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Development of Digitalized Society through Integration 0f Digital Tools and Resources on Teacher Education System

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Abstract

Teaching and learning in the digital society involve incorporating technological resources to enhance educational effectiveness. Technology has become a cornerstone of modern existence, paving the way for critical and higher-order thinking. Governments worldwide have integrated technology into school curricula to prepare students for the demands of a digital world. Teacher education must incorporate information and communication technology (ICT) tools that enable adaptive, personalized, collaborative, and flexible learning. Students of this era are highly proficient in using ICT tools to browse, configure, create animations, and design presentations, making technology a central part of their learning journey. Laptops, smartphones, desktops, and other devices have replaced traditional pens and paper, transforming education into a dynamic and interactive process. ICT tools facilitate communication, graphic work, research, and calculations, moving beyond traditional methods where teachers were the sole knowledge providers. Teacher education programs must ensure that educators familiarize themselves with ICT tools during training, empowering them to impart knowledge effectively. This study highlights the need for governments to provide adequate funding to install ICT facilities in educational institutions and emphasizes that all teachers should acquire ICT skills to create more effective teaching and learning environments.

Keywords*: Teaching and learning in the digital age, educational technology in 21st-century education, Affordances of digital tools in instruction, Principles for integrating technology into classrooms*

Introduction

Teaching and learning in digital society are defined as the process of incorporating technological resources to effect quality teaching and learning in the classroom. Ajiboye (2005) encapsulated that no matter how beautiful the curriculum is planned, without effective training and retraining of teachers to execute or interpret the curriculum in the classroom the energy and resources dissipated will be a waste of effort. Dike (2008) emphasized that teacher education in this 21st century should be centered on new knowledge on information and communication technology, in line with the teeming population of youths that seeks knowledge on daily basis,

teacher education should consider the nature of the learners. This would enable teachers to make necessary innovations through teaching with new technologies. It is imperative that the government also provide modern learning resources that will enable learners to attain educational goals at their own pace. New resources and concepts such as team teaching and computer assisted instruction need to be emphasized with utmost priority.

In this new age, teaching is becoming more challenging, knowledge on use of different technological resources and tools are growing more rapidly like wide fire to the benefit of students that seek knowledge. In this digital era, students have become conversant with how to manipulate or use digital tools mutually for communication, assessment of information, personalized and group learning at any given time. Students can confidently use laptops, smartphones, personal digital assistants, tablets, PCs and other handheld devices for communication, search information that enables them to write their quizzes, seminars and thesis among others. In this modern technology cultured society, both children and adults of schools age have aligned themselves with the use of social networks to explore and acquire knowledge, skills and information they are in dire need of. Social networks have helped students to engage in out-of-class discussions or chats with their friends and peers. They can comfortably use social networks to write documents and send messages and receive feedback from their teachers. They and their teachers can also use audio and videos machines to engage in virtual learning. These digital tools and resources have become the modern pens and paper through which students, adults and children of school age use to develop more experiences in this digital world. In these modern times, 21stcentury students are known as digital natives because they have immersed themselves into different streams of digital technologies that develop their intellects because they are born in the era of technology and played with digital machines, develop manipulative knowledge and skills from the digital tools and resources right from their birth. Children of this new age are fondly called digital immigrants because they are born during the time teaching and learning technological machines have been in vogue. Little wonder, Prensky (2001) averred that the new generation of students are now digital immigrants because they are born in the reigns of teaching and learning technologies and can afford some of them for their personalized learning or use.

Teachers of this 21stcentury must immerse themselves, perhaps accommodate themselves with different digital cultures or lifestyles to cope professionally with the demands of teaching in this digital era. Teachers must be professionally sailable with digital tools and resources that develop student's intellectuality, made manifest through deep thinking and creativity. It is expedient that teachers should develop technological driven skills and knowledge that could help them develop different means of coping with digital students in this technological age. Teaching is made explicit and effective when technologies are brought in handy with teaching and learning.

Teaching and learning are mostly planned, organized, coordinated and controlled when digital tools and resources are controlled by a teacher to ease students' learning and understanding in the classroom. The goals of teaching and learning are realized when students show concerted efforts to learn with teachers and instructional technologies and resources. Teaching is most likely a rewarding adventure when students are inquisitive, and teachers form repository to student's questions. In this technology driven age, students are digital fluent, it is imperative that teachers should be digital fluent as well so that they can comfortably fit in in the classrooms, make use of computers and source information from the internet. Teachers should be abreast of the numerous digital tools for teaching and learning and be able to work with them. They should allow their use flow into their blood veins to meet with the demands or exigencies of this computer or digital age. Digital learning tools and resources are imperative for teaching and learning and should not be jettisoned because they enable students of this age to compete favorably with their mates in professional examinations, and in the world of work (Cope and Kalantzis 2000). Vast array of technology integration models that can be of help to teachers for effective teaching and learning in conducive education environment include ASSURE MODEL and technology ENQUIRY MODEL. These technologies ease effective teaching and learning especially when they are harnessed in a conducive teaching and learning environment (Smaldino, Lowther & Rusell 2008). (Morrison and Lowther 2010) also identified the efficacy of these technologies in teaching and learning.

Efficacy of Educational Technology Tools on 21st century Teachers Education

Educational technology tools are those tools that ease easy grasp information especially when they are harnessed to improve the performance of students in classroom teaching and learning. In this 21st century education system teaching and learning have changed from the use of traditional teaching method to the use of modern methods. It is obvious that use of modern teaching and learning methods are multitasking because teachers are needed to have knowledge of the skills needed for the use of those technological learning resources. To enable the achievement of these tasks, teachers need to be abreast of how to create, use, understand, organize, and coordinate the management of digital learning tools and resources. In this 21st century education system, some teachers show resistant to use of technology in teaching "techno phobia" to use of modern teaching and learning technological tools. This is not expected from teachers in this digital era. Teachers need to be abreast of how computer works, how to operate computers and incorporate the skills for student intellectual development. In this modern age, there are numerous application software's students can glide on. Application software's are productivity tools that enables teachers and to know how to use, create, produce, manage documents, use mobile devices, digital cameras to snap and record events posts and publish snapped events. 21st century teacher education system demands that

teachers should know how to use the internet as a collaborative learning tool, communication tool and as source of information. It is obvious that modern educational technology tools are productive, educative, communicative and resourceful for quality teaching and learning because they can be used on different learning styles. Teachers are obliged to make use of them (Januszewski & Molenda 2008). Teachers should be aware about the affordances of modern teaching and learning digital tools and resources that enhance quality teaching and learning in this internet and computer age Francom (2014).

Affordance of digital tools and Resources

Affordances of teaching and learning digital tools and resources refers to the process of determining the efficacy of digital tools and resources, procurement and usability. Teachers that have familiarized themselves with the use of word processing tools can effectively write, search for information from the web and make presentations with the use of presentation software. These responsibilities demand that teachers acquire skills of how to use information and communication facilities right from their training to discharge these responsibilities to students. Teachers can use word processing software to format or change the appearance of documents. Teachers that have familiarized themselves with the use of word processing or formatting tools can change fonts styles, sizes, color of texts, add borders to portions of text, adjust margins, bullet points and numbered lists. Some teachers that are conversant with the use of word processing software can use it to insert pictures from gallery of images. Some qualities of word processing software are used for spelling and checking correct grammar. Another piece of software that is very efficacious for teaching and learning is the spread sheet software. Spread sheet software enables information and technology inclined teachers and students to calculate and make numerical analyses very easy. The knowledge of spread sheet can be helpful in recording and graphics. In business, spread sheet can be used to record expenses, create simplified budget. Some spread sheets allow users to create charts. On the other hand, some teachers that are famished with the use of ICT software in teaching and learning can use presentation software to create visual presentations with dynamic slide show. Presentation software can also be used for creating clip art, graphs, photos and audio/ video shows. It is expedient that in this 21st century education system, teachers should be conversant with the use of different information technology software and appropriate their use during teaching and learning (Francom, 2014).

Principles guiding the use of technology during classroom teaching and learning

i. Technologies that enhance teaching and learning should be used for all courses or subjects. They should not be permanently provided for a particular subject or course. Their importance should cut across all subjects. This means that they should be used for teaching and learning all subjects. Just the way pen and

books are used by teachers and students on daily teaching and learning. Technologies such as laptops, desktops, PCs and handsets that contains different software's are for teaching and learning in the classroom.

ii. The vast array of software's that enhance mastery of different concepts should be incorporated into teaching and learning. This will speed up fast learning in the lives of students.

iii. Students should be exposed to innovative use of technological tools, devices or resources. Students should see their teachers as models that introduce them to different technological learning tools. Student's observation of their teachers on use information and communication technology to teach will enable student to be skilful in their learning.

iv. Different computers and internet facilities should be provided in schools for quality teaching and learning. This will enable teaching and learning to be competitive and engaging in schools (Resta, 2002).

Statement of the Problem

The benefits derived from integration of information and communication facilities in the 21st century education system is enormous. In view of these benefits, information and communication technology on teacher education system is beclouded with many challenges on teacher education below, some of these challenges include:

i. **Inadequate funding**: Government has continued to pay lip service to steady provision of ICT facilities and resources on education system. Many computers such as desktops and other peripheral ICT devices have for long malfunctioned in many colleges of educations. The funds to provide these facilities have become too exorbitant to afford by some learning institutions especially in Nigeria due to lack of steady fund provision to institutions of learning by the government.

ii. **Inadequate security**: Some colleges of education and universities have experienced inadequate security from time to time, because of this, some ICT facilities have been stolen by hoodlum or unscrupulous individuals in the society.

iii. **Selfish interest of management**: In many colleges of education and universities, funds provided for maintenance of ICT facilities are hijacked or plundered for personal use by managements of some colleges of education and universities. This is the reason that some ICT facilities in many institutions of learning have crumbled why some are dumped as scraps.

iv. **Inoperancy or techno phobia among teachers and lecturers**: Some teachers are formerly trained in an analogy way. It is very saddening that many teachers and lecturers do not know how to operate computers nor operate some handsets. This is because they are not trained with ICT facilities right from

their secondary and tertiary institutions. This is a problem truncating the use of ICT in teaching and learning in some secondary schools and universities in the developing countries of the world, especially in Nigeria.

v. **High neglect and absence of ICT facilities in public schools:** It is evident that most public secondary schools in the developing countries of the world have no ICT facilities in the secondary schools. Majority of teachers in public secondary schools in the developing countries of the world are not computer literate. In some secondary schools, there are no computer lab, no computer technician in many public secondary schools. These are reasons why majority of students that have graduated in public secondary schools and some of their teachers do not know how to operate computers. This has become impossible for students at public secondary schools to compete with their mates in private secondary schools. This is also the reason many students deface to private secondary schools especially in Nigeria because some teachers in the public secondary schools do not know how to operate computers and other digital resources in public secondary schools.

Concept of Technology Integration

Technology integration entails the process of incorporating computer and internet in the classroom for effective teaching and learning. It is clear to understand that technology cannot aid teaching and learning unless teachers are involved in using those teaching and learning technologies as tools to teach. This implies that with teachers expertized knowledge on use of teaching and learning technologies, it is evident that teachers will be adequately equipped in content area, pedagogical knowledge and internet surfing. It is imperative that teachers should align themselves on use of digital tools as innovative ways of maintaining effective teaching and learning. Teachers should be aware of various technological tools that will enable them achieve quality instructional objectives that would yield more advanced use of teaching and learning goals Shelly, Cashman, Gunter &Gunter, (2008).

To ensure effective teaching and learning with the use of teaching and learning, teachers must be well-grounded with content knowledge, pedagogical knowledge and technological knowledge.

i. **Content knowledge**: hinged on teachers' good knowledge of the subject matter that centres on knowledge of ideas, theories, knowledge of existing educational practice, organization of teaching and learning contents and use of different approaches that yields to effective teaching.

ii. **Teaching Methods:** Teachers should be well grounded on the various teaching methods. Teachers are obliged to use different approaches, strategies or ideas for effective teaching of subjects. Teachers should understand the manner his or her student's uses to learn. Teachers should ensure effective classroom

management and organizational skills; effective lesson plan and students assessment strategies are ways teachers can use to o make learning contents comprehensible by students.

iii. **Pedagogical content knowledge**: This entails the use of different teaching and learning strategies to facilitate effective teaching and learning. Pedagogical contents knowledge entails that teachers should guide students, engage in interactive teaching and learning activities with students. Teacher should interpret the subject matter, use multiple ways to present the learning contents and ensure that students adapt to different instructional events that connects to student's prior knowledge. Pedagogical content knowledge ensures effective repertoire of learning by teachers. This facilitates effective learning and high academic performance by students.

iv. **Technological Content knowledge**: Entails teacher's ability to understand how to use digital tools/ resources and their affordances. Technological content knowledge on the other hand, requires the use of pedagogical strategies for constructing knowledge, building more existing knowledge. This implies that effective use of teaching and learning technologies requires understanding of the skills involved in the use of information and communication technology coupled with effective use of other teaching pedagogical strategies that enhance quality learning across different disciplines Mishra &Koehler, (2006).

Concept of Technology Integration

Some teachers are engrossed with how to integrate digital tools/ resources into teaching and learning. It is crucial for teachers to furnished with the five categories of software's, examine their efficacy and their affordances in teaching and learning. The five categories of software according to (Morrision & Lowther 2010) include:

i. Productivity software
ii. ii. Communication software
iii. Research
iv. Problem solving / educational software.

These software's are used often in teaching and learning. It is imperative that teachers should develop skills on how to use them. These software's help teachers and students to improve on effective writing skills communication, presentation, and research solutions. Communication software like web 2.0 tools helps in the exchange of digital files such as power point, audio, video, word processed documents and spread sheet among others.in the same vein, Search engines contain browser, search engines such as internet explorers, safari, Mozilla Firefox, Net cape and Navigator, Yahoo, Google are very essential for teacher education. These search engines

enables both students and teacher to enter keywords and expect immediate feed backs. Other search engines such as Adobe reader, real audio are used to open document. Their files serve as portable files in the form (pdf). Also, some video platforms provide enabling grounds for users to view digital video. Also, Real audio provides effective and sound listening on digital audio files with the use of plug-ins devices or resources.

Problem solving software the importance of problem-solving software cannot be overemphasized. Children and adults of school age use problem solving software to practice different games, simulations and drills. They gain quick mastery of games and drills with problem solving software. A maxim says that constant Practice makes one to be perfect. Continuous use of problem-solving software for games, simulations and drills and practice, testing software and tutorials enable children and adults to get acclimatized with how to use different problem-solving software. This goes a long way to ease their learning on every learning that require solution from the use of problem-solving software. Children of this new age are gifted with the skills of how to use computers, laptops, pam tops handsets, among others.

The idea behind this good omen is that right from the childhood age of some children, their parents and care givers have provided digital learning tools and resources for their children use. Children perhaps play with it and get familiarized with them. Children and adults have used these methods to be oriented with tech- savvy. They need not to go to computer school because they have been groomed with the use of computers, laptops, and can confidently make use of the software contained in any of the information technology facilities (ICT). Frequent use of software contained in ICT facilities makes one to be entertained and have fun. Though the use of those facilities to a novice can be encompassing and intriguing, deep thinking and higher order thinking are required for an individual to surmount hitches they can bring about. Students requires collaborative, adaptability, persuasion, and cooperative efforts of students to win every step involved in the masteries of those software. Teachers on the other hand requires communicative ability, motivational, coaching, management and organization skills to be able to manage or control both student and the ICT facilities placed in their care in educational institutions. Prensky (2007) identified that the use of problem-solving software requires critical thinking. Problem solving software enables both children and adults of school age to get acquainted with more broader learnings the problem-solving software can bring immediate solution to very easily.

Theoretical Framework

Jean Piaget theory of cognitive development

This theory was propounded by Jean Piaget in the year (1936). This theory proves that an ideal classroom is one where students are encouraged to actively explore, discover, and where teachers facilitate learning rather than

directly teaching. This theory explained that students should be provided with digital instructional technologies that will develop their intellect into critical or higher order thinking. This theory further explained that when instructional technologies are provided to students, it enables students to reason individually from their own perspectives. Teachers are also, beneficiaries of cognitive development because the make use of instructional technologies to explore and understand concepts before teaching them. Cognitive development encourages personalized, collaborative and hands on learning among students. The relevance of this theory to this paper includes the following:

i. when instructional technologies are provided to students it enables students to tackle complex skills.
ii. It enables students to delve into higher order thinking, active and adaptive learning are encouraged.
iii. It enables students to develop manipulative skills on use of technological learning facilities.
iv. It enables teachers to know their technological abilities and capabilities and be able to use the skills acquired to tackle complex problems during teaching.
v. Teachers will be able to assess individual performances of students on effective use of instructional technology in learning thus encouraging more diversification and skills on use of technology to solve different problem in learning.

Piaget believed that the goal of education is to create people who are creative, inventive, and discoverers, rather than repeating what others have done. This theory emphasized that traditional classrooms where chalks are used are no longer effective. Modern instructional technologies have been incorporated in learning and the traditional classrooms are getting eroded gradually leaving a yawning gap for modern instructional technologies to fill. Teachers' responsibilities are to facilitate learning with aided technological facilities that enhance effective learning.

Recommendations

The following recommendations guided this paper.

i. The government should prioritize installing ICT facilities, such as computer labs and internet access, in public secondary schools. This will help both teachers and students become proficient in using technology for educational purposes.
ii. The government should allocate dedicated funding for procuring ICT facilities and resources in public secondary schools and teacher training institutions. Additionally, measures should be taken to ensure reliable power supply to support the effective use of these technologies.
iii. Professional development programs should be introduced to help teachers overcome reluctance or

unfamiliarity with instructional technologies. These programs should focus on practical training to ensure that all teachers, regardless of experience, are equipped to integrate ICT into their teaching practices.

Conclusion

Teaching and learning in this digital era, required that teachers should acquire skills how to use instructional technologies during teaching and learning. It is saddening that some teachers do not know how to operate computers because ICT facilities were no introduced by the time they are schooling. It is also evident that some teachers are resistant to change because they have already developed techno phobia on use of ICT facilities during teaching and learning. 21st century education system demands that every teacher should know how to operate computer and other instructional technologies. Lack of teacher's competency on use of ICT facilities have resulted to poor performances of students in competitive JAMB and SSCE examinations. The current trends in teacher education demands that teachers should be familiar with how to operate computers. This will enable teachers to teach effectively in the classroom. In the same vein, the students that under their care will as well acquire ICT skills under teachers' tutelage. This would also enable students these teachers have taught to compete favourably in the classroom and in the world of work after graduation.

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