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FAMILY DIGITAL DIVIDE AND THE ACADEMIC PERFORMANCE OF UPPER-BASIC SCHOOL STUDENTS IN COMPUTER SCIENCE STUDIES IN ILORIN SOUTH, KWARA STATE, NIGERIA

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Abstract

This study examined family digital divide and the academic performance of upper-basic school students in Computer Science Studies in Ilorin South, Kwara State, Nigeria. The study employed descriptive survey method. The population for the study comprised all upper basic school students in Ilorin South, Kwara State. A systematic random sampling technique was used to select 11 public secondary schools out of 33 public schools, while 20 upper basic school students were randomly picked from each of the selected schools to make a total number of 220 students as sample size for this study. Researcher-designed questionnaire titled Family Digital Divide Questionnaire (FDDQ) with the reliability coefficient of 0.87 was used to figure out students with access to digital devices and those without access while the proforma was used to collect students' results in Computer Science subject in the school sampled. Descriptive statistics of Frequency and percentage were used to describe demographic data and answer the research question. Hypotheses were tested with the use of inferential statistics of independent t-test at 0.05 alpha level. Findings showed that the majority of the students with access to digital devices were above average level in their performance while the majority of students without access to digital devices at home were of low performance level in Computer Science Studies in Ilorin South, Kwara State, Nigeria and thus, there was statistically significant difference in the academic performance of students with access to digital devices at home and those without. It was therefore recommended that there is need to invest in technological infrastructures with more innovations that promote the fight against digital divides and technological inequalities in Nigerian societies. This could provide new means and solutions to equal access to digital devices in their homes regardless of socio-economic status, geographical location, etc.

Keywords: *Family, Digital Divide, Performance, Computer Studies.*

Introduction

The technological revolution which began at the end of the 20th century was not just the change from an industrial to a technological model; rather, it was accompanied by a radical transformation in several key fields such as the social, economic, political, geographical and cultural areas. Thus, the development of information and communication technologies (ICT) has greatly impacted the socio-economic activities of individuals within and outside the society (Chen & Zhu 2004). Given that Information and communication technologies (ICTs) today are important factors for economic growth and social development, there are reports on the gains brought about by networked computers where information is obtained by anyone from anywhere and at any time (Timo 2003, Siti et al. 2009), leaving those with no or limited access to computers behind. Consequently, this created and/or broadened the socio-economic gap between the 'haves' and the 'have nots.' This gap creates digital divide within or between societies.

The term "digital divide" was introduced in the mid-1990s and described as the gap separating those who have access to new forms of information technology through digital devices such as desktop/laptop computers, android mobile phones, tablet computers, e-readers, radios, television connected with DSL/decoder, internet and other electronics signals at home from those who do not. The digital divide remains an important public policy debate that encompasses social, economic and political issues (Srivastava &

Bohlin, 2011). The term digital divide refers to the social, economic and cultural consequences of the unequal distribution of access to computers and the Internet. Whereas, Scholarly literature (Norris, 2001; Van Dijk, 2006) and that of international organizations (OECD, 2001) described the divide in terms of both access and the use of ICT. Hamburg and Lutgen (2019) described the concept of digital divide as "the gap of unequal accessibility and experience for access and use of modern ICTs. Digital Divide refers to the disparity between social, ethnic, racial, and economic sectors of society that are fully enabled online versus those which have been systematically neglected by the online revolution (Adeogun, 2003). This is therefore referred to as the gap separating those who have access to new forms of ICTs from those who do not.

Although most of the literature on digital inclusion, especially reports produced by international agencies such as OECD (2011), highlight the potential of ICTs to reduce poverty and social inequality, the social dynamic is quite the reverse: this is because, the introduction of a new product that becomes a condition of 'civilized' life (be it a telephone, electricity, a refrigerator, radio or TV) raises the minimum standard by which one is defined as poor. Richer sectors of society are generally the first to access new products, and it takes a long time before these products are made available to the poor, if at all and hence, the introduction of new digital 'essential' products increase social exclusion and inequality. Wei *et al.* (2006) describe digital divide under three main categories namely:

- i. Digital access divide - is the inequality of access to Information Technology (IT) in homes and schools.
- ii. Digital ability divide - inequality of the ability to exploit IT arising from the first-level divide and other contextual factors like socioeconomic status and education.
- iii. Digital outcome divide - the inequality of outcomes, based on exploiting IT arising from the second-level divide and other contextual factors like motivation and meaningful usage.

Family digital divide is the lacuna between children that have access to the computer systems and those who are not opportune as a result of family involvement. Although, Sousa, Mele & Gomez (2020) viewed family digital divide as the division of technology access and skills between students from affluent areas compared to students from poverty, the divide has been attributed to a number of factors which include students' parental socio-economics status, ethnicity, geographical location, inequitable access to internet etc. Also, the study of Tayo, Thompson & Thompson (2016) revealed that lack of Internet access, inability to buy computers and Internet usage, poor economic condition, deficiency in computer skills, and poor infrastructures were contributors to the digital divide among various families in Nigeria. In education, students who have access and manage to harness this technology have amplified their active, evaluative, integrative, creative and collaborative learning capabilities (Hong *et al.* 2003, Timio 2003, Zaidieh and Jalal 2012) as there is ample documentation on the use of the internet as a source of information for literature reviews, authors' searches, subject searches, and research all which make learning easier and foster students' academic activities and performance (Adeogun, 2003, Luamibano and Nawe 2004, Rehman and Ramay 2004). However, given the paradigm shift in education with the emergence of online (virtual) teaching and learning, e-Library, etc. all which require mobile/digital technologies and strong internet connection, students with no or limited access to digital technologies are prone to find learning more difficult and denied to compete academically with those students from affluent homes.

This study could therefore make a significant contribution to the research focused on the digital divide and students' performance in computer science by seeking to understand the ways in which students' home access to digital devices shape their school-based performance in computer science.

Statement of the Problem

The integration of digital technologies has totally revolutionized the teaching and learning processes, methods and research in education in Nigeria and across the globe. To foster active and autonomous lifelong learners, there is need to accommodate the digital technologies to equip students with the necessary skills and

knowledge that will allow students to reach this potential and optimize learning in a fast-changing world. Despite increase in the use of computer and internet related facilities in Nigeria. It is however painful that disparities in access due to socioeconomic background and other related factors limit the access of students either in the school and at home. The discrepancies in access to the digital devices has greatly affect students' academic performance because it does not ensure equal education at secondary school levels which against Sustainable Development Goals which specify that children in 2030 will be equal in terms of education provisions and activities. Different studies have been carried out on digital divide in different study areas. Thus, it is viewed that this disparity might cause discrepancy in students' academic performance in Ilorin South, Kwara State, Nigeria and hence, the need to explore this study. The researchers such as Jie (2006), Sianou-Kyrgiou & Tsipakides (2012), carried out study on digital and academic achievement among students of different backgrounds in United State of America focused Mathematics and English Language. The outcome of the study revealed that despite the provision of computers and internet related facilities in some schools, disparity in access still exist as the number of facilities were limited in number and this has limited the students' opportunities and greatly impacted on their academic achievement.

Also, Gamji, Kara, Nasidi & Abdul (2021) studied the challenges of digital divide and the use of web 2.0 platforms as knowledge sharing tools among Nigerian academics. The study result showed that majority of secondary school students studied lack access to digital devices both in the school and home. He found out that those have access to digital facilities at home had high academic performance than those have not. He concluded the bridging of the gap by the government can ensure equal access and boost their performance.

To the best of the researcher's knowledge, none of these studies have focused on family digital divide and academic performance of students in Ilorin South, Kwara State, Nigeria. This has been the gap the study filled.

Purpose of the Study

The main purpose was to explore family digital divide and the academic performance of upper-basic school students in Computer Science Studies in Ilorin South, Kwara State, Nigeria.

Research Questions

- i. What is the proportion of students with and without access to digital devices for learning at home?
- ii. What is the level of academic performance of students in Computer Science Studies?

Hypothesis Testing

H₀: There is significance difference in the academic performance of students with access to digital devices at home and those without

Methods

The study employed descriptive survey method. The population for the study comprised all upper basic school students in Ilorin South, Kwara State. The target population made up of Upper Basic II students. A systematic random sampling technique was used to select 11 public secondary schools out of 33 public schools while 20 Upper Basic school students were randomly picked from each of the selected schools to make a total number of 220 students as sample size for this study. Researcher designed questionnaire titled Family Digital Divide Questionnaire (FDDQ) was used to figure out students with access to digital devices and those without access while the proforma was used to collect students' results in Computer Science subject in the school sampled. The validity of the instrument was determined using content validity approach. The instrument was given to three experts in sociology of education and measurement and evaluation at University of Ilorin to ascertain the relevance and adequacy of the instrument items. The

reliability was ensured through test re-test method outside the sampled population at an interval of three weeks. The two results obtained were correlated using Pearson Product Moment Correlation statistics and the coefficient of 0.67 was obtained. Descriptive statistics of Frequency and percentage were used to describe demographic data and answer the research question while the hypotheses were tested with the use of inferential statistics of independent t-test at 0.05 alpha level.

Results of the Data Analysis

Demographic data of the participants obtained indicated that the majority of the participants were from low socio-economic status and semi-educated homes in Ilorin South, Kwara State

Answering of Research Questions

Question One: What is the proportion of male and female students with and without access to digital devices for learning at home?

Participants' responses on access to digital devices at home for learning were subjected to percentage analysis and the summary statistics is presented in Table 1.

Table 1: Proportion of Students with and without Access to Digital Devices for Learning at Home

Gender	Digital Access		
		with Access (%)	without Access (%)
Male		42 (19.2)	62 (28.1)
Female		45 (20.4)	71 (32.3)
Total		87(39.6)	133 (60.4)

As shown in Table 1, out of 220 students sampled, 87 (39.5%) respondents had access to digital devices at home while 133 (60.4%) had no access to digital devices at home. This implies that majority of sample respondents had no access to information technology and internet related facilities at home. More so, out of 220 respondents 104 (47.3%) were males while 116 (52.7%) were females. This signifies that female respondents were major in the study. Data available signifies that out of 133 sampled respondents with no access to digital device at home, 62 (28.1%) were males while 71 (32.3%) were females. This indicates that females were not having access to digital devices at home compare to male counterparts. That is, inequality in access to digital devices is very prominent among female respondents (gender digital divide).

Question Two: What is the level of academic performance of students with and without access to digital devices at home in Computer Science Studies?

Participants' raw scores in Computer Science Studies were obtained and categorized into three (3) levels of high, average and low academic performance using the range scores of 70 – 100, 50 – 69 and 0 – 49 respectively. The summary statistics of students' academic performance is presented in Table 2.

Table 2: Levels of Academic Performance of Students in Computer Science Studies.

Academic Performance		Digital Access		
Levels	Score Range	With Access (%)	Without Access (%)	
High	70 – 100	13 (14.9)	36 (27.0)	66 (54.8)
Average	50 – 69	33 (37.9)	53 (39.9)	69 (59.7)
Low	0 – 49	41 (47.1)	44 (33.1)	85 (80.2)
Total		87 (100.0)	133 (100.0)	220(100)

Data in Table 2 revealed that out of 220 respondents 66 (54.8%) had high academic performance, 69 (59.7%) had average performance and 85 (80.2%) had low performance in Computer Studies. This shows that majority of sampled respondents had low academic performance in Computer Studies.

Hypotheses Testing

All the hypotheses were tested using independent t-test at 0.05 alpha level

H₀₁: There is significance difference in the academic performance of students with access to digital devices at home and those without

Table 3: t-test Statistics Showing the Difference in the Academic Performance of Students with access to Digital Devices at Home and Those without

Students	No	Mean	Mean diff	S. D.	df	t-value	Sig	Remark
With Access	87	57.447	8.775	2.327	218	1.721	0.000	Rejected
Without Access	133	48.672	-8.775	3.688				

*significance at $p < 0.05$

Table 3 shows that the t-value 1.721 is obtained with a p-value of 0.000 computed at 0.05 alpha level. Since the p-value 0.000 is less than 0.05 level of significance, the null hypothesis one is not retained. Therefore, there was statistically significant difference in the academic performance of students with access to digital devices at home and those without ($t_{(218)} = 1.721, p < 0.05$). The difference is in favour of students with access to digital devices at home with the mean difference of 8.775.

Discussion

Findings revealed that the majority (60.4%) of the students in Ilorin South do not have access to digital devices for learning at home. This implies that a large proportion of students came from homes where there were limited or no access to digital devices such as internet facilities, desktop/laptop computers, android mobile phones, tablet computers, e-readers, radios, television connected with DStv/decoder and other electronics signals. That is, large proportion of public upper basic school Computer Studies students in Ilorin South have unequal access to digital device at home. This could be attributed to the poor/low level of socio-economic status of many public-school students' parents, irregular supply of electricity, low parents commitment, low level of parental education, a high degree of illiteracy, geographical location and unequal access to internet facilities. Thus, students from poor or relatively low in financial resources may not be capable to afford any current technological products at the moment as they will have to wait until the device becomes outdated. This result substantiates the outcome of the finding of Venkat (2001) who found out that access to computer assisted learning devices and internet related facilities either in the school or at home can greatly boost the academic performance of students in Computer Studies and inequality in access can limit the academic growth and encourage rote learning, thereby bring variations in students' performance. The result of the finding supports the finding of Mutume (2005) and the ITU (2005) which show that Africa due to poor socioeconomic conditions has been categorized as one of the most underdeveloped telecommunication infrastructure in the world which is characterized by having the lowest ICT indicators in terms of connectivity, access to radio, television, computers and the internet.

Findings also revealed there is gender digital divide as majority of female respondents (32.3%) had no access to digital devices at home compared to male counterpart with 28.1%. The outcome of the study corroborates the finding of Manduna (2016) which revealed that a low level of education is related with digitally underprivileged persons and that men had more opportunities of using ICTs than women. The finding is against the submission of ... (2010) who avers that females have much access to computer assisted learning materials at home than their male counterparts.

The results of this study showed that there was statistically significant difference in the academic performance of students with access to digital devices at home and those without and the difference was noted to favour students with access to digital devices at home with the mean difference of 8.77. The implication of the result is that children learn better when they have constant interaction with people, ICT

related facilities and computer materials connected with learning in their surroundings. This outcome agrees with the results of some of the researches such as Mariscal (2005), Gebremichael & Jackson (2006), Ugas & Cedros (2007) and Fuchs & Horak, (2008) who found that students who are digitally buoyant and having access to information technology and the internet facilities either at home or in the school are always exhibit higher performance than those who have not.

Conclusion

It is indeed not a gain saying that Information and communication technologies have almost become essential to teaching and learning, hardly a student will be offering Computer Studies in school without been utilizing internet related facilities and electronic resources in the computer laboratory in schools for performing different learning activities. It is sometimes assumed that access to digital devices by the students can assist their learning as provision of it can make them to have access to it and interact with information needed for improved academic success and it could be suggested that digital devices use is increasingly associated with student academic performance and their involvement in other social activities in modern day society. However, the presence of family digital divide among parents of secondary school students offering Computer has been a threat to effective learning of computer studies. The study finding revealed that digital divide prevalence in the areas such as family and gender. This is associated with inequalities in the socioeconomic status of the parents, their level of education and uneven distribution of social resources by the government. This has invariably drawing back the public schools in meeting global best practices and meet up with the Sustainable Development Goals' objectives.

It is therefore imperative for government to make the digital devices available at school and empower the parents in the provisions of computer related facilities as this will promote the opportunity of equal accessibility for both students and the parents.

Recommendations

With respect to the findings of this study, it is recommended that there is need for government to invest in technological infrastructures with more innovations that promote the fight against digital divide and technological inequalities in Nigerian societies. This could provide new means and solutions to equal access to digital devices in the homes regardless of socio-economic status, geographical location, etc. of students.

There is the need for government being the owner of the school to provide adequate digital related facilities to various schools this will bridge digital divide gap to a barest minimal and narrow inequality in access. Also, urgent policy efforts should be made by the government which will focus on assisting students of Computer Studies from poverty-stricken families to obtain not only physical access to the digital devices but also information-age skills necessary for its effective functioning.

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