Journal of Education and Society
Vol 13(3), 169-181, 2023.
ISSN: 1596-1462

ICT For Effective Teaching In Public Primary Schools In 21st Century

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Abstract

ICT for effective teaching in public primary schools in 21st century has become the major challenge for good communication and application of ICT equipment. The advent of technology has redesigned human life and altered interactive and learning pattern in individuals. The 21st century learners are born into a technological world and this has significantly affected the way they learn. If education is going to serve its purpose of preparing learners to be practical and productive workers and members of the society, there is need for a change in the approach to teaching. A learner centred teaching environment should be advocated rather than the traditional teacher centred classroom. There is also the need for teachers to migrate to using digital tools to enable them speak the language of 21st century learners understand. This study, therefore, suggest that the government should provide information and technology gadgets in all the public primary schools in the state and make it functional.Teachers should employ the use of information and communication gadgets in the teaching/learning experience in the classroom in public primary schools.Again, government should make provision for ICT experts to train teachers and learners on how to effectively use and manage the gadgets for optimal utilization.

Keywords: ICT, Zoom, Email, Google, Whatsapp Messenger, Google Classroom, Effective Teaching

Introduction

The 21st century has made available several opportunities for personalities irrespective of their place, race, sex and capability. The chances ranging fromtechnology, entrepreneurship, remote work to education has become readily available for individual to explore and discover their potentials and excel in one or two areas of human life through information and knowledge acquisition. The 21st century global society lays much emphasis on information and knowledge based-economy which demands a more competitive, knowledgeable, creative and innovative workforce in

education, training, research and development. This revolution in knowledge was made possible with the advent of technology in human world.

The advancement of new technologies (ICT) has challenge the traditional method and process of teaching and learning and have also change the way education is managed to a more flexible, friendly and simplified form. The United Nation Education Scientific and Cultural Organizations (UNESCO, 2017) stressed that ICT has turned from being a technology of communication and information alone, but to a curriculum creation and delivery system for educators and learners. Moemeke (2019), ICT enhances possibility by providing what teachers are able to do, by providing an entry point into the content and enquiries that were not possible without the use of ICT, by extending what pupils are able to produce and as a result of their investigations and by providing teachers with the opportunities to become learners again. It has made it possible for complicated collaborative activities of teaching and learning by dividing it in space and time with seamless connectivity between them (Otamir, 2014).

In recent times, Information and Communication Technology is gaining more grounds in the educational sector as it is occupying a central stage in the primary school curriculum in order to presents the total experiences to which all teachers and learners must be exposed and through which the content and performance objectives of the subject must be achieved for both teachers and learners. Also, the provision of teaching and learning materials for any subject are enhance for effective teaching and learning. Thus, these could be possibly realized if the teacher and learner can effectively integrate ICT into the classroom. According Rambe and Chipunza, (2013) a good teacher can use various teaching and learning technologies (such as google classroom, internet and multimedia resources) which are increasingly being used in support of the teaching and learning process in presenting new challenges and opportunities for teachers and pupils to translate information into relevant knowledge that a student can understand, retain and pass on to others under a conducive school environment. The development of ICT into the school system will have effect on the technological "revolution" expected in business and economic environments and the global society.

In the view of Schut (2017) the use of ICT in teaching and learning in Primary school today can assist in reducing the teachers' workloads through its use for lesson preparation, instructional delivery as well as teaching and learning evaluation. Schut further buttressed that primary school teachers will become learning facilitator, collaborator, coach, mentor, knowledge navigator and coleamer and not only a dispenser of knowledge. The educational reform policies were aimed at integrating the use of ICT tools in the Nigerian school system. The Nigerian National Policy for Information Communication and Technology (FRN, 2001) emphasizes the need for the implementation of ICT tools in education for three major objectives viz: to empower the pupils with ICT skills, to prepare the pupils for competitiveness in a global environment, integrate ICT into the mainstream of education and training and; establishment of multifaceted ICT institutions, as centres of excellence.

The document specifically noted the need for restructuring the educational system of all levels to respond effectively to the challenges of the 21st century where the global life is being digitalized. For the above listed objectives to be meaningfully realized, it means that ICT tools must be properly effective and judiciously utilized in the

teaching and learning of Basic Science and Technology in primary schools in Ahoada East Local Government Area of Rivers State. According to Wadi and Sonia (2016), proper and effectiveness of information and communication technology tools in Schools in Rivers State will definitely improve the quality of education in several ways such as increasing teachers' motivation and engagement, facilitating the acquisition of learner's basic knowledge and skills and also to enhance teachers training.

Conceptual Clarification

Information Communication Technology

In this research, Information and Communication Technology (ICT) is defined as electronic media, devices and application used in the classroom to aid effective teaching and learning processes. All such materials, media and devices provided by ICT which appeal to all the senses and feeling and learning constitute teaching and learning materials. The materials help teachers communicate effectively to the pupils so that learning is facilitated. This is an exciting method of technological developments incorporated into the Nigeria classroom so well implemented as to enable teachers and pupils to do what has been impossible in the educational system (Osuala, 2016). It was further buttressed that teachers and pupils will be able to assimilate the new machinery and its skill requirements.

As revealed by United Nation Educational Scientific and Cultural Organization (UNESCO, 2017), ICT is defined as the combination of all the google classroom, telecommunication and media technologies. They are also electronic technologies used for accessing, processing, gathering, manipulating and presenting or communicating information in education system. Echheverria, et. al., (2010) explained that Information and Communication Technologies (ICTs) empowerment enhances the abilities of people to use.

ICT to improve their life skills and strengthen their capabilities. Such empowerment could be facilitated awareness and motivation for ICTs. In regards to their view, Wang (2018) added that the role of information and communication technologies in teaching and learning is rapidly becoming one of the most important widely discussed issues in primary schools in Nigeria. In another view, Obanya (2019) opined that primary schools in Nigeria must strive to meet common 21st century challenges of providing student with an education that is viewed by the general society as relevant and valuable; and that teaching and learning must be driven by ICTs for effectiveness.

Effective teaching

Nsukka (2015) describe effective teaching as knowledge, strategies, processes and behaviours which lead to good student outcomes. Effective teachers have a positive impact on their students and use their expertise to improve learning. These good outcomes are often those that can be measured easily, usually through summative assessment. Understanding the effects of new technologies on the workplace and everyday life, today's educational organizations try to redesign their programs and classroom activities in order to reduce the teaching and learning technology gap between today and the future. According to Dunkin (2018) this process needs effective integration of technologies, especially google classroom into existing

context to provide pupils with knowledge of subject areas, to develop active learning and to increase professional productivity (Safahieh & Asemi, 2018).

Today google classroom are used in most courses to improve student learning. Google classroom technologies are becoming increasingly effective components of education (Papadouris & Constantinou, 2016). Researchers have shown the positive effects of the use of information and communications technology (ICT) on pupils" learning (Mumtaz, 2018). Teachers perceived that immediate feedback to pupils and provision of alternative teaching techniques are the major advantages of google classroom-aided instruction (Wang & Chan, 2014). According to Mumtaz (2018), Google classroom Supported Teaching (CST) is the use of google classroom by the teachers in teaching as an interactive process which makes learning easier. Educators have begun to use google classroom supported teaching methods more often to increase the participation of pupils to the learning activities and to promote access to learning materials (Yaman, 2017).

Perhaps more than any other fields, science teaching has benefited from the developments of google classroom technology (Ogunkola, 2018). Clearly, the role of ICT in science education is significant. Where investigative science plays a central part, there are applications of ICT, which can both support „live" bench work and some, which can replace it, providing a virtual system to investigate using the same principles as in the laboratory (McFarlane & Sakellariou, 2016).

Use of WhatsApp Messenger and Effective Teaching Public Primary School

Although social networks differ structurally to some extent (Boyd & Ellison, 2017; Taylor, Lewin & Strutton, 2016), it hasn't taken much time for the social networks, which have become a part of our daily lives, to be used in education. Consequently, together with the individual and social effects of social networks, their usability and effects in education started to be examined by researchers. It is seen that these tools, each of which has different features for learning aims, have potentials to provide cooperation, increase social interaction, interest and motivation, sense of belonging, academic success, student-student and student-teacher interaction, support learning anytime and anywhere, provide peer support, feedback, and allow for sharing of information in education.

WhatsApp is a mobile application that allows users to communicate with them using mobile gadget and computers. Below are the areas where WhatsApp can be applicable to instructional delivery (Becta, 2018).The folder WhatsApp/Media/WhatsApp Audio/ contains the downloaded audio files that are received as an attachment from a contact. The file names usually start with AUD. The folder WhatsApp/Media/WhatsApp Voice Notes/ contains the voice files that are recorded using WhatsApp. Over (209 million people) have access to and use WhatsApp as a communication multiple platforms; smartphones (operating system, android), PC, laptop, IPAD, Tab, and Web Compactible file format; jpg, audio, movie, pdf, excel, word, PowerPoint. Media files are automatically saved, WhatsApp/Media/folder. Better storage capacity and management. The WhatsApp folder is located in Internal Storage.

WhatsApp's can also be used to conduct a flipped learning mode before the class meeting, as a means of passing information to students, and after the class lectures. Schut (2017) noted that WhatsApp can be used the following in e-learning;

1. Announcement, forum for class, discussion, quiz, open-ended question, listening practice
2. Forum such as class discussion/Quizzes
3. Open ended question
4. Listening practice
5. Pronunciation practice
6. Content/material sharing
7. PowerPoint presentation

Data Processing

Anderson, et. al., (2016), Data Processing (data processing) is a data collection, storage,, retrieval, processing, transformation and transmission. Data is facts, concepts, or instructions of a form of expression, can be manual or automated device for processing in form of digital data, text, graphics or sounds. Data are explained and, after giving a certain sense, they become information. The basic purpose of data processing from a large number, possibly chaotic, difficult to understand and extract the data derived for some specific people who are valuable and meaningful data. Data processing is a systems engineering and automatic control of basic aspects. Data processing is applied throughout the social production and social life in various fields. Data processing technology and its application breadth and depth greatly affect the process of development of human society (Cannon &Feinstein, 2015). No one be effective in any life's endeavour without the support of data processing software, data processing software includes: writing process for various programming languages and compilers, data management, file systems and database systems, and various methods of data processing software package. To ensure data security and reliable, a range of data security technologies and management is very essential.

Data are a collection of facts unorganized but able to be organized into useful information. Processing is a series of actions or operations that convert inputs into outputs. When we speak of data processing, the input is data, and the output is useful information. What then is data processing? So, we can define data processing as a3 series of actions or operations that converts data into useful information. According to Carl (2018) data processing is, broadly, "the collection and manipulation of items of data to produce meaningful information. In this sense it can be considered a subset of information processing, "the change (processing) of information in any manner detectable by an observer. The term is often used more specifically in the context of a business or other organization to refer to the class of commercial data processing applications.

Data processing (numerical and non- numerical) includes the analysis of various, sorting, calculating, editing, processing and handling data. There are a large number of socio-economic data (population, transport, industry and agriculture, etc.), often require comprehensive data processing. Therefore, the need to establish geographic database, the system to collate and store geographic data to reduce redundancy, the development of data processing software, full use of database technology for data management and processing. Research data also are processed to answer research questions and test hypotheses. For data processing business website: As the site visits is very large, making a number of professional data analysis, data cleansing often

have targeted, that is not related to data, important data such as disposed of.

Types of Data

The type of data we have experience of; for example, weight, sex, ethnicity, job grade, and consider their different attributes. These variables can be described as categorical or quantitative. Type of data Level of measurement Examples Nominal = (no inherent order in categories), eye color, ethnicity, diagnosis Ordinal - (categories have inherent order). E.g. Job grade, age groups Categorical - Binary Gender (2 categories - Male / Female) Discrete - (usually whole numbers) e.g. size of household (ratio) Quantitative (Interval/Ratio) Continuous - Can, in theory, take any value in a range, although necessarily recorded to a predetermined degree of precision) Temperature °C/°F (no absolute zero) (interval) Height, age (ratio).

Data processing functions Data processing may involve various processes, including:

1. Validation
    i. It ensures that supplied data is clean, correct and useful Sorting -
    ii. It combines multiple pieces of data. Analysis
2. Reporting
    i. It lists detail or summary data or computed information. Classification.
    ii. It separates data into various categories

Components of Data Processing

Basic data processing operations Five basic operations are characteristic of all data processing systems: inputting,- storing, processing, outputting, and controlling. They are defined as follows. Inputting is the process of entering data, which are collected facts, into a data processing system. Storing is saving data or information so that they are available for initial or for additional processing. Processing represents performing arithmetic or logical operations on data in order to convert them into useful information. Outputting is the process of producing useful information, such as a printed report or visual display. Controlling is directing the manner and sequence in which all of the above operations are performed (Hennessy, 2015).

Data Sharing

Data sharing is the practice of making data used for scholarly research available to other investigators. Many funding agencies, institutions, and publication venues have policies regarding data sharing because transparency and openness are considered by many to be part of the scientific method. Data sharing are of 3 (three) types. They are
• Sharing Data between functional units. Sharing data between management' units. Sharing data between geographically dispersed location.

Data Sharing Elements and Activities

Data sharing activities, such as the type(s) of data to be shared; provider(s) and recipient(s) of shared data; and whether and when data are disclosed publicly, with or without restrictions, or exchanged privately among parties. This section then describes a selected set of data sharing activities. The purpose of outlining potential data sharing activities is to provide a heuristic approach to organizing the work of the committee throughout the course of the study, including information gathering and discussions in public sessions. In its final report, the committee will, with respect to each of these data sharing activities, present findings relating to benefits, risks, and burdens associated with these data sharing activities and suggest strategies and

practical approaches to facilitate responsible data sharing (Inijie, 2016).

Excel Sheet

Microsoft Excel is a spreadsheet developed by Microsoft for Windows, macOS, Android and iOS. It features calculation, graphing tools, pivot tables, and a macro programming .language called Visual Basic for Applications it helps for accounting student in tertiary institution.

Email and Effective Teaching in Public Primary School

E-mail, that is, electronic mail, is an application that allows the sending of messages prepared by google classrooms via telecommunications technology to each other by people. E-mail is one of the most important applications of Internet technology and has developed since the early times of the internet. Today, a large percentage of total Internet traffic belongs to the use of e-mail. E-mail allows individuals and institutions to communicate with each other through electronic media. It is a fast and easy-to-use e-mail program that will allow you to send and receive e-mail messages without any user intervention.

However, many studies have focused on the delivery of course-related information or assignments by email (Boxie, 2019). Such studies have described email use rather than analyzed its conceptual basis and effectiveness on learning outcomes (Alexander, 2019). Other studies have reported on the general effect of email on learning, most typically in the context of course evaluation. There have been few investigations of the specific components of email messages that contribute to improved course designs and more effective teaching (Davis, 2019).

Harris and Jones(2017), they can be used for two-way knowledge translation, a process that involves sending evidence-based clinical recommendations to physicians and then receiving their constructive feedback. Two examples of educational email alerts are “Daily-POEMs” (Patient-Oriented Evidence that Matters) and “Highlights from e-Therapeutics+”. These alerts support continuing education programs that involve more than 10,000 Canadian physicians and pharmacists. First, Daily-POEMs are tailored for family physicians. POEMs are synopses of original research and systematic reviews, selected after scanning and critically appraising new articles from more than 100 journals. Second, Highlights are treatment recommendations tailored for a primary care audience.

Google classroom and Effective Teaching Public Primary School

Hennessy, Harrison and Wamakote (2018),understanding the effects of new technologies on the workplace and everyday life, todays educational organizations try to redesign their programs and classroom activities in order to reduce the teaching and learning technology gap between today and the future. According to Tomei (2015), this process needs effective integration of technologies, especially google classroom into existing context to provide pupils with knowledge of subject areas, to develop active learning and to increase professional productivity (Safahieh, 2018). Today google classroom are used in most courses to improve student learning. Google classroom technologies are becoming increasingly effective components of education (Papadouris & Constantinou, 2016). Researchers have shown the positive effects of the use of information and communications technology (ICT) on pupils" learning (Mumtaz, 2018).

Perhaps more than any other fields, science teaching has benefited from the

developments of google classroom technology (Ogunkola, 2018). Clearly, the role of ICT in science education is significant. Where investigative science plays a central part, there are applications of ICT, which can both support „live" bench work and some, which can replace it, providing a virtual system to investigate using the same principles as in the laboratory (McFarlane & Sakellariou, 2017). Google classroom assisted instruction has the potential to help lower achieving pupils in science classes and may increase enrolment rate in science lesson (Park, 2019). CST also increases conceptual understanding of pupils (Flick & Bell, 2019; Schank, 2016).

Zoom Technology and Effective Teaching in Public Primary School

Zoom is an interactive audio and video program based on Cloud technology. Programs that were once used primarily for inter-company video conferences and other types of meetings suddenly started being used in educational settings. The era of learners gathering physically in classrooms has largely passed due to the development of Zoom technology. Modem learners who are also digital natives are often familiar with Zoom technology and how to use it. At this point in time, it is necessary to consider the efficiency of remote video classes using Zoom.

Zoom Video Communications, Inc. (stylized as zoom or simply Zoom) is an American communications technology company headquartered in San Jose, California. It provides video telephony and online chat services through a cloud-based peer-to-peer software platform and is used for teleconferencing, telecommuting, distance education, and social relations (Adeosun, 2015). Eric Yuan, a former Cisco engineer and executive, founded Zoom in 2011, and launched its software in 2013. Zoom's aggressive revenue growth, and perceived ease-of-use and reliability of its software, making it a "unicorn" company. Beginning in early 2020, Zoom's software usage saw a significant global increase following the introduction of quarantine measures adopted in response to the pandemic. Its software products have faced public and media scrutiny related to security and privacy issues due to unexpected usage. Zoom assist in instructional delivery in accounting education in tertiary.

Several prior studies have explored the implementation of videoconferencing and its pedagogical implications in learning. For instance, some scholar conducted a study featuring task-based activities on an online platform via Zoom to explore how videoconferencing can help learners to develop their communicative competence. The study's findings revealed that the group that interacted virtually using Zoom outperformed the group with face-to-face interaction. Thus, this study concluded that Zoom-based videoconferencing is a convenient tool for helping pupils negotiate meaning and enhance their communicative competence (Vurdien , 2019).

Using video learning in the classroom can also be helpful in developing and enhancing intercultural competence (Al-Faki & Khamis, 2016).). Prior research conducted on videoconferencing reported that video lectures can contribute to the development, of pupils' listening and speaking skills (Lim and Pyun, 2016). For instance, a study on the advantages of implementing videoconferencing highlighted that pupils' oral proficiency and pronunciation can be remarkably improved through the use of video lectures (Lu & Goodale, 2018). Wang (2018) conducted a study that investigated a blended synchronous learning environment (BSLE). The majority of pupils attended the course FTF (Face-to- Face) while the rest joined the course using two-way videoconferencing (Zoom). The purpose of the study was to investigate the pupils' learning experiences and their perceptions of the blended synchronous

learning approach Adeyemi & Olaleye, (2018).Results of the study indicated that pupils liked the flexibility and convenience of attending lessons via Zoom at remote sites. However, the researchers observed that pupils' participation through Zoom was low.

Sayem, et. al., (2017) studied the effectiveness of using Zoom on improving the success of pupils studying foundation engineering units. Student engagement with the course was measured by observing the number and types of posts to the Q&A Forum on the Moodle site and the number of pupils attending Zoom virtual tutorials. The researchers found that the use of Zoom virtual tutorials resulted in increased pupils' satisfaction and reduced instructor workload of approximately 25% (Bere & Chipunza , 2015). Demuyakor (2020) .investigated Ghanaian international pupils' levels of satisfaction of online learning in higher educational institutions in China. The results of the study indicated that pupils supported the implementation of online learning programsChurch and de Oliveira (2019). They were satisfied with their online learning experience during the transition from FTF to online and perceived the online courses as effective. On the other hand, pupils who participated in the courses while outside China indicated that they spent a lot of money to secure internet data for online learning. In addition, pupils who lived in dorms indicated that the internet connectivity was very slow (Cascio & Gasker, 2018).

The 21st Century Pupils

Prensky (2018) called the 21st century learners 'digital natives". These are people born in the 1980s forward and he referred to those born before 1980 as "digital immigrants. According to him Digital Natives are the children who have grown up into a world surrounded by and using computers, videogames, digital music players, video cams, cell phones, and all the other modern technological toys and tools(De Montes& Gonzales, 2015). He says that they are the product of the new culture that has emerged as a result of the aggressive penetration of digital technology in the lives of young people born since the last two decades of the 20th century. In contrast, for "Digital Immigrants" when it comes to using technology they are in the process of learning a new language.

As a result of exposure to digital technological devices of the digital world, children of this era think and learn differently from their predecessors. According to Viskaconcept (2020) growing up with this level of technology means growing up with a completely unprecedented amount of information at their fingertips. These are kids who are just a few seconds away from the answers to their questions, with everything just a quick search away. They are able to teach themselves about any topic they are interested in without even leaving their bedroom. They are digital natives, as comfortable using apps and code as their grandparents were flipping pages. This explains why the orthodox method of rote learning becomes boring to them.

Why go to school when you could learn the same information faster by watching a You tube video or playing a computer game? Why memorize facts for a test when you have all the information in the palm of your hand anyway? Cook-Sather and Mawr, (2019),past methods make little sense to today's students who learn and think differently, and they make little sense in relation to the changing workplace, where making use of information is now far more valuable than simply knowing things. Schools are failing to teach students to respond to rapid change and how to handle new information because they are clinging to obsolete methods

21st Century Education

21st century effectiveteaching is about giving students the skills they need to succeed in this new environment, and helping them grow the confidence to practice those skills. With so much ICT equipmentreadily available to them, 21st century skills focus more on making sense of that information, sharing and using it in smart ways.The coalition P21 (Partnership for 21st Century Learning) has identified four skills for today: creativity, critical thinking, communication and collaboration . These four themes are not to be understood as units or even subjects, but as themes that should be overlaid across all curriculum mapping and strategic planning. They should be part of every lesson in the same way as literacy and numeracy.

Creativity is about thinking through information in new ways, making new connections and coming up with innovative solutions to problemsDavenport, (2015).. Critical thinking is about analyzing information and critiquing claims. Communication is understanding things well enough to share them clearly with other people. Collaboration is about teamwork and the collective genius of a group that is more than the sum of its parts. There are other skills that are important, which fall within these four areas. Entrepreneurship can be considered a skill of its own. Inquiry and problem solving are key. Emotional intelligence (EQ) is one of the most important keys to successful work and relationships. The bottom line? Education needs to be all about empowering students with transferable skills that will hold up to a rapidly changing world, not prescribed content that has been chosen for its past relevance.

Conclusion

The effectiveteaching of Basic Science and Technology could be herculean to the teacher. To this end, the information and communication technology could help the teacher for effective lesson delivery and enhanced pupils' academic performance in public primary schools.The 21st century teacher has the enormous task of migrating into the digital age to enable him/her understand the language of the kind of learners he has now. This is the only way that teaching can be made effective.

Suggestions

Based on the findings of the study, the following recommendations were made:

1. The government should provide information and technology gadgets in all the public primary schools in the state and make it effective.
2. Teachers should employ the use of information and communication gadgets in the teaching/learning experience in the classroom in public primary schools.
3. The management of the primary schools should encourage parent, non-governmental organizations and public-spirited individuals to help in providing these ICT gadgets in public primary schools.
4. Teachers should try to control the use of zoom influences especially the negative one to make parent appreciate the use of technology in basic science in primary school.

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