

**AVAILABILITY AND USABILITY OF DIGITAL
TECHNOLOGIES FOR TEACHING PUBLIC PRIMARY
SCHOOLS PUPILS IN GWALE LOCAL GOVERNMENT AREA
OF KANO STATE**

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Abstract

The paper investigates the extent of the availability, usability and challenges of digital technologies for teaching pupils in Gwale Local Government Area of Kano State. A descriptive survey research design was used to collect the data. The population of the study was 2,619 primary school teachers (comprising 1,351 males and 1,268 female) in the study area. Convenience sampling technique was used to select the sample size of 340 teachers (comprising 198 males and 142 females). Three research questions guided the study. Descriptive statistics involving the mean and standard deviation were used to analyze the data. Digital technologies such as modem, digital video camera, digital photo printer, digital camera, IPods, smart watch, and card reader were found not to be available for teaching primary school pupils in the study area. The digital technologies that were found to be available were discovered to be rarely used for teaching. The respondents agreed that information literacy, computer literacy, integration literacy, availability of curriculum-specific applications, effective communication network, high cost of digital technologies are some of the challenges in using digital technologies for teaching primary school pupils. It is, therefore, recommended that schools should be adequately funded to equip them for using digital technology for teaching, education authorities should develop a policy for sourcing, using, management, and handling of digital devices for teaching; and teachers and students should be supported to develop capabilities in using digital technologies for teaching, learning, and professional work.

Key words: Digital technologies, primary school, pupils, teachers, teaching and learning process

Introduction

The evolution of technologies which started with telegraph, then telephones, radios, television, early and modern personal computers has allowed human beings to create new form of interactions and communications. This has permeated into all sphere of life including teaching and learning enterprise. The role of technology in classroom teaching and learning process has gradually occupied an important stage since the advent of modern personal computer technology in the early 1980s. It is the recent advancements in personal computers which merge the various forms of communications (the telephones, radios, television, and computers) that gave birth to digital technology (Shelly, Cashman, Gunter and Gunter, 2006). According to Cambridge International (2017), digital technology can be taken to mean digital processing systems that encourage active learning, knowledge construction, inquiry, and exploration on the part of the learners, and which allow for remote communication as well as data sharing to take place between teachers and/or learners in different physical classroom locations. In this study, digital technologies are instructional technologies which include computer hardware and software, tools and techniques that are used in or outside classrooms in facilitating, and improving the effectiveness and efficiency of teaching and learning. Specifically, digital technologies refer to the common technology-based tools such as computer, digital camera, scanner, DVD player, digital pen, PC video camera, mobile phone and projector that are being used by teachers and students to facilitate teaching and learning process. According to Salavati (2016), terms such as information technology (IT), information and communication technology (ICT), and educational technology are used interchangeably to describe digital technology.

The influence of digital technology makes today's students to be known as 'digital students'. Shelly et al., (2006) identified digital students as those that are (i) communicating using multiple tools; (ii) multitaskers who do several things at the same time; and (iii) pursuing multiple goals at the same time. According to a survey by Bolstad (2017), teachers reported that students use digital technology to: Practice specific skills (e.g. Maths or reading), research using the internet, create printed documents or slideshow presentations, generate multimedia work (e.g. images, movies, music, and animations), collaborate with others inside the school on shared learning projects, collect and/or analyze data (e.g. from an internet site or spreadsheet), maintain a record of goals or learning achievements (e.g. e-portfolio), communicate with people outside the school (e.g. parents, other teachers, other students, and the community members), and; also to collaborate with others

outside the school on shared learning projects (e.g. online book clubs, creating a wiki).

The relevance of Digital Technologies in teaching and learning process cannot be over-emphasized. Underwood (2009) reported that an integrated use of digital technologies in teaching and learning enables a range of positive outcomes for children and young people. These outcomes include: increased learner effectiveness or performance gains, increased learner efficiency, greater learner engagement or satisfaction, more positive student attitudes to learning and discourages truancy among young people.

Notably, the use of Digital Technologies has the potential to accelerate, enrich and deepens children's skills; motivate and engage them in learning; helps them to relate school experiences to home practices; strengthens learning and equally contributes to radical changes in pupils. Furthermore, Kapur (2018) opines that the usage of technology within classrooms has led to (i) an increase in the enrolment of students; (ii) pleasure in learning and thus led to a decline in the rate of absenteeism; (iii) enhancement of learning for those who have special needs; and (iv) gaining immediate feedback as assignments and projects can be e-mailed.

However, it is important to note that the argument for digital technologies' positive impact on learning has been a subject of controversy. In a synthesis of the evidence from meta-analysis about the impact of the use of digital technology in schools on children's academic achievement, Higgins (2012) discovers that the link between the provision and use of technology with attainment tend to find consistent but small positive associations with educational outcomes. The synthesis further suggests that it is not whether technology is used (or not) which makes the difference, but how well the technology is used to support teaching and learning. Though technology engages and motivates students to learn, Higgins reports that the co relational and experimental evidence from the synthesis does not offer a convincing case for the general impact of digital technology on learning outcomes.

No doubt, the developments in the use of the digital technologies have influenced all sectors of life - and education is no exception to this. The use of these technologies for enhancing the quality of education by making teaching and learning more relevant to life has been widely accepted by education stakeholders (teachers, parents, students, government, etc) irrespective of their negative consequences. The uses create a flexible learning environment that breeds innovation and a more collaborative learning environment that ultimately keeps students active. Also, the uses of these technologies open doors to countless resources, new experiences, new discoveries, and new ways of teaching and learning; the essence of which is to enhance education and

make learning more fun and effective. Indeed, the successes of using the technologies in the study area will ultimately depend upon their availability. However, the researcher is worried that the technologies might not be available in the study area or even if they are available the teachers seem not to be using them for teaching primary school pupils. Thus, allowing many classroom teachers to rely on the traditional instructional strategies such as discussion, play-way, demonstration, field trip, and questioning that have their numerous limitations especially when class sizes are very large (e.g. over 100). Indeed, observation has shown that teachers in the study area are not using digital technologies for enhancing the quality of teaching as proposed by the National Policy on Education. It is against this background that this study has been designed to investigate the extent of the availability and usability of digital technologies for teaching primary school pupils in GLGA of Kano State. Specifically, the objectives of this study are to identify:

- i. Teachers' perceptions on the extent of the availability of digital technologies for teaching and learning in the study area.
- ii. The extent to which teachers are using digital technologies for teaching and learning in the study area.
- iii. The challenges of using digital technologies for teaching and learning in the study area.

Based on the specific objectives of this study the following research questions were posed to guide the study:

- i. What are the teachers' perceptions on the availability of digital technologies for teaching and learning in Gwale local government area of Kano State?
- ii. What is the extent to which teachers are using digital technologies for teaching and learning in Gwale local government area of Kano State?
- iii. What are the challenges of using digital technologies for teaching among public primary schools teachers in Gwale local government area of Kano State?

Method

The study adopted descriptive survey research design. Descriptive survey design are those studies in which information about opinions, attitudes, preferences and perception is gathered from a group of respondents using either a questionnaire or an interview or observation or a combination of any two or all the instruments. The area of the study is Gwale local government area of Kano State. The population of the study was 2,619 primary school

teachers (comprising of 1,351 males and 1,268 female) of the study area (MoESTI, 2017). Convenience sampling technique was used to select the sample size of 340 teachers (comprising 198 males and 142 females). Convenience sampling is a non-probability technique that involves the choosing of available or closest person as respondent in order to save time and energy (Sulaiman, 2012). The sample size is quite adequate for the study in accordance with the sampling procedure table given by Krejcie and Morgan as cited in Sulaiman,(2012).

A questionnaire designed by the researcher from literature reviewed was used for data collection in the study. It was structured on a 4-point rating scale of Very Often, Often, Rarely, and Very Rarely for the first and second clusters; and Strongly Agree, Agree, Disagree, and Strongly Disagree for the third cluster, all with the corresponding weights of 4, 3, 2 and 1 respectively. To validate the instrument, the questionnaire was presented to three experts: one from the Department of Science Education, University of Nigeria, Nsukka and the others from the areas of educational technology and measurement and evaluation, all in Sa'adatu Rimi College of Education, Kano. Experts made observations that improved the items of the questionnaire. Cronbach's Alpha was used to determine the internal consistency of the instrument. In doing this, 30 copies of the instrument were trial tested using public primary schools teachers of a different local government area other than the study area. The analysis of data collected yielded a reliability coefficient of 0.84 (see Appendix A for the questionnaire). In Allison cited in Tulinayo, Ssentume and Najjuma (2018), it is posited that an instrument is regarded reliable if the Cronbach alpha coefficient is greater than 0.5.

The data for the study were collected by the researcher through personal contact with the respondents in their respective schools. This allowed for a 100% rate of return. The data collated were analyzed, using the mean and standard deviation. For taking decisions on the research questions, the item with criterion mean response that is equal to or greater than 2.5 was considered accepted while those that are less than 2.5 were rejected. In taking decisions on the extent of an item, the boundary limits of 3.50-4.00; 2.50-3.49; 1.50-2.49 and 0.05 - 1.49 were used to interpret the results as very often, often, rarely, and very rarely respectively.

Results

The results for this study were presented in line with the research questions as shown in Tables 1, 2, and 3.

Research Question 1: What are the perceptions of primary school teachers on the availability of digital technologies for teaching primary school pupils in GLGA of Kano State?

Table 1: Mean and standard deviation analysis of perceptions of primary school teachers on the extent of the availability of digital technologies for teaching primary school pupils in GLGA of Kano State

S/N	Digital Technologies	\bar{X}	SD	Decision
1	Digital camera	1.3	0.15	Rejected
2	Modem	1.1	0.23	Rejected
3	Digital video camera	1.2	0.42	Rejected
4	Digital photo printer	1.1	0.35	Rejected
5	Smart phone	2.7	0.46	Accepted
6	iPods	1.1	0.28	Rejected
7	Smart watch	1.2	0.56	Rejected
8	Card reader/writer	1.3	0.32	Rejected
9	Microphone	2.9	0.41	Accepted
10	Keyboard	2.8	0.13	Accepted
11	Computer monitor	2.8	0.22	Accepted
12	Desktop computer	2.9	0.31	Accepted
13	Mouse	2.8	0.27	Accepted
14	Speakers	2.6	0.21	Accepted
15	USB flash drive	1.9	0.26	Rejected
16	Personal computer (PC)	2.8	0.12	Accepted
17	CD/DVD drive	1.4	0.31	Rejected
18	Floppy disk	1.3	0.27	Rejected
19	Digital pen	1.1	0.21	Rejected
20	Scanner	1.4	0.16	Rejected
21	PC video camera	1.9	0.12	Rejected
22	Projector	2.6	0.31	Accepted
23	Fax machine	1.4	0.27	Rejected
24	Flash memory card	1.1	0.21	Rejected
25	Electronic whiteboard	1.2	0.41	Rejected
26	Online games	1.8	0.13	Rejected
27	DVD player	1.2	0.22	Rejected
	Grand mean	1.8		

Data presented in Table 1 shows the responses on the perceptions of primary school teachers on the extent of the availability of digital technologies for teaching primary school pupils in Gwale Local Government Area (GLGA). The respondents showed that only items 4, 9, 10, 11, 12, 13, 14, 16, and 22 were available in teaching primary school pupils for their criterion means were above 2.5 while the remaining items have their criterion means below 2.5 indicating that they were not available for teaching primary school pupils. The grand mean of 1.8 further indicates that the digital technologies identified in the questionnaire were not available for teaching primary school pupils in GLGA. Furthermore, the closeness of the standard deviation scores on the extent of the availability of digital technologies for teaching primary school pupils indicate the less variability of the scores from the mean central tendency.

Research Question 2: What are the perceptions of primary school teachers on the extent to which digital technologies are used for teaching primary school pupils in GLGA of Kano State?

Table 2: Mean and standard deviation analysis on perception of primary school teachers on the extent to which digital technologies are used for teaching primary school pupils in GLGA of Kano State

S/N	Digital Technologies	\bar{X}	SD	Decision
1	Smart phone	1.4	0.27	Rejected
2	Microphone	1.8	0.21	Rejected
3	Keyboard	1.2	0.26	Rejected
4	Computer monitor	1.9	0.12	Rejected
5	Desktop computer	1.8	0.31	Rejected
6	Mouse	1.6	0.27	Rejected
7	Speakers	1.9	0.21	Rejected
8	Personal computer (PC)	1.8	0.16	Rejected
9	Projector	1.4	0.12	Rejected
	Grand mean	1.6		

Data presented in Table 2 shows the responses of the respondents on the perceptions of primary school teachers on the extent of using digital technologies for teaching primary school pupils in GLGA. The respondents showed that items 2, 4, 5, 6, 7, and 8 were rarely used for teaching primary school pupils as their criterion means were between 1.50-2.49 while, the remaining items were very rarely used since their criterion means are

between 0.05 - 1.49. The grand mean 1.6, further confirms the fact that the digital technologies under consideration are rarely used for teaching primary school pupils in the study area. Also, the closeness of the standard deviation scores on the extent of using digital technologies in teaching primary school pupils responses indicate the less variability that exist among the responses.

Research Question 3: What are the perceptions of primary school teachers on the challenges of using digital technologies for teaching primary school pupils in GLGA?

Table 3: Mean and standard deviation analysis on perception of primary school teachers on the challenges of using digital technologies for teaching primary school pupils in GLGA

S/N	Possible challenge	\bar{X}	SD	Decision
1	Poor information literacy	3.3	0.13	Accepted
2	Poor computer literacy	3.1	0.11	Accepted
3	Poor availability of variety of digital technologies	3.2	0.14	Rejected
4	Lack of fund for integration of digital technologies in classroom	2.9	0.19	Accepted
5	Poor integration literacy	3.6	0.26	Accepted
6	Poor curriculum-specific applications	3.4	0.14	Accepted
7	Poor communication network	3.1	0.11	Accepted
8	High cost of digital technologies	3.2	0.12	Accepted
9	Poor access to internet at home	3.4	0.18	Accepted
10	Lack of fund to purchase digital techs	2.8	0.16	Accepted
11	Inadequate power supply	3.6	0.12	Accepted
	Grand mean	3.5		

Result in Table 3 showed the mean and standard deviation of respondents on the perceptions of primary school teachers on the challenges of using digital technologies for teaching primary school pupils in the study area. Results showed that all the ten items enumerated have the criterion mean ratings of above 2.5. Since the criterion mean ratings are above 2.5 set for accepting an item, it means that the respondents agreed that poor information literacy, poor computer literacy, poor integration literacy, poor availability of variety of digital technologies, lack of fund for integration of digital technologies in classroom, poor availability of curriculum-specific

applications, poor communication network, high cost of digital technologies, poor access to internet at school, inadequate power supply, and lack of fund to purchase digital technologies are the challenges in using digital technologies for teaching primary school pupils in the study area. The grand mean 3.0 further reveals the fact that all the challenges under consideration are very often perceived as the challenges in using digital technologies for teaching primary school pupils in the study area. Similarly, the closeness of the standard deviation scores indicates the less variability that exists among the responses.

Discussion of results

The data presented on Table 1 shows that many of the digital technologies used for teaching are not available in the public primary schools of the study area. In general, one can claim that digital technologies are not adequate to facilitate teaching in the public primary schools in the study area. This finding is similar to that of Ifulunni, Ibiam, Ugwu and Okoroma (2015) who investigated the extent of availability of information and communication technology (ICT) in teaching public and private primary school's pupils in Ndokwa East and West Local Government Education Authorities (LGEAs) of Delta State. Ifulunni, Ibiam, Ugwu and Okoroma (2015) discovered that ICT facilities were not available for teaching primary schools pupils in the two LGEAs with all the existence of a national policy on ICT.

From the result of data analysis in Table 2, it was found that the digital technologies under consideration were rarely used for teaching primary school pupils in the study area. The finding of this study support the finding of Abass and Ayo (2013) who discovered that computer package is not being used by the majority of the teachers, even though a very large number of them support the introduction of information technology (IT) into the school curriculum. However this finding is in contrary to the findings of Odhiambo (2013) who found that computer was almost always used by teachers ($\bar{X} = 3.79$); this was followed by the use of overhead projector ($\bar{X} = 3.71$). The least used hardware by teachers was the internet ($\bar{X} = 3.42$). The finding of this study is also contrary to the findings made by Ajeigbe, Ogunsakin and Shogbesan (2015) which revealed a high level usage of ICT facilities in secondary schools among Computer Studies teachers.

From the result of data analysis in Table 3, it has been discovered that poor information literacy, poor computer literacy, poor integration literacy, lack of availability of variety of digital technologies, lack of fund for integration of digital technologies in classroom, poor availability of curriculum-specific applications, poor communication network, high cost of

digital technologies, poor of access to internet at school, inadequate power supply, and lack of fund to purchase digital technologies are the challenges in using digital technologies for teaching primary school pupils in the study area. The finding of this study support the finding of Abass and Ayo (2013), that factors such as constant power failure, lack of funds, lack of computer skills on the part of teachers, and lack of information about the impact of ICT on teaching and learning are hindering the effective utilization of computer in primary schools in Osun State, Nigeria. Similarly, the finding is in line with that of Okon and Nwizu (2015) who revealed that the integration of ICT into distance education programmes of National Teachers Institute (NTI) in Akwa Ibom and Cross Rivers States is ineffective as a result of problems such as poor funding of NTI institutions, High cost of ICT facilities, non-availability of ICT facilities in NTI institutions, and poor state of infrastructural facilities.

Conclusion

Based on the findings of this study, the following conclusions were made:

1. Many of the digital technologies used for teaching are not available in the public primary schools of the study area.
2. The digital technologies that are found available are rarely used for teaching primary school pupils in the study area.
3. Poor information literacy, poor computer literacy, poor integration literacy, lack of availability of variety of digital technologies, lack of fund for integration of digital technologies in classroom, poor availability of curriculum-specific applications, etc are some of the challenges in using digital technologies for teaching primary school pupils in the study area.

Recommendations

Based on the findings and conclusions of the study, it is recommended that:

1. Schools should be adequately funded to equip them for using digital technology for teaching and learning. Governments (national, state and local) should device means of incorporating the private sector in funding schools' technology needs.
2. Education authorities should develop a policy for sourcing, using, management, and handling of digital devices. The policy need to specify a range of services and tools that can be used to support innovative teaching practices and promote learning in classrooms and beyond.
3. Teachers and students should be supported to develop capabilities in using digital technologies for teaching, learning, and professional

work. There is need to effectively integrate digital technology into classroom teaching and learning.

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APPENDIX A

**QUESTIONNAIRE ON EXTENT OF THE AVAILABILITY,
USABILITY AND CHALLENGES FACED IN USING DIGITAL
TECHNOLOGIES IN PRIMARY SCHOOLS**

SECTION A: Introduction

The term “digital technologies” simply means those technologies that allow students and teachers to create new form of interactions, expression, communication, and entertainment in a digital format in teaching and learning process e.g. computers, smart phones, digital camera, modem, digital video camera, scanner, etc. This questionnaire is attempting to investigate the teachers’ extent of the availability of these technologies, extent of using them and challenges faced in using them in Kano State primary schools. Kindly, tick as appropriate.

SECTION B: The questionnaire

Cluster A: As a primary school teacher, indicate your perception by ticking if the digital technologies listed are available or not available in Kano State primary schools.

S/N	Digital Technologies	VHE	HE	LE	VLE
1	Digital camera				
2	Modem				
3	Digital video camera				
4	Digital photo printer				
5	Smart phone				
6	IPods				
7	Smart watch				
8	Card reader/writer				
9	Microphone				
10	Keyboard				
11	Computer monitor				
12	Desktop computer				
13	Mouse				
14	Speakers				
15	USB flash drive				
16	Personal computer (PC)				
17	CD/DVD drive				
18	Floppy disk				
19	Digital pen				

20	Scanner				
21	PC video camera				
22	Projector				
23	Fax machine				
24	Flash memory card				
25	Electronic whiteboard				
26	Online games				
27	DVD player				

Cluster B: To what extent are you using the available technologies in teaching of your primary school pupils?

S/N	Digital Technologies	VHE	HE	LE	VLE
1	Digital camera				
2	Modem				
3	Digital video camera				
4	Digital photo printer				
5	Smart phone				
6	iPods				
7	Smart watch				
8	Card reader/writer				
9	Microphone				
10	Keyboard				
11	Computer monitor				
12	Desktop computer				
13	Mouse				
14	Speakers				
15	USB flash drive				
16	Personal computer (PC)				
17	CD/DVD drive				
18	Floppy disk				
19	Digital pen				
20	Scanner				
21	PC video camera				
22	Projector				
23	Fax machine				
24	Flash memory card				
25	Electronic whiteboard				
26	Online games				
27	DVD player				

Cluster C: As a primary school teacher, indicate your perception as to the following challenges of using digital technologies in teaching your primary school pupils.

S/N	Possible challenge	Not a challenge	Minor challenge	Moderate challenge	Serious challenge
1	Poor information literacy				
2	Poor computer literacy				
3	Poor availability of digital technologies				
4	Lack of fund for integration of digital technologies in classroom				
5	Poor integration literacy				
6	Poor curriculum-specific applications				
7	Poor communication network				
8	High cost of digital technologies				
9	Poor access to internet at school				
10	Lack of fund to purchasing digital technologies				
11	Inadequate power supply				