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The different dimensions of the digital divide

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Abstract:

The digital divide is often addressed from a purely technical perspective. Nevertheless, a few years ago, a body of critical research in the field of social sciences suggested a broader approach to this concept, than that which associates it only to the lack of equipment. In this regard, the social researcher "Kling" makes a clear distinction between the disparity in access to information and communication technologies and the divergence in terms of knowledge and abilities between people connected to the Internet. In the present paper, we investigate the other type of exclusion that users of modern technologies in general and the Internet in particular are subjected to, and the variables affecting the emergence of these differences. We also attempt to clarify this different vision and how it differs from the previous one, in order to move away from the hypothesis of the inevitable digital exclusion related to equipment and to show the other dimension of the digital divide.

Keywords: digital divide., exclusion., information and communication technologies., Access., use.

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1. INTRODUCTION

Over the last thirty years or so, information and communications technologies have emerged and gradually imposed themselves on society through equipment and materials, which initially made it possible to overcome the difficulties that characterized the process of connecting and communicating by circulating and disseminating information much better than it was in the past (Champeaux, 2000, p37). This is what the researcher "Charpentier" refers to when he defines information and communication technologies, as he considers them as a set of techniques used to process and exchange information between different actors, whether in the professional or personal context of the individual (Charpentier, 2000, p133).

Indeed, information and communications technologies make it possible to provide information and offer people the possibility of communicating with each other, regardless of the distance between them. On the other hand, these technologies encourage the provision of a real work force within the organization, and help to achieve effective control of operational processes, in addition to the competitive advantage that characterizes them and their role in increasing the effectiveness and efficiency of users.

2. The theoretical aspect of the digital divide:

At first sight, the concept of digital divide seems to be a relatively new concept, and the question has not yet been solved as to its various connotations and statistical indicators, but it simply means the different levels of development and evolution of communication technologies and the information society, and that the measurement and monitoring of this gap depends on a complex statistical tool represented by the information and communication technology development index. Thus, it is important in sociology to know that the measurement and monitoring of the digital divide depends on the social survey with samples, and the questionnaire as a fundamental tool in the collection of information in some cases on the countries of the world or specific economic sectors or institutions such as small, medium and large enterprises, or social entities such as the individual and the family. Also, ICT indicators have socio-economic dimensions, given their roles in economic and social life.

The concept of the digital divide initially emerged at a local level. Its origins lie in the United States of America with the publication of the famous State Department report entitled: "Falling Through the Net", which drew attention to the great difference between the American social classes in the use of computers and the Internet in comparison with the population displaced to the US from Asia and Latin America, but the concept quickly moved beyond this local dimension to a global scale, and the digital divide is defined as the distance between the widespread use of the Internet in developed countries, including changing patterns of interaction in commerce, human and work relations, and the state of Internet diffusion in Third World countries in general. The term digital divide is also used to

refer to the gap between those who have the knowledge and ability to use information technology, computers and the Internet, and those who do not, as society has become divided in this way, in addition to its other traditional class-based divisions, and this gap has scientific, technological and organizational reasons, as well as infrastructure availability. Several Researchers were among the first to react early to the implications of this concept, defining the digital divide as a kind of Western civilizational challenge. They went even further to speak of the existence of three divides: the mind divide, which includes the divides of thought, science and technology, the learning divide and the language divide, all of which spill over into the knowledge economy.

Also we can use this concept in terms of the gap between users of modern technology, which is called "the digital divide". Thus, over the past two decades, the issue of the digital divide has received a great deal of attention from researchers in order to find out the factors that influence the digital divide. These factors include: age, gender, economic status, work, geographical location, social level and work environment.

The digital divide is the difference between those who have and those who do not have access to information through the different means and technologies of communication (fixed and mobile telephones, computers and the Internet...), or between rural and urban areas, or among the population according to age, gender, income and ethnic characteristics.

The digital divide presents itself, in most cases, as a clear term that defines itself in a way that allows us not to redefine it and to underline its meanings each time, and we just need to measure its aspects and dimensions to be able to notice this difference and gap, whether it is at the family level between different members of the same family, or within the institution. This is true whether it is at the family level between different members of the same family, or within the institution, between different employees, or even at the university with regard to the design and preparation of courses and also the enthusiasm of teachers and students for the use of ICT (Guichard, 2011, p70). By calculating or assessing the rates of use and availability of devices or the lack of computers in homes, or the rate of connection to the Internet or the volume of its high flows, we can determine on which side of the “digital divide” we can place a person or a group of individuals, and since this gap emanates from the group, it belongs to certain limits.

The technological progress related to computing, the Internet and telephone communications is the basis for the development of the "information society" that has replaced the industrial society. The digital divide often refers to inequalities in the use of and access to information and communications technologies such as mobile phones, computers or the Internet. Therefore, the digital divide is in fact only a small part of the overall inequalities related to development and evolution, and is usually referred to as a "digital divide" or "digital gap".

From this point of view, we can define the parameters of the expression which suggests the seemingly deep gap between those who use and connect easily to modern technologies and the majority of people who do not have access to the same technologies for technical,

economic or cultural reasons. Thus, we find the same digital divide today and it exists between countries or within the same society.

There are many definitions of the digital divide, where "Castells" sees this divide mainly as the inequality between individuals in access to the Internet (Dupuy, 2007, p. 19), while "Compain" defines it as a divide and the disparity that exists between individuals in access to various modern technologies (Dupuy, 2007, p19).

Generally, we can define the digital divide as a condition of "the existence of an inequality concerning the possibility of accessing and contributing to information, knowledge and networks, and thus of benefiting from the basic elements and services of development that information and communication technologies offer. These elements are considered to be among the many other elements of the digital divide that can be highlighted. It is in fact a combination of more global socio-economic factors, including lack or absence of infrastructure, high prices of the communication process, lack of local creativity and innovation of content and the possibility of benefiting from it at the economic and social level, and various information-intensive activities" (Elie, 2001, p32).

The different definitions of the digital divide suggest that there is a difference between two groups: on the one hand, there are those who benefit from the advantages of the digital economy, and on the other, those who are on the margins of the digital economy and its advantages and benefits. Initially, the digital divide was conceived as excluding all those who do not have access to information and communication technologies, so that only the aspect of equipment and technology was highlighted and placed at the center of the analyses. Thus, this purely technical approach places the issue of access to information and communication technologies as a primary and necessary condition for wealth, so that these technologies are supposed to generate huge profits through production independent of the economic, institutional or cultural environment in which they spread (Rallet, Rochelandet, 2004, pp24-25).

The digital divide can also be explained by the existing inequality (either between people or between regions or countries) in access to and use of new information and communications technologies, although the digital divide should not be seen or understood as a result of information and communication technologies, as universal access to these technologies has a great impact on people and economies. On the other hand, the severe lack of infrastructure can contribute to exacerbating economic disparities, as today's global economy is increasingly dependent on information technologies and the services they provide to function and operate better (Faucheux et al., 2010, p79).

The digital divide can also include several inequalities as it sometimes appears as a disparity in level between developed and underdeveloped countries and also, between individuals equipped with the latest networked devices and those who are isolated from them. These forms can be listed as follows:

2.1. The geographical digital divide:

It is this gap that explains the extent of the disparity between developed and third world countries in terms of access to the various technologies associated with the Internet.
According to Dupuis, this gap is gradually widening in relative terms, particularly with the rapid development of communication devices and networks. For example, in Africa, despite a population density that represents more than 10% of total world population, the proportion of people with access to the Internet does not exceed 1% of the global population (Dupuy, 2007, p42). Moreover, this gap is not only limited to the percentage of access to the net, as African countries do not have access to the sites and content available on the Internet, which reflects the widening of the digital gap between the countries of the North and those of the South.

The digital divide with a geographical dimension can also take other forms, namely the gap between urban and rural areas, as the increasing use of and access to information and communication technologies is obviously high in cities and large urban centers, which is the case in developed countries in this area (Dupuy, 2007, p45).

2.2. The generation gap:

It is the digital divide that characterizes the difference between the age groups "generations" in the adoption and use of new information and communication technologies. Obviously, young people are more comfortable with the use of different technologies, while the elderly are the most vulnerable to the risks of digital exclusion due to their limited level and lack of contact with technology and this is due to the isolation in which they live, especially with the rapid development of modern technologies and their applications.

As a result, the elderly category is exposed to several difficulties related to the adoption and use of new technologies, due to the degree of complexity of these systems, which are often not adapted to their cognitive abilities and knowledge, unlike the younger categories. On the one hand, the factor of disinterest in activities directly related to information and communication technologies may be a reason for the decrease in the level of use among older people (Dupuy, 2007, p68).

3. Challenges of technological exclusion:

In this section we will discuss the consequences of modern exclusion based on the problem of disparities in access and ability to use information and communications technologies.
It is important to refer to some recent debates in the fields of sociology and communication sciences on the problems posed by the inability to use the Internet and modern technologies, as many theses have dealt with the regional impacts of the digital divide (Moati, 2003,p15).In this respect, the searcher "Moati" states that "the centralization of the largest communication infrastructures in the big cities and the increasing role of information and

communications technologies have contributed to attracting various economic activities to the large urban areas" (Moati, 2003, p16).

In fact, the geographical dimension of the digital divide is often found in the communication sciences literature, particularly with regard to the difference in access between urban and rural areas. In his research, "Dorion" shows that urban areas are the most connected and the most depended to the use of new information and communications technologies (Dorion, 2003, p288).On the other hand, some authors, such as "Poncet" and "Ripert", think that it may be appropriate to study modern technologies in a particular space, because these two searchers believe that limiting the study of the geographical space of the digital divide to studies of conditions of equipment acquisition in rural areas is synonymous with a purely superficial view of the issue, which will lead to neglecting the search for other factors and consequently the study will be centered on simple spatial singularities (Poncet; Ripert, 2004, p16).

Indeed, the digital divide can take different forms, linked to access, uses and content. Since the beginning of the third millennium, a new inequality has emerged, relating to the ability to access unlimited and high-speed communication (Granjon, 2007, p3). As a result, and in addressing the digital divide, it is necessary to address any changes related to the use of and access to information and communication technologies (Kiyindou, 2009, pp11-17).

According to “Veltz”, the world we live in is largely based on new and modern technologies. Currently, there is a rapid growth and a significant increase in their use in all fields, which could lead to the creation of a kind of disparity and inequality in the fields of work. This disparity lies in the opportunities offered to the category that masters the specific technologies, each in its own field of work, which may later enable it to dominate that field. As for the other category, which is the one that does not fulfill these conditions, its situation will become more and more complex, especially in terms of performance.

In the words of “Veltz”: “Modern technology offers those with the greatest resources (especially cultural and cognitive) the opportunity to perform in-depth work and provides them with a priority considered [...]. However, this reality is seen as confusing and dangerous for all those who do not have these same resources and who have difficulties in adapting for reasons related to the assimilation of technical systems [...]” (Veltz, 2003, p88).

Therefore, the issue of exclusion at work can be raised, as the inability of the worker to use and master the digital devices can be a real obstacle in his professional career. In a context where new technologies are widely available, it is possible to distinguish two categories of people: individuals (or groups) who master the various devices and, on the other hand, individuals (or groups) who are unable to keep up with the pace of technological progress (Lasfargue, 2003, p237). Furthermore, according to Gollac, information and communications technologies are a factor supporting differences in cultural capital (Gollac, 1996, pp 39-60). Thus, it can be seen that the mastery of modern technologies within the organization requires prior cultural capital, and it can be seen that some workers who do not master technical equipment have considerable difficulties in using it and often have to ask

for help from their colleagues when they encounter problems in using it, especially in the professional context. Dealing with these difficulties has a lot to do with the size and scope of each person's social network. On the other hand, modern technologies contribute to increasing the individual's cultural capital (acquisition of knowledge through computers) and social capital, as contemporary communication devices allow the individual to expand or maintain his social network through social networks.

4. Different approaches to digital exclusion:

Several studies have proposed assessments of the phenomenon of the digital divide, although no common definition has been adopted, as each study provides a distinct explanation of the other works that have addressed the concept of this phenomenon. We will not present these studies, but we can explain how to deduce from this vast body of literature by outlining the main distinguishing features of some of this research.

At first sight, we can distinguish three types of studies: quantitative studies, qualitative analyses and global works. The first consists of measuring the availability of equipment, the rate of access to the internet and the rate of use, while qualitative studies focus on the ways and methods of using the Internet, highlighting the ability to find specific information, in general, and explain how individuals use a computer or the internet through tests carried out with users. Finally, the third method, which is rarer because it is difficult to implement, combines the two previous methods.

4.1. The quantitative approach:

Historically, the digital divide was first measured statistically, as an assessment of the rate of acquisition of computer equipment by the population of a specific region of a country or continent.

Thus, the digital divide appears when there is a difference or disparity in the supply of computer equipment. In the light of this approach, the work carried out seeks to highlight the socio-demographic characteristics through which these differences have emerged. This approach, which is quantitative in nature, is interested in highlighting all the factors of contradiction. The first research within this approach focused on the computer and technical equipment, and the studies that followed gradually concentrated on the Internet, as it became apparent in recent years that the disparity between people with and without a computer was insufficient to enrich the study, especially with the gradual spread of the computer and the internet, which led to the emergence of new approaches focusing on uses that can be summarized in two levels:

The first level is concerned with the frequency of use of digital devices, while the second level is essentially concerned with the study of the different uses available through this frequency and the search for information via the network.

4.2. The qualitative approach:

Qualitative studies attempt to address the process of adoption of this network by Internet users, who are subjected to tests that evaluate their performance on the Internet. Thus, the question of the digital divide speaks of the ability or not to use these new technologies.

Among the studies carried out on this subject, we mention the one elaborated by the searcher "Hargitaï". For this author, the main component of the digital divide in the United States of America is not the economic capacity of individuals to have access to a computer and the internet (Hargitaï, 2002, p23) (given that the Internet has spread to a large part of the population), but rather digital exclusion is about the unequal capacity of individuals to use these means of communication. The researcher therefore attempted to assess the ability and skill of individuals to use the internet, particularly in the area of information seeking.

The same researcher therefore conducted a field study on a sample of candidates tasked with finding five different types of content on the Internet (information on local cultural events, music videos, tax forms and children's artworks) in order to assess the ability and diversity of internet users to find information on topics with which they are not necessarily familiar. The evaluation consists of calculating the success rate and measuring the duration of the search.

Finally, this research tested the knowledge levels of each person on the use of the Internet and the learning process of each of them, and the results of the research concluded to clarify the effect of the age factor on the success of the test, so that the younger people are, the more likely they are to find information quickly, but the success rate is not only related to the age factor, but also includes the level of education, which plays an important role, so that people with an academic background get much better results than other people. This research also highlighted the effect of experience on individuals. People who use the internet regularly are more effective than those who use it intermittently. Spending at least one hour a week on the web is enough to register progress in performance, according to the same researcher.

4.3. Global Approach:

The global approach attempt to combine the advantages of quantitative studies with the characteristics of qualitative studies, as in the studies by Lilong, Thomas and Ziemliky, who sought to address two methodological problems often present in studies of the digital divide:

On the one hand, qualitative studies, which are often carried out on a cross-sectional basis (i.e. at a precise and immediate moment like any other instantaneous act), do not make it possible to assess the evolution of uses at individual level over time, and it is therefore difficult to highlight, for example, the phenomenon of "discontinuity" (abandoning the use of equipment and the Internet after having made several attempts in the past). Moreover, the classic socio-demographic characteristics cannot be explained by the diversity of individual cases. The Internet user may be registered in one or many networks at the same time. He is

therefore a polymorphous individual and is not distinguished solely by his age, social class or place of residence, etc.

5. The dimensions of the digital divide:

In the early 2000s, many voices among the proponents of globalization and defenders of the idea of an "information society" called for a globalization of the use of new information and communications technologies to make it even more universal. Proponents of this economic approach suggest that State organismsshould provide funding for various projects, as well as for the acquisition of the necessary equipment, in order to allow for a more rapid development of the technology in all sectors of activity. However, this proposal is likely to be synonymous with a new form of exclusion at a time when the idea that the difficulties faced by individuals in owning computer equipment are strongly linked to the economy is being denied. (Lasfargues, 2003, p 13)

From this perspective, one might ask: how can a technological revolution accompany or distance itself from the mutation of socio-economic or socio-demographic inequalities? In order to answer this question, we will rely on the research of “Benyoucef” through his contributions in 2004, by which he draws attention to the existence of four dimensions of the digital divide. This brief table classifies the four dimensions of the digital divide, according to the vision of the researcher Benyoucef.

Table 1: Dimensions of the digital divide and associated hypotheses according to Ben youcef (Adapted)

Dimensions hypotheses	
1/- Digital divide related to equipment	Information and communications technologies are general factors. The development of information and communications technologies leads to disparities and delays in their diffusion. Information and communications technologies are very influential technologies.
2/- A digital divide related to the use of information and communications technologies	The use of information technology reinforces a dominant culture It has a global reach The dynamics of use driven by the market
3/- Digital divide related to the performance resulting from the use of information and communications technologies	Differences in performance are directly related to the contributions of information and communication technologies in a given economy Unclear relationship between communication, use and performance.
4/- A digital divide related to the learning process	Information technologies are supposed to be complex and not widely available, and their use requires particular skills and competences The digital divide is the result of the behavior of individuals and

	early adopters of information and communication technologies The digital divide is the result of the organization of people into virtual communities

Source: Benyoucef, 2004, pp 181-209

The digital divide has a physical dimension that is due to the financial deficit resulting from the lack of means and equipment and consequently a lack of access to these new information and communications technologies. This level indicates a first degree digital divide (Brotcorne; Valenduc, 2008, p10). According to the author, there is a first degree digital divide, which is closely related to ICT equipment and facilities. Here we can refer to “Castells” definition of the digital divide, which according to him is represented in "the disparity in Internet literacy", a definition that clearly confirms this trend. (Dupuy, 2007, p19)

The digital divide is often assessed by rates of computer equipment acquisition in terms of whether or not a computer or Internet connection is available, and then defined by the situation in which the two categories (those who are proficient and those who are not) find themselves in relation to the digital divide (Guichard, 2011, p 70).

This hypothesis generally depends on the disparities that exist between those connected to the Internet and those who are not connected due to the lack or absence of technological equipment, which leads to the widening of the disparities between these two categories, and thus the digital divide is represented in the gap between those who are able to access new information technologies and those who cannot (Compaine, 2001, p357).

Therefore, it is important to distinguish between the different uses of information and communication technologies, as the latter include everything related to the Internet and technological equipment (telephone, smartphone, computer, etc.).

To return to Benyoucef's research, the first main hypothesis is based on three secondary hypotheses, as follows:

The first secondary hypothesis considers that information and communication technologies are general technologies, an assumption supported by the work of many authors such as "Bresnahan" and "Tragtenberg" focusing on the possibility for all social classes to use information and communications technologies, which are becoming widespread, which will facilitate their use, but it is difficult to generalize the network without taking into account other factors that may lead to an imminent gap. (Benyoucef, 2004, pp 181-209).

As regards the second secondary hypothesis, it is related to the impact of information and communication technologies in creating disparities and delaying dissemination, because any technological change systematically causes a kind of qualitative break (the quality of the flow, the evolution and modernization of equipment), which leads to providing services to some people before others and offering access to the Internet network for some regions before other regions can benefit from it, but it can be said that priority will be given to social

groups that are more economically comfortable before other groups, and that in this way, benefiting from the advantages of the network will be more or less late for some.

In this case, the focus is on the Internet and the different ways of accessing it. On the other hand, the dynamics of development of new technologies can create a gap between those who have the latest technologies and those who do not (Dupuy, 2007, p19). In the field of information and communications technologies, the rate of diffusion is rather rapid, which means that the gap we are talking about gives us the feeling that the situation of some people will improve rapidly compared to the situation of others, which makes the digital divide even more important and sensitive.

In this context, one very important point should not be overlooked, and this is related to the idea of diffusion and propagation itself. In this particular context, "Kallerman" carefully distinguishes between the concepts of access and penetration, access being determined by the behavior of the Internet user (in relation to his capacity or budget) in a specific location (home or workplace), while the concept of penetration is specifically represented by the percentage of households connected to an Internet network via an access provider. The author reinforces his hypothesis with statistics from the United States of America in 2002, where Internet access was estimated at 75%, while penetration at the same time was estimated at only 60%. It can be concluded that the home Internet connection criterion is a better way to distinguish the digital divide than the second criterion, which is determined by whether people use the Internet or not (Kallerman, 2004, pp 63-85).

It is therefore futile to think that the mere spread of access to information and communication technologies, and in particular access to the Internet, is synonymous with greater equality. A number of current studies have shown that the disparity in computer ownership and access to the Internet is decreasing in some countries, particularly in the industrialized world, with the emergence of new disparities in usage patterns, and this is what Hargitaï first called the second-level digital divide (Brotcorne, Valenduc, 2009, p46).

Thus, the second dimension (the second main hypothesis) is strongly related to the use of information and communications technologies and the process of their adoption. Proponents of this principle focus in particular on the cognitive and intellectual capacities of users of these technologies. In other words, this hypothesis confirms the existence of a second-level digital divide. According to this hypothesis, closing the technology and Internet ownership gap is a necessary but not sufficient condition for reducing the social inequality resulting from the diffusion of information and communication technologies in the society.

In fact, access to technologies does not necessarily require their effective, independent or efficient use, but to be able to do so, one just needs to possess the necessary knowledge and cognitive abilities. In this respect, many research shows the combination of several factors with the traditional socio-demographic variables (social and economic status, level of education, age, gender, etc.) to influence the use or not of information and communication technologies by individuals. The complete dependence on modern

technologies and their implications – by using them enthusiastically and effectively - is a complex activity that draws on many resources of a cognitive, social and cultural nature. According to "Benyoucef", the second hypothesis recalls the conclusions of the first hypothesis since it is based on the following three partial hypotheses:

- The dynamic use of information and communications technologies reinforces and consolidates the dominant culture.
- Information and communications technologies have a universal dimension and overcome local differences and barriers.
- The dynamics of use are mainly market driven

The dynamics associated with information and communication technologies directly indicate that they reinforce and enhance the dominant culture and its various applications (Benyoucef, 2004, p191), if we admit that the value of the use of information and communication technologies is proportional to the number of users, taking into account the characteristics of their networks. Moreover, this hypothesis addresses the social inequality caused by the existing disparity in the use of these digital technologies, when the access barrier is crossed.

On the other hand, addressing only the problem of connection to the Internet does not address the problems of content, but what is certain is that there are factors that make access to digitized information very difficult for certain groups with a limited educational and cultural level, and the language factor can also be a real barrier. The dominance of the English language remains a factor of exclusion for many people who do not master it. (Brotcorne, Valenduc, 2008, p18).

In the same sense, many recent and contemporary studies have tried to show the diversity of ways in which individuals and nations appropriate and adopt information and communications technologies.

In contrast, the most widely held assumption is that technologies have overcome local and contextual differences to introduce individuals into a more universal world (Benyoucef, 2004, p192). For the proponents of this hypothesis, the different uses of information and communication technologies are not necessarily the result of the local context while allowing individuals to communicate away from it, and this hypothesis can be taken into account for certain uses of the Internet, but it neglects certain cultural and linguistic characteristics.

From the same perspective, there is another partial hypothesis regarding the role of the market in the dynamics of use. Indeed, the existence of employment opportunities and the satisfaction of new needs and requirements of individuals would stimulate the use of information and communication technologies, generating a dynamic of use, without forgetting the preponderant role of public authorities or state institutions in creating a new dynamic of use. From this, it can be concluded that the scientific literature in communication sciences has focused its interest on uses and this, by invoking the object of

the discourse centered on public policies related to the digital divide. (Benyoucef, 2004, p 193).

Thus, we turn to the third hypothesis of the digital divide in Benyoucef's vision, which is to explain the adoption and use of new technological services to change the performance of individuals and regions. According to the researcher, the ease of access to these technologies and the intensity of their use do not necessarily mean improved performance. What is more important - in this case - is to improve the performance of individuals and countries in terms of information and communication technology equipment. In this hypothesis of the digital divide, the disparity in economic performance is expressed by the different forms of contribution of these information and communication technologies to the performance of individuals and regions. (Benyoucef, 2004, p194)

This proposal is based on two implicit assumptions that deserve to be discussed: The first concerns differences in performance related to input volumes in the field of information and communications technology inputs within a given economy.

It can be seen that many subjects have removed the ambiguity and confusion and focused on the complementary activities related to information and communication technologies needed to improve performance (regulatory innovations, institutional and organizational framework. We can cite here the research work by Orlikowski, in which he proposes a synthesis of the management of changes (organizational and technological) brought about by the innovation of new information systems (Orlikowski, 2000, pp 404-428).

This work draws attention to the contradictory nature of technological change, which can be influential and determinant in the process of use, but the nature of skilled work, which enables the realization of innovations complementary to information and communications technologies, as well as organizational change, can be one of the main causes of the digital divide, particularly with regard to use. (Benyoucef, 2004, p198).

Concerning the second partial hypothesis of this approach, it concerns the reconciliation between the rate of available information and communication technologies on the one hand and their uses on the other, but according to “Benyoucef”, the gaps studied and the differences in uses remain complicated and difficult to explain and the nature of the deficit or lack is not as precise. What can be said is that this hypothesis has not succeeded in defining the digital divide well, as it has focused on the disparity in macroeconomic performance resulting from the uses of information and communications technologies. (Benyoucef, 2004, p 199).

Finally, the fourth and last hypothesis of the digital divide is clearly related to learning methods related to information and communications technologies, so use in this case requires the availability of a set of skills and abilities to increase the efficiency of performance resulting from the use of information and communications technologies. In this sense, the disparity appears in the level of capacities to learn and use ICT for productive

purposes. In this way, the digital divide will continue to renew the differences in the availability of learning, training and knowledge for societies and individuals.

The first partial hypothesis of this proposal is based on the particular qualities of learning that takes place through new technologies. For the proponents of this hypothesis, technology is a complex and constantly evolving subject, and therefore the acquisition of digital knowledge inevitably involves formal and informal learning. Furthermore, according to the advocates of this approach, it is necessary to acquire technical abilities and skills that allow better use of information and communication technologies and at the same time increase their input, in order to improve performance and increase the level of their use.

Therefore, and in the light of this partial hypothesis, we could conclude that the progressive use of information and communication technologies is a relatively complex process. It is worth noting that among the most widespread hypotheses are those that place a large part of the responsibility for the emergence of the digital divide on the first users of the technology, in other words, the pioneers. (Benyoucef, 2004,p 202).

Therefore, based on this partial hypothesis, it can be said that the individuals and nations that were early adopters of the technology are the ones who dictate the rules and at the same time contribute to the different modes of development of these information and communications technologies, which leads to the emergence of a difference between the early adopters (those who consider themselves pioneers) and their supporters (i.e., followers) who follow them, and this means that early adopters are always more knowledgeable and skilled in information and communications technologies than followers, due to the phenomenon of disparity related to the time of discovery of the technology by individuals.

In the same vein, the development of knowledge groups allows its members to develop some kind of special skills which in turn determine the nature of technological developments. Here, it is only the growing difference between the knowledge developed by a particular group and the new knowledge of the new users that attracts our attention, which may lead to a clear increase in the severity of use and content gaps. Furthermore, the development of groups can also lead to a kind of exclusivity, which we can call knowledge exclusivity, although the original aim was the opposite. From this, we conclude that the reason for the diversity of digital divides is due to the different rates of diffusion of information and communication technologies and the different behaviors of economic actors. (Benyoucef, 2004, p203). The four types of digital divide were built on the basis of different and distinct conceptions of information and communication technologies.

6. New technologies and the risk of exclusion:

At the beginning of 2000, 70% of institutions with more than 20 employees in Europe were connected to the Internet and 80% of them had computers connected to the network. The use of information and communications technologies has thus become normal practice in most institutions. The use of these technologies at home has also increased significantly over the years.

Whatever their use, whether at work or at home, and apart from their symbolic value, information and communications technologies also have several characteristics that distinguish them from most other technologies, hence, the importance of the disparities that characterize its use.

6.1. Information and communications technologies and the problem of access:

The concept of the digital divide is receiving a great deal of attention from the scientific community, and this interest is growing by the day. Indeed, the concept has been the subject of growing research interest, particularly in the social sciences, since the mid-1990s, when a large body of work contributed to the opening up of a wide field of reflection on the definition of the extent and limits of the digital divide.

On this point, researchers are virtually unanimous in their view that the idea is difficult to understand and contain, as its conceptual definitions are often vague and inadequate. Initially, research on this issue considered the digital divide to be a form of exclusion, especially for those individuals who do not have access to new information and communication technologies, since this access logically depends on the physical dimension of the equipment and the connection to the Internet. This approach of digital divide, which places technological equipment at the center of the analysis, indirectly suggests that information and communications technologies are technologies of a general nature, since access to them automatically leads to their use, without taking into account the economic, social or cultural environment in which they have spread.

Nowadays, the digital divide is discussed and criticized from a purely technical perspective. However, in recent years, some critical social science studies have proposed a broader understanding of this idea than that relating to the sole technical constraint of lack of equipment.

In this respect, "Kling" clearly distinguishes, for the first time, the disparity related to access to information and communications technologies (Brotcorne, Valenduc, 2008, p88) from the disparity in knowledge and abilities of people connected to the Internet. In this context, researchers call for a reconsideration of the concept of the digital divide in a more precise manner than the dual notion, which is excessively based on the idea of a division between two categories, namely the information possessors and the information deprived.

This critical view emphasizes the multidimensional nature of the concept of the digital divide. It advocates a more holistic approach to the issue and considers that it is better to talk about digital divides rather than a single digital divide because of the various disparities that this idea brings together.

Indeed, the problem of digital inequality is usually presented in complex terms and according to different factors and variables. It is true that physical access to information and communication technologies hides behind it uses of different forms and purposes, which are carried out in various contexts via different technological platforms or services, and which require certain very different levels of ability, knowledge and mastery.

In this perspective, several authors go even further by suggesting to replace the term gap with inequality, in order to highlight the different levels involved in the process leading to access to technologies, and then to their appropriation.

As a result, this multidimensional conception of the digital divide has been well described from a theoretical point of view in the scientific literature. Currently, the thinking

revolves around the four-dimensional model elaborated by "Van Dijk" and developed by "Dohaene". Applied research is much less (Brotcorne, Valenduc, 2008, p16).

6.2. Second-Level Digital Divide, the other dimension of the digital divide:

As the digital divide is characterized by its multiple dimensions, it would be futile to think that a simple access to information and communications technologies and access to the Internet in particular, represents more equality. In this respect, several recent studies have shown that while certain disparities in terms of acquisition (computer and Internet...) seem to be diminishing, these have given way to a new form of disparity linked to the way in which information and communications technologies are used, and this is what the researcher "Hargitaï" preferred to call "the Second-Level Digital Divide" (Brotcorne, Valenduc, 2008, p 17).

This expression clearly indicates that there is a divide in the gap itself; in other words, these new divides are not necessarily related to physical access to information and communication technologies, but rather to users in terms of the ways in which they use not only these technologies but also the services and information accessible via the Internet.

To be more explicit, the analysis focuses on the social inequality due to the difference in the use of digital technologies, as soon as the access barrier is crossed, as Warschauer explains: "[...] the main issue is not the unequal access to information and communications technologies, but rather the different ways of using them [...]" (Warschauer, 2003, p. 46). In this case, the challenge is to identify the point at which the process of use is likely to turn into a real form of inequality.

Second-Level Digital Divide has been described in a very precise and theoretical way in literature. However, few studies have focused on understanding how various factors (demographic, economic, social and cultural) interfere with different usage patterns. Moreover, global analyses might be appropriate to establish that different patterns of use are likely to be reasons for the aggravation of a new form of 'racial' discrimination from a technological point of view (Le Guel, 2004: 55-82).

6.3. Cognitive skills as the main determinant of the digital divide:

While the dimensions of the digital divide are multiple, the use of information and communications technologies and the exploitation of their content clearly highlight the question of the cognitive abilities and skills of individuals to possess information and exploit the services available on the Internet as a whole, as some researchers believe that the problem of access and the ability to master the various technologies constitute the major problems of the digital divide.

Indeed, mastering information and communication technologies and the information flows they provide requires a certain amount of mastery and knowledge in navigating a rather complex and unstructured conceptual world, unlike a book for example, and therefore it is difficult to extract and summarize the information obtained.

Therefore, it requires that individuals master digital information and acquire a special set of digital skills that can be classified into three categories: instrumental, structural and strategic. On the other hand, there are factors that make access to information more difficult for certain groups of individuals who are less trained in the field and have less knowledge of the subject matter, as information is often presented in a way that requires the acquisition of considerable specific skills and knowledge, which allows the category of individuals who are well trained in the field to prevail and take a big lead.

In contrast, the predominance of the English language remains an important exclusion factor for many individuals who do not master it. Finally, there is a need for users to be more aware of the cultural elements that influence, feed into and compose digital information, and they are also required to assimilate them well.

Furthermore, the rapid spread and diffusion of information and communications technologies has not resulted in equal opportunities for access between different groups of people. On the contrary, the diffusion of a new generation of modern technologies produces the same gaps, so that access to information and communications technologies is strongly related to the level of responsibility, skill or education; it also depends on the age of the person. Thus, new technologies become widespread without being generalized, and the use of technology becomes a factor of social discrimination. In this case, it is important to distinguish between "divergence" on the one hand and "disparity" on the other hand in the processes of access to and use of information and communications technology.

In fact, the observation of some differences in these two aspects within smaller population groups is not a reason for them to have the differentiated characteristic; some of these disparities are sometimes related to simple variations in behavior (Vendramin, Valenduc, 2002, p 87).

As an example, we can cite the fact that some persons make little use of the Internet, which is mainly due, as some studies show, to a personal and responsible choice, as well as a process subject to discrimination or social exclusion (Selwyn, 2006, pp 273-292). In other words, for exclusion to become effective, these differences must create discrimination phenomena and therefore, the greatest challenge is to know when these different processes of use will turn into real inequality.

However, if we adopt this idea, we are more interested in the discriminatory effects caused by differences in usage patterns than in the differences themselves. The discriminatory effects of non-access and non-use can be reflected in many areas such as work and professional development, and many authors explain that these effects play an important role in understanding the consequences and the impact of the digital divide (Brotcorne, Valenduc, 2008, p52).

7. The skills needed to use information and communication technologies:

The use of information and communications technologies, particularly with regard to the exploitation of the various contents available on the Internet, is mainly concerned with the cognitive capacities and resources that people possess to fully appropriate these

technologies in their social context. However, given the abundance of information on the Internet, which is offered to all without any discrimination or hierarchy, (where everyone enjoys total independence and freedom), this does not mean that mere access to information "as a whole" can replace the prior capacity for people to understand and assimilate what information to look for and how to use and exploit it.

In this respect, "Wolton" clearly thinks that "the process of direct access does not erase the hierarchy of knowledge (Wolton, 2000, p89). There is also a certain exaggeration on the part of people to think that they are capable of learning and cultivating themselves without resorting to networks.

In addition, some researchers believe that the disparity in the acquisition of cognitive and mental abilities in society is one of the causes of the digital divide. Thus, digital information literacy requires the mobilization and acquisition of a number of specific cognitive skills and knowledge. Today, these abilities are considered essential to take full advantage of technological change, at a time when the digital divide is spreading very rapidly and radically "(Guichard, 2003, p 8).

For a long time, this question of digital cognitive abilities has been addressed by a number of researchers specializing in teaching and pedagogy in the field of information and communications technologies. These cognitive abilities are clearly visible in the various research studies conducted on the digital divide, under many names such as: new digital culture or alphanumeric. In this respect, many researchers, such as "Vendramin" and "Valenduc", have created new schemes to analyze digital capabilities and the way they are constructed, i.e. the ability to use information and communications technologies effectively and autonomously. The three levels of digital capabilities are: instrumental, structural (or informational) and finally strategic (Vendramin, Valenduc, 2009, p52).

Instrumental skills relate to the mastery of hardware and the various programs and software. These capabilities include, in the first instance, the practical skills that encompass the basic skills available to individuals. Instrumental capabilities also include the technical and mental capabilities to deal with technical risks in everyday life, whether at home or in the workplace.

Secondly, the structural or informational capacities are related to the new mode used to access the contents available on the Internet and to search, select, understand and treat the information,

In the recent past, the use of the computer tool required instrumental capabilities, but today informational capabilities have received all the attention, and this by developing the content of information and services on the Internet, which has led to a distinction between formal informational capabilities and essential informational capabilities, the former concerning the size, and the latter concerning the substance of the information content.

Third and finally, strategic capabilities refer to the ability and capacity to use information proactively and to make sense of it in one's own context, and also to the ability

to make decisions and conduct oneself well in the personal and professional sphere, and they also support goal-directed behavior.

Strategic skills, such as informational skills, are not new, as their necessity has been demonstrated by the written and audiovisual media, while the interactive media on the Internet underline the importance of mastery and the urgency of it. Both authors, previously mentioned, agree on a hierarchy of digital capabilities where instrumental capabilities must be acquired first and informational capabilities in turn support strategic capabilities.

CONCLUSION

Through this article, we have addressed the problem of the digital divide in society in a general way, because we wanted to present a comprehensive theoretical approach to the concept from several angles, and we have also presented the results of digital exclusion by addressing some approaches that have dealt with the subject. In addition, we discussed some dimensions of the digital divide based on a purely theoretical approach, as well as the different approaches used to measure this digital divide within society and the social, economic and technical reasons behind the emergence of this gap between different spectrums of society.

In addition, we have addressed a very specific element of the digital divide represented in the usage processes of individuals by explaining the most important disparities between users, and which are originally related to social, cognitive and technical variables.

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