Bridging the Digital Divide in Nigerian Information Landscape:
The Role of the Library

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ABSTRACT

In the global economy, the use of ICTs in everyday activities enables individual or communities to reduce the social divide and also enable them benefit from the internet and other information and communication technologies (ICTs), thereby competing effectively in the global economy. This study examines the concept of digital divide, types and manifestations globally and in the Nigerian context and the role of the library in bridging the persistent gap. The chapter further highlights previous attempts to bridge the digital gap in Nigeria and concludes with a range of recommendations.

KEYWORDS

Digital Divide, Digital Exclusion, Digital Gap, Digital Inclusion, Digital Literacy, Digital Split, Information Literacy, Libraries, Nigeria

INTRODUCTION

The use of ICT for human development has brought, in its wake, both opportunities and challenges. One major challenge is the unequal access and ability to use ICTs. This is the digital divide, creating a "frightening gap" between the information haves and the have-nots. Bridging the digital divide has therefore become an important feature and a key factor in sustainable development. Many people the world over, especially adults, and in developing countries, still lack the fundamental digital skills that are necessary for life and work. Except the digital divide is bridged, more adults will still be left behind as a result of digital exclusion. Internet World Stats (2019) assert that the term became popular among concerned parties, such as scholars, policy makers, and advocacy groups, in the late 1990s. Research has however concluded over the years that the "Digital Divide" is a global phenomenon with far-reaching effects and broad definitions (Tammi, 2004). Pimienta (2009) views the digital divide as nothing other than the reflection of the social divide in the digital world, and according to Tammi (2004) it is "the mainstream buzzword for technology inequality", the exclusion of people from the digital world.

In the global economy, the use of ICTs in everyday activities such as education, economic activities, entertainment, travel and communication, offers opportunities to reduce the social divide for

individual beings or communities and enables them to benefit from the Internet and other Information and Communication Technologies (ICTs) in order to improve literacy, democracy, social mobility, economic equality and growth. However, there are a lot of obstacles to overcome in order to bring the opportunities closer to the disadvantaged people and groups. The most common and prominent of these obstacles happen to be the lack of relevant education, literacy and an infrastructure for connectivity i.e. ICTs.

Sadly however, access to ICTs does not automatically provide access to opportunities for human development. According to the Information Society Commission (ISC) the digital divide is much more complex than physical access to Internet-linked computers. Education, ethics and participation have been identified as key players to bridging the digital factor, more specifically a digital and information literacy as pointed out by Dunn (2013), with telecommunication systems, computer hardware and software being predictable prerequisites. OECD (2001) corroborates this mentioning that people, education and learning are at the heart of bridging the digital divide.

Unless these issues are sufficiently paid the necessary attention, the digital divide will only get wider with developing countries suffering most from this inequality. Access to ICTs varies from country to country. While some countries have about 90 percent access, others have little or none at all. Many developing countries are not advancing at the expected speed and those technologies are yet to be fully integrated into their social and economic lives. Majority of these countries, like Nigeria, are faced with insufficient funds, inadequate ICT facilities for the teeming population of over 150 million people, lack of, or poor and inadequate infrastructural support like erratic electricity supply and especially network infrastructure such as poor internet services, poor maintenance of ICT facilities, low bandwidth. Hence, Nigeria faces a massive digital divide.

ICTs have become a vital engine of any economy, an essential feature for survival in the global information economy. Arikpo, Osofisan, and Usoro (2009) see it as an essential infrastructure that can promote development in other sectors like agriculture, education, defense, health, industry, banking, transportation and tourism. Digital divide has been identified as affecting access to a broad range of public services including education, health and other social services (The Economist Intelligence Unit Limited, 2012). The global nature of ICTs therefore enables developing countries, like Nigeria, to compete in a global economy, where information is currency and wallets are digital (Bulls, 2016). According to the International Telecommunications Union (ITU) as reported by Intel (2007), Nigeria in 2004 had just seven PCs per 1,000 inhabitants, internet connectivity was, and is still in short supply, the street price of a new PC is well beyond most Nigerians' reach, and consumer financing is limited, civil service resources to design, implement and administer a digital inclusion program are limited. Similarly, Tayo, Thompson and Thompson (2016) assert that Nigeria has ICT facilities that are limited to urban areas at exorbitant rates, only affordable by the middle and upper classes of society, thus making many of the rural and suburban areas unable to fully participate in the emerging information economy.

Consequently, people lack the knowledge and skills to use ICT facilities, where available, and therefore need the necessary ICT literacy in order to measure up. Intel (2007) stated also that Nigeria needs to extend technology access, expand connectivity, shore up its struggling education system, otherwise bridging the digital divide will remain an illusion.

THEORETICAL FRAMEWORK

This work builds on Pimienta's (2009) Information Communication for Development (ICT4D) model as presented in Figure 1.

In this model Pimienta (2009) postulates that it takes a holistic approach to effectively address the digital divide in any given environment. According to this model, it will take a combination of infrastructure, 'infostructure' and infoculture to surmount the obstacle of digital divide. He sees "Infrastructure" (of ICT) as the devices that permit the signal to be transmitted (such as lines,

Figure 1. Information communication technology for development (ICT4D) (Pimienta, 2009)
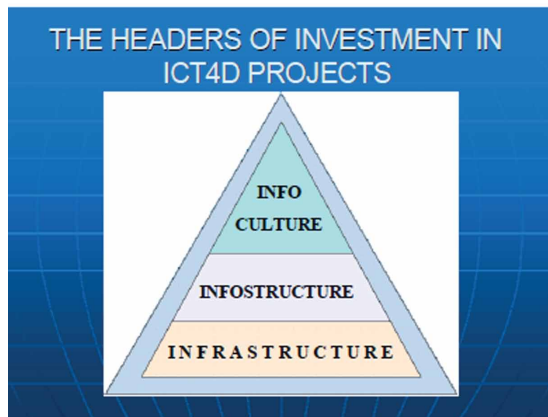
Source: Pimienta, D. (2009)

microwaves, satellites), and to be carried (such as protocols for communication and routing devices), as well as the computer hardware and software that are involved in the transport of the information (operating systems, in the very broad sense, and communication protocols), reaching the users, while "Infostructure" refers to the contents and the applications that are located, given access and are executed above the infrastructure such as the software, the databases and the websites that are hosted in the computers which work as servers in the network.

"Infoculture" according to him refers to the sum of knowledge, methods, practices, and rules of good conduct that the people possess when they have appropriated the use of information and communication networks acquired through a planned process of digital and information literacy.

The model is relevant to this study in that it makes a clear distinction between ICTs and information literacy and proposes that unless the technology is built on a planned process of information literacy, such efforts might be exercise in futility.

Digital Divide: A Conceptual Analysis

Although it is difficult to determine the origin of the digital divide, Mossberger, Tolbert, and Stansbury (2003) claim that it became popular in 1998 after it was used to describe differences in computer and Internet access by the National Telecommunications and Information Administration (NTIA) in its report "Falling through the Net: A Survey of the "have nots" in rural and urban America." But as Tammi (2004) states, the concept "digital divide" has broad definitions. In the early 1990s, for instance, the digital divide meant the division between those with and without telephone access; but, in the late 20th century, the concept was perceived as the division between those with and without Internet access. Perception of the phrase is therefore dependent on a lot of factors including individual opinions and prevailing conditions and it is a multi-dimensional phenomenon (Naidoo & Raju, 2012). Consequently, the phrase "digital divide" has been defined in various ways and is not indeed a clear single gap which divides a society into two groups (Internet World Stats, 2019a).

IFLA (2014) states that the digital divide is information divide. However, the definition of the digital divide could be determined from different contexts. Hence, Wikipedia, (2019a) states that the digital divide is any uneven distribution in the access to, use of, or impact of information and communication technologies (ICT) between any number of distinct groups; these groups may be defined based on social, geographical, or geopolitical criteria, or otherwise.

When used academically, digital divide tends to express the stratification of social classes, race, gender and age who lack the skills to use the Internet as a tool to improve their livelihood.

Purushothaman and Zhou (2014) aver that traditionally, the phrase digital divide refers to an unequal distribution of information and communication technologies, resulting in a gap between those who are able to access digital information, and thus participate in the information or knowledge society, and those who are not. Economically, Doczi (2000) pictures it as the economic disparity among groups who adequately have computers and Internet access (i.e., the information haves) and individuals with insufficient or no access (i.e., the information have-nots).

When viewed globally, Rouse (2014) recognises the digital divide as the gap between demographics and regions that have access to modern information and communications technology, and those that do not, or have restricted access. Arikpo et al. (2009) describe it is as the information technology gap between developing and developed countries, typically existing between those in cities and those in rural areas, the educated and the uneducated, socioeconomic groups; between the more and less industrially developed nations (Rouse, 2014), and between the information rich and the information poor (Naidoo and Raju (2012). Ugboma (2012) corroborates this, asserting that it is the gap existing with regards to access to information and communication technologies (ICTs), or between parts of the world having easy access to knowledge, information ideas and works of information through technology and those who do not. Thus, it involves the differences in access to technology by developed and developing societies dictating who uses or does not use technology.

The digital divide, as stated inter-alia, has thus been defined in different ways, and therefore means different things to various authors. Internet World Stats (2019) also calls it the "digital split", a social issue referring to the differing amount of information between those who have access to the Internet (especially broadband access) and those who do not have access. It is seen basically as unequal Internet access and usage. According to Umar (2019), it is the troubling gap between those who use computers and the Internet and those who do not, that is, between information haves and have-nots (Doczi, 2000; Kruger, 2004) and according to Stanford (n.d.), between the "underprivileged members of society, especially the poor, rural, elderly, and handicapped portion of the population who do not have access to computers or the internet; and the wealthy, middle-class, and young Americans living in urban and suburban areas who have access".

As succinctly put by Akanbi and Akanbi (2012), the digital divide is an inequality in access, distribution, and use of information and communication technologies between two or more populations, between individuals, households, business and geographical areas at different socio-economic levels with regards both to their opportunities to access ICTs and to their use of the communication and digital technologies for a wide variety of activities (Gautam, 2014); even in a particular country between those who readily have access to information and communication technologies and the knowledge ICTs provide, and those without such access or skills, or by some members of society to information and communications technology, and the unequal acquisition of related skills (New World Encyclopedia, 2019). The OECD (2001) therefore labels it as the differences, relating to access and usage of ICT, existing between individuals, households, companies or regions" i.e. the gaps in access to and use of information and communication technologies (ICTs). Willis and Tranter (2006), corroborate this, viewing it as a wide variety of inequalities, including differential access to, contact with, and use of ICTs across nations as well as between social and demographic groups within individual countries, i.e. a social stratification due to unequal ability to access, make use of the digital technologies, adapt, and create knowledge via use of information and communication technologies (ICT).

This unequal ability is due largely to unequal access and some other factors such as education, literacy, knowledge, skill, language, location, content, economic ability etc., and even when some access to technology exists, the digital divide can be evident in the form of lower-performance computers, lower-speed wireless connections, lower-priced connections etc. (Rouse, 2014). People therefore need effective access to digital and information technology (New World Encyclopedia, 2017; Wikipedia, 2019a).

Simply put therefore, the digital divide is the exclusion of people from the digital world; the gap, disparity or inequality existing between people who have, and people who do not have access to information and communication technologies tools and related services such as computers, telephones, Internet access etc. It portrays an imbalance between those who have the training and access to technologies that enable them to take advantage of digital technologies and those who are unable to take full advantage of the tools, skills, benefits, and employment opportunities available in the new economy. Thus, digital divide focuses not only on access to, but also understanding of the technology. Hence, New World Encyclopedia (2017) perceives the digital divide as skills people have – the divide between peoples who are at ease using technology to access and analyze information and those who are not, and as Elvidence Computer Forensics (2015) states, digital divide can be about skills too, hence the need for digital literacy.

Tammi (2004) also avers that the concept "digital divide" has far-reaching effects. Although it has evolved over the years and has in fact, been defined in different ways, the digital divide is still a reality today. Thus, Hilbert (2016) concluded, "the bad news is that the digital access divide is here to stay", and Stanford (n.d.) sees the gap as a "growing gap" while Mehra, Merkel and Peterson (2004) bewail it as "troubling".

MANIFESTATIONS OF DIGITAL DIVIDE/TYPES OF DIGITAL DIVIDE

The digital divide does not only manifest within the less developed countries but also within, and between the developed and less-developed countries. This divide, according to Cullen (2001) may appear due to historical, socioeconomic, geographic, educational, behavioural or generational factors or be due to the physical incapability of individuals. OECD (2001) supports this assertion, stating that the digital divide is in fact, a whole series of interlocking "divides" - the gaps that separate segments of society as well as whole nations into those who are able to take advantage of the new ICT opportunities and those who are not. Internet World Stats (2019) therefore affirm that the digital divide is not indeed a clear single gap which divides a society into two groups.

Elvidence Computer Forensics (2015) also points out three categories of the divide namely:

the sections of society that do not have access to the Internet and therefore do not get the best access to products and services via technology or are unable to find the best deals online… between people who understand the technology they are using and those who know just enough to get by… those who are able to use computers and mobile devices to carry out their daily tasks, but are likely to panic when something changes or does not work as they expect.

Dunn (2013) and Mutula (2008) also identify the following manifestations of digital divide:

- **Access divide:** An imbalance among individuals or communities who have access to the Internet, ICTs and related technologies and those who do not;
- **Content divide:** This refers to gaps created as a result of some communities' inability to use the knowledge contained in available digital technologies because the technologies do not relate to their needs;
- **Demographic divide:** There can be a disparity in access to the Internet, ICTs and related technologies due to gender, age, physical ability and other demographic variables;
- **Economic divide:** A disparity arises when Internet, ICTs and related technologies are more easily accessible to, and used by some communities than others due to economic factors such as financial constraints, poverty and underdevelopment;
- **Gender Digital Divide:** This is a gender imbalance resulting in more men having access to and using ICTs than women;

- **Information and knowledge divide:** This is an imbalance among individuals or communities who have access to certain information and the knowledge of certain issues than others. This automatically gives the "information haves" strategic advantage over the "information have-nots";
- **Infrastructural divide:** A disparity occurs when there is lack of existence of an infrastructure for connectivity i.e. telecommunication systems, computer hardware and software and related technology among individuals or communities;
- **Job divide:** This arises when certain individuals have access to computers and the Internet resulting in improved education, increased innovation, higher wages and economic competitiveness thereby giving them more advantages than individuals with limited access;
- **Linguistic or Language divide:** Although majority of the world's population does not speak English, ICTs and digital contents are packaged using predominantly international languages like English. This at once constitutes a divide for those who speak foreign languages and do not understand English;
- **Literacy divide:** This refers to gaps created as a result of some individuals' or communities' inability to locate, evaluate and use digital information, encompassing both technologies (such as computers) and services (such as e-mail), or even deal with and make sense of the amount of information they receive. Nielson (2006) identifies lower literacy as the Web's biggest accessibility problem;
- **Social Divide:** Disparities can arise when cultural factors between and within individuals, communities and countries affect accessibility and use of various digital technologies.

In addition, Mossberger et al. (2003) suggest four different types of divides related to ICT:

- An information divide due to certain people's inability to gain access to online information due to demographic characteristics;
- A skills divide related to computer-specific capabilities;
- An economic opportunity divide related to the inability to receive training, education or employment opportunities;
- A democratic divide related to certain people's inability to participate in e-government.

Dewan & Riggins (2005) also propose an emerging e-commerce divide. This is simply people's lack of ability in using advanced e-commerce online functionalities and services. They are therefore unable to take advantage of powerful e-commerce functionalities.

Nielsen (2006) substantiates these assertions, adding that the digital divide manifests in three stages as:

Stage 1: Economic Divide: the inability of some people affording to buy a computer.

Stage 2: Usability Divide: inability of some people to use or understand a computer because of the complicated technology and services associated with the use of the computer. Hence, they are unable to achieve the full benefits of the modern world.

Stage 3: Empowerment Divide: Neilson (2006) identified this as the most difficult of the divides to bridge. He noted that not everyone would effectively use opportunities presented by technology even if ICTs were free and easy to use. He added that participation inequality is a key promoter of the empowerment divide, noting that majority of users (90%) do not contribute, minority (9%) contribute periodically, while an insignificant minority (1%) contributes effectively.

Digital divide within countries can therefore manifest in forms of lack of ICTs, access, lower-performance computers, lower-quality or high cost connections, difficulty of obtaining technical

assistance, and lower access to subscription-based contents, inequality of access to goods and services available through technology.

Digital Divide, National and Global Distinctions

Digital divide, that has been described as the information technology gap between developing and developed countries, has different characteristics both nationally and globally and is affected by various factors (Arikpo et al., 2009; Lucky, 2013).

The digital divide at the global level reflects growth across countries, describing disparities on an international level, between the highly and less developed nations. Considering this, research shows the uneven development of Internet throughout the world, with a lot of developing countries being unable to keep up with the speed of the alarmingly expanding Internet and is automatically disadvantaged in a lot of developmental issues and cannot compete in the global economy. This is simply because developed countries have invested in ICTs, Internet and other related technology and are already reaping the benefits of the information age, while others are lagging behind technologically.

Factors causing the divide globally can vary depending on individual countries and cultures (Wikipedia, 2019b) These factors as highlighted by New World Encyclopedia (2017) include country of residence, ethnicity, gender, age, educational attainment, and income levels are all factors of the global aspects of digital divide.

Similarly, on a national level, age, generation gaps, gender, education, income, language etc, affect access to the Internet, ICTs, and the technology that can be used by the different segments of a society. The digital divide nationally therefore differs between countries because different nationalities have different personalities and each country has a unique trait, history, behavior, language, attitude and population characteristics.

FACTORS THAT CONTRIBUTE TO THE DIGITAL DIVIDE

Researchers have identified various factors that contribute to the digital divide among individuals, communities, groups and countries. However, these factors are likely to vary depending on the peculiarity of individuals, communities, groups and countries. Here, these factors will be discussed under the following subheadings identified by Rizza (2014):

1. Socio-economic factors
2. Geographical
3. Educational
4. Generational Factors
5. Attitudinal factors
6. Physical disability

Socio-Economic Factors

These include factors such as income, relevant infrastructure, affordability and access to ICTs and gender (Athavale and Bhide, 2014; Caumont, 2013; Ifijeh, Iwu-James & Adebayo, 2016; Umar, 2010).

Computers, infrastructure and telecommunication facilities are usually not affordable or accessible to individuals, communities and countries with low income levels. Also, individuals from poor economic backgrounds and countries ravaged by poverty are less likely to afford and fund technology. Even in areas where these facilities are available, they may not be reliable. These issues have resulted in the enormous gap between developed and developing countries.

Gender is also a major determinant of the digital divide. In a lot of communities, countries and organizations, females have less access to the internet than males. Men are therefore more likely to

be exposed to technology than women due to gender inequality in many countries especially in the developing countries.

Geographical Factors

These include location, race, country of residence, different population groups, community type, disparities between urban and rural areas or more developed countries and less developed countries (Caumont, 2013; Ifijeh, Iwu-James & Adebayo, 2016; Umar, 2010). Some people are still deprived of technology due to location, race, country of residence, different population groups, community type and economic state of the country in which they reside. In some countries, basic infrastructures for technological development are not available. Hence, more developed countries have better technologies due to better economies.

Even within the more developed countries, people who reside in rural communities are usually less developed and have lower access to technologies. Also, the digital divide is largely affected by race. Caumont (2013) reveals that black households and schools with a higher percentage of minorities have a lower number of computers than white households and schools with a lower percentage of minorities respectively.

Educational Factors

Studies have shown that education is an important determinant of the digital divide (Athavale and Bhide, 2014; Caumont, 2013; Umar, 2010). Educated people are expected to be better exposed to and use ICTs and the internet. Educational levels would also determine the extent to which computers and the internet would be used. People with higher levels of education are expected to use ICTs more than those with lower levels, while those with no education are likely to have no knowledge of computers or use them at all.

Closely related to education and educational levels is individual disciplines. Some disciplines are more likely to have internet access and use computers and internet technology at work than others. Those in computer and information related disciplines would be more exposed to computer and internet use than disciplines that depend less on computer and internet technologies.

Illiteracy, lack of digital literacy and lack of ICT skills and support are also educational factors contributing to the divide. Relevant literacy and skills are required in order to use available technology. Furthermore, the earlier children are exposed to ICTs in their schools and classrooms, the more proficient and comfortable they will be in using new and emerging technologies. Many disadvantaged people lack proper skills about modern technology. Without the necessary literacy level, skills and support, availability of and access to digital technology are useless.

Generational Factors

Age and generation gap between users of technology is another factor that determines the digital divide. (Athavale and Bhide, 2014; Stanford, n.d.). Younger generation, regarded as "digital natives", usually feel more comfortable when it comes to using emerging technologies than the older generation, regarded as "digital migrants". The older generation has less confidence in new technologies and is less likely to be interested in or use it. This is probably because the younger generations were brought up with these technologies which, in actual sense, are focused on them.

Physical Disability

Physical disability is another contributing barrier to digital divide especially in less developed countries where technology has not advanced much.

Other Factors Include

Language and Relevant Content

Some people do not use internet technologies because, on one hand, they do not understand the language and the content on the other hand is not relevant and interesting to them.

Transportation

Transportation is another factor contributing to the digital divide especially between the urban and rural areas and in locations with bad roads. The disadvantaged communities are usually neglected due to bad roads which discourage access (CRAM, 2016).

Who is Excluded by the Digital Divide?

Studies have revealed that particular categories of people are essentially excluded from the digital world, largely because they tend to be disadvantaged in a lot of ways. These include individuals or communities who cannot afford or do not have access to the Internet, ICTs and to goods and services available through technology, or lack the existence of the necessary infrastructure for connectivity, have lower-performance computers, are unable to use the knowledge contained in available digital technologies because the technologies do not relate to their needs or have difficulty of obtaining technical assistance. It also includes those excluded due to culture, gender, age (especially the elderly), marital status, physical ability, financial constraints and low incomes, poverty and under-development; those with few or no educational qualifications, who do not have access to certain information and the knowledge of certain issues; those who do not speak or understand the language in which ICTs and digital contents are packaged; those who are unable to locate, evaluate and use digital information, encompassing both technologies and services or cannot deal with and make sense of the amount of information they receive.

These excluded categories exist predominantly in the developing and less developed parts of the world, where majority of the population still live in the rural area, face a lot of obstacles, such as under-development in many ways, low educational qualifications and literacy levels, and lack of an infrastructure for connectivity. These factors largely exclude them from the digital world and from enjoying the benefits of the global digital economy. Efforts need to be put in place to extend digital access to those disadvantaged either by barriers such as age, income, social status etc. In order for these disadvantaged people and groups to harness and benefit from the opportunities of the digital revolution therefore, it is imperative to focus developmental activities in these remote areas and ensure they have access to relevant educational opportunities and the relevant skills and infrastructure for connectivity.

Information Literacy (IL) and its Impact on the Digital Divide

The digital divide poses a grave concern for anyone who intends to participate actively in, and also benefit from the global information and knowledge economy. Without the necessary skills and knowledge, it becomes almost impossible to survive in an information society. As earlier stated, the most common and prominent obstacles to overcome in bridging the digital divide include the lack of relevant education, literacy and an infrastructure for connectivity, i.e. ICTs. OECD, cited in Umar (2010) corroborates this, noting that people, education and learning are core in bridging the gap; otherwise, infrastructure and accessibility would be useless without the necessary people, education and skills to utilize the available resources. People need to be able to obtain the necessary information and competence to survive in the information society, improve their quality of existence and be economically independent. Information literacy is therefore of the utmost importance in the information age in order to be current and stay informed.

The Association for College and Research Libraries (ACRL) (2016) defines information literacy as a set of abilities requiring individuals to recognize when information is needed and have the ability

to locate, evaluate, and use effectively the needed information. It is the ability to discover and use various types of information (Loftis, 2015). This includes identifying information need and what is needed, understanding how the information is organized and the best sources of information to address the need, locating and retrieving relevant sources, critically evaluating the sources and using the retrieved information to ascertain that information need has been met. It is the ability to define problems in terms of the perceived information needs, and the ability to" search, locate, apply, and synthesize the information and evaluate the entire process in terms of effectiveness and efficiency" (Business Dictionary, 2019). This establishes that before an information problem is solved, it is essential to recognize that a need exists and information is needed and be able to identify, locate, retrieve, evaluate, and effectively use the information. The Board of Trustees of the Leland Stanford Junior University (2019) states that IL enables people to "become more self-directed, and assume greater control over their own learning", be empowered to use information for "independent learning, lifelong learning, participative citizenship and social responsibility". Similarly, Kgosiemang (2016) considers information literacy (IL) very crucial for individuals to achieve personal, social, occupational and educational goals.

The literature is replete with the relationship between the digital divide and information literacy. In the United States, several studies revealed that the digital divide has been prevalent and remains a major social challenge in modern times in spite of the ubiquitous nature of technology (Ritzhaupt, Liu, Dawson and Barron, 2013; Subramony, 2014). Likewise, Williams (2017) reports that one-fifth of U.S. households, which possibly includes "first-generation college and low-income college students" do not have internet access.

Naidoo and Raju (2012) carried out a study in South Africa and recommend that computer literacy training should always precede information literacy training for digitally disadvantaged students since the study revealed that the digital divide slows down the progress of information literacy lessons and the disadvantaged students need more involvement in bridging the information and digital divide. This simply shows that the digital divide greatly impacts on information literacy training. Considering a combined class with both digitally advantaged and disadvantaged students, Naidoo and Raju (2012) added that information literacy classes should be interactive and creative consisting of online tutorials, games and group work in order to engage both groups in the classroom.

Digital Literacy and Digital Competence in Bridging the Digital Divide

With the emergence of the knowledge society, the concepts of digital literacy and digital competence have been in frequent use to determine what skills people need to possess, what is appropriate and how to teach pupils and students in the knowledge society in order to help bridge the digital divide.

Although digital literacy and digital competence are often used synonymously, and are closely related, they have distinct origins and meanings. However, they are used to strengthen each other. Pérez-Escoda and Rodríguez-Conde (2015) understand digital literacy and digital competences as the set of skills, knowledge and attitudes needed in the 21st century for citizens.

European Commission defines digital literacy as "an expression that suggests that the abilities required to use the new technologies are similar in some respects to those required for reading and writing". Merchant (2009) therefore suggested that "the central concern of digital literacy is reading and writing with new technologies.

However, Shannon (2017) has a broader view of digital literacy as the set of competences required for full participation in a knowledge society. According to Shannon, the Cornell University defines digital literacy as "an individual's ability to find, evaluate, utilize, share and create content using information technologies and the internet.", a concept that is "understood as a combination of technical-procedural, cognitive and emotional-social skills".

Eshet-Alkalai (2004) adds that "digital literacy involves more than the mere ability to use software or operate a digital device; it includes a large variety of complex cognitive, motor, sociological, and emotional skills, which users need in order to function effectively in digital environments".

This assertion is largely supported by Martin and Grudziecki (2006) who define digital literacy as "the awareness, attitude and ability of individuals to appropriately use digital tools and facilities to identify, access, manage, integrate, evaluate, analyze, and synthesize digital resources, construct new knowledge, create media expressions, and communicate with others, in the context of specific life situations, in order to enable constructive social action; and to reflect upon this process".

Gallardo-Echenique, De Oliveira, Marqués-Molias and Esteve-Mon (2015) propose that digital literacy is a "concept that is closely related to digital competence", which according to Ferrari (2013) is the "set of knowledge, skills, attitudes (thus including abilities, strategies, values and awareness) that are required when using ICT and digital media to perform tasks; solve problems; communicate; manage information; collaborate; create and share content; and build knowledge effectively, efficiently, appropriately, critically, creatively, autonomously, flexibly, ethically, reflectively for work, leisure, participation, learning, socializing, consuming, and empowerment".

The European Union Framework (the DIGCOMP project) of Key Competencies for all citizens developed by the European Commission highlights digital competence as one of the eight key competences required for "life-long learning which is a requisite for personal fulfilment and development, active citizenship, social inclusion, and employment in a knowledge society". (Yazon, Ang-Manaig, Buama and Tesoro, 2019). According to the DIGCOMP project, digital competence involves not only basic technical mastery, but also the development of abilities to (1) browse, evaluate, and manage information; (2) communicate and collaborate; (3) create digital contents; (4) preserve safety; and (5) solve problems, both in formal, non-formal, and informal learning contexts (Fraile, Peñalva-Vélez and Lacambra, 2018). These are the kind of skills and understanding learners need in the knowledge society.

A simple and succinct definition of digital competence by Ferrari (2013) states that digital competence is the confident, critical and creative use of ICT to achieve goals related to work, employability, learning, leisure, inclusion and/or participation in society. Corroborating this, Fraile, Peñalva-Vélez, and Lacambra (2018) view digital competence as "the creative, critical, and safe use of information and communication technologies (ICT) to reach goals related to work, employability, learning, leisure, inclusion, and social participation".

To be regarded as digitally competent, one must acquire the appropriate knowledge, skills and attitudes for using digital technologies and for survival in the emerging knowledge society. Digital competence is thus a process and cannot be achieved in a day. It however requires time, consistency and fluency of individuals in the use of information and communications technologies (ICTs). Martin (2009) in Gallardo-Echenique et al therefore concludes that digital competence is a requirement for and a precursor of digital literacy, but it cannot be described as digital literacy.

With digital competence, people can take advantage of the benefits of and actively participate in the global knowledge society.

Examples and Lessons From Other Countries

- In the United States, the use of the internet, through the Gates Library Initiative, positively impacted the lives of public library users in different areas such as education, health, income, personal finances and time savings;
- In Chile, a national digital literacy campaign, through the Gates Library Initiative, trained numerous people in basic technology skills, through a network of more than 300 public libraries. This has enabled Chileans to initiate "businesses, navigate market information and develop technology skills to improve their job competitiveness";
- In rural Botswana, public libraries helped serve as offices to small business owners, and also helped people repackage and rebrand their businesses thereby making them more sophisticated, competitive and also created more awareness for such businesses;

- In Romania, the public library created internet access and opportunities for more than 41,000 farmers to apply online for agricultural subsidies. Thereby resulting in more than US $63 million in subsidies from the Ministry of Agriculture to individuals;
- Bill and Melinda Gates Foundation, 2019.

Other examples of the positive impact of the role libraries in bridging the digital divide include:

- In Estonia, public libraries have been equipped with free and open access internet points to provide easy access to information;
- In Malaysia, public libraries provide space known as "electronic corners" which provide electronic library services with readily available and accessible information and also serve as entertainment;
- In Poland, Polish public libraries provide free internet access to their patrons;
- In South Africa, space is provided in public libraries for "information kiosks and telecenters" where people can easily gain access to the internet and information;
- In Sunderland, England, the public library free access to PCs (personal computers) is provided. Furthermore, library personnel provide training for adults and children users;
- In Uganda, health workers and the general public receive free internet access and training at the Hoima Public Library.

Manifestations of Digital Divide in Nigeria

Nigeria, like many developing countries, has poor information and communications infrastructure which affect connectivity and creates a gap between Nigeria and the developed world. Whereas many often assess the inequality between the haves and have-nots based on access to ICTS- particularly the internet and hardware- the Nigerian context tends to establish that the digital divide goes beyond access to the internet and hardware. Other factors such as education, lack of knowledge and inadequate skills to access information that is essential to the lives of the citizenry are features of the digital divide in the Nigerian context. Nwabueze (2010) therefore emphasizes that the poor economic conditions deprive Nigerians of information available in other developed societies.

As earlier stated, Nigeria, due to widespread poverty, is faced with insufficient funds, low level of income, inadequate ICT facilities for the teeming population of over 150 million people resulting in lack of access to and affordability of computers and the Internet, lack of, or poor and inadequate infrastructural support like erratic power supply and especially network infrastructure such as poor internet services, poor maintenance of ICT facilities, high tariff charges for Internet access and low bandwidth. This digital divide is especially evident in the rural areas, since 70% of the Nigerian population live in "underserved and remote" areas of the country (Arikpo, Osofisan, & Usoro, 2009). Nigeria therefore faces a massive digital divide (Tayo, Thompson, &Thompson, 2016).

The Nigerian context is very complex when it comes to bridging the digital divide. Despite the value of information and communications technology in sustainable development and for providing opportunities to compete in the global economy, many Nigerians still exhibit apathy towards ICTs. These, according to Dijk (2006) are described as 'want-nots'. Majority of the want-nots exist in the rural areas and among the poor people in Nigeria. These, according to Eke (2011), live below the poverty level, are marginalized and have little or no access to ICTs either because Internet access is unavailable or it is unaffordable and as Wikipedia (2019) stated, the digital divide in Nigeria is impacted by education, income and urban drift, as well as a variety of other social and political factors.

According to the United Nations Global Development Goals Indicators (2009), Nigeria falls within the category of developing countries with 0-4.54% computers per 100 people and Africa accounts for only 11.2% of the entire world population that has access to and effectively uses the internet (Internet World Stats, 2019). Consequently, Nigeria is consistently striving to bridge the

digital divide. However, the nation lacks the critical drive and strategies to harness the full potential of ICT for the socio-economic development of the country (Arikpo, et al., 2009) and this increases the economic disparity and the digital divide in Nigeria. Tayo, Thompson and Thompson (2016) therefore affirm that no other country is a better example of the need for information technology than Nigeria.

Previous Efforts to Bridge the Digital Divide in Nigeria

Nigeria, though a developing country, has been reported to be growing fast, precisely at twice the African average, thereby having the most profitable telecommunications market in Africa (Odufuwa, 2006). This is evident with the rate at which telecommunications companies are thriving in Nigeria, and the rate at which individuals and corporations are partnering with the telecommunications sector and profiting from telecommunications products and services.

Although, as stated inter alia, Nigeria faces a massive digital divide with just seven PCs per 1,000 inhabitants in 2004, Obi (2019) however reports that by 2018, the situation had positively improved and there were 92.3 million internet users in Nigeria. Similarly, NCC reports that in April 2019, there were already 119.5 million internet users in Nigeria. This is probably as a result of the "lucrative telecommunications market" in Nigeria. Obi (2019) added that the figure is expected to grow to 187.8 million in 2023.

The digital situation in Nigeria has therefore received more attention thereby bringing to birth various initiatives, programmes, projects, innovations and efforts to close the digital gap in the country. Wikipedia (2019) notes current collaboration between government agencies and technology corporations such as Andela, Cchub, Google, Intel, Microsoft and StarBridge Africa, Likewise, the Centre for Information Technology and Development (CITAD) has urged stakeholders to bridge the digital divide, stating that "Nigerians are far left behind in terms of accessibility, availability and penetration levels of the internet and its usage" (Nigerian Diary, 2019). Some of these initiatives are discussed below.

TechnoFuture Nigeria

This is an innovative computerized educational tool launched by the New Partnership for Africa's Development (NEPAD). It is a tool which teaches a combination of computer and entrepreneurship skills to learners from four years to adulthood, thereby empowering them with skills to be self-reliant and compete more effectively in the global economy.

Red Cheetah Free Wi-Fi App

Swift Networks' Red Cheetah Free Wi-Fi App was introduced across various locations in Lagos assisting Nigerians to access the internet.

MTN Foundation's Universities Connect Initiative

This is a donation of a fully furnished and air-conditioned digital library (equipped with over 100 networked computers, running on Microsoft 365, equipped with an alternative source of electricity, VSAT-based Internet connectivity, a server, and laser jet printers) by Microsoft Philanthropies to universities in Nigeria. Universities that have benefited from the Universities Connect initiative include the Ahmadu Bello University, the University of Nigeria, Nsukka and the University of Benin. In addition, MTN Foundation upgraded and reopened a similar digital library at the University of Lagos.

Public Service Network (PSNet)

This is a National Information Technology Development Agency (NITDA) project conceived to promote the use of ICTs especially in the Nigerian Public Service in order to bridge the ICT infrastructural gap in Nigeria.

The Digital Bridge Institute

This is an institute, an international centre for advanced telecommunications studies established in 2004 by the Nigerian Communications Commission (NCC) for information technology training, education and capacity building, in order to continue promoting the rapid growth and development of the Nigerian Telecommunications marketplace.

Computers for All Nigerians Initiative (CANI)

The program is a collaboration between the Nigerian Federal Ministry of Science and Technology (FMST), National Information Technology and Development Agency (NITDA), PC producers, local banks and private technology companies like Intel and Microsoft, to make affordable PCs and internet services available and accessible to Nigerians. These accessories are made available at subsidized and convenient rates.

Nigerian Universities Network (NUNet) Project

An initiative of the Nigerian Universities Commission (NUC) to connect all Nigerian universities to the Internet through the Nigerian Universities Network (NuNet). The initiative provides connections to all Nigerian Universities and University Centres in one national computer network (Internet) with a gateway at NUC. This has helped disseminate Nigerian content the world over.

National Rural Telephony Project (NRTP)

The NRTP was meant to provide telecommunications services to the rural dwellers and communities. This project was to "provide over 636 256 Code Division Multiple Access (CDMA) lines in 774 local government areas" in a bid to reduce the digital divide in Nigeria.

NITDA's Mobile Internet Unit (MIU) Project

MIU is a project of National Information Technology Development Agency (NITDA). It is a mobile training and cyber center in an 18-seater bus with 10 high-tech networked workstations connected to the Internet via VSAT equipment. The system is also complete with a photocopier, multi-media facilities and printers. This mobile facility was initiated to ensure penetration of internet all over the country and take the Internet to places without other means of internet access especially rural areas, various primary and secondary schools. Prospects were to all Nigerian states and Local Government Areas (LGAs).

Collaborative Initiative Between Nigeria and Intel World Ahead Program

A collaboration between Nigeria and Intel World Ahead Program targeted at ensuring that PCs are made available, accessible and affordable, increasing wireless internet access, improving education and basic literacy and providing locally relevant content as skoool™ curriculum resources. With this collaboration, Nigerians purchased highly capable PCs, the capital city of Abuja was covered by a high-speed WiMAX network, local PC manufacturers are producing PCs for the program and have increased production volumes by approximately 50 percent, three banks are offering loans, and two have extended the program to their own employees. Participating employers include private enterprises, along with federal and state ministries and agencies (Intel Corporation, 2007).

Intel Classroom PC Proof of Content

Intel Corporation, in a bid to enable children and youth function effectively in an information society by providing them with the necessary skills, designed a fully equipped e-classroom for students in Jabi, Abuja, Nigeria, to enable them to have the benefit of e-education, change their method of learning and make ICT an everyday tool of teaching and learning in the school environment. Thereby enabling them to be nurtured in an affordable, collaborative e-learning environment (Nkanga, 2006).

School Curricula and the Development of Digital Competence in the Classroom

Pérez-Escoda and Rodríguez-Conde (2015) state that digital literacy and digital competences need to be taught at schools in this digital age since digital technology has made a learning revolution possible (Da Silva and Behar, 2017). The challenge, however, for the classroom is how to make educational use of the new literacy practices. This may not simply be a matter of enhancing classroom practice but may need a more transformational pedagogy (Burnett et al., 2006; Squire, 2002) in Merchant (2009).

Education plays a vital role, and the school is an important factor, in equipping students with the required competence for survival in the digital age, but teachers also need to acquire the appropriate skills in order to foster the development of digital competence in their students. As much as pupils and students need to acquire digital competence in this knowledge society, teachers also need to be adequately prepared to integrate digital tools into their classroom teaching. They need to have a confident and critical usage of the full range of digital technologies for information, communication and basic problem-solving in all aspects of life. It is therefore important to equip everyone, especially young people with necessary key competences and to improve educational attainment levels.

School Education Gateway (2015) notes that digital competence is not just about knowing how to surf the Internet, but can be broken down into a range of smaller components outlined in DIGCOMP (the European Digital Competence Framework for Citizens). These are Information Processing, Communication, Content Creation, Safety and Problem Solving. Teachers need to endeavour developing these components in the classroom in order to produce "digitally savvy" citizens.

Integrating digital competence into the school curricular involves digitally competent teachers producing digitally competent pupils. It therefore transcends the four walls of the school. It entails integrating it as a set of skills and competences embedded at the level of teachers, to embedding it within and across the wider school organization to the development and adoption of national policies which will introduce ICTs in schools and provide internet access for every child and every school. Thereby implementing a national strategy related to digital competence. Thus, digital competence supports the "National Curriculum aims and a school's own educational ethos and values" (FutureLab, 2010).

Digital competence plays an important role in the teaching and learning process. Ottestad, Kelentrić, and Guðmundsdóttir (2014) state that gradually, over the past decade, digital competence has been introduced into school curricula, assessment tests and classroom practice. Educators are increasingly required to introduce digital literacy into their classroom delivery and teach students with digital tools as their teaching aids. They may choose to vary their teaching methods and styles depending on subjects, topics and the aims they seek to achieve. With digital competence, other key competences, such as communication, language skills, or basic skills in math and science can be mastered (School Education Gateway, 2015), students' digital skills are developed, their confidence and dependence in today's society is increased, and according to FutureLab (2010), they become independent, critical learners and the gap between their lived experiences inside and outside of school is narrowed.

School Education Gateway (2015) states that the development of digital competence should start at an early age but decisions as to the types of technologies and amount of time spent with them should be carefully considered; advocating teaching digital competence through a cross-curricular approach at both the primary and secondary level, providing teachers with sufficient digital competence such as development of ICT skills for teaching and the use of new technologies in the workplace, provides a good environment for teachers to collaborate with peers and learn about new ways of using ICT for teaching.

Digital literacy curriculum does not necessarily have to be a stand-alone curriculum but could be incorporated into other subjects. For example, as Promethean (2017) opined, "English teachers can use blogging to advance digital literacy while Citizenship teachers can present their class with real world problems and encourage pupils to use their computational skills to come up with solutions." Promethean also advanced creating "modern" classrooms, making lessons digital,

reviewing acceptable "Use Policy", creating digital ambassadors, engaging teachers in digital education and student-staff partnerships.

Also, introduce the use of devices within and outside the school to facilitate and improve school learning. Digital technologies such as smart devices offer new possibilities to improve student learning and digitally competent use of ICT and could help facilitate learning in schools. However, children need to be protected in the digital world which is largely unsafe for them, exposes them to criminals and bullies and sometimes leads to the development of psychological problems and mental health issues (Promethean, 2017). They therefore need to be protected against such threats and harm by incorporating e-safety into the curriculum also highlighted in the DIGCOMP framework. This would include teaching students about online safety, how to fight fake news, how to identify appropriate adverts, encouraging children to think critically about the images they are seeing, share emotions and think ethically.

Developing digital competence in the classroom by incorporating digital literacy into the national school curriculum as early as possible will facilitate students' digital skills' development, and consequently help in bridging the digital divide.

The Role of Libraries in Bridging the Digital Divide

The task of bridging the digital divide is one that includes libraries, information and documentation centers, academic and research institutions, all tiers of the government and also private companies. Each of these institutions has significant roles to play in ensuring that the digital divide is either reduced or totally eradicated. However, this paper focuses on roles that libraries and information centers can play in bridging the digital divide.

Umar (2010) also reports that the World Summit on Information Society (WSIS) states that bridging the digital divide requires improving access to information and communication infrastructure and technology. Others include improving access to information and knowledge, "building capacity, increased confidence and security in the use of ICTs, create an enabling environment at all levels, develop and widen ICT applications, foster and respect cultural diversity, recognise the role of the media, address the ethical dimension of the information society and encourage international and regional cooperation".

Since libraries in the global information society are positioned to provide the right information to all classes of people at the right time and in their preferred formats, and also by providing access to computers and the internet, they are considered core in bridging the digital divide. Consequently, librarians are now combining the responsibilities of digital literacy with the traditional approaches to information literacy in this digital era, are changing their role from traditional storehouses of information to providing access to information from any part of the world, and have therefore been recognized as information disseminators or communicators rather than custodians of information (Athavale & Bhide, 2014; Becker, 2018).

Libraries also provide various services which can largely bridge the digital divide. These roles identified by various authors (DJIM, 2016; Gautam, 2014) include the following.

Information Gathering and Dissemination

Information is a vital factor in decision making and especially in the development of individuals, societies and nations. A key role of libraries is collection/acquisition, processing, storage, retrieval and dissemination of information. This enables libraries provide relevant information to meet users' information needs promptly.

Providing Access to the Internet and Related Technologies

Libraries in the digital age provide the right technologies that enable the citizenry gain access to the internet and relevant information, thereby closing the access and information gap. Public libraries in particular provide access to computers and the internet free of charge.

Instruction, Education and Training Services

Libraries provide access to and use of the Internet and ICTs through instruction, education and training. Libraries, especially the public libraries, also provide instruction and adult education programmes in form of extra-mural literacy classes. These classes are established to teach and train the adults especially the working class, in order to expose them to new technologies and opportunities for a better life. In addition, library staff provide different training and support programmes to orient their users especially first-time internet users with modern information and technologies and to also help those looking to improve their skills to acquire relevant skills for using the computers and retrieving relevant information, thereby promoting computer and digital literacy.

Institutional Repository

Academic libraries now set up institutional repositories to enable effective resource sharing and provide people with access to content which is relevant to their needs.

Activism and Advocacy

Libraries undertake various efforts to provide timely information to every patron with the desire to positively impact the society. Librarians therefore advocate that equal and equitable access to information must be provided for all, regardless of gender, age, race or ethnicity. Thus, projecting librarians as activists and advocates, providing information, training and ICTs to everyone without discrimination. This is evidently explained by Raganathan's second law "every person his or her book" showing that librarians and libraries serve a wide range of patrons regardless of their educational level, gender, age, race etc. and therefore acquires materials to meet various needs. However, the libraries/librarians do not judge each patron's preference.

CONCLUSION AND RECOMMENDATIONS

The global digital economy is here to stay, so also, the digital divide is a reality. While some developed countries have almost surmounted the challenge of the looming digital gap, developing countries still have a long way to go in closing the gap but are making notable progress by increasing awareness, expanding mobile services and internet access.

However, more strategies need to be employed in bridging the digital divide. As noted earlier, bridging the gap is work for everyone the libraries, information and documentation centers, academic and research institutions, all tiers of the government and also private companies. Libraries therefore need to play a massive role in closing the gap. Awareness, enlightenment and advocacy programmes are needed to sensitize people about the need to bridge the gap.

Information literacy is a major component that the citizenry must acquire in a bid to bridge the digital gap.

Libraries must also be positioned to provide access to ICTs and related technology, trainings, education and instructional programmes and also timely information through institutional repositories (especially in academic libraries), online and offline databases and other print and non-print sources of information.

Libraries need to take a prominent position in education right from the school level to ensure that all children acquire basic literacy and a proper reading habit. Libraries should also advocate for computer and information literacy and trainings to be incorporated into the curriculum from the elementary level in order to equip children early with the necessary ICT skills and technology.

Consequently, it becomes imperative to implement projects that will improve/strengthen the educational infrastructure and basic literacy in Nigeria, especially in the rural communities, in order to ensure that every child gets the basic education from the earliest possible age.

Personal computers and related accessories need to be made available, accessible and affordable to every household. There should therefore be collaborative efforts between government agencies and technology corporations so that the cost of computers, computer accessories and related technology can be subsidized.

Also, there is a need for free wireless public internet access and also subsidized fee-based access to be widespread. This also includes mobile telephone access and broadband signals.

More attention needs to be focused on rural communities. Libraries, digital or tele-centers should be established and equipped with internet facilities to provide internet access and meet the information needs of rural dwellers.

These could also serve as centers for group meetings, instruction, basic education and trainings, and where people get exposed to new technologies. The public library has a key role to play in ensuring that the rural community has access to basic education, information literacy and constant trainings in the use of ICTs.

Technology corporations need to develop packages and software that make information on the internet more accessible to and better understood by rural communities. Libraries can also support by providing locally relevant content and translating the content into accessible languages.

Constant free refresher courses and fresh trainings should be organized and widely publicized. This will help remind people on the proper use of ICTs, tools and also new technologies.

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