# **DIGITAL-MULTIMEDIA IN ADVANCING EDUCATION IN THE 21st CENTURY**

#### \*ADEJOKE Olabisi Sheyin, Ph. D

Tai Solarin University of Education, ijebu Ode, Ogun State, Nigeria shevinao@tasued.edu.ng

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# **OPEOLUWA Iyabo Olubela, Ph.D** Florida, USA obriggsfamily@yahoo.com

## Abstract

The descriptive paper explores the dynamic influence of global digital technology, especially the use of technological devices in the classroom, on the performances of learners, in public Schools in Nigeria, and their preparedness for the job market. The study was conducted on 235 students studying Mathematics, in their second year at each of the five colleges of Specialized Education; Basic Sciences; Social Sciences; Humanities; and Languages. An online survey was conducted regarding their use of technology. The Pearson Correlation *Coefficient and Descriptive Statistics were applied to study the* frequency of and Influence of technology on learning achievement in mathematics courses. A significant relationship was found between the use of technology and their achievements in Mathematics, (r = .42) at p < .05; positive relationship was also found between the use of the gadgets, (Laptop and Phones, r=.234, Ipads, r=.125, Tablets, 121 and Desktops, r=.297, all at p<(0.05); and Multiple Regression Analysis demonstrated that most used devices are laptops (45%), phones (34.5%), Ipads (15%), tablets (5%) and computers desktops (0.5%) jointly contributed significantly, (F-ratio of 25.819 at 0.05 level of significance). The study therefore concludes that the use of technology has also shows that the learners were able to do more in their studies by developing collaborative skills and creating the connections that turns innovative ideas into reality necessary for the job market.

# *Keywords*: Specialized Education; Basic Sciences; Social Sciences; Humanities; mathematics; digital technology, academic performance.

# Introduction

Globalization and Computerization is dynamic, Technology is used as a drive for development that is affecting every area of human life. The world is developing at an accelerated speed; one important vehicle driving the development is using Technology in teaching learning process in the school. The spread of Covid-19 epidemic raced the expediency of application of technology in the classroom; as it improves engagement of students; it improves knowledge retention; and it encourages students to learn at their own pace. Advances in digital technology have opened up many avenues of learning. Technology has made information accessible, transmittable from anywhere and, to all groups of people. Education has reached most parts of the world and technology has become an integral part of human life. Technology use in education has been an important issue since the potential of computer technology was recognized in the 1960s. Quick and easy online access to information for knowledge and learning has affected young people's social, emotional and physical development. Technology role in education has been an important question since the potential of computer technology to transform Skinner's teaching machines was recognized in the 1960s. Digital Technology in Education, (E-learning), is the modern learning technology used to communicate or transfer knowledge on platforms, for teaching and learning activities interactively from afar, with the E-learning is location, as well as, content independent. Knowledge can be tapped from, and taken to any corner of the world, no matter how remote, using appropriate network technology. It can also be time independent, particularly in its asynchronous form. Cost is an important factor in deploying any form of technology, particularly to the rural communities. E-learning can attain a wide reach, at low cost, if implemented and managed properly; it can also be maintained at minimal cost. Teaching process can be automated, thus minimizing the effect of lack of qualified teaching personnel. Informal training can be maximized giving rise to new opportunities for non-professionals, to find new roles.

The unique thing about E-learning is that its multi-modal methodologies. There are several modes or forms of e-learning that can broadly be categorized into two; namely synchronous and asynchronous. Synchronous is a style of engagement in e-learning using tools. Learning takes place in real time: that is, instantly and interactively. It is usually scheduled and time-specific. In asynchronous e-learning, on the other hand, collaboration, communication or access, takes place intermittently. Asynchronous involves coursework delivered and later posted on online forums. It is self-paced and available, at any time. Common to them, however, is the use of computer network and software to facilitate life, interactive learning transactions, via the internet. Education reforms incorporates the use of computer technology into education, in order to prepare students to be well equipped to face the challenges of the evolving Artificial Intelligence (AI) and Automation, as it affects the job market and employment. There are innumerable styles of interactive activity that may be synchronous and asynchronous in nature. Such as: Learner-content (Moore, 1989), Learner-interface (Hillman, Willis & Gunawardena, 1994), Learner-instructor (Moore, 1989), Learner-learner (Moore, 1989), Learner-self (Crawford, 2001), Learner-community (Burnham & Walden, 1997), Instructor-community (Crawford, 2001), and Instructor-content (Crawford, 2001; 2003.

#### Statement of the problem

An anecdotal observation revealed that, apart from some private schools in Nigeria who have incorporated computer into teaching and learning for more than two decades, the Government also has introduced Information and Communication Technology (ICT) into the National Policy on Education. Information and Communication Technology for Development Agenda (ICT4D), in the country, recognize ICT Training and Instruction in schools. Therefore, the use of digital technology in the process and delivery of teaching and learning, in form of

Blended Pedagogy is now integrated into the teaching-learning in Public Schools in Nigeria. Is this innovation in teaching/learning worthwhile, necessary and sufficient? The authors want to assess the transitioning from traditional classroom pedagogy; the emerging digital enabled Blended Teaching-Learning; and also looks into the great challenge of training teachers, in the Higher Institutions of Learning. Tai Solarin University of Education, Ijebu-Ode, an Institution that is committed to the pursuit of preparing professional teachers, is used; focusing on the students taking Mathematics course work, towards attaining access into a teacher education programme.

#### **Purpose of the Study:**

It is the aim of this study, to explore the dynamic influence of global digital technology, especially the use of technological devices in the classroom, on the performances of learners, in public Schools in Nigeria, and their preparedness for the job market.

## **Literature Review**

Access to computers and the Internet alone have been proven to be insufficient to make meaningful impact if the individual do not possess the basic skills and exposures to other resources that take advantage of technology, (Mossburger, K., Tolbert, J.C. & Stansbury, M. 2003; Warschauer, M., 2004; and Kvasny, L., 2005, cited in Sheyin, 2013). Advances in digital technology have opened up many avenues for learning. Technology has made information accessible, transmittable from anywhere, and to all groups of people. Education has reached most parts of the world and Technology has become an integral part of human life.

Kvasny argues that public access and computer training though justified, is not enough to address other "social forces" that may limit those endeavours. The issue is therefore not only about access but also about use or ability to take advantage of technology – needs that cannot be dissociated from other social and economic factors such as poverty and literacy level. Even in the light of the above discourse, contemporary Technology can be used to provide access to better education if only it is carefully planned and appropriately deployed. Literacy acquisition requires variety of resources and the development of skills, knowledge with the right attitude, physical access to devices and motivation to make meaningful use of technology. All these are matters of not only education but also of power and privilege ((Mossburger, K., et al, and Kvasny), which is the goal of this paper, when the product aspires to join the labour force.

The Government of Nigeria in the past decade has given recognition to the requirement for technology skills training and instruction in schools, colleges and universities and the enhancement of the education training framework at large as outlined in the government Information and Communication Technology for Development Agenda (ICT4D) agenda. The application of Technology in education is expected to generate better approaches to acquiring knowledge and learning analytic and improved outcomes for learners and instructors. Technology can also improve access to information and education [Ussiph, 2012].

Warschauer, M., 2004, proposes range of resources that will need to be mobilized for Technology access for the social inclusion into the job market. These include: Physical Resources: access to computers, their accessories and the internet; Digital Resources: needed application software and relevant online or digital materials; Human Resources: trainers or instructors on education and literacy to provide basic skills needed for computer use and online communication; and Social Resources: societal structures such as community or institution that provides support for infrastructure..

Wikramanayake G.N. (2003) further analyzed that, the availability of vast amount of information on the web has provided access to all types of learning material. The teacher's lecture notes are no longer the primary focus of a learning process, and the teacher's role and the student's learning process is changing. Paradigm shifts in today's world have identified the Machine and Industrial era being replaced by Technology and Information era. Similarly production process has moved from Products to Knowledge, Workplace has moved from Physical to Virtual, and its focus has changed from Worker to Customer, (Schwandt, David & Marquardt, Michael, 2000). The time for change in the Nigerian education system is now. This study will be a catalyst for a broader exposure on change and an improvement in the education system, in a near future if technology is embraced by her stake holders.

# **Research Question and Hypotheses**

The following research question and hypothesis were were answered and tested to make inference in the study

**Research Question:** Which social networking sites are mostly used by undergraduates in campuses?

# Hypotheses

**Ho1:** There is no significant influence of social Networking sites usage on academic performance of students in Ogun State universities.

**Ho2:** There is no significant relationship between usage of technology devices on academic performance of students in Ogun State universities

**Hypothesis 3:** There are no significant joint contributions of Technology Devices, (Laptops Phones, Ipads, and Tablets) to learning achievement of students in mathematics courses in Nigerian Universities

#### Methods

#### **Research Design:**

Descriptive Survey Design was used for the study. It is descriptive because the study describes the characteristics of the sampled population based on their responses to the questionnaire items. The students' responses to the questionnaire items will inform the researchers on how the use of digital multimedia affects the respondents learning, as well, as their performance.

# **Population**

The study population comprised all second year Mathematics students, in Colleges of Specialized Education: Education, (COSPED); Basic Sciences, (COSIT); Social Sciences, (COSMAS); Humanities, (COHUM); and Technical, (COVTED), in Tai Solarin University of Education, Nigeria.

# **Sampling Technique**

290 students were selected using stratified random sampling technique, to represent all in the colleges; COSPED, COSIT, COHUM, COSMAS, and COVTED, in the University

# **Research Instrument**

An online survey was conducted regarding the sampled students' use of technology. A questionnaire tagged, " the Use of Digital Technology in Education," (QUDTE), whose psychometric properties were established, as follows: to test the degree to which the said instrument accurately measured what it intends to measure, it was given a content validity by experts in the field; while the degree to which the instrument yielded consistent results, was tested using test-retest measure; whereby using Cronbach's alpha, correlation between the scores from one administration of 20 of the instruments on 20 students, apart from those sampled, and to another 20, within an interval of 2weeks, the correlation coefficient was (.81). subsequently, the 290 questionnaire was administered, online, on the sampled students, to enable ease of generalization on the findings of the study.

## **Data Collection:**

A Facebook©, Imo© and WhatsApp© groups, including all the participants were organized. Then a Social Media Class was created with the teachers as the administrators; and students were added to the group for participation in the 'extended' classroom sessions and to also collaborate with their peers. This allows the teacher to post teaching notes, assignments and quizzes notices in Mathematics, as well as, to initiate a forum. Students could request for further explanation to some lessons taught in class; Students utilized Laptops, Ipads, Cell phones, Tablets and Desktop Computers, with internet access, together with the influence of social networking sites, and this offered a resourceful stage for collaboration, creative, student-centered, learning experiences. They could post responses to assignments online; and also perform live chat, live, with the teachers and peers on the platform. Then the Questionnaire was administered after six weeks of interaction.

#### **Data Analysis:**

Pearson Product Moment Correlation Coefficient was used because of its efficacy in establishing linear relationship between two variables (Independent variables(digital multimedia) and Dependent variables (students' learning and performance) and their contributions were analyzed using Multiple Regression Analysis.

**Findings / Results:** 

**Research Question 1**: Which social networking sites are mostly used by undergraduates in campuses?

Table 1: V	ariona socielina tworking sites	nostly used	h <b>y</b> em <b>deng</b> gelua	tes
	Facebook	120	18.46%	
	WhatsApp	290	44.61%	
	Twitter	190	29.32	
	2go	50	7.69	
	Total	650	100	

**Hypothesis 1:** There is no significant influence of social Networking sites usage on academic performance of students in Ogun State universities.

Table 2: Influence of social netwo Mathematics	r <del>king s</del> N	<del>ites usa</del> X	i <del>ge on stud</del> SD	<del>lents'</del> DF	achieve R	Prents in P
social Networking sites usage on		2.37	213.12	8	0.42	0.05
students' achievements in						
Mathematics						
1						

The table above shows that the obtained value of 0.42 is higher than the critical value of 0.05 at the freedom of 8. This shows that the null hypothesis which states that there is no significant influence of the uses of social Networking sites and academic performance of students in Ogun State universities will not be accepted. This means that there is significant correlation between social Networking sites usage on academic performance of students.

**Hypothesis 2:** There is no significant relationship between usage of technology devices on academic performance of students in Ogun State universities.

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	Laptops	Phones	Ipads	Tablets	Desktops
Learning	1				
Achievement					
Laptops .243*		1			
	(.000)				
Phones	.125*	.438	1		
	(.012)	(.000)			
Ipads	.121*	.191	.369	1	
	(.016)	(.001)	(.000)		
Tablets	.297*	.170	.226	.438	1
	(.000)	(.001)	(.000)	(.000)	
Mean	50.05	17.23	22.21	12.78	15.80
S.D	7.28	3.19	3.65	2.07	2.50

Table 3: Relationship between usages of technology devices on learningachievement of students in mathematics courses in Nigerian Universities.

Table 3 reveals that there is a positive significant relationship between Learning Achievement and the use of Laptop, r=.234, p<(0.05), Phones,, r=.125, p<(0.05), Ipads.121 p<(0.05) and Tablets, r=.297, p<(0.05), respectively. Hence it could be deduced that, Laptops, Phones, Ipads and Tablets, influence learning achievement of students in mathematics courses in Nigerian Universities. The better usage of each, the better will be the Learning Achievement.

**Hypothesis 3:** There are no significant joint contributions of Technology Devices, (Laptops, Phones, Ipads, and Tablets) to learning achievement of students in mathematics courses in Nigerian Universities

Table 4: summary of Regression Analysis showing joint contribution of usagesof technology devices (Laptops, Phones, Ipads, Tablets and Computer

R	R Square	Adjusted R Square	Std. Error of the		
			Estimate		
,542	.283	.272	6.2162		
ANOVA					

Model	Sum of	DF	Mean	F	Sig.	Remark
	Square		Square			
Regression	5986.050	6	997.675	25.819	.000	Sig.
Residual	15185.848	393	38.641			
Total	21171.898	399				

# Desktops) on learning achievement of students in mathematics courses in Nigerian Universities.

Table 4 shows the joint contribution of the four independent variables (Laptops, Phones, Ipads, Tablets and Computer Desktops) to the prediction of the dependent variable, learning achievement of students in mathematics courses in Nigerian Universities. The table also show a

coefficient of Multiple Correlation (R= .532 and a multiple R<sup>2</sup> of .293. This means that 28.3% of the Variance was accounted by four predictors' variables when taken together). The significance of the composite contribution was tested at  $\alpha$ =0.05. The table also shows that the analysis of variance for the regression yielded-ratio of 25.819 (at 0.05 Sig. level). This implies that the joint contribution of the independent variables to the dependent variable was significant and that the other the other variables not included in this model may have accounted for the remaining variance.

Students confirmed that technology has helped them to become better learners; by being able to access rich information, to heighten their learning experience. They are able to source for further materials on their own and provide alternative solutions to problems. There was also the general conclusion that their learning experiences with the new teaching approach have been positive. Additionally, integrating social media platform into classroom teaching, has been proven to be effective and efficient in respect of the ease of its use and availability. However, there could be some technical hitches or inadequate facilities that may impede the system, such as irregular power supply, access or affordability of devices and internet connectivity down times. The result shows a positive relationship between the use of digital multimedia technology and the students learning and performance.It was found that the use of technology and their achievements in Mathematics had (r=.42), at p < .05. It also demonstrated that most used devices were laptops (45%), phones (34.5%), Ipads (15%) and tablets (5%) The study therefore concludes that the learners, apart from their progress academically, developed collaborative skills and created connections that turned their innovative ideas into realities, necessary for the job market.

#### Summary

Corroborating Grabe, Mark and Grabe, Cindy (2004) the study opined that, in order to change the teacher's and student's role, the curriculum needed to be revised, because, while traditional curriculum focus on fragmented knowledge and disciplinary

#### Conclusion

With the use of a projection through a computer, teachers are now equipped

with tools to teach easily, project text, figures, animations, video clips etc, effectively. They can communicate with the students, update their teaching materials, and the students easily obtain, the information imparted, without having to copy them, from the Chalkboard. In conclusion, the education system that has been producing graduates without an exposure needs to be revolutionized and her graduates take assignments in the job market, fully equipped with the use of digital technology in education, to make the country great socially, economically and technologically to be able to face and compete, successfully, in the global challenges

## **Recommendations**

Separation, modern curriculum should focus on multidisciplinary themes. The future generation will need the ability to move, through several different jobs. It therefore recommended emphasis on thinking skills, knowledge integration and application. With changes to the learning process the assessment methods should also change. Instead of measuring a student on fact knowledge and discrete skills, assessments should focus on application of knowledge. Students should also be given tasks to demonstrate understanding and creativity. This will allow for the testing of the problem solving skills of the students.

Presently, using computer and enjoying its benefits are currently enjoyed by a small fraction of the population; this should not be so, the study suggests that computers be made available in schools. Institutions such as Banking have moved towards providing most of their services through the web. This includes managing of accounts, placing standing orders and settlement of bills; virtual visits to his bank at anytime, to withdraw cash, deposit cheques, etc, are now encouraged. Students should be the socializing agent for the society to be educated in digital technology.

### References

- Abel, S. (2011). The Future of technical communication is socially enabled: Understanding the Help 2.0 revolution, Intercom, 58(4),6-10.
- Baehr C. & Henschel, Sally (2013). STC student membership: Challenges, opportunities, and benefits. Intercom, 60(1), 31-33.
- Ball, C. E. (2012). Assessing scholarly multimedia: A rhetorical genre studies approach. *Technical Communication Quarterly*, 21(1), 61–77. doi:1 0.1080/10572252.2012.626390
- Barhoumi, C. (2015). The Effectiveness of WhatsApp Mobile Learning Activities, Guided by Activity Theory on Students' Knowledge Management, *Contemporary Educational Technology*, 2015, 6(3), 221-238. Taibah University, Saudi Arabia.

- Barton, M. D., & Heiman, J. R. (2012). Process, product, and potential: The Archaeological
- Assessment of collaborative, wiki-based student projects in the technical communication classroom. *Technical Communication*, 2012,64, (3),21-38
- urnham, B., & Walden, B. (1997). Interactions in distance education: A report from the otherside. In Proceedings of the Adult Education Research Conference. Oklahoma State University. Available: http://www.edst.educ.ubc.ca/aerc/1997/97burnham.html
- Crawford, C. M. (2001). Developing webs of significance through communications: Appropriate interactive activities for distributed learning environments. Campus-Wide Information Systems Journal (CWIS), 18(2), 68-72.
- Crawford, C. M. (2003). Emerging learning environments: Enhancing the online community. Academic Exchange Quarterly, 7(4), 131–135.
- DeGennaro, D. (2008), Learning designs: An analysis of youth-initiated technology use, Journal of Research on Technology, in Education. 41(1), 1-21.
- Denzin, N.K. & Lincoln, Y.S. (eds) (2005), Handbook of Qualitative Research, 2nd edition: Thousand Oaks, Sage.
- Ding, Huiling. (2009). Rhetoric of alternative media in an emerging epidemic: SARS, Censorship and Extra Institutional Risk Communication, Technical Communication Quarterly, 19(4),327-350. doi:10.1080/10572250903149548 Dore-Natteh Namong &Ussuph, N. (2017), International Journal of Computer Applications (0975 - 8887) Volume 166-No.3, May 2017.
- Fraenkel, J. R., & Wallen, N. E. (2000), How to design and evaluate research in education (4th Ed.). Boston: McGraw Hill.
- Frost, E. A. (2013). Tran cultural risk communication on Dauphin Island: An analysis of ironically located responses to the deep-water horizon disaster, Technical Communication Quarterly, 22(1),50-66. doi:10.1080/10572252.2013.726483
- Grabe, Mark and Grabe, Cindy (2004), "Integrating Technology for Meaningful Learning", (4th Ed.): Houghton Mifflin Company.
- Garrison, D. R., & Anderson, T. (2003), E-Learning in the 21st Century A Framework for Research andPractice: RoutledgerFalmer Publishers, USA
- Graham, S. Scot & Whalen, B. (2008), Cited in Dorenatteh, Doris & Ussuph, N.

(2017),

International Journal of Computer Applications, (0975-8887), 166(3), 26-34

- Ghorbani, N. R., & Heidari, R. N. (2011). Effects of Information and Communication Technology on youth's health knowledge. Asia Pacific Journal of Public Health, 23(3), 363-368. doi:10.1177/1010539509340435
- HEFCE (2005) 'HEFCE Strategy for E-learning', Higher Education Funding Council for England, Joint Information Systems Committee, Higher E d u c a t i o n A c a d e m y, A v a i l a b l e a t : http://www.hefce.ac.uk/pubs/hefce/2005/05-12/ Accessed 10/6/2009
- Hsieh, H-F and Shannon, S. E, (2005). Qualitative Health Research, Vol. 16 No. 9, 1277 1288 DOI: 10.1177/1049732305276687
- Klopfer, E., Osterweil, S., Groff, J., & Haas, J. (2009). The instructional power of digital games, social networking, simulations, and how teachers can leverage them. Cambridge, MA: The Education Arcade, Massachusetts I n s t i t u t e o f T e c h n o l o g y. http://education.mit.edu/papers/GamesSimsSocNets\_EdAr cade.pdf
- Kvasny, L. (2005). The Role of the Habitus in Shaping Discourses about the Digital Divide. *Journal of Computer Mediated Communication* Vol. 10 (2). [23]

Mossburger, K., Tolbert, J.C. & Stansbury, M. (2003) *Virtual Inequality: B e y o n d The Digital Divide*. Washington, D.C.: Georgetown University Press

Oloyede, B. (2008). *Free Press and Society: Dismantling the Culture of Silence*, Ibadan: Stirling-Horden Publishers Ltd. \

Oluwalanu, S. B., Omowale, A. and Kayode, O. J., (2014). Adapting Social Media for Formal Learning in Nigeria: Challenges and Prospects. *Arabian Journal of Business and Management Review* (OMAN Chapter) Vol. 3, No.9

Richadson, L. (2000). Writing: A Method of Inquiry. In N. K. Denzin & Y. S. Lincoln (Eds.), *Handbook Qualitative Research* (2nd ed.): Thousand Oaks.

Schwandt, David & Marquardt, Michael (2000), "Organisational Learning: From World-Class theories to Global Best Practices" : London: St. Luis Press.

Sheyin, A.O. & Ojo A.A, (2013). Computing in Education: a Pedagogical Resolution Pattern for Forum Moderation in a College Learning Environment. *Journal of Librarianship and Law*, 4 (1). 77-95. A publication of the University of Tanzania.

Straus, A., & Corbin, J. (2008). Basics of Qualitative Resarch: Techniques and Procedures

for Developing Grounded Theory (3rd ed.). London: Sage.

Stosic, L., & Stosic, I. (2013). Diffusion of innovation in modern school.

International

- Journal of Cognitive Research In Science, Engineering And Education (IJCRSEE), 1(1), 5-13. Retrieved from http://ijcrsee.com/index.php/ijcrsee/article/ view/7.
- Tonio, V. L. (2008). ICT in Education Retrieved from http://en.wikibooks.org/wiki/, ICT, in Education
- Ussiph, N. (2012). Using a Virtual Learning Environment to Support Teaching and Learning and to Bridge the Digital Divide between Urban and Rural Communities in Ghana: An Action Case Study. Ph.D, Thesis. University of Salford: Manchester
- Warschauer, M. (2004). Technology and Social Inclusion: Rethinking the Digital Divide. The MIT, Press.
- Wikramanayake G.N. (2003), "eLearning: Changes in Teaching and Learning Styles", Proc. CSSL. Proceedings of 22nd Nat. IT Conf., Computer Society of Sri Lanka, pp. 118-124,11..