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Challenges of Digital Divide as a Precursor for Effective Information Retrieval

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Abstract

Purpose: *The study seeks to establish the fact that although individuals might be capable of accessing the Internet, many are challenged by barriers to entry such as a lack of infrastructure or the inability to comprehend the information that the Internet provides.*

Methodology/Approach: *The approach adopted for the paper was exploratory.*

Finding: *The findings were that overcoming the problems posed by digital divide would include overcoming bandwidth challenges, overcoming lack of adequate infrastructure and others are some of the issues of digital divide. It addresses the physical mediums and associated problems like low bandwidths, that people use to connect to the Internet , desktop computers, laptops, basic mobile phones or smartphones, iPods or other MP3 players, gaming consoles such as Xbox or PlayStation, electronic book readers, and tablets such as iPads. There is need to close or overcome the digital gap because of its implications for effective information retrieval for all especially young people, women, marginalised and then the poor.*

Implications: *The study shows that all the tools necessary for overcoming the digital divide or bridging the gap between information rich and poor countries were prerequisites for effective information retrieval.*

Originality: *There is need to sensitise all information seekers to be acquainted and have mastery of all ICT tools, effectively to be able to overcome barriers of the digital divide, so as to achieve the effective information retrieval (EIR).*

Keywords*: Information Retrieval, Digital Divide, Precursor, Bandwidth, Infrastructure, Developing Countries*

Paper type: Viewpoint

INTRODUCTION

Digital divide conceptualised

A digital divide is an economic and social inequality with regard to access to, use of, or impact of information and communication technologies (ICT) The divide within countries (such as the digital divide in the United States) may refer to inequalities between individuals, households, businesses, or geographic areas, usually at different socioeconomic levels or other demographic categories. The divide between different countries or regions of the world is referred to as the global digital divide, examining this technological gap between developing and developed countries on an international scale. The term *digital divide* describes a gap in terms of access to and usage of information and communication technology. It was traditionally considered to be a question of having or not having access, but with global mobile phone penetration of over 95%, it is becoming a relative inequality between those who have more and less bandwidth and more or fewer skills. Conceptualizations of the digital divide have been described as "who, with which characteristics, connects how to what, who is the subject that connects: individuals, organizations, enterprises, schools, hospitals, countries, etc.

Characteristics or attributes used to distinguish or describe the digital divide are income education, age, geographic location, motivation, reason not to use, etc. Others are sophistication in the usage, mere access, retrieval, interactivity, intensive and extensive usage, innovative contributions, etc. What does the subject of the digital divide connect for instance whether fixed or mobile Internet, or telephone, digital TV, broadband, and others. The "digital divide" is also referred to by a variety of other terms which have similar meanings, though may have a slightly different emphasis like digital inclusion, digital participation, basic digital

skills, media literacyand digital accessibility (Gurstern, 2012).

The infrastructure by which individuals, households, businesses, and communities connect to the Internet address the physical mediums that people use to connect to the Internet such as desktop computers, laptops, basic mobile phones or smartphones, iPods or other MP3 players, gaming consoles such as Xbox or PlayStation, electronic book readers, and tablets such as iPad. Traditionally the nature of the divide has been measured in terms of the existing numbers *of subscriptions and digital devices. Given the increasing number of such devices, some have concluded that the digital divide among individuals has increasingly been closing as the result of a natural and almost automatic process. Others point to persistent lower levels of connectivity among women, racial and ethnic minorities, people with lower incomes, rural residents, and less educated people as evidence that addressing inequalities in access to and use of the medium will require much more than the passing of time. Recent studies have measured the digital divide not in terms of technological devices, but in terms of the existing bandwidth per individual (in kbit/s per capita).(Norris, 2010, Kang 2016).

The gap in a digital divide may exist for a number of reasons. Obtaining access to ICTs and using them actively has been linked to a number of demographic and socio-economic characteristics which are income, education, race, gender, geographic location (urban-rural), age, skills, awareness, political, cultural and psychological attitudes. Analyses across countries have shown that income levels and educational attainment are identified as providing the most powerful explanatory variables for ICT access and usage. As for geographic location, people living in urban centres have more access and show more usage of computer services than those in rural areas. Gender was previously thought to provide an explanation for the digital divide, many thinking ICT were male gendered, but controlled statistical analysis has shown that income, education and employment act as confounding variables and that women with the same level of income, education and employment actually embrace ICT more than men. One telling fact is that "as income rises so does Internet use. Strongly suggesting that the digital divide persists at least in part due to income disparities. Most commonly, a digital divide stems from poverty and the economic barriers that limit resources and prevent people from obtaining or otherwise using newer technologies.

OVERCOMING THE DIGITAL DIVIDE

An individual must be able to connect in order to achieve enhancement of social and cultural capital as well as achieve mass economic gains in productivity. Therefore, access is a necessary (but not sufficient) condition for overcoming the digital divide. Access to ICT meets significant challenges that stem from income restrictions. Furthermore, even though individuals might be capable of accessing the Internet, many are thwarted by barriers to entry such as a lack of means to infrastructure or the inability to comprehend the information that the Internet provides. Lack of adequate infrastructure and lack of knowledge are two major obstacles that impede mass connectivity. These barriers limit individuals' capabilities in what they can do and what they can achieve in accessing technology. Some individuals have the ability to connect, but they do not have the knowledge to use what information ICTs and Internet technologies provide them. This leads to a focus on capabilities and skills, as well as awareness to move from mere access to effective use of ICT. Social media websites serve as both manifestations of and means by which to combat the digital divide. Rana (2017) and Foroohar (2017)

INFORMATION RETRIEVAL CONCEPTUALISED

Information retrieval (IR) according to Hilbert (2011),is the activity of obtaining information resources relevant to an information need from a collection of information resources. Searches can be based on full-text or other content-based indexing. Information retrieval is the science of searching for information in a document, searching for documents themselves, and also searching for metadata that describes data, and for databases of texts, images or sounds.

Automated information retrieval systems are used to reduce what has been called information overload. An IR system is software that provides access to books, journals and other documents, stores them and manages the document, (Hilbert, 2011). Web search engines are the most visible information retrieval applications. Information retrieval (IR) is the activity of obtaining information resources relevant to an information need from a collection of information resources. Searches can be based on full-text or other content-based indexing. Information retrieval is the science of searching for information in a document or searching for documents themselves, and also searching for metadata that describes data, and for databases of texts, images or sounds.

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provide access to books, journals and other documents. Web search engines are the most visible applications, Stacey (2014). Information retrieval is the science of searching for information in documents, searching for documents themselves, searching for metadata, which describes documents, or searching within databases, whether relational stand-alone databases or hypertext networked databases such as the Internet or World Wide Web or intranets, for text, sound, images or data. Information retrieval is the process of searching for some collection of documents, using the term document in its widest sense, in order to identify those documents which deal with a particular subject. Any system that is designed to facilitate this literature searching may legitimately be called an information retrieval system. Haridasan, (2009).

An information retrieval process begins when a user enters a query into the system. Queries are formal statements of information needs, for example, search strings in web search engines. In information retrieval, a query does not uniquely identify a single object in the collection. Instead, several objects may match the query, perhaps with different degrees of relevancy. An object is an entity that is represented by information in a content collection or database. User queries are matched against the database information. However, as opposed to classical SQL queries of a database, in information retrieval the results returned may or may not match the query, so results are typically ranked. This ranking of results is a key difference of information retrieval searching compared to database searching, (Hilbert, 2013)

Depending on the application the data objects may be, for example, text documents, images, audio, mind maps[1] or videos. Often the documents themselves are not kept or stored directly in the IR system but are instead represented in the system by document surrogates or metadata. Most Information retrieval systems compute a numeric score on how well each object in the database matches the query and rank the objects according to this value. The top ranking objects are then shown to the user. The process may then be iterated if the user wishes to refine the query

EFFECTIVE INFORMATION RETRIEVAL CONCEPTUALISED

According to Kang (2016), as cited by Onwukanjo (2017) being effective in its simplest terms, means having the internal and external processes that lead to the desired end result. It means having the means to produce the desired effect in information retrieval services which leads to maximum user satisfaction. This is because effectiveness implies causing the desired or intended result. It means doing the right things and selling the right targets to achieve an overall goal, and achieving your worthwhile goals that support your vision and mission. Management effectiveness relates to getting the right things done. Therefore effective information retrieval implies obtaining information resources relevant to an information need from a collection of information resources that maximally satisfies the information seeker.

Effective Information retrieval (EIR) lays emphasis on obtaining information resources relevant to an information need from a collection of information resources. Searches can be based on full-text or other content-based indexing. Any system that facilitates this literature searching may legitimately be called an effective information retrieval system.

THE WORD PRECURSOR CONCEPTUALISED AND ITS CONTEXTUAL USAGE

The word precursor means something that comes before something else and often leads to or influences the development of another. It precedes and indicates the approach of another so contextually in this write-up, the digital divide has positive impacts, developments and positive implications for effective information retrieval.

DIGITAL DIVIDE AND EFFECTIVE INFORMATION RETRIEVAL: AN INTERPLAY

Educationally, the digital divide has positive implications and effect on children's education globally. It impacts on children's ability to learn intellectually in low-income school districts. Without Internet access, students are unable to cultivate the necessarytechnical skills in order to understand today's dynamic economy. Teachers give students homework that demands access to broadband. Even more, approximately 65% of young scholars use the Internet at home to complete assignments as well as connect with teachers and other students via discussion boards and shared files A recent study indicates that practically 50% of students say that they are unable to finish their homework due to an inability to either connect to the Internet, or in some cases, find a computer, (Ali, 2011). This has led to a new revelation: 42% of students say they received a lower grade because of this disadvantage. Finally, according to an empirical study conducted by the Center for American Progress, "if the United States were able to close the educational achievement gaps between native-born white children and black and Hispanic children, the U.S. economy would be 5.8 percent—or nearly $2.3 trillion—larger in 2050". This clearly shows that the consciousness of the digital divide has positive implications for effective information retrieval among students. "Internet use

takes place overwhelmingly among the upper-income, educated, and urban segments" largely due to the high literacy rates of this sector of the population. As such, James suggests that part of the solution requires that developing countries first build up the literacy/language skills, computer literacy, and technical competence that low-income and rural populations need in order to make use of ICT for effective information retrieval.

The digital divide has lots of implications for the Knowledge industry. This is because gender, age, race, income, and educational gaps in the digital divide have lessened compared to past levels, some researchers suggest that the digital divide is shifting from a gap in access and connectivity to ICTs to a knowledge divide. A knowledge divide concerning technology presents the possibility that the gap has moved beyond access and having the resources to connect to ICTs to interpreting and understanding information presented once connected. This simply put means that the digital divide is aiding effective information retrieval for everybody both young and old. Paschalidou, (2011). Socially, once individuals are connected, Internet connectivity and ICTs can enhance his or her future social and cultural capital. Social capital is acquired through repeated interactions with other individuals or groups of individuals. Connecting to the Internet creates another set of means by which to achieve repeated interactions. ICTs and Internet connectivity enable repeated interactions through access to social networks, chat rooms, and gaming sites. Once an individual has access to connectivity, obtains infrastructure by which to connect, and can understand and use the information that ICTs and connectivity provider, that individual is capable of becoming a "digital citizen". This shows that digital divide involved helps in ‘’effective information retrieval’’ that would have turned such an individual into a digital citizen. Kang (2016)

SKILLS AND DIGITAL LITERACY PERFECTION

Graham (2014) assertsthat digital divide trains and perfects the Skills and digital literacy of its participants irrespective of their socioeconomic status. As a result, research shows that the digital divide is more than just an access issue and cannot be alleviated merely by providing the necessary equipment. There are at least three factors at play: information accessibility, information utilization and information receptiveness. More than just accessibility, individuals need to know how to make use of the information and communication tools once they exist within a community. Information professionals have the ability to help bridge the gap by providing reference and information services to help individuals learn and utilize the technologies to which they do have access, regardless of the economic status of the individual seeking help. The skills and digital literacy that has been perfected results in effective information retrieval that brings about a total man. All accolades go to the digital divide.

According to Paschalidou (2011), demographic and socioeconomic characteristics could have caused a gap or further worsened the digital divide because of the demographic and socioeconomic characteristics involved. These characteristics are income, education, race, gender, geographic location (urban-rural), age, skills, awareness, political, cultural and psychological attitudes.

Multiple regression analysis across countries have shown that income levels and educational attainment are identified as providing the most powerful explanatory variables for ICT access and usage. Asfor geographic locations, people living in urban centreshave more access and show more usage of computer services than those in rural areas. Gender was previously thought to provide an explanation for the digital divide, many thinking ICT were male gendered, but controlled statistical analysis has shown that income, education and employment act as confounding variables and that women with the same level of income, education and employment actually embrace ICT sometimes more than men, However, each nation has its own set of causes or the digital divide. This means that instead of these socioeconomic and demographic qualities worsening the digital divide, they have actually closed the gap. With the closure of the gap created by the digital divide, it means a lot of hands are on deck towards ICT and related technologies. That implies that effective information retrieval has been encouraged.

ECONOMIC DISPARITY

In the developed worlds, the digital divide greatly boosts their economies because of access to technological advancements. This engenders effective information retrieval that helps in bolstering their economy. In the United States, research provided by Sungard Availability Services notes a direct correlation between a company's access to technological advancements and its overall success in bolstering the economy.The study, which includes over 2,000 IT executives and staff officers, indicates that 69 percent of employees feel they do not have access to sufficient technology in order to make their jobs easier, while 63 percent of them believe the lack of technological mechanisms hinders their ability to develop new work skills. The additional analysis provides more evidence to show how the digital divide also affects the economy in places all over the world. A BCG Report suggests

that in countries like Sweden, Switzerland, and the U.K., the digital connection among communities is made easier, allowing for their populations to obtain a much larger share of the economies via digital business. There are concerns that poor and underdeveloped countries would be left behind due to a lack of funds to bridge the digital divide. This would increase the economic gap between these nations. This would negatively impinge on economic growth on a small scale and on a large scale negatively affect information retrieval from where every economic growth is premised.(pick and Azari 2014).

THE DIGITAL DIVIDE VERSUS THE GLOBAL DIVIDE: BAD OMEN FOR EFFECTIVE INFORMATION RETRIEVAL

Pick and Azari (2014) posits that the global digital divide is a special case of the digital divide, the focus is set on the fact that "Internet has developed unevenly throughout the world causing some countries to fall behind in technology. This is tantamount to poor and ineffective information retrieval, causing some countries to fall behind in education labour, democracy, and tourism. The concept of the digital divide was originally popularized in regard to the disparity in Internet access between rural and urban areas of the United States of America; the *global* digital divide mirrors this disparity on an international scale.

The global digital divide also contributes to the inequality of access to goods and services available through technology. This means that access to computers and the internet that strengthens effective information retrieval for improved education, which can lead to higher wages is grossly reduced. The people living in nations with limited access are therefore disadvantaged because of ineffective information retrieval. This global divide is often characterized as falling along what is sometimes called the north-south divide of "northern" wealthier nations and "southern" poorer ones. (Robert and Fairle, 2014).

HARMFUL EFFECTS OF THE DIGITAL DIVIDE AND ITS IMPLICATIONS FOR EFFECTIVE INFORMATION RETRIEVAL

Social mobility is one of the harmful effects of the digital divide. Computer and Internet use is regarded as being very important to development and success. However, some children are not getting as much technical education as others, because lower socioeconomic areas cannot afford to provide schools with computer facilities. For this reason, some kids are being separated and not receiving the same chance as others to be successful. This means that effective information retrieval is either is very limited or not available at all.

Economic equality is one of the harmful effects of the digital divide. For example, the telephone is often seen as one of the most important components, because having access to a working telephone can lead to higher safety. If there were to be an emergency situation, one could easily call for help if one could use a nearby phone. In another example, many work-related tasks are online, and people without access to the Internet may not be able to complete work up to company standards. The Internet is regarded by some as a basic component of civil life that countries ought to guarantee for their citizens. Additionally, welfare services, for example, are sometimes offered via the Internet. This means that the digital divide breeds economic inequality due to lack of access to ICT and its components for effective information retrieval.

Democratic discrepancies are one of the harmful effects of the digital divide. Some people believe that eliminating the digital divide would help countries become healthier democracies. They argue that communities would become much more involved in events such as elections, political campaigns or decision making because, with the aid of ICT and its components,there would be a free flow of information across borders. Eliminating these discrepancies can only occur when people understand the democracy of other nations through effective information retrieval. (Greyling, 2011)

CONCLUSION

The concluding part of this paper dwelt on the need to close the digital gap because of its implications for effective information retrieval towards;

Young people: There should be a realisation of the common vision of the Information Society for the future generations. Young people are the future workforce and leading creators and earliest adopters of ICTs. They must, therefore, be empowered as learners, developers, contributors, entrepreneurs and decision-makers. The focus should be on young people who have not yet been able to benefit fully from the opportunities provided by ICTs. There should be a commitment to ensuring that the development of ICT applications and operation of services respects the rights of children as well as their protection and well-being. All these would augur well for effective information retrieval that would bring about a complete child.

Women: The development of ICTs provides enormous opportunities for women, who should be an integral part of, and key actors, in the Information Society. There should be a commitment towards ensuring that the Information Society

enables women's empowerment and their full participation on the basis of equality in all spheres of society and in all decision-making processes. To this end, we should maintain a gender equality perspective and use ICTs as a tool to that end. All this can be made possible by effective information retrieval.

Marginalised and vulnerable groups: The development of ICTs provide enormous opportunities to the special needs of marginalized and vulnerable groups of society, including migrants, internally displaced persons and refugees, unemployed and underprivileged people, minorities and nomadic people. There is a need to recognise the special needs of older persons and persons with disabilities. They would be fulfilled effective information retrieval.

The poor: There should be resolutions to empower the poor, particularly those living in remote, rural and marginalized urban areas, to access information and to use ICTs as a tool to support their efforts to lift themselves out of poverty through effective information retrieval. This is because access to relevant information creates knowledge and wealth.

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