service teacher professional development, testing, assessment and development, and local context software development are not discussed. These are essential elements of successful ICT use in education.

Given these inadequacies, there is a need to revise the Nigerian national policy for information technology. Such updates should include education stakeholders to ensure that the policy addresses learning about ICT and learning by ICT. Furthermore, sectoral implementation areas' goals should include education to extend the market-driven objectives. The main emphasis should also be on integrating ICT into any aspect of teaching and learning.

Even though infrastructure is implicit in the current policy, it should be checked to discuss access policy in specific terms, as it is crucial in ICT integration. Infrastructure requirements must be addressed at all government levels, including zones and schools.

Teachers are critical to integrating ICT in education, so IT should be a national policy that addresses teacher professional development. Teacher education institutions and ICT problems, preservice teacher education, in–service teacher education, and requirements for teacher competence and qualification in ICT should all be included.

Since research, evaluation, and appraisal are essential for ICT use in education, the national policy should establish a framework for measuring ICT application performance. A framework like this would inspire schools to improve their ICT integration practices.

Conceptual Framework

Two theories of Diffusion of Innovations by Rogers (2003) and Technology Acceptance Model (TAM) by Davis (2003) have been described and adapted to the research setting as the conceptual basis for this study in light of ICT incorporation to improve a quality teaching and learning experience in schools (Figure 1). Rogers' theory explains how innovation is transmitted among social system participants across specific networks and over time. The process will start with the "knowledge" of the first channel that represents characteristics of the ICT users' decision-making unit to integrate the technology. Moreover, it ends with "confirmation" by the users to accept the technology and integrate it accordingly. The TAM theory has many components that reflect user acceptance of ICT, such as behavioral intention, perceived utility, and ease of use. If perceived utility refers to a person's belief that using a specific technology can help them perform better at work, perceived ease of use refers to how important it is for technology to be user-friendly. TAM theory was created to assess the effectiveness or performance of the technology in assessing a particular method's utility and efficacy. It is also referred to as the most prominent theory in information management research today. Over time, however, the theory has expanded to include more complex variables that illustrate how a consumer will adopt a technology.
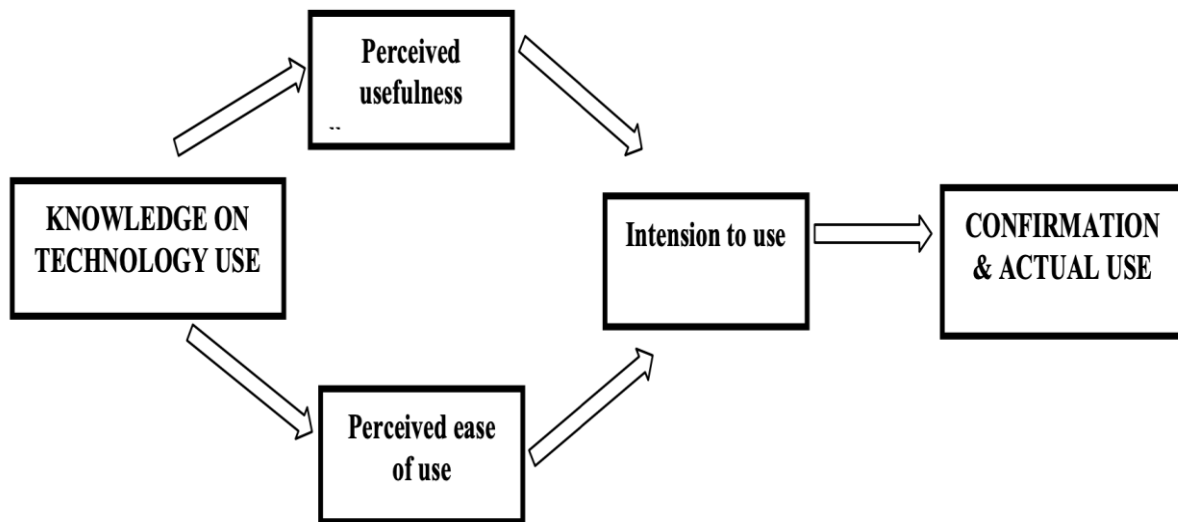
Figure 1. Conceptual framework of study (Davis, 2003; Rogers, 2003)

The proposed structure outlines how awareness and expectations can influence the perceived utility and ease of ICT incorporation and includes multiple variables directly related to the study's central goal. The conceptual system variables have been meticulously interlaced so that the interrelationship between them can be used to assess their efficacy in assisting teachers with ICT integration. However, the primary variable that supports the critical elements in the above system, such as ease-of-use, functionality, versatility, accessibility, and incorporation, is teachers' intention to incorporate ICT. Teachers' intentions to use technology are often affected by their expectations of the system's effectiveness and perceived ease of use, which dictates how much ICT is used. This study used the proposed structure to look at the factors that influence school teachers' use of technology.

II. METHODOLOGY

Research Design

The quantitative approach was used to collect and interpret the respondents' data in this report. The questionnaire was created and finalised by the researchers before being distributed to the respondents' target group. There were just a few sections on the questionnaire that were explicitly designed to deal with science.

In a public school in Delta State, Nigeria, about the efficacy of ICT integration for students in learning and realistic ICT integration components. As a result, the questfinalizedwas distributed to the respondents to collect data.

Population and Sampling

The respondents' overall total was 101 teachers from public primary and secondary schools in Delta State, Nigeria. Regardless of gender, race, teaching experience, or highest teaching experience, the questionnaire was randomly distributed to respondents with teaching backgrounds. The researchers have no preferences as long as they come with teaching backgrounds, especially in a public primary and secondary school in Delta State, Nigeria. The researchers attempted to recruit teachers from public primary and secondary schools in Delta State to participate in this study because the intended respondents for this study are individuals with teaching backgrounds. As a result, the number of questionnaires distributed is not equal, with secondary school teachers outnumbering primary school teachers in the total population.

Instrumentation

This study's key instrument was a survey questionnaire with 43 items, which was used to assess the efficacy of ICT integration in teaching and learning in public schools in Delta State, Nigeria. There were a total of 101 questionnaires distributed. All respondents were asked to read the statements and answer on a four-point scale, with four being Strongly disagreed, three being Disagree, two being Agree, and one Strongly agreeing. The questionnaires were divided into four parts. The respondents' demographic history is covered in Section A, which includes gender, teaching experience, type of school, school location, preferred teaching style, and willingness to use ICT in the classroom. The other three sections in the questionnaire focus more on teachers' perceptions and ICT integration effectiveness. Section B comes with 15 items that look into teacher's perception

of ICT in teaching; section C consists of 10 items that look into the effectiveness of ICT integration for students in learning; meanwhile, section D comes with ten items that look into the practical elements of ICT integration in teaching. This quantitative analysis questionnaire was adapted and updated from Gulbahar and Guven's original questionnaire, which was deemed appropriate for this study. Some of the items are planned and created by the researchers by the title chosen so that the items developed can address both research questions.

Data Collection Procedure

The researchers modified the questionnaire before finalizing and distributing it to the respondents' target group. Then, each researcher takes up 50 and 51 questionnaires, which made 101 questionnaires distributed to all respondents. The data were collected within two weeks through random distribution, and some of the questionnaires were sent to respondents' email. The respondents had 3-5 days to complete the survey and return it to the researcher for data analysis. After two weeks, the researcher gathered and compiled all of the completed questionnaires for further data processing to obtain the research's production and results.

Data Analysis Process

All of the respondents' information was combined and analyzed with the Statistical Package for the Social Sciences (SPSS) version 21. Both descriptive and inferential analysis was used in the analysis. The researchers used descriptive analysis to look at the population's frequency and percentage in the demographic context. It is also used to determine the mean, standard deviation, frequency, and percentage to identify the effectiveness of ICT integration for students in learning and the practical elements of ICT integration in teaching in public schools in Delta State, Nigeria.

III.   RESULTS

This research will give the researchers the output to answer the research questions. The findings are done according to the sections in the questionnaire. Some inferential analysis that includes reliability testing and Mann-Whitney U testing is also conducted towards the overall data.

Factors	Frequency	Percentage (%)
Gender		
Female	82	81.19
Male	19	18.81
Teaching Experience		
<1 year	20	19.8
1-5 years	36	35.64
6-10 years	34	33.66
>10 years	11	10.89
Type of School		
Primary	37	36.63
Secondary	64	63.37
School Area		
Urban	79	78.22
Rural	22	21.78
Preference of Teaching Style		
Traditional	42	41.58
Modern	59	58.42
Use of ICT		
The Ability of Handling ICT in Teaching		
High	25	24.75
Medium	67	66.34
Low	9	8.91

From the overall population (n=101) based on gender, 82 female respondents with a percentage of 81.19% compared to only 19 male respondents with 18.81%. From the overall population-based on teaching experience, most of the respondents have 1-5 years of teaching experience with 36 (35.64) followed by 6-10 years of experience with 34 (33.66%), then < 1 year of teaching experience with 20 (19.8%) and 11 respondents with > 10 years of teaching experience with 11 (10.89%). From the overall population-based school type, 64 respondents teach in secondary school with 64 (63.37%) than a primary school with 37 (36.63%). From the overall population-based on school area, more respondents are teaching in city school area with 79 (78.22%) as compared to respondents who are teaching in rural school area with 22 (21.78%).

From the overall population-based on the preference of teaching style, more respondents preferred modern style with 59 (58.42%) compared to respondents who preferred traditional teaching methods with 42 (41.58%). From the overall population based on the ability to handle ICT in teaching, most of the respondents believe that they possess medium ability with 67 (66.34%) followed by high ability in handling ICT with 25 (24.75%) and low ability with 9 (8.91%).

Teachers' Perception on Technology-based Teaching and Learning

The data provided in Table 2 about teacher's perception of ICT in teaching shows that most teachers are aware of the goodness and usefulness of ICT in teaching. Most teachers realized that using ICT helps teachers improve teaching with more updated materials that show the lowest mean of 1.70. It is undeniable that teaching resources and materials online are more updated, and teachers can refer to them to design more exciting and engaging lessons for students.

Table 2. Teacher's perception of ICT integration in teaching

NO	ITEMS	STRONGLY DISAGREE	DISAGREE	AGREE	STRONGLY AGREE	MEAN	S.D
		Frequency and Percentage (%)					
1.	I feel confident learning new computer skills.	0	6 (5.9%)	70 (69.3%)	25 (24.8%)	1.81	0.52
2.	I find it easier to teach by using ICT	0	12 (11.9%)	70 (69.3%)	19 (18.8%)	1.93	0.55
3.	I am aware of the great opportunities that ICT offers for effective teaching.	0	8 (7.9%)	57 (56.4%)	36 (35.6%)	1.72	0.60
4.	I think that ICT supported teaching makes learning more effective.	1 (1%)	8 (7.9%)	54 (53.5%)	38 (37.6%)	1.72	0.65
5.	The use of ICT helps teachers to improve teaching with more updated materials.	1 (1%)	6 (5.9%)	56 (55.4%)	38 (37.6%)	1.70	0.63
6.	I think the use of ICT improves the quality of teaching.	1 (1%)	8 (7.9%)	61 (60.4%)	31 (30.7%)	1.79	0.62
7.	I think the use of ICT helps to prepare teaching resources and materials.	1 (1%)	10 (9.9%)	59 (58.4%)	31 (30.7%)	1.81	0.64
8.	The use of ICT enables the students' to be more active and engaging in the lesson.	0	9 (8.9%)	58 (57.4%)	34 (33.7%)	1.75	0.61
9.	I have more time to cater to students' need if ICT is used in teaching.	0	26 (25.7%)	55 (54.5%)	20 (19.8%)	2.06	0.68
10.	I can still have an effective teaching without the use of ICT.	3 (3%)	19 (18.8%)	58 (57.4%)	21 (20.8%)	2.04	0.72
11.	I think the use of ICT in teaching is a waste of time.	24 (23.8%)	48 (47.5%)	27 (26.7%)	2 (2%)	2.93	0.76
12.	I am confident that my students' learn best without the help of ICT.	12 (11.9%)	63 (62.4%)	23 (22.8%)	3 (3%)	2.83	0.66
13.	The classroom management is out of control if ICT is used in teaching.	23 (22.8%)	54 (53.5%)	22 (21.8%)	2 (2%)	2.97	0.73
14.	Students' pay less attention when ICT is used in teaching.	24 (23.8%)	54 (53.5%)	23 (22.8%)	0	3.01	0.69
15.	Students' makes no effort for their lesson if ICT is used in teaching.	23 (22.8%)	56 (55.4%)	20 (19.8%)	2 (2%)	2.99	0.71

Besides, most teachers agreed that using ICT would provide lots of opportunities for effective teaching, and ICT-supported teaching makes learning more effective with the sharing mean of 1.72. This situation shows that teachers view the use of ICT in the teaching and learning process as something positive, where ICT is the aid needed by teachers to ensure the effectiveness of both the teaching and learning process. Next, the data obtained shows that using ICT in teaching enables the students to be more active and engaging in the teachers'

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lesson, with a score of 1.75. This is because students are familiar with ICT, and they find it easier to learn by ICT and allows them to engage more in the lesson.

Teachers' familiarity and competency in handling ICT are also obtained from the data where the mean of 1.81 shows that most teachers feel confident learning new computer skills and can use ICT to find teaching materials and resources. This context shows that teachers are open to using ICT in teaching, not being resistant, and feels comfortable in learning new things.

With a mean score of 1.93, teachers agree that using ICT makes teaching easier. However, they continue to believe in the traditional teaching model, in which teachers are at the center of learning and say that they can still provide successful instruction without the use of ICT, with a mean of 2.04.

On the other hand, most teachers disagree that using ICT allows them to cater to students' needs with a mean of 2.06 because of clerical works and other works that need to be completed other than teaching responsibility. The use of ICT makes it easier for them to teach, but other school things remain the same. Most teachers believe that using ICT benefits teaching and learning in various ways and say that ICT integration is not a waste of time, with a total mean of 2.93. However, there is also a negative part of ICT integration. The result shows that classroom management is out of control when ICT is used in teaching with a mean of 2.97, followed by students making no efforts for their lesson and learning process with a score mean of 2.99. The majority of teachers agreed that using ICT in the classroom only causes students to pay less attention, with the highest mean of 3.01 indicating that teachers are less accepting of ICT inclusion due to students' attitudes of being too reliant on ICT and not taking responsibility for their learning, which frustrates and disappoints teachers.

Effectiveness of Technology-based Teaching and Learning for Students

The results obtained from Table 3 that would want to examine the effectiveness of ICT integration for students in learning show that using ICT promotes active and engaging lessons for students' best learning experience with a record of the lowest mean score of 1.67. In the previous section, most teachers agreed that using ICT enables them to be more active and engaging in the lesson. This shows that both teachers and students agreed that using ICT allows students to be active and take more parts or roles for their best learning experience.

The use of ICT also helps broaden students' knowledge paradigm with a mean score of 1.69. Students can integrate their prior knowledge into the current learning systems and share and exchange views with the teachers and classmates. ICT helps to provide the latest and current issues where students can obtain it very quickly and integrate it into their learning process.

Besides, ICT helps students learn more effectively and helps students find related knowledge and information for learning with a shared mean of 1.71. Students should still use technology to find essential knowledge and information for their studies. For successful learning, students should collect knowledge, apply it to what they have learned, and discuss the information with teachers and peers to see the relationship between what is new and what they need to catch up on.

Other than that, there are many educational videos provided for students online, which improves students' ability in language learning skills such as reading, writing, listening, and speaking, with a total mean of 1.72. It is suitable for students to watch videos and learn from them to gather the confidence needed for contentious issues in the classroom to provide clear clarification and judgments on specific issues. The use of ICT also allows students to be more creative and imaginative, with a mean score of 1.80, followed by their ability to express their ideas and thoughts better with a mean of 1.81. This demonstrates how ICT stimulates students' thoughts, allowing them to think beyond the box and maximize their learning process.

Table 3. Effectiveness of ICT integration for student's learning

NO	ITEMS	STRONGLY DISAGREE	DISAGREE	AGREE	STRONGLY AGREE	MEAN	S.D
		Frequency and Percentage (%)					
1.	ICT allows students' to be more creative and imaginative.	1 (1%)	7 (6.9%)	64 (63.4%)	29 (28.7%)	1.80	0.60
2.	The use of ICT helps students to find related knowledge and information for learning.	1 (1%)	4 (4%)	61 (60.4%)	35 (34.7%)	1.71	0.59
3.	The use of ICT encourages students to communicate more with their classmates.	11 (10.9%)	0	63 (62.4%)	27 (26.7%)	1.84	0.60
4.	The use of ICT increases students' confidence to participate actively in the class.	10 (9.9%)	0	65 (64.4%)	26 (25.7%)	1.84	0.58
5.	I think students learn more effectively with the use of ICT.	6 (5.9%)	0	60 (59.4%)	35 (34.7%)	1.71	0.57
6.	I think the use of ICT helps to broaden students' knowledge paradigm.	8 (7.9%)	0	54 (53.5%)	39 (38.6%)	1.69	0.61
7.	I think the use of ICT helps to improve students' ability specifically in reading, writing.	10 (9.9%)	0	53 (52.5%)	38 (37.6%)	1.72	0.63
8.	The students' are more behaved and under control with the use of ICT.	2 (2%)	16 (15.8%)	51 (50.5%)	32 (31.7%)	1.88	0.74
9.	The use of ICT enables students' to express their ideas and thoughts better.	3 (3%)	13 (12.9%)	47 (46.5%)	38 (37.6%)	1.81	0.77
10.	The use of ICT promotes active and engaging lesson for students' best learning experience.	1 (1%)	6 (5.9%)	53 (52.5%)	41 (40.6%)	1.67	0.63

The result shows that the effectiveness of ICT for students in learning encourages students to communicate more with their classmates and increases their confidence to participate actively in the class with a shared mean of 1.84. It is effective because students are occupied with adequate knowledge that enables them to be more confident in sharing and exchanging their opinion with their classmates. Lastly, it shows that students are more behaved and under control with ICT use in learning, but teachers also consider fewer acceptances as the score means the highest of all with 1.88. This might give teachers that students are a little bit out of control when ICT is used in teaching as teachers are not the main focus of the learning process.

Practical Elements in Technology-based Teaching and Learning in Schools
The data obtained shows that teaching time is not enough for teachers to use the ICT for teaching and learning purposes with a score mean of 1.97. It means there are no slow times provides for teachers so that teachers can at least use ICT for effective teaching and learning process. It is good if teachers are given more time to teach so that ICT integration can succeed. Most teachers agreed that all ICT tools provided for their school go to waste with a mean of 1.98 due to teachers' lack of knowledge and skills in using it. Sometimes, ICT facilities are completely provided, but little access to ICT prevents teachers from using it in teaching with a mean of 2.02.

Some teachers feel the urge and motivation to use ICT in teaching, but there is a lack of supports from the school top management that hinders and discourages them from using ICT with a mean of 2.08. The top school management must encourage teachers to use ICT in teaching and convince them that ICT can benefit both the teaching and learning process. Besides, teachers are not given the freedom they need to design their teaching with the helps they received from ICT, with a total mean of 2.75. Some schools are not provided with at least a computer laboratory in which students will get the chance to integrate ICT in their learning process that shows a mean score of 2.79. Teachers must be given the freedom to design their teaching and make full use of ICT, but they must be remembered to keep it on track with the curriculum designed by the Ministry of Education.

Table 4. Practical elements in ICT integration in teaching and learning in public schools

NO	ITEMS	STRONGLY DISAGREE	DISAGREE	AGREE	STRONGLY AGREE	MEAN	S.D
		Frequency and Percentage (%)					
1.	The ICT facilities in my school are well-functioning and can be used.	34 (33.7%)	36 (35.6%)	22 (21.8%)	9 (8.9%)	2.94	0.96
2.	The technical supports are provided if teachers are faced with difficulties.	29 (28.7%)	36 (35.6%)	26 (25.7%)	10 (9.9%)	2.83	0.96
3.	Little access to ICT prevents me from using it in teaching.	3 (3%)	16 (15.8%)	62 (61.4%)	20 (19.8%)	2.02	0.69
4.	Lack of supports from the school top management discourages me from using ICT.	6 (5.9%)	20 (19.8%)	51 (50.5%)	24 (23.8%)	2.08	0.82
5.	Teaching time are not enough for me to use the ICT for teaching and learning purposes.	1 (1%)	21 (20.8%)	53 (52.5%)	26 (25.7%)	1.97	0.71
6.	There is enough training and professional development provided for teachers about ICT use in teaching.	19 (18.8%)	57 (56.4%)	17 (16.8%)	8 (7.9%)	2.86	0.81
7.	All ICT tools in my school go to waste and less used by teachers.	6 (5.9%)	21 (20.8%)	39 (38.6%)	35 (34.7%)	1.98	0.89
8.	Teachers are given more time to learn and be comfortable with the use of ICT in teaching.	25 (24.8%)	55 (54.5%)	17 (16.8%)	4 (4%)	3.00	0.76
9.	There is computer lab in my school in which I can bring students there to watch educational videos.	28 (27.7%)	34 (33.7%)	29 (28.7%)	10 (9.9%)	2.79	0.96
10.	Teachers' are given the freedom to design their own teaching with the helps from the ICT.	26 (25.7%)	33 (32.7%)	33 (32.7%)	9 (8.9%)	2.75	0.94

Technical supports if teachers are faced with difficulties and training and professional development are less provided for teachers about ICT use in teaching with the score mean of 2.83 and 2.86. The top school management must find ways to provide enough technical supports and training, and professional development for teachers to ensure successful implementation of ICT in teaching. Besides that, teachers' ICT facilities are not healthy functioning and are not in good conditions as teachers are not using it with 2.94. There is no maintenance to make sure the facilities are well taken care of by the school's management.

Finally, the worst findings show that teachers are not given enough time to learn and be comfortable using ICT in teaching, with the highest mean recorded at 3.00. It is better if teachers are given time to learn and be comfortable with ICT to explore its use and make the best use. Overall, the data collected about the functional elements of ICT integration in teaching and learning in public schools in Delta State, Nigeria, revealed no successful elements. However, based on their findings, the researchers devised some suggestions and recommendations for teachers and school administrators to address this problem.

Reliability Testing

The Cronbach's Alpha reliability testing is used to test an instrument's internal consistency and items (see Table 5). It is also considered a measurement for scale reliability. For this study, the Likert scale's scale ranged from 4= strongly disagree, 3= disagree, 2= agree, and 1= strongly agree. According to Kline (1999), the most generally accepted value of alpha value is something greater than 0.7, and an alpha value greater than 0.6 is ranged acceptable. For this research, the reliability test is done accordingly by a section that includes sections B, C, and D of the questionnaire.

Table 5: The reliability test for teacher's perception of ICT integration in teaching

	Corrected Item-Total Correlation	Cronbach's Alpha if Item Deleted	Cronbach's Alpha	N of Items
-I feel confident learning new computer skills.	0.32	0.59	0.61	15
-I find it easier to teach English language by using ICT	0.39	0.58		
-I am aware of the great opportunities that ICT offers for effective teaching.	0.48	0.56		
-I think that ICT supported teaching makes learning more effective.	0.55	0.55		
-The use of ICT helps teachers to improve teaching with more updated materials.	0.48	0.56		
-I think the use of ICT improves the quality of teaching.	0.42	0.57		
-I think the use of ICT helps to prepare teaching resources and materials.	0.54	0.55		
-The use of ICT enables the students' to be more active and engaging in the lesson.	0.38	0.58		
-I have more time to cater to students' need if ICT is used in teaching.	0.11	0.62		
-I can still have an effective teaching without the use of ICT.	0.40	0.57		
-I think the use of ICT in teaching is a waste of time.	-0.13	0.66		
-I am confident that my students' learn best without the help of ICT.	0.17	0.61		
-The classroom management is out of control if ICT is used in teaching.	0.07	0.63		
-Students' pay less attention when ICT is used in teaching.	-0.07	0.65		
-Students' makes no effort for their lesson if ICT is used in teaching.	-0.16	0.66		

In Table 5, the reliability test results from an alpha value greater than 0.6, which means that the items are acceptable and can be considered an instrument for the respondents. However, the researcher can note this and improvise the items to increase the alpha value and make it more reliable as an instrument.

In Table 6, the reliability shows the result of alpha value are more than 0.7, which shows excellent and satisfactory reliability of the items and accepted as research instruments to the respondents.

Table 6. The reliability test for the effectiveness of ICT integration in learning (for students)

	Corrected Item-Total Correlation	Cronbach's Alpha if Item Deleted	Cronbach's Alpha	N of Items
-ICT allows students' to be more creative and imaginative.	0.61	0.86	0.87	10
-The use of ICT helps students to find related knowledge and information for learning.	0.49	0.87		
-The use of ICT encourages students to communicate more with their classmates.	0.61	0.86		
-The use of ICT increases students' confidence to participate actively in the class.	0.59	0.86		
-I think students learn more effectively with the use of ICT.	0.53	0.87		
-I think the use of ICT helps to broaden students' knowledge paradigm.	0.55	0.86		
-I think the use of ICT helps to improve students' ability in reading, writing and speaking English.	0.63	0.86		
-The students' are more behaved and under control with the use of ICT.	0.60	0.86		
-The use of ICT enables students' to express their ideas and thoughts better.	0.73	0.85		
-The use of ICT promotes active and engaging lesson for students' best learning experience.	0.60	0.86		

As presented in Table 7, the reliability test results from an alpha value greater than 0.6, which means that the items are acceptable and can be considered an instrument for the respondents. However, the researcher can note this and improvise the items to increase the alpha value and make it more reliable as an instrument.

Table 7. The reliability test for the practical elements of ICT integration in teaching(for teachers)

	Corrected Item-Total Correlation	Cronbach's Alpha if Item Deleted	Cronbach's Alpha	N of Items
-The ICT facilities in my school are well-functioning and can be used.	0.54	0.54	0.63	10
-The technical supports are provided if teachers are faced with difficulties.	0.59	0.53		
-Little access to ICT prevents me from using it in teaching.	0.05	0.65		
-Lack of supports from the school top management discourage me from using ICT.	0.01	0.66		
-Teaching time are not enough for me to use the ICT for teaching and learning purposes.	-0.08	0.67		
-There is enough training and professional development provided for teachers about ICT use in teaching.	0.60	0.54		
-All ICT tools in my school go to waste and less used by teachers.	-0.17	0.70		
-Teachers are given more time to learn and be comfortable with the use of ICT in teaching.	0.59	0.55		
-There is computer lab in my school in which I can bring students there to watch educational videos.	0.44	0.57		
-Teachers' are given the freedom to design their own teaching with the helps from the ICT.	0.50	0.55		

Hypothesis Testing

In this study, the Mann-Whitney U test is used to test the researcher's hypothesis (see Table 8). The test is used to compare the differences between two independent groups towards one dependent variable. THE Mann-Whitney U test is an inferential analysis by the researcher to test the researcher's null hypothesis. Mann-Whitney

	Type of School	N	Median	Range	Mean Rank	Mann-Whitney U	p
Score_B	Primary	37	2.33	2.20-2.33	59.89	855.00	0.02**
	Secondary	64	2.20	1.95-2.33	45.86		

Significant P < 0.05

	School Area	N	Median	Range	Mean Rank	Mann-Whitney U	p
Score_C	Urban	79	1.60	1.40-2.00	46.92	547.00	0.01**
	Rural	22	2.00	1.60-2.35	65.64		

Significant P < 0.05

Checks Where the data is not usually distributed, the U test is used to evaluate the effectiveness of two treatments in clinical trials. It is commonly viewed as an alternative to the t-test (Hart, 2001).

H01 - There is no significant difference between teachers' perception of ICT in teaching with the type of school (Primary & Secondary)

Table 8. Mann-Whitney U-test between teacher's perception of ICT integration and school's type

From the result in Table 9, it shows that there is a significant difference between teachers' perception of ICT with the type of school (Mann-Whitney U= 855, P= 0.02) where primary school scored higher median (2.33) and meant rank (59.89) as compared to the secondary school with median (2.20) and mean rank (45.86). As a result, the null hypothesis is discarded, while the alternative hypothesis is adopted.

H02 - There is no significant difference between the effectiveness of ICT integration for students in learning with the school area (City & Rural)

Table 9. Mann-Whitney U-test between the effectiveness of ICT integration for students in learning with school area

From the result, it shows that there is a significant difference between the effectiveness of ICT integration for students in learning with school area (Mann-Whitney U= 547, P= 0.01) where a school in rural area scored higher median (2.00) and meant rank (65.64) as compared to the school in the city area with median (1.60) and mean rank (46.92). As a result, the null hypothesis is discarded, while the alternative hypothesis is adopted.

IV.   CONCLUSION

Despite its late entry into the ICT world, Nigeria's national strategy for information technology, adopted in 2001, is the right step toward ICT implementation in all aspects of its existence. The document is intended to ensure that Nigeria recognizes the strategic importance of information and communication technology (ICT) for national development. Adequate coverage of required areas is the best way to ensure successful application in any field. The identified gaps in education should be filled with key stakeholders' participation.

ICT is a powerful tool for improving teaching and learning; it is a catalyst for fundamental reform in current school practices and a veritable vehicle for preparing students for the future. Recognizing the role of sectoral applications in education and ensuring long-term implementation would be critical to an ICT program's success. Maximizing ICT potentials will involve quality ICT policy, greater private and public involvement in the implementation's funding, and proper implementation and monitoring.

In conclusion, the first stage of ICT implementation must be adequate to ensure that teachers and students can make the best use. Thus, technology-based teaching and learning preparations begin with proper implementation and support by the school's top management. If the implementation process of technology integration in schools takes place appropriately from the very beginning stage and continuous maintenance are adequately provided, ICT integration in schools will have tremendous success and benefits for both teachers and students. The use of ICT, especially in teaching and learning, is more about practicality as compared to theories, and that is why teachers must be given time to learn and explore it, face the "trial-and-error" phase before they are entirely comfortable with its usage and able to make use of it for teaching and learning.

Finally, integrating ICT in the classroom needs serious consideration to increasing the country's education system's competency. This will help increase the national education world ranking and produce a better future workforce. To enhance the use of ICT in the classroom, the government needs to improve and change the teachers' beliefs about integrating ICT in the classroom. As the teachers' role is critical in making any of the new policies be implemented efficiently and successfully. Advanced technology and communication devices, which should be available to students at school or home, are driving the changes that are happening. To encourage successful learning and meet the demand for 21st-century teaching skills, teachers must be literate and have strong skills and experience in using ICT to develop their teaching methods and approach.

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