

ICT in Educational Inclusion in Regions with High Digital Gaps. The Case of Costa Rica and Online Platforms

Enrique GÓMEZ-JIMÉNEZ^a, Ariana ACÓN-MATAMOROS^b

^a Master in Management of Technological Innovation, Coordinator of the Software Development Cathedra of the Computer Engineering Career at UNED, Teacher of the National University of Costa Rica, Distance State University, Costa Rica, egomez@uned.ac.cr

^b Master in Management of International Negotiations, Licensed and Bachelor of Computer Science, Coordinator of the ICT and Engineering Cathedra of the Computer Engineering Career, UNED, Costa Rica., Distance State University, Costa Rica, aaconm@uned.ac.cr

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ABSTRACT

Internet accessibility and other digital technology resources have meant a giant step in the ability of academic sectors to penetrate almost all social sectors and geographical areas. Simply have the appropriate devices from a cell phone to a complex multimedia computer, to access and use different platforms multitude of mediation tools and knowledge transfer. But all that entails have an adequate telecommunications platform with broad bands conducive to the needs of users and infrastructure repeaters and amplifiers digital signal equipment, among other technical requirements. Here awakens the dilemma of developing countries in particular: a digital gap that forsakes the inhabitants of remote corners of the capital and benefits overmuch, who resides in the GAM (Greater Metropolitan Area). This paper is to display the current state of the art in the field of Information Technology and Communications and the new educational environments in regions with high digital gaps and what are some interesting proposals that can be reviewed by the political and academic authorities and implement them be necessary.

Introduction

Costa Rica has had for many years the privilege of being considered a country with a high literacy rate. According to the index mundi, the country's percentage is 96.3%. It is also considered a country with an important social and economic development; large public investments in technological infrastructure and education. Secondary and primary education enjoys high participation of technology in their academic plans. Many educational centers are committed to the generation of knowledge through the use of various computer techniques. They exist from platforms where asynchronous mediation is carried out, virtualized laboratories that implement the simulation of realities and even complex systems that interact systematically with the user. Networks are vitally important in the basis of this educational style and that is why there is a clear interest of the academic authorities of the country to exploit them to the fullest. With that vision, they invest important amounts of the public budget to install communication platforms that try to connect the whole country. However, there are population sectors to which these opportunities do not reach and it is necessary to

create measures to avoid differentiation of treatment by the government. That digital gap is then attacked with the implementation of new educational environments and training strategists.

Definition of the object or study problem:

What is the role of the digital gap in educational inclusion in regions with high gaps, and the situation of Costa Rica in relation to that?

Justification:

The digital gap is an issue of importance these days, because if the world is facilitated by the use of ICT, that benefit is not available to all the population of the planet, so it becomes part of discrimination, governed by the country of birth, residence or by social, economic or status. Later on, important data are presented regarding the subject and other countries are compared with Costa Rica.

Methodology

The research is of a descriptive type that according to Hernández, Fernández and Baptista, (2016) "intend to measure or collect information independently or jointly on concepts or variables" (p.102), therefore, documents and studies were analyzed in this regard, in order to determine the position of Costa Rica in relation to the rest of the world and determine the role of the digital gap in educational inclusion.

The following are important historical data for this article:

The Information technologies

According to Gil (2007) information technologies can be define "... as that technology or combination of technologies that allow man to carry out processes or products in which his intellectual capacity (brain) and his capacity for manipulation (hands) are replaced in part by physical systems that combine electronic technology with another or others such as mechanics, pneumatics, fluidics, etc." (p.181). This concept merely oriented to an industrial connotation correlates the computer area (hardware and software) and the processes that are carried out in this context: machines and processes being aided by hardware and software.

A concept much closer to our reality is provided by Seoane (2005) who states "By ICT, we understand the set of technologies and resources associated with information and communication systems. That is, the set of technologies that assure us the efficient management of the information generated in a company". (p. 2).

With this definition we approach the general knowledge that we have about ICT (Information and Communication Technologies), which conceives as computers and computer systems helping people, whether within a company or not, in the activities or tasks that require processing, generation, storage, extraction, replication, printing and information transfer. The information systems associated with ICT allow people to make transactions, prepare documents, control budgets, among other activities that have allowed them to accelerate and facilitate these processes.

Given that ICT is made up of Information and Communications, it is essential today to have some means that allows us to transfer information. With the advent of telecommunications networks this became possible and nowadays we can transfer information from one place to another at a great speed, without caring much about the geographical area of origin and the geographical area of destination. The communication speed is extremely high. However, computer technologies (hardware and software) and telecommunications networks are often not available to people or do not have enough training to use them.

This could be because in the country or region where they live there is no access to ICT or either because of socio-economic or political conditions or because they do not have the necessary literacy rates to use them. In this sense, the world entered an asymmetric cycle where, rather, the phenomenon of the expansion of ICT became more exponential every time and on the other side many people were relegated to not being part of that expansion. This is known as the phenomenon of the digital gap.

What is the digital gap?

Serrano and Martínez (2003) define digital gap as "... the separation that exists between people (communities, states, countries ...) who use new information technologies as a routine part of their daily lives and those who do not have access to it, or if they have access to, do not know how to use them "(p.17). Interpreting Serrano and Martínez, it could be argued that the digital gap is defined in terms of the inequality of possibilities for citizens to access information, knowledge, resources and education through ICT. It is not exclusively an aspect of a technological nature, but rather involves socio-economic factors and, particularly, limitations and lack of telecommunications and information infrastructure. Finally, technological and socioeconomic development factors are correlated and manifest themselves in different ways in the world. To determine the magnitude of the digital gap, it is necessary to incorporate cultural, sociopolitical and demographic factors of each region or country.

Ortiz and Welp (2014) affirms that the digital gap is what separates those who have access to new technologies from those who do not. This distance can be measured according to each country, region and citizen. Even at the planetary level. These authors affirm that there is a digital gap at a global level constituted through the differentiation in access to information technologies between countries and geographical areas and a local digital gap constituted between groups of the same society. They agree that the three factors that produce the digital gap are the lack of connectivity, infrastructure and training.

The digital gap in in the world

According to Fernández (2016) who published in the Costa Rican newspaper El Financiero, in the edition of April 5, citing figures from the World Bank's 2016 World Report, 60% of the world is disconnected. He points out that 4 billion people in the world do not have access to the internet; that the expansion of digital technology in the world and the widening of the digital gap are contributing significantly to the increase in the differences between rich and poor countries. This means questioning the supposed democratization of Internet access. Reviewing the data published in the World Bank Report 2016 on its website, it can be seen that of the approximately 7400 million people on the planet, only 2.4 billion are connected to the Internet and 4000 million are not. It also identifies the countries with the largest digital gap in the world, which are presented in table No.1

Table no. 1: Countries with an important digital gap in the world, 2016

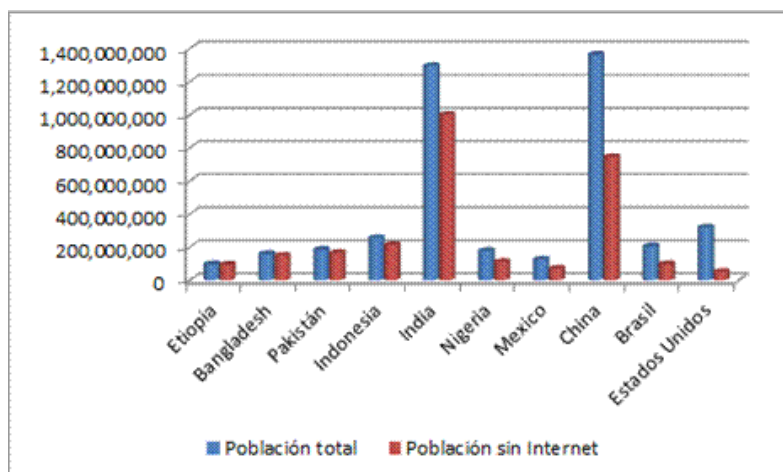
Country	Population	Population without Internet access	%
Etiopía	96,900,000	95,000,000	98
Bangladesh	159,100,000	148,000,000	93
Pakistán	185,000,000	165,000,000	89
Indonesia	254,500,000	213,000,000	84
India	1,295,000,000	1,000,000,000	77
Nigeria	177,500,000	111,000,000	63
México	125,400,000	70,000,000	56
China	1,364,000,000	745,000,000	55
Brasil	206,100,000	98,000,000	48
Estados Unidos	318,900,000	51,000,000	16

Source: Prepared by the authors with data obtained from the annual report of the World Bank, 2017

As we can see in table No.1, Ethiopia is the country with the highest digital gap with 98%, while the United States has the lowest with 16%.

Graphic No. 1 shows the graphical representation of table No. 1.

Graphic no. 1: Countries with significant digital gap in the world, 2016



Source: Prepared by the authors with data obtained from the annual report of the World Bank, 2017

The International Telecommunication Union (ITU), which is a specialized agency of the United Nations (UN) for Information and Communication Technologies (ICT), by means of a press release, published the annual global data on ICT and country rankings according to the ICT Development Index 2015, where it was recorded that, worldwide, 3200 million people are connected, representing 43.4% of the world population.

The Measuring report of Information Society (2015) of the UIT, considering the ICT Development Index (IDI), determined that, in Africa, Mauritius is a country that has an IDI value of above the 5.03 points that is the world average. Meanwhile, Seychelles, Republic of South Africa and Green Cape, with 4.12 points, surpass the average value of developing countries. Of 37 African countries 29 are placed in the fourth lower part of the IDI 2015, comprising the 11 countries that have the lowest rankings, meaning that it is necessary to reduce the digital gap in Africa and other regions.

In America, the United States, Canada and Barbados, according to their ICT Development Index (IDI), they occupy the privileged positions since they exceed 7.50 points and are classified among the top 30 countries in the world. With these values they surpass the rest of the countries America. Some 29 countries in the region are located in the upper half of the world ranking.

It is important to quote what the report on the Measure of the Society indicates on page 22: "Countries in the Americas region have experienced some of the most significant movements up and down in global IDI rankings between 2010 and 2015. The most dynamic improvement worldwide was achieved by Costa Rica, which raised 23 places in the global rankings, while other substantial improvements were achieved by Suriname, Brazil, Barbados and Colombia. "Literally we can translate what the ITU indicated as:" In the American countries some movements have been observed very important, in one sense or another, in the IDI world ranking between 2010 and 2015. The most dynamic advance, worldwide, was achieved by Costa Rica, which climbed 23 places in the world ranking, while Suriname, Brazil, Barbados and Colombia reached substantive progress."

It is worth mentioning that the IDI carried out by the ITU is recognized worldwide by countries, United Nations organizations and private companies, as the most accurate and impartial measurement that is made on the global development of national ICTs. It combines 11 indicators in a single measurement that includes number of cell phones, number of computers in the home, number of users that have Internet, subscribers to broadband service and basic literacy rates, among others. This index can be referenced on a global, regional or national scale.

Digital gap in Costa Rica

The General Telecommunications and Strengthening Law No. 8642 in its Article 1 says: "The purpose of this Law is to establish the scope and regulatory mechanisms of telecommunications, which includes the use and exploitation of networks and the provision of telecommunications services." In its article 2, subsection b. notes: "Ensure the application of the principles of universality and solidarity of the telecommunications service". Also, in subsection c. indicates "Strengthen the mechanisms of universality and solidarity of telecommunications, guaranteeing access to the inhabitants that require it". This law was enacted on June 4, 2008 and signified the implementation of an aggressive program by the government to provide Costa Ricans with a telecommunications infrastructure appropriate to personal and business requirements. In May 2009, the First National Plan for Telecommunications 2009 - 2014 was issued by the Executive Branch, establishing a Digital Solidarity Agenda that promoted a series of actions aimed at carrying out a series of actions aimed at implementing telecommunications services to all sectors of the country, regardless of social, economic or geographical status. In short, what the government of the moment proclaimed that telecommunications were "an economic, social, digital and opportunities tool" This established the importance for the government what the expansion of the telecommunications network meant and the decrease in existing digital gap.

In 2009, the index was created that allowed measuring the dimensions of access, use, quality and education of telecommunications. With this, it was possible to design the First Advance of the Measurement of the Digital Gap in Costa Rica 2009, which showed the results of international statistics and total country, with respect to citizen access to telecommunications services in Costa Rica. In August 2010 the Progress Report of the Digital Gap Index was presented: use of Information and Communication Technologies, which contained information regarding the Digital Gap Index so far. This index for 2011 yielded interesting data such as that, for every 100 inhabitants, 80 had access to the Internet; for every 100 homes, 100% had at least one computer and Internet access. From this analysis it was concluded that, from a scale of 0 to 10, Costa Rica had a 4.11 digital gap, considering, according to international metrics, a level of Medium Gap Low.

Costas Rica's Connectivity and Access to technologies

The United Nations Organization (UNO) declared access to the Internet as a highly protected human right, demanding its member countries to provide an accessible and accessible service for all and that it is a priority to ensure this right to citizens. The Internet for the UNO means allowing individuals to exercise their right of opinion and expression, constituting, at the same time, part of their human rights.

According to the newspaper La Nación, in its electronic edition of October 6, 2010, in Costa Rica, by judgment No.10627 of June 18, 2010, the Constitutional Chamber of Costa Rica declared that access to the Internet constituted a fundamental right because it is an indispensable and necessary means to travel in the information society. It is also indicated in this newspaper that, because it is a public service, it is subject to the constitutional principles of efficiency, effectiveness, equality, continuity and adaptability. It ends up affirming that the guiding principle of technological neutrality established in article 3 of the General Telecommunications Law prevents Internet service providers.

With this panorama, it can be affirmed that connectivity and access to technologies in Costa Rica is a constitutional mandate that guarantees the accessibility of all citizens, without discrimination of race, creed, geographic location or economic position.

It is for this same reason that inclusive education is determined in Costa Rica if it is more accessible to the population than in other countries. As will be seen in the next section, through new ICT-based educational environments, the spectrum of people who can receive education using the technologies available in the country is expanded.

New educational environments based on ICT in regions with high digital gap

The modalities of e-learning can become digital gaps by themselves when they require specific training or discriminatory knowledge. Suppose that a training system is established for a specific region where a community scarcely has computer training. The appropriate

platform and the formative and evaluative instruments for the training are implemented. However, computer skills and use of the users' platform are not considered. With this, it is facing a gap that is also well known in the implementation of virtual teaching platforms.

In the learning in networks, two trends are presented: the systems that bet on the effort in aspects of human intervention: teachers, methods and pedagogical systems, forms of teaching and learning, among other elements and that tendency that focuses on the tool and its autonomy in front of the teaching intervention. In addition to the technological gap of not having teleinformatic platforms, Internet access is also added to the distance learning of both the teacher and the user. A teacher who does not know the technology and a student who does not know it really becomes another breach of the system. As stated by Segura and Rojas (2007), "Owning technology and access to it are not conditions per se, that reduce the digital gap, it is necessary to develop skills and competencies regarding the adoption and appropriation of these technologies "(P.75).

In spite of all that, at a global level it has been seen how virtual learning platforms have been developed in such a way that it has allowed the inclusion of many social sectors that were previously unattended by face-to-face training. With this, educational tools and strategies that are merely oriented towards virtual process have appeared.

As for the new educational environments, an important variety has been created to reach the vulnerable or most deprived population of access to academic training. Logically, the bases of this series of diverse environments are the ICT resources (networks, hardware and software). This has allowed many citizens who did not have access to face-to-face education today to enjoy the possibility of training academically.

An educational environment that strongly uses information technologies are virtual platforms. With these platforms you can reach many regions, however distant they may be. It is enough to have access to the Internet and the appropriate computer equipment. In Costa Rica, there have been the following known virtual platforms:

a. Blackboard: is a commercial online learning management system that means "Learning Management System (LMS)". It is considered to be the most widely used e-learning system provider in the world. In summary, it is a platform that integrates an environment that manages a series of resources that allow creating and managing online courses. The contents of the course can be presented in various formats (text, sound, and video); tools can be evaluated using rubrics that are developed on the platform, among other capabilities. A very detailed explanation of its functionalities can be found in <http://www.ecured.cu/Blackboard>. Many universities in Costa Rica use it, for example, the State Distance University (UNED).

Image number 1 shows the interface of this platform.

Image no. 1: Blackboard platform



Source: Taken from <https://lmsyweb20.wikispaces.com/12.+Proprietary+AlphaStudy+-+Angel+LMS>

b. WebCT: It is a commercial tool that allows creating online courses. It is known as Web Course Tools, for its acronym in English. It is similar to Blackboard. As in Blackboard in

WebCT can be added interactive tools such as discussion boards or forums, email, chat, documentary content, among others. This product was merged with Blackboard on February 28, 2006. Image number 2 shows the WebCT interface.

Image no. 2: WebCT platform



Source: Taken from <https://veronicaporras.wordpress.com/>

c. Sakai: is an open source education system that was born in the University of Michigan and the University of Indiana, United States. In addition, they obtained the contributions of the Massachusetts Institute of Technology and Stanford University. The Mellon Foundation was behind all project financing.

This project was created with the intention of creating a collaborative and online learning environment in higher education that could compete with proprietary and commercial platforms Blackboard and WebCT. More than 100 universities use this platform, among which are the fourteen most prestigious universities in the world according to the website: <http://www.20minutos.es/noticia/1104579/0/>. For more information and download this platform you can visit the website <https://sakaiproject.org/> Image number 3 shows the interface of Sakai.

Image no. 3: Sakai platform



Source: Taken from <http://www.tonybates.ca/tag/e-portfolios/>

d. Moodle: it is a platform for free use and is designed for the creation of online courses and virtual learning environments. It is one of the most used worldwide and, in Costa Rica, the most implemented in public and private universities. This platform is called Virtual

Learning Environments or virtual learning environments, by its acronym in English. Its name comes from the acronym Modular Object-Oriented Dynamic Learning Environment. It is designed thinking about the constructivist social pedagogy, where the communications between the actors of the platform are building knowledge through interaction and experience. Its main strength is that it is free software, which allows its use without payment of licensing. A community of developers is constantly updating the software.

Image number four allows to observe the interface of this LMS.

Image no. 4: Moodle Platform



Source: Taken from <http://queaprendemoshoj.com/conoce-moodle-i-e-learning-con-software-libre/>

In Costa Rica, the two most used platforms are Blackboard and Moodle. These platforms are present in the public universities of Costa Rica, to implement an alternative collaborative action to traditional education. In the case of the State University at a Distance they are of generalized use, appearing in the four schools in which the university is divided: education, social sciences, administration and exact and natural sciences. The website www.softwareinsider.com makes a comparison of these two platforms, considering aspects such as instructions for use, course development, collaborative environments and administration. Image number five shows the comparison that is made of these two platforms.

Image no. 5: Comparison Blackboard and Moodle



Source: Taken from <http://lms.softwareinsider.com/compare/83-226/Blackboard-Learn-LMS-vs-Moodle>

From the image number 5 it can be seen that Blackboard is compared as Moodle in key aspects such as administration, collaboration, course development and instructional methods. The instructional methods of the two platforms are the same with a 67% rating. As soon as the development factor of course Moodle owns 75%, while Blackboard 88%. In collaborative aspects Moodle surpasses Blackboard by 78% and exceeds it in tools for course development. But the most important feature is that Moodle is open source while Blackboard is paid. With this situation Moodle is the most used virtual platform in public universities in Costa Rica.

a. But what are these new educational environments, based on ICT, that collaborate with training in regions that have a high digital gap? Following are some of the efforts to break the limitations of the digital gap that the Costa Rican government has driven.

b. The Omar Dengo Foundation, the Ministry of Public Education of Costa Rica and the National Program of Educational Informatics have created mobile e-learning, in order to reach the most distant communities and promote the learning of students through computer resources. This initiative focuses on young people ranging from 5 to 18 years.

c. The Distance State University is the main promoter in Costa Rica of education based on information technologies. It has virtual platforms that allow the access of any Costa Rican citizen to pursue a career. These platforms allow establishing knowledge dissemination mechanisms through various media strategies such as forums, videoconferences, blogs, and educational videos, among others. It also has a mobile laboratory with Internet access to be able to move to regions with high digital gap and provide training to these communities.

d. The government of Costa Rica has worked on the policy that primary and secondary students can enter the training through technology, facilitating the possibility of acquiring (or the government itself provides) a low-cost laptop under the initiative of One Laptop per Child <http://one.laptop.org/>

e. Mobile telephony has also become an element associated with technology, given that in Costa Rica the majority of the population has a telephone with Internet access facilities. With this type of devices it is easy to implement e-learning. Users can use these devices to participate in various training strategies.

As indicated by Segura (2007) about e-learning: "In our opinion, e-learning is configured as a powerful tool that can contribute to the training and acquisition of basic professional skills in situations where there are or are projects oriented to the reduction of the digital gap."

It has been cited as academic organizations and the government itself has been concerned with establishing mechanisms for the creation of new educational environments, based on ICT, to deal with regions with high digital gaps. This has been achieved through e-learning methodologies that range from online training through virtual platforms or through computer resources such as CD, DVD, and USB with digital material that is used in these training activities.

The Omar Dengo Foundation is a precursor of capacity building through the use of technology. It is projected to young people, adults, and people with some disability, among others. The methods of e-learning have allowed reaching corners of the whole country; mobile laboratories that allow knowledge to be taken to regions far from the center of the country, among other strategies make the FOD a governmental organization that implements educational environments in order to reduce the digital gap.

Conclusions

A clear picture has been established about the digital gap in the world and in Costa Rica and how it generates a differentiation between the communities and regions of those who suffer it.

This digital gap is defined as the difference between those communities that have access to the benefits of the information society and those that do not. Such inequalities can also refer to ICT, the computer, telephony, broadband and other devices. This gap is based on differences prior to accessing technologies themselves. The latter refers to the differences that exist between groups according to their ability to use technology.

Many people do not have the adequate training to access the technology despite having it. As an example we can mention a person who has internet, computer and other suitable conditions to use the technology, however, does not have enough skills, abilities or knowledge to use it. This is also called the digital gap.

Another gap is that, having access to the information and the necessary capacities, the informative resources are not of quality. As a contribution to these digital gaps, ICT have allowed the creation of new ways or environments to transmit knowledge. Strategies such as

e-learning or the disconnected use of computer resources allow to bring the knowledge and technical training of people anywhere in the world, helping to reduce the digital gap and benefit more people.

That is to say, that necessarily the educational inclusion takes of the hand the diminution of the digital breach. The more people who receive education, using ICT, the less access discrimination there will be. This is a subject for which the country and the universities should focus their efforts, although in Costa Rica, as seen, the panorama is better than in other parts of the world, it can be reinforced with action plans and management to continue rising in the world ranking, make education have the characteristic of using ICT and that is accessible to the majority of the population, to say that all, and at the same time reduce the digital gap.

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