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Acceptance and Perception toward Using Digital Technology in the Classroom among Students and Teachers in Ogun State, Nigeria

T. O. Abiodun[1*], A. A. Asanre[2], O. A Awofala[3]
[1,2] Department of Mathematics, College of Science and Information Technology, Tai Solarin University of Education. Ijebu ode.
[3]Department of science Education University of Lagos
[*]Corresponding Author. Email: abiodunto@tasued.edu.ng

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Abstract

Digital technology has been recognized as a powerful tool in teaching and learning Mathematics. Proper usage of digital technology would enhance students' and teachers' effectiveness in the classroom setting. This study investigated the acceptance and perception of using digital technology in the classroom among students and teachers in reference to Ogun in Nigeria. The study used a survey-type descriptive research design. Three hundred and sixty (360) respondents consisting of three hundred (300) students and sixty (60) teachers made up the sample for this study. In the investigation, a Multi-stage Sampling Technique was adopted. In the first stage, the researchers selected ten (10) secondary schools in Ogun State with digital technology facilities using the Purposive Sampling Technique. In the second stage, the researchers selected six (6) teachers and thirty (30) pupils from each of the selected schools using the Simple Randomly Sampling Technique. The instrument for data collection was titled "Acceptance and Perception on Digital Technology Questionnaire". (APDTQ) Using Cronbach's alpha, the instrument's reliability was assessed, and a reliability coefficient of 0.82 was calculated. The content validity was ascertained by the preparation of the table of specifications. Four research questions were answered. Data collected were analyzed using the descriptive statistics of mean, standard deviation, and percentages. Results of the findings showed that both teachers and students had favorable opinions on the usage of digital technology in the classroom, although students were shown to be more perceptive than teachers. Additionally, the study's findings indicated that both teachers and students highly embrace the use of digital technology in the teaching and learning of mathematics. It was recommended, among others, that additional knowledge about using digital technology in the classroom should be given to teachers and students.

INTRODUCTION

It is impossible to overstate the importance of digital technology in education. Kozmam (2013) states that digital technology is the use of electronic systems, tools, and devices to create, process, store, and retrieve information using resources that are mediated by technology, such as computers, laptops, tablets, smartphones, multimedia, the internet, and social media. It is an essential component of education that changed how knowledge is created and shared, how people learn and understand things, and how people engage in activities with the participation of teachers and students.

The question of how to successfully integrate digital technology into teaching and learning practices becomes crucial as the level of digitalization in education systems around the world rises, with many nations adopting legislation and action plans to speed up the process (Davies, 2011; Lindberg & Olofsson, 2018). There is widespread agreement that using digital technology in education is essential in a time when information is disseminated through satellite and the Internet (Samuel & Ede 2015). The impact of digital technology on education, according to Ogunji (2013), is to enhance results and performance in the delivery of academic activities. Although Nigeria, like many other developing nations, is a late starter of digital education policies in the education sector, initiatives to partially digital education drive secondary education in Nigeria have been ongoing over the past ten years. These initiatives include

educating teachers on computer use, providing computer lab space, installing ICT-driven teaching aids, and creating new technologically based curricula (Ogunji, 2013). The numerous elements of digital technology, such as electronic whiteboards, subject-specific application software, and the Internet, which enables connections between teachers and students and the rest of the world, have made learning easier. Therefore, one of the main factors that can ensure an increase in the quality of the secondary education system in Nigeria is the adoption of digital technology (Damkor et al., 2015). Exposing teachers to cutting-edge teaching tools and making library resources accessible to students through the use of e-library technology, would bring about the much-expected change and revolution in our educational sector (Agbetuyi & Oluwatayo, 2012).

To effectively assist people across a range of professions, academic subjects, businesses, locations such as work, school, and residences, etc., digital technology is the key. The majority of countries have built robust educational policies in their educational systems due to the relevance of digital technologies; as a result, they must pay priority to digital technologies. This holds for the case of Nigeria as well. The full integration of digital technologies into the educational system is something stakeholders or policymakers in the field of education must pay attention to. This is reflected in the federal government of Nigeria's ICT strategy, which is outlined in their 9- 3- 4 educational policy and named National Implementation Guidelines for ICT in Education (NIGICTIE, 2019).

There are many ways that technology can be used to support and enhance learning. In the past, video content, digital moviemaking, laptop computers, and mobile devices have all been used in classrooms. In a similar vein, new technological applications are emerging, such as podcasting. (Elnaga, 2012). Elnaga argues that various technologies serve a variety of purposes in the classroom and deliver a variety of understanding. People can develop their organizational and communication abilities by using word processing, email, spreadsheet, database, and modeling software. It is crucial to think about how various electronic devices differ from one another and what qualities make them valuable as tools for education (Kozmam, 2013).

The technology used in classrooms nowadays ranges from simple tool-based programs (like word processors) to online scientific data warehouses. Additional resources include primary historical documents, laptop computers, closed-circuit television channels, and two-way distance learning classes. Even the cell phones that many people use nowadays can be used for learning (Nikian & Aziz, 2013). Each technology is anticipated to have a different effect on students' learning. Instead of seeking to generalize the effects of all technologies as if they were the same, researchers should take into account the types of technology that are used in classrooms. From the literature, two broad distinctions may be made. Students can learn from computers in situations when technology is essentially used as a teaching tool to assist them in understanding more fundamental topics. Students can also learn using computers, where technology is used as a tool to accomplish a variety of learning goals and as a resource to promote higher-order thinking, creativity, and research skills (Kozmam, 2013).

It is important to note that there may be a need to introduce modern technologies for instruction in Nigerian secondary schools due to, the fact, it has been realized that they present new opportunities and enhance individualized instruction at the secondary school level. The Nigerian educational and training systems are still in the process of developing the use of digital technology platforms. Nigeria's secondary school curricula present many intellectual problems that the country's educational system must be prepared to address. Against this background, this present study investigated the acceptance and perception of using digital technology in the classroom among students and teachers: a case study of Ogun State secondary schools in Nigeria.

RESEARCH METHOD

The sample Population

All of the Senior Secondary School Mathematics students and teachers in Ogun, Nigeria's Ogun State, constituted the research population of this study.

Research Design

The study used a survey-type descriptive research design.

Sample and Sampling Techniques

Three hundred and sixty (360) respondents consisting of three hundred (300) students and sixty (60) teachers made up the sample for this study. The age bracket of the students is between 17-19 years while that of the teachers is between 28-58 years. There are 156 female and 144 male students who participated in the study. Also, 34 female and 26 male teachers took part in the study. In the investigation, a multistage sampling technique was adopted. In the first stage, the researchers selected ten (10) secondary schools in Ogun State with digital technology facilities using the Purposive Sampling Technique. In the second stage, the researchers selected six (6) teachers and thirty (30)

pupils from each of the selected schools using the Simple Randomly Sampling Technique.

Instrumentation

Acceptance and Perception on Digital Technology Questionnaire (APDTQ) used by Simon (2008) was adopted. The APDTQ assesses the perception and acceptance of digital devices among teachers and students in the teaching and learning of mathematics. Twenty (20) of the original 32 items on the questionnaire were chosen by the researchers for this study because of their applicability.

Respondents completed the twenty (20) items on the modified questionnaire by rating each item on a four-point Likert scale. The twenty (20) items measured the importance of digital devices, perceptions of the usage of digital devices, and acceptability of digital devices in teaching and learning respectively. There were two parts to the instrument. In the first portion, data regarding the respondents' demographics was gathered, and in the second, questions concerning the respondents' opinions on the acceptability, and their perception of the use of digital devices in mathematics teaching and learning were asked. The validity of the questionnaire was determined through face validation by experts in mathematics education, test and measurement, and curriculum development. It was confirmed that the instrument was relevant, unambiguous, detailed, and capable of eliciting the needed responses from the target sample. To test the reliability of the instrument, fifty (50) respondents who were randomly selected from a senior secondary school other than the designated schools participated in the trial testing. Using Cronbach's alpha, the instrument's reliability was assessed, and a reliability coefficient of 0.82 was obtained. The content validity was ascertained by the preparation of the table of specifications. The researcher and a research assistant handed out copies of the questionnaire to respondents in the sampled schools. The questionnaire took forty-five (45) minutes to complete. The distribution and collection of the questionnaires took three weeks. Descriptive statistics of mean, standard deviation, and percentages were used to answer the research questions.

Research questions

The research questions that guided this work are:

(i) To what extent are students being perceived as the usage of digital technology in the classroom?

(ii) To what extent do mathematics teachers perceive the usage of digital technology in the classroom?

(iii) To what extent do students find digital technology acceptable for learning?

(iv) To what extent do mathematics find digital technology acceptable for learning?

RESULT AND DISCUSSION

Results

Research question 1: To what extent are students being perceived as the usage of digital technology in the classroom?

Table 1. Students' Perception toward the Use of Digital Technology in Learning of Mathematics.

S/N	Statement	S. A	A	D	SD	N	Mean	S. D
1	I often use a laptop/computer/phone in the classroom or outside the classroom to enhance my understanding of mathematical concepts.	118 (39.3%	95 (31.7%)	38 (12.7%)	49 (16.3%)	300	2.94	1.083
2	I used a laptop/computer/phone to do mathematics activities like assignments, homework.	101 (33.7%)	161 (53.7%)	35 (11.7%)	3 (1.0%)	300	3.20	0.674
3	I normally utilize online learning materials provided by my teachers.	128 (42.7%)	112 (37.3%)	24 (8.0%)	36 (12.0%)	300	3.11	.989
4	I participated in class discussions using online or electronic medium.	142 (47.3%)	85 (28.3%)	21 (7.0%)	52 (17.3%)	300	3.06	1.112
5	I used digital technology to produce visual displays of information (charts, graphs, pictures, video, etc.).	129 (43.0%)	98 (32.7%)	9 (3.0%)	64 (21.3%)	300	2.97	1.114
6	Mathematics learning through digital technology provides flexibility to the study at a time convenient to the learners.	146 (48.7%)	74 (24.7%)	31 (10.3%)	49 (16.3%)	300	3.06	1.115
7	Using technology can simplify most mathematical concepts.	59 (19.7%)	122 (40.7%)	12 (4.0%)	107 (35.7)	300	2.44	1.165

S/N	Statement	S. A	A	D	SD	N	Mean	S. D
8	I believe that the technological platform is user friendly and the service is compactable with the way that I learn mathematics in the classroom	132 (44.0%)	104 (34.7%)	36 (8.7%)	38 (12.7%)	300	3.10	1.013
9	I feel confident when using digital technology to learn mathematical concepts	107 (35.7%)	103 (34.3%)	34 (11.3%)	56 (18.7%)	300	2.87	1.097
10	Digital technology can increase my competency in solving mathematics.	147 (49.0%)	74 (24.7%)	20 (6.7%)	59 (19.0%)	300	3.03	1.161

The perceptions of students on how to use digital technology in mathematics teaching and learning are presented in Table 1. The mean benchmark of 2.5 was obtained by finding the mean of a coded four-point structured questionnaire anchored on a continuum of strongly agreed (SA) as 4 points, agree (AG) as 3 points, disagreed (DA) as 2 points, and strongly disagree (SD) as 1 point. According to Table 1, the means of nine items (Items 1, item 2, item 3, item 4, item 5, Item 6, item 8, item 9, and 10 respectively) are higher than the mean benchmark whereas the means of one item (item 7) is less than the mean benchmark of 2.5. This finding suggests that students have an understanding of how digital could be leveraged to teach and learn mathematics.

According to the students' viewpoints in this circumstance, they may believe that digital technology is the only way to completely solve their problems when learning mathematics. Another explanation for the student's perception of using digital technology is that they may have learned enough about the advantages and disadvantages of various traditional instructional methods and media. They may also have had enough exposure to using mobile technology for effective learning, which enables them to decide on practical ways to advance good instruction using digital technology.

Research question 2: To what extent do mathematics teachers perceive the usage of digital technology in the classroom?

Table 2. Teachers' Perception toward the Use of Digital Technology in Teaching of Mathematics**.**

S/N	Statement	S.A	A	D	SD	N	Mean	S.D
1	I prefer using laptops/ computers/ phone in the classroom to teach students in mathematics class.	14 (23.3%)	3 (5.0%)	3 (5.0%)	40 (66.7%)	60	1.85	1.287
2	I used a laptop/ computer/ phones to prepare my lesson notes and prepare students' assignments.	24 (40.0%)	15 (25.0%)	6 (10.0%)	15 (25.0%)	60	2.80	1.219
3	I normally utilize online learning materials when teaching mathematics.	16 (26.7%)	18 (30.0%)	16 (26.7%)	10 (16.7%)	60	2.67	1.052
4	I used to participate in seminars, workshops, and conferences for the training of teachers in mathematics on the use of digital technology in the classroom.	8 (13.3%)	2 (3.3%)	17 (28.3%)	33 (55.0%)	60	1.75	1.035
5	I used digital technology to produce visual displays of information (charts, graphs, pictures, video, etc.)	14 (23.3%)	6 (10.0%)	16 (26.7%)	24 (400%)	60	2.17	1.196
6	Mathematics learning through digital technology provides flexibility to the study at a time convenient to the learners.	16 (26.7%)	18 (30.0%)	17 (28.3%)	9 (15.0%)	60	2.68	1.033
7	Using technology can simplify most mathematical concepts	10 (16.7%)	21 (35.0%)	18 (30.0%)	11 (18.3%)	60	2.50	0.983
8	I believe that technological platforms are user friendly and the service is compactable with the way that I teach mathematics in the classroom	14 (23.3%)	15 (25.0%)	21 (35.0%)	10 (16.7%)	60	2.55	1.032

S/N	Statement	S.A	A	D	SD	N	Mean	S.D
9	I feel confident when using digital technology to teach mathematical concepts	16 (26.7%)	18 (30.0%)	17 (28.3%)	9 (15.0%)	60	2.68	1.033
10	Digital technology can increase my competency solving mathematics.	16 (26.7%)	23 (38.3%)	11 (18.3%)	10 (16.7%)	60	2.75	1.035

The perceptions of teachers concerning the usage of digital technology in teaching of mathematics are displayed in Table 2 above. Seven (7) items (item 2, item 3, item 6, item 7, item 8, item 9 and item 10) from Table 2 had means that were higher than the average mean benchmark of 2.5 while three items (item 1, item 4 and item 5) had means that were less than the average mean benchmark. This finding suggests that teachers are particularly astute when it comes to the use of digital tools for teaching mathematical concepts. Perhaps there is a connection between the teachers' perception and their exposure, experience, and emotional stability. Additionally, teachers' eagerness to keep up with the 21st century's methods of teaching and learning may influence how they see the application of digital technology to the teaching of mathematics. Additionally, teachers' position is to avoid becoming redundant in the classroom in the future. In contrast, teachers whose perceptions are at conflict with the use of digital technology may believe that they need to adjust to the changes brought about by technology in both teaching and learning. This is because they fear that computers will take the place of these teachers in carrying out their duties.

Research Question 3: To what extent do students find digital technology acceptable for learning?

Table 3. Student's Acceptability on the Use of Digital Technology in Learning of Mathematics.

S/N	Statement	S. A	A	D	SD	N	Mean	S. D
1	Overall, I am satisfied with how easy it is to use digital devices in learning mathematics in the classroom.	110 (36.7%)	95 (31.7%)	38 (12.7%)	57 (19.0%)	300	2.86	1.113
2	Whenever I make a mistake using digital technology I recover easily and quickly.	34 (11.3%)	125 (41.7%)	9 (3.0%)	132 (44.0%)	300	2.20	1.128
3	I believe I become more productive in learning mathematics by using digital technology.	126 (42.0%)	79 (26.3%)	50 (16.7%)	45 (15.0%)	300	3.00	0.980
4	The information (online help, on-screen messages, and other documentation) provided by digital devices is always clear to me.	76 (25.3%)	103 (34.3%)	38 (12.7%)	88 (27.7%)	300	2.57	1.144
5	The information provided with the digital technology is effective in helping me complete my work.	29 (9.7%)	122 (40.7%)	12 (4.0%)	137 (45.7%)	300	2.14	1.111
6	Digital technology has all the functions and capabilities. I expect it to have.	80 (26.7%)	85 (28.3%)	38 (12.7%)	97 (32.3%)	300	2.59	1.198
7	I can complete my work quickly using digital technology	108 (36.0%)	112 (37.3%)	24 (8.0%)	56 (18.7%)	300	2.91	1.087
8	The organization of information on digital technology is cleared.	130 (43.3%)	118 (39.3%)	3 (1.0%)	49 (16.3%)	300	3.10	1.044
9	It is simple to use digital technology to learn mathematics	96 (32.0%)	161 (53.7%)	35 (11.7%)	8 (2.7%)	300	3.15	0.723
10	It is always easy for me to find the information that I need by using digital technology	100 (33.3%)	104 (34.7%)	30 (10.0%)	66 (22.0%)	300	2.79	1.129

Table 3 illustrates the results of the students' acceptance of digital technology in mathematics in their studies. Table 3 shows that the means of eight items (item I, item 3, item 4, item6, item7, item8, item 9, and item 10) are greater than the mean benchmark of 2.5 while the means of two items (item 2 and item 5) are less than the mean benchmark of 2.5.

This data suggests that the majority of the students were prone to using digital technologies for their mathematical activities.

Research Question 4: To what extent do teachers find digital technology acceptable for teaching?

Table 4. Teacher's Acceptability on the Use of Digital Technology in Teaching of Mathematics.

S/N	Statement	S. A	A	D	SD	N	Mean	S. D
1	Overall, I am satisfied with how easy it is to use digital devices in learning mathematics in the classroom.	14 (23.3%)	21 (35.0%)	17 (28.3%)	8 (13.3%)	60	2.68	0.963
2	Whenever I make a mistake using digital technology I recover easily and quickly.	23 (38.3%)	15 (25.0%)	15 (25.0%)	7 (11.7%)	60	2.90	1.053
3	I believe I become more productive in learning mathematics by using digital technology.	12 (20.0%)	27 (45.0%)	11 (18.3%)	10 (16.7%)	60	2.68	0.983
4	The information (online help, on-screen messages, and other documentation) provided by digital devices is always clear to me.	20 (33.3%)	14 (23.3%)	17 (28.3%)	9 (15.0%)	60	2.75	1.083
5	The information provided with the digital technology is effective in helping me complete my work.	16 (26.6%)	14 (23.3%)	22 (36.7%)	8 (13.3%)	60	2.53	0.966
6	Digital technology has all the functions and capabilities. I expect it to have.	6 (10.0%)	5 (8.3%)	26 (43.3%)	23 (38.3%)	60	1.90	0.933
7	I am able to complete my work quickly using digital technology	19 (31.7%)	11 (18.3%)	17 (28.3%)	13 (21.7%)	60	2.60	1.153
8	The organization of information on digital technology is cleared.	14 (23.3%)	18 (30.0%)	16 (26.7%)	12 (20.0%)	60	2.57	1.064
9	It is simple to use digital technology to learn mathematics.	23 (38.3%)	22 (36.3%)	13 (21.7%)	2 (3.3%)	60	3.10	0.858
10	It is always easy for me to find the information that I need by using digital technology.	16 (26.7%)	10 (16.7%)	24 (40.0%)	10 (16.7%)	60	2.63	1.031

Table 4 shows the results of teachers' level of digital technology acceptance in teaching mathematics. From Table 4, the mean of all the items responded to is more than the mean benchmark of 2.5 except item 6. This result showed that mathematics teachers embrace digital forms of instruction as a valid platform for teaching mathematics in the classroom. More so, the majority of the teachers believed that it is simple to use digital technology to teach mathematics and that whenever they make a mistake using digital technology they recover easily and quickly. Hence, making digital technology is acceptable to them.

Discussion of findings

This study investigated the acceptance and perception toward using digital technology in the classroom among students and teachers: a case study of Ogun State secondary schools in Nigeria. According to the study's findings, students in Nigeria strongly believe that digital technology can foster successful learning more effectively than teachers. In this regard, it is important to emphasize the expansion of digital technology in the classrooms from the perspective of Nigerian students to improve the quality of teaching and learning. In this respect, their perceptions corresponded with those of Demir (2009), Sahhin, & Toy (2016). Students believe that computers are a necessary prerequisite for their learning issues or that digital technology is the only solution to their problems with learning. The perceptions of Nigerian students in this regard are comparable to those of Digital Natives or Net Generations (Rao, 2015; Kenedy, et. al 2012). According to Prensky (2001), Digital Natives have lived their entire lives around and utilizing computers, digital music, mobile devices, and other toys and tools from the digital age. He argued that the natives' upbringing in a digital culture and environment has altered the way they thought and, consequently, how they view education and learning. Digital natives have a poor tolerance for teacher-led learning and instruction, and they rely extensively on communication technology to get knowledge. Their perceptions, however, conflict with the claims made by Afari-Kumah & Achampong (2020), who suggested that a teacher's successful instructional design, as

opposed to media (computers), is the best way to ensure high-quality learning. According to Clark (2011), one reason why students' perceptions don't match he claims that they may not be sufficiently aware of the advantages and disadvantages of different instructional methods and media.

In addition, the study's findings suggest that not all teachers agree that computers can make it easier to teach and learn mathematics. This particular study is noteworthy because it shows that while some teachers' perceptions are consistent with Gorra & Bhati (2016), other teachers' perceptions are consistent with students' perceptions, which support Clark (2011) and others' position. On the one hand, teachers whose perspectives align with the use of digital technology may believe that adapting to the technological advances in mathematics teaching and learning is necessary. On the other hand, Rao (2015) noted that teachers' perceptions conflict with using digital technology may be concerned about being replaced by computers. In other words, this impression of teachers is consistent with how Digital Immigrants behave. Digital immigrants are strangers to the future generation's digital technologies and lack technological proficiency. The findings imply that, to some extent, there are differences in perceptions between students and teachers in Nigeria regarding the function of digital technology.

Furthermore, the results showed that teachers' and students' experiences of using digital technology were highly favorable in terms of usability and behavioral intent. According to Ayodele (2020), the use of digital technology in education fosters efficient information distribution and also enhances the simplicity of learning mathematics. In their free time, they can practice and learn by doing it. Sequential learning, which is the most common type of instruction, gives students variable time to do particular assignments and participate in discussions. This shows that both students and teachers can benefit from using digital technology to study mathematics. Nwachukwu, Johnson, & Amadi (2011) concluded that using educational technology in teaching and learning is reasonable. More proof was provided by Daniel (2020) to back up the claim that teachers and students throughout the outbreak of COVID-19 had a positive view of using digital technology to teach mathematics.

The study's findings also revealed that teachers and students share a high liking for the use of digital technology in the classroom. This outcome might not be unrelated to how crucial digital technology is to the development of education. This finding is consistent with research by Kizito (2012) & Wang (2017), which claimed that the use of digital technology in teaching and learning results in beneficial ideas and outcomes that encourage instructors and students to comprehend concepts more thoroughly. Similar to this, Ibrahim et al. (2018) showed that mobile phones improve the efficiency and effectiveness of teaching and learning. More specifically, the majority of teachers and learners thought that digital technology might be used to facilitate their administrative tasks as well as enhance the quality of mathematics teaching and learning. This outcome supports Simon's (2008) conclusions that digital technology can be used to improve teaching and learning.

CONCLUSION

This study investigated the acceptance and perception toward using digital technology in the classroom among students and teachers: a case study of Ogun State secondary schools in Nigeria. The study's conclusions showed that both teachers and students had favorable opinions on the use of digital technology in the classroom, although students were shown to be more perceptive than teachers. Additionally, the study's findings indicated that both teachers and students highly embrace the use of digital technology in the teaching and learning of mathematics. Additionally, the majority of students and teachers concurred that using technology to teach mathematics improves learning. Based on the results of the findings in this study, the following recommendations are made:

(i) Additional knowledge about using digital technology in the classroom should be given to teachers and students.

(ii) Mathematical teachers should be sent to conferences, workshops, and seminars to refresh their pedagogical knowledge and methods for efficient teaching in the use of digital technology in the classroom.

(iii) For students to improve their mathematical thinking, reasoning, problem-solving, and communication abilities, they must regularly have access to digital devices that facilitate digital learning.

(iv) (To encourage the development of an interactive, value-based digital learning process, teachers and parents should collaborate to ensure that students are using digital devices appropriately.

(v) Future studies should take into account the difficulties that teachers and students face when utilizing digital technology in the classroom.

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