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Digital Technology and Learning Effectiveness among Secondary School Students in Ondo West Local Government Area, Nigeria.

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ABSTRACT

One of the leading indicators of poor education structure among experts is the low deployment of digital technologies in schools. The importance of digital technologies to teaching and learning process has been widely stressed while its non-use is continuously underscored as consequential to low quality of education that characterizes Nigerian system. This study evaluated the level at which digital technology is deployed into the teaching and learning process. The study employed a survey research design while engaging samples which consists of randomly selected three hundred and twenty (320) secondary school students from public and private secondary schools in Ondo West Local Government Area of Ondo State, Nigeria. Adapted Digital Technology for Effective Learning Tool (DITELT) was used for data collection. The findings of the study revealed that set of technologies: Interactive Digital Content ($\bar{x} = 2.67$); Websites ($\bar{x} = 2.63$), Social Networking ($\bar{x} = 2.53$), Communication Tools ($\bar{x} = 2.48$) were the highly recognized as useful for learning while others are under-appreciated among respondents. Both descriptive and inferential statistical analyses revealed and supported the influence of digital technologies on learning effectiveness ($\bar{x} = 2.65$) and ($t = 6.784$; $p < .05$). It was recommended that government should support secondary schools with digital technologies so as to improve delivery as well as foster qualitative education across the nation.

Keywords: Education, Digital technologies, Digital tools, Learning, Learning Effectiveness

INTRODUCTION

Today's technology-driven age has driven globalization to the backyard of every nation of the world. This evolutionary feat is fast affecting all aspect of life, activities and practical ways of doing things. Teaching and learning process cannot longer been done effectively without technology (Klopfer, Osterweil, Groff and Haas, 2009; Srivastava and Dey, 2018). Technology is continuously taken to the four walls of the classroom. This is done on the belief that digital technology can foster dialogic and emancipatory practice (Staley, 2004). Costley (2014) submitted that technology may have positive impact on student learning; it causes students to be more

engaged; and provides meaningful learning experiences. Although, technology comes with certain pitfalls, but the conclusion is that teachers and students should focus on the positive advantage side while eliminating the disadvantages which can hinder achieving academic excellence.

An extremely large magnitude of learning crisis today among Nigerian learners particularly at public schools may have pointed to low digital technology use and poor ICT integration to classroom experience (Thomas & Omotoke, 2015). Cognitive psychologists emphasize the crucial need to foster remembering of the

information learned for possible recall at a later time and effective utilization in a wide variety of situations to learning effectiveness. To this end, effective integration of technology became an indispensable. When technologies are effectively integrated, students are more actively engaged in projects. Thus, the use of technology resources such as computers, mobile devices, digital cameras and social media platform among others seem capable of offering a variety of educational opportunities that can improve learning (Adeyemi, 2008).

Today's students are often called "digital-age learners" reflecting their technological savvy and free-agent approach to learning (Burkholder, 2012). These evolving student characteristics and the increased presence of technology and digital resources certainly provide challenges for schools as they work to adapt and embrace this rapidly changing environment. There is no doubt that technological change is playing an important role in providing support to teachers, students and the teaching-learning process. More broadly, it is touted that technologies can help teachers manage the classroom and offer different challenges to different students. However, in reference to Nigeria and many African countries where development is still slow, it is debatable if digital technologies are adaptable to the revered traditional system given the circumstances, i.e. characteristics and motivation of teacher themselves (Shonola & Joy, 2014).

Digital technology provides great opportunity to help schools advance student learning effectiveness and acquire 21st century skills. These opportunities include: increasing student enrichment, addressing teacher effectiveness, mitigating inequality and preparing students for success.

Research has shown that one of the most important factors contributing to a student's success is the quality of teaching he or she receives. Fully leveraging the opportunities of digital learning and technology in the classroom will require a shift in the role and skills of teachers (Alliance for Excellent Education, 2012). With the expansion of digital learning and technology in the classroom, the training and professional development of teachers must transit to fully realize the potential of these resources to foster student learning. This encompasses using technology to guide instruction and to measure, evaluate and understand student learning through data-driven instructional methods (Yakubova & Taber-Doughty, 2012). In addition to this shift in role, many teachers lack proficiency with technology. These gaps of teacher role in digital learning environments and their technology skills prevent digital learning and technologies from being used effectively. To make the transition from the traditional pattern of disseminating content knowledge to that of instructional design in guiding students' discovery and application of information, teachers require a significant investment in time and learning (Wuang, Chiang, Su & Wang, 2011).

Dede (2011) posited that technologies can be used to deepen learning, they can also help prepare students for life and work in the 21st century, mirroring in the classroom some powerful methods of learning and doing that pervade the rest of society. According to Groff (2013) digital technologies create a practical, cost-effective division of labor, one that empowers teachers to perform complex instructional tasks. In addition, it is touted that media can address the learning strengths and preferences of students growing up in this digital age, including bridging formal instruction and informal learning (Trinder,

Guiller, Margaryan, Littlejohn & Nicol, 2008). However, it is worrisome that not many teachers in Africa and most especially, Nigeria are ready to pit the traditional method, (teacher-centred approach) for technological adapted teaching for some reasons. This issue is summed under technical issues since teachers need to be competent provide infrastructure and technical support for technology use throughout the curriculum (UNESCO, 2002).

Thinking about the implications of the digital technologies as a technical issue, schools need to be able to provide and service equipment and connectivity, and children and teachers need the skills required to use these resources. This requires adequate funding, professional development for teachers, and an educational infrastructure that can respond flexibly to change. These requirements are challenging given the rapid pace of technological evolution, a strong accountability culture and budget constraints. For many schools, equipment is scarce, faulty and out-of-date, and innovation may be stifled as schools and teachers juggle competing pressures. However, in responding to the digital age, schools will want to go further than providing access to digital technology and equipping children with skills. They will want to ensure that all can draw on the potential of digital technologies in ways that are personally fulfilling and economically, socially and politically empowering (Williamson & Perkins, 2009).

To date, however, the digital tools and media that have had the most substantial impact on practice have mainly been used to automate conventional models of teaching, as though the goal were to continue pursuing a narrow set of learning goals related to preparing the students for future challenges (Araya & Peters, 2010). Thus, some learning

management systems deliver drill-and-skill instruction, tested through traditional measures, rather than via application to real-world problems. The real value in digital tools for teaching lies in rethinking the enterprise of schooling in ways that unlock powerful learning opportunities and make better use of the resources present in the 21st-century world (Dede, 2011).

Learning effectiveness refers to ability of learners to receive educations that represent the distinctive quality of the learners and the institution. Learning could be effective if teachers are able to introduce digital tools into teaching. Thus, learning effectiveness could be the first outcome measure by which standard of classroom and online education are judged. Students need to be able to easily manage and use information personally and professionally in the 21st century. Skills such as the ability to collect analyze and understand data and information support good decision making and are key to their success. The best learning occurs when real world problems are paired with real world tools for problem solving. As technology is an integral part of 21st century students' realities, these tools need to be digital to be relevant. Research works on digital tool and learning effectiveness is scarce.

This study seeks to address the gap especially in secondary schools in Ondo West Local Government Area of Ondo State. This study therefore seeks to investigate the influence of digital tools on learning effectiveness of secondary school students in Ondo West Local Government of Ondo State. Precisely, it seeks to investigate the availability and use of digital tools in the schools under study and the influence on learning effectiveness of students.

Statement of the Problem

Today, the domain of education has appreciably accepted technologies as a game-changer; its scaling impact has been established through improvement and coordinated teaching and learning activities especially in developed nations. However, scholars in the Nigeria continue to weigh on the potential difference digital technologies can make given the nation's benchmark for traditional methods of instructional delivery. While some scholars see negative outcomes for integrating digital technologies into teaching-learning process, some hold that utilization of digital technologies can stimulate classroom engagement, motivate and aid students' assimilation of instructional contents. However, in peculiarity to Nigeria, it is not clear whether schools have integrated technology into the teaching-learning process. It is against this background that the study evaluated the use of digital technologies in school and its overwhelming importance on learning effectiveness among secondary school students in Ondo West Local Government Area, Ondo State and advocate use of digital tools to aid effective learning.

Objectives of the Study

The main purpose of this study is to investigate the influence of digital age on learning effectiveness among secondary school students in Ondo West Local Government Area, Ondo state. The specific objectives of the study are to:

- i. evaluate the commonly used digital technologies deployed to teaching-learning process in Ondo West Local Government Area
- ii. assess the general impact of digital tools on teaching and learning activities
- iii. determine the influence of digital learning tools on learning effectiveness among secondary

school students in Ondo West Local Government Area.

Methodology

The survey research design was adopted in the study which according to Ogunleye (2000) is a very systematic description of an event in a very factual and accurate manner. This research design was therefore deemed applicable since it assists in finding out influences of digital tools on learning effectiveness of students.

Population and Sample

The population for the study consists of students from secondary Schools in Ondo West Local Government of Ondo State. Multi-stage sampling procedure was employed, i.e. systematic random sampling technique was adopted in selecting the private and public schools, while simple random sampling technique was also used to select three hundred and twenty (320) secondary school students: 176 (55%) female and 144 (45%) male respondents were engaged for the study.

Instrumentation

An adopted structured questionnaire titled: *Adapted Digital Technology for Effective Learning Tool (DITELT)* was used to collect the data. The instrument is divided into section A and B. The first section, A, deals with the personal data of the respondents such as sex, class, religion and type of school. Section A contained of a question that asked whether digital technologies are integrated into their teaching-learning activities. Section B contains items that measure influence of digital tools on learning effectiveness of secondary school students. The validity of the DITELT was ascertained by the author but also subjected to validation of three experts from the Department of Educational Psychology and Counseling, Adeyemi College of Education, Ondo being an adopted instrument. The

reliability coefficient of the DITELT was determined by the scores obtained from a pilot study using Cronbach alpha coefficients. The reliability coefficient of 0.87 proves that the instrument was reliable. Finally, scores of respondents in the five relevant subjects were averaged and used as a measure of effective learning.

Procedure and Data Analyses

The instrument was administered by the researchers in the selected schools. There was no time limit given. The instrument was collected same day of administration. Data collected was analysed using descriptive statistic tools (simple percentage and mean), and inferential (independent sample t- test) statistics.

Results

Table 1 reveals the demographic information of the respondents. It shows that 176 (55%) were female and the rest 144 (45%) were male. This means that females participated more in the study than their male counterparts. Also, 127 (39.7%) were in JSS1-JSS3 and the remaining 193 (60.3%) were in SS1-SS3. This means that respondents from the senior classes participated more in the study. One hundred and eighty-nine (59.1%) were Christians, 127 (39.7%) were Muslims and the rest 4 (1.2%) were traditionalist. This means that Christians participated more in the study than their other counterparts. Also, 136 (42.5%) were from private school while 184 (57.5%) were from public school. This means that respondents from the public school participated more in the study.

Table 2 displays the rating of digital technologies useful to delivering instructional contents to students. Most noted digital tool by ranking are: Interactive Digital Content (mean =2.67); Websites (mean = 2.63), Social Networking (mean = 2.53), Communication Tools (mean = 2.48) and others. However, digital tools

such as Multiplayer games (mean = 1.44); Photoshop (mean = 1.64) and Multimedia Softwares (mean = 1.25) are under-appreciated. Altho

The finding of the study justified the position of Tella, Tella, Toyobo, Adika and Adeyinka (2007) who found that teachers perceive ICT as being easier and very useful in teaching and learning. However, the study did not fall short of pointing to some technologies that are scarcely used due to lack of such facilities in the school. Aayi and Ekundayo, (2009) explained the reasons for low appreciation of some digital technologies in irregular power supply: inadequate computer literate teachers; high cost of purchasing computers in schools; inadequate facilities to support full application of the ICT and lack of fund.

Result from Table 3 shows the extent of influence of digital age on learning effectiveness of secondary school students in Ondo West Local Government Area. It shows that 154 (48.1%) agreed that using digital tools such as phone, computer etc have increased their academic achievement while 68 (21.2%) disagreed. One hundred and sixty-seven (52.1%) agreed that digital age has given teachers the opportunity to be learning facilitators instead of information providers while 43 (13.4%) disagreed. Also, 143 (44.6%) agreed that the use of digital tools had helped them in personal learning styles while 67 (20.9%) disagreed. 131 (40.9%) agreed that the use of technology motivated them to get more involved in learning activities while 87 (27.2%) disagreed. One hundred and nineteen agreed that digital age has helped their interpersonal skills in class while 50 (15.6%) disagreed. Lastly, 150 (46.9%) agreed that the use of technology has improved their learning on critical concepts and ideas while 53 (16.5%) disagreed

The average mean is 2.65, revealed that digital age has influence learning among

secondary school students in Ondo west Local Government Area is to a high degree. The finding goes in line with Kaya and Ebenezer (2007) who found that students' attitudes toward learning and confidence about school work improved when they used technology during their lesson. The Table 4 above showed that there was significant difference in the effective learning of students' whose instructions are adapted with digital tools and those whose instructions are not adapted with digital tools. The mean value of the table further revealed that the students' whose instructions are adapted with digital tools perform better than their counterpart (whose instructions are not adapted with digital tools). The result shows that there was significant influence of digital technologies usage on learning effectiveness among secondary school students in Ondo west Local Government Area, Ondo state.

The finding corroborates Ericksen, Cannon-Bowers, and Bowers, (2006) who found that computer-assisted instruction (CAI) is a widely studied and supported method of teaching as it influences learning effectiveness among students. The authors found that the use of digital tools by teachers influenced learning effectiveness among students in US. The finding also goes in line with Vonnie and Gleason's (2007) who found that there was significant of digital age on the learning outcome of students. They further found that as students use digital tool often, so is improvement in their academics. Further, to become skilled at solving problems and develop thinking skills, students need to identify or formulate a problem, analyze the data, and find a solution.. Across all subject areas, it is crucial that students gain the ability to synthesize large amounts of information into a coherent format and communicate the information clearly.

Discussion

Based on finding of the study, it was documented that few digital technologies are recognized and used in teaching and learning activities. Leading among the digital technologies deployed are Interactive Digital Content, Websites and Social Networking tools. However, the study pointed to the fact that many digital technologies are still far from being used in teaching and learning. There are few important digital technologies that not recognize as a potential tool for educational activities. The result obtained can be related to other findings e.g. Tella, Tella, Toyobo, Adika & Adeyinka, (2007) concluded that there is not much information on how ICTs are being used by teachers, despite the appreciable deal of knowledge about how ICTs are being used in developed countries.

Further result revealed that both belief and practical use of digital tools have significant influence on learning effectiveness. The findings go in line with the works of Nafiz and Ebenezer (2007) & Isernhagen (1999). Nafiz and Ebenezer (2007) found students' attitudes toward learning improved with the use of technology. Moreover, the study of Isernhagen (1999) concluded that computer based instruction individualizes the educational process to accommodate the needs, interests, and learning styles of each student. Students also tend to like their classes more and develop more positive attitudes towards learning which results in positive academic achievement to analyze, access, manage, integrate, evaluate and create information in a variety of forms and media.

Conclusion

Although, digital technologies is still far less used, but its appreciable impact among the respondents means that it can be a tool to achieving a vibrant and much improved

academic outcome. Digital technologies can have positive influence on learning effectiveness. When students are exposed and monitored in the use of these digital tools such as smart phones, computers; social media and so on in this digital technology age, they can be vast about and stay up-to-date on information that are relevant to their learning and also prepare them for future career aspiration. When teachers adopt the use of these tools, their teachings are enhanced so also their students are able to have a full grasp of the content being taught. Hence, learning effectiveness can be enhanced.

Recommendations

Based on the research findings, the following recommendations were made:

- Secondary school students should be encouraged to use digital tools such as phones, laptops, tablets etc toward enhances their learning rather than for other means. This would however enhance their learning effectiveness.
- Since the world is dynamic in technology development, teachers should be trained on how to use some of these tools in delivering their subject contents, this would however make teaching interesting and less stressful.
- School management should provide interactive whiteboards, tablets, smartphones, digital language recorder, overhead projectors and slide projectors, Educational CDs and DVDs, computers mobile phone, tablet, notebook, etc. in schools, this would improve teaching and learning processes.
- Teachers should give assignment to their students by making it compulsory for them to go to the internet for them to get the assignment done. This would expose the students to more educational

relevant information on the internet which would consequently enhance their learning outcome.

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Table 1: Demographic characteristics of the Respondents

Variables		Frequency	Percentage
Gender	Female	176	55.0
	Male	144	45.0
Class	JSS1-JSS3	127	39.7
	SS1-SS3	193	60.3
Religion	Christianity	189	59.1
	Islam	127	39.7
	Traditional	4	1.2
School type	Private	136	42.5
	Public	184	57.5

Table 2: Perceived useful digital learning tools to improve learning among respondents

Digital Learning Tools	Less useful (%)	Averagely useful (%)	Highly Useful (%)	Mean	Rank
Multiplayer games	210 (65.6)	79 (24.7)	31 (9.7)	1.44	9 th
Social Networking	47 (14.7)	56 (17.5)	217 (67.8)	2.53	3 rd
Online Quiz	83 (25.9)	137 (42.8)	100 (31.3)	2.05	7 th
Websites	30 (9.4)	59 (18.4)	231 (72.2)	2.63	2 nd
Lecture Capture Softwares	60 (18.8)	69 (21.6)	191 (59.7)	2.40	5 th
Interactive Digital Content	32 (10.0)	43 (13.4)	245 (76.6)	2.67	1 st
Gmail for students	77 (24.1)	140 (43.8)	103 (32.2)	2.08	6 th
Photoshop	142 (44.4)	151 (47.2)	27 (8.4)	1.64	8 th
Multimedia Softwares	272 (85.0)	15 (4.7)	33 (10.3)	1.25	10 th
Communication Tools	49 (15.3)	67 (20.9)	204 (63.8)	2.48	4 th

Table 3: Summary of extent of influence of digital technologies on learning effectiveness

Items	SA	A	D	SD	Mean	SD
1 Using digital tools such as phone, computer etc. has increased my comprehension of subject matter	89 (27.8%)	154 (48.1%)	68 (21.2%)	9 (2.8%)	2.16	.96
2 Digital technologies has not given teachers the opportunity to be learning facilitators instead of information providers	93 (29%)	167 (52.1%)	43 (13.4%)	17 (5.3%)	2.71	.97
3 The use of digital tools has helped me in personal learning styles	72 (22.5)	143 (44.6%)	67 (20.9%)	38 (11.8%)	2.67	.71
4 The use of technology motivates me to get more involved in learning activities	87 (27.2%)	131 (40.9%)	87 (27.2%)	15 (4.7%)	2.32	1.03
5 Digital technologies have helped my interpersonal skills in class	108 (33.8%)	119 (37.2%)	50 (15.6%)	43 (13.4%)	3.31	.91
6 The use of technology has	72	150	53	45	2.77	.88

improved my learning on (22.5%) (46.9%) (16.5%) (14.0%)
critical concepts and ideas

Average mean: 2.65

Table 4: The summary table showing significant difference in the learning effectiveness based on Digital tools integration to teaching

Variable	N	Mean	SD	Std. Error	DF	t-cal	P	Remark
Students taught with digital tools	89	61.93	14.38	1.52455	318	6.784	.000	Sig
Students taught without digital tools	231	49.89	14.16	.93159				