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Information and Communication Technologies (ICT) and digital divide in Costa Rica: opportunities to create complementary learning spaces in Higher Education using social networks.

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Abstract : *The purpose of this article is to provide a general approach of the state of the digital divide in Costa Rica, exploring the current situation and considering reports of the government institutions involved, giving emphasis to the definition of digital divide. Giving emphasis to relevant data on the progress of telecommunications and the reduction of the digital divide in access, in addition to an approach to digital literacy as a the need not to stay behind the development of ICT to take advantage of the best way to its benefits on to use technologies that encourage virtual learning spaces. In addition, you will see a small exploratory exercise of the use of social networks in higher education and environments where it eventually could prevail the digital divide of use. Finally, there are some considerations due to the currents avoiding the maximum achievement of the ICT advantages.*

Keywords: *information technologies, access, education, digital divide, connectivity*

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I. INTRODUCTION

The Information and Communication Technologies (ICT) have transformed in recent years our lifestyles, experiences, social dynamics and the way we teach and learn. This transformation has also entailed an increase in the use of technological equipment such as smart phones, laptops, tablets, among others. These technologies have taken a leading role in many areas of action in our current society, called the Knowledge Society by many renowned authors such as Manuel Castells or Peter Drucker.

This globalized society with the leading role of the Internet, connected in networks with ever wider roads to transmit and receive information, requires real-time communications and information available continuously, but also accurate, real and responsible. A few years ago, if you wanted to obtain information about a subject for our knowledge or someone else's, you used fax technology or even the traditional postal system. Today, something like that is unthinkable, because you have information at hand through different devices. Thus, ICT can satisfy the desired information demand in a faster way in terms of time and location. In education, ICT have provided new methods, teaching-learning methods and tools, educational applications and even new ways of using so-called social networks in educational environments that rely on new ways of being protagonists, both the teacher and the student. There is also the use of new resources in learning spaces such as the presence of tablets, interactive whiteboards and laptops.

The society has suffered more transformations in other areas as well, some of which have a greater impact than others, however, one of the most disturbing phenomena to achieve a universal impact that is directly related to ICT is the digital divide (although it is also spoken of social gap).

To know this concept, it is indicated that the digital divide is:

The separation that exists between people (communities, states, countries) who use Information and Communication Technologies (ICT) as a routine part of their daily lives and those who do not have access to them and who, even if they do not know them how to use them. (Serrano & Martínez, 2003, p.8).

Thus, the main idea of this essay is to analyze and reflect on the context of this phenomenon in Costa Rica and the opportunities for spaces for complementary learning with the support of ICT tools.

II. ICT ACCESS IN COSTA RICA AND DIGITAL DIVIDE

The Constitutional Court in 2010, declared the Internet as a fundamental Costa Rican right and highlighted the right to access to new technologies, equality and promote a work agenda to eliminate the digital divide.

This fact was made known by the press of Costa Rica as follows:

In the vote, notified this Monday, the magistrates argue that at this moment access to new technologies is a basic instrument to facilitate the exercise of fundamental rights such as democratic participation and citizen control, education, freedom of expression and of thought, among others. (The Nation, 2010, p.34).

Because of this vote, which to date has referred to the country in the world, it is then that access to ICT and access to information takes an important turn in Costa Rica, including some government institutions such as the Vice Ministry of Telecommunications and Ministry of Science and Technology (MICITT and the Superintendence of Telecommunications (SUTEL) began several studies in order to know real data on access issues and digital divide in the country. For example, in 2009, the first National Development Plan for the Telecommunications 2009 - 2014 (PNTD) and recently in 2015 the second PNDT 2015 - 2021: A connected Society. In these plans goals and objectives were defined for five years, in addition to diagnoses and statistics on access to telecommunications services in ours. The same Vice Ministry of Telecommunications, as of 2010, prepared the Report on the Advancement of the Digital Divide Index: Use of Information and Communication Technologies, which was a great input for what is now called the Digital Divide Index (IBD) and that oversees this government entity.

According to (Vice Ministry of Telecommunications, 2010) speaks of access from the technological point of view to "The provision to the general public of telecommunications services at affordable cost and within a reasonable distance from their homes" and that is why the following data respond to the access panorama and that will also provide an initial vision of the challenges that could be faced for new forms of teaching and learning.

Among the relevant data of the report highlights that 86.8% of households had at least one cell phone in 2010, and that of that percentage, at least 16.5% used the Internet data service. In addition, Costa Rican households that had a desktop or laptop computer reached almost 63.9% and of these 65.4% also had Internet. In that year the mobile Internet and in homes were the technologies to which less access was had in the homes. Another interesting fact is that 49.6% of the households that have access to fixed Internet at that time, are in the Metropolitan Region, 36.8% in the rest of the central valley and 26.3% in the rest of the country (Vice Ministry of Telecommunications, 2010).

Subsequently, a study also conducted by the Vice Ministry of Telecommunications on the digital divide and access revealed significant changes compared to 2010; for example, the Digital Gap Index in Costa Rica showed that the possession of mobile telephony in 2011 grew by 50.6%, from 68.55 to 103.23 lines per 100 inhabitants (Vice Ministry of Telecommunications, 2012).

It is important to note that there is a constant increase in the use of technologies by Costa Ricans, a situation that does not change between 2006 and 2011. Reading that report also noted that fewer and fewer Costa Ricans acquire fixed telephone lines, a scenario that even today is wider. This situation has not changed recently since according to (Superintendence of Telecommunications, 2015):

The trend observed during the last years continues and in 2014 the number of subscribers to the fixed telephony service was reduced. In fact, of 1,060,466 subscribers that the service had at the end of 2010, the number of subscribers in 2014 reaches a total of 881,217 subscribers. (p.36).

However, the difference in possession of access technologies between the urban and rural areas is double, in which the urban area is favored by more than 25 percentage points. This situation was described through an example, published in a national press, of a family from the La Cruz canton in Guanacaste province, which reflects what many other families live in their homes: "They are an average family, like many in this border canton, of about 20,000 inhabitants, which has low development rates and where 87.5% do not have access to the fixed Internet and 72% do not have a computer ", adds the note in the words of a citizen: "Now everything is technology, everywhere they use it, but, one still cannot have that. Here I believe that only a teacher is the one who has a computer " (The Nation, 2012).

Previously, what is the reason that access to ICTs has been concentrated for more years in central areas and is decreasing towards rural areas? The concentrated population that lives in the central zones generates more economic activity and a greater amount of professional and technical labor. In addition, there is a greater offer of services and products of all kinds and scope offered in these areas, sometimes even the quality turns out to be better than in rural areas (although this is debatable).

All this makes the central zone more attractive in terms of culture, education, business, entertainment, productivity, politics and technologies. In other words, rural areas suffer a digital divide in terms of access at a considerable level compared to the central zone of the country.

However, these differences that serve these areas should not be a wall to ensure equitable access to ICT in Costa Rica. In this specific case, it is the duty of the government to establish the necessary facilities so that rural areas are not excluded, not only in terms of access and technologies, but also in other aspects of Costa Rican society. The efforts have been made in a recent SUTEL report which also indicates a data that is relevant and that can be one of the indicators that provide new opportunities for learning environments, according to (Superintendence of Telecommunications, 2015):

The mobile telecommunications market experienced a boom in the number of subscribers between 2010 and 2013, during which period it went from 3,128,372 to 7,111,981 subscriptions (this last figure is the highest record of the period), which on average meant that During this period an average annual growth of 31% will be recorded. (p.48).

As the reader can probably guess, this increase has been due to the entry into the country of other telephone operators with affordable, innovative, varied products that have also strengthened the mobile telephony infrastructure in the country, guaranteeing access to the Internet through technologies such as the 3G and the 4G.

Currently, Costa Rica has made great efforts to ensure connectivity and access to new technologies, especially ICT, in collaboration with the private sector, because by 2014 the digital divide was placed in a low category as expressed by the most recent official statement of the Presidential House where it is stated that the Digital Divide Index (BDI) was estimated at 2.63 points for 2014, placing for the second consecutive year between 0 and 3, limits corresponding to the values of the category "Low Gap". This sustained reduction in the Inter-american Development Bank, allowed the country to successfully comply with the goal 8.6 in collaboration with the private sector, give access to the benefits of new technologies, especially Information and Communication Technologies (ICT) of the eighth Millennium Development Goal, according to the III Country Report (Government of the Republic, 2016). The foregoing proposes that Costa Rica then behaves according to the global trend, in terms of the adoption of ICT and that then efforts as in PNDT 2015-2021 will have an impact on public policy and projects that allow access and connectivity to rural areas where there is still working to be done.

There has been much discussion about access, however, it is important to remember that the digital divide also includes the quality of access to services, that is, the degree of user satisfaction. Also, an important component is the use, in this case, the amount of Internet users and computers. In these components, Costa Rica has also grown in recent years, in some places more than in others.

According to these data presented, it can be derived that, in terms of access and connectivity in Costa Rica is high in households, which indicates that there are enough resources and platforms to connect to ICT. The important thing is that it is necessary to give an adequate use to these and to provide access and literacy to the population to reduce the digital divide.

III. APPROACH TO DIGITAL LITERACY IN COSTA RICA

The current Costa Rican society is characterized by a demand and dependence on ICT, which have come to form a new model in economic, political, educational, social, and cultural processes, making today's society known as the information society and of knowledge. However, the changes and processes that have produced the new technologies have been of great acceleration, causing people to seek to update in the same way leaving out those people who do not have the ability to do it as quickly as it should, according to (Silvera, 2005):

The increasing flows of information and communication in society, as well as the emergence of new forms of digitalized coordination, are translated into new forms of social and productive organization. The countries then require an update in their livelihoods, organization and production, so as not to be in a marginal situation in front of this new paradigm. (p.11).

That is why it has, in accordance with the so called digital society, emerged the phenomenon of digital literacy, in fact, it is common in many initiatives in our country at the level of universities and government, such as process of acquiring necessary skills, abilities and attitudes related to the adequate management of technologies for work and life in general, as affirmed (Silvera, 2005).

For (Gros & Contreras, 2006), digital literacy, from its definition and content, is a matter of discussion. Initially, the concept of reading literacy was understood as the simple ability to read and write. Digital literacy is much more complicated and is formed, not only by a set of skills necessary to use ICT properly, but also by others such as: acquiring critical thinking and making informed value judgments about information in digital format; use reader skills and understanding of dynamic and non-sequential hypertexts, as well as skills for the construction of knowledge from reliable data and information of diverse origins, among others.

Recent studies, beyond the borders of Costa Rica, it is reported that there is a tendency to more extensive use of ICT as tools to think and learn. In addition, a series of competences cataloged as digital literacy are conceptualized, which are now a requirement to function effectively in the information and knowledge society (Trilling, 2007). Some of these competences are related to the use of e-mail and surfing the Internet, research online, uploading and downloading content, creating web pages, doing learning activities and collaborative interactions, participating in online learning communities, among others. these opportunities for new spaces of learning based on ICT.

In Costa Rica, literacy processes have become a priority and, above all, considering that the Vision made 2021 puts inclusive access on the route of the National Telecommunication Development Plan, according to (MICITT, 2015): "Transform to Costa Rica in a connected society, based on an inclusive approach to access, use and appropriation of information and communication technologies; in a safe, responsible and productive way ". It is then necessary to ensure that the skills reach all citizens regardless of location and socioeconomic level, it becomes necessary for individuals to participate in an educational process that provides the knowledge to understand the documents on the Internet, make use of the devices that process and allow access to this information. It is interesting when analyzing digital literacy from this perspective that it is precisely there when limitations are often encountered when implementing new environments to transmit or share knowledge. Thus, it is assumed that the skills, skills and attitudes to know and use ICT responsibly refers to digital literacy, and that this is necessary to integrate into society in a better way.

In educational contexts, digital literacy can also be summarized in three phases according to (Jonassen, 2003), which are: a) learning from technology, b) learning about technology and c) learning from technology. Historically, in principle, ICTs were dedicated to the promotion of routine exercises and practices, however, as the number of desktops and then laptops increased and telecommunications increased, as happened in Costa Rica after the opening of telecommunications. , began to talk about computer skills and nowadays there is a tendency to use them as tools to meet a wide variety of educational needs, for example: virtual learning, virtual classrooms, videoconferences, online forums, collaborative knowledge through Wikis or social networks and everything that Web 2.0 (collaborative tools and Internet) brings with it. From the educational perspective this is somewhat complicated because if a mediator needs to teach with ICT, he must learn if he does not know and then must use the new media in a way that the learners can develop skills to produce and distribute their own content.

In Costa Rica, it seems that there is a categorical vacuum in terms of statistical figures and documents that report on the state of digital literacy, there are no quantitative or qualitative data, reports or reports that show the level of understanding that Costa Ricans have in the use or management of ICT, some data can be derived from studies derived from others, such as those who previously saw that include access issues but not in terms of education, according to (Government of the Republic, 2016) just are entering queries related to digital literacy, the use of ICT and adoption processes of new technologies for the growth of the Internet, this within the framework of the elaboration of the new Digital Divide Index 2015.

In the country there have been several interesting initiatives to address these phenomena described above, efforts in the Ministry of Public Education (MEP), the MICITT, private initiatives among others. For example, an interesting initiative is the Smart Community Centers (CECI) which are a network of centers with a certain number of computers installed in different parts of the country and are used for basic training in the use of computers, the Internet, email, videoconferences, among others. In addition to promoting the transfer of knowledge, they seek to encourage the use of ICT to also reduce the digital divide by diversifying access opportunities. These Centers can be seen in many rural areas of the country and are supported by institutions such as universities, municipalities, and public libraries. (MICITT, sf).

IV. SOCIAL NETWORKS: ACCESS AND TRAINING IN HIGHER EDUCATION

It seems that the digital divide is shifting from access to use, assuming that more progress will be made in the area of infrastructure at the level of new connectivity technologies to networks such as the Internet, then it is necessary to increase the use of these opportunities in areas where the digital divide is rather biased to use and not to access, for this it seems that in the country there are conditions to take advantage of ICT in learning environments, but of course it is understood that we must go through a process of awareness and training to use new tools and hence the importance that people working in education at any level accept the challenge of acquiring new skills and knowing the tools that are presented. Then, under this scenario why not think about the use of social networks to mediate in education, the technical conditions are given, considering that: a) cellular penetration in the country has been increasing (this includes rural areas), b) the internet service on cell phones has become almost basic and c) thanks to the opening of telecommunications, areas that previously did not have coverage are covered.

Social networks on the Internet in one way or another allow interactivity between people, have caused a stir in communication and there are many ways to access them and the most used is through cell phones, laptops and tablets. It seems that the potential, at the level of educational initiatives, of the use of these tools has gone unnoticed.

Social networks are one of the terms that have been formally incorporated into the educational environment, reinvented from a technological platform, the Internet. What was previously done face to face (which is still important), is now done through a platform through which you have a catalog of friends or contacts, under your own preference and from that information is exchanged synchronous (real time) and asynchronous (in non-real time) because people can talk directly through chat tools that incorporate social

networks but also leave messages directly or in an open forum where they write whatever they like, such as would do in any real environment like a forum, discussion, simple meeting of friends or in a classroom. Anyone could read the published information and therefore, in doing so, they can learn more about the life of that other person. These platforms were designed with that goal in mind and this is how social networks on the Internet represented by different famous platforms come to light, such as: Myspace (used with affluent in the United States), Twitter, Facebook, Flickr (to share photos) or LinkedIn (to share job opportunities), among others. However, in this part of this essay we will reflect on the social network Facebook, which is, today, one of the social networks with the most traffic worldwide and the one with the most Internet users and It has also designed applications for cell phones that do not have great benefits to increase access to the platform with low-cost devices, a situation that has benefited countries like Indonesia and India where there are high rates of limited purchasing power (El Universal, 2016). Facebook then becomes a great opportunity to access information and teaching and learning processes.

In the educational context, for (Tuñez &Sixto, 2012):

> "Social networks, Facebook in this case, should be understood as a complement to teaching and a supplementary space that must be managed without forgetting that it is a personal network that students' value as a good setting for reflection and learning" (p. 87)

Under this scheme, (Duffy, 2010) highlights that Facebook has benefits for teaching and learning, since it exploits the ability to allow students to share information and knowledge acquired within a dynamic community, linked through the personal profiles of the members and the associations between them. On the other hand, just as various ICT and tools to support face-to-face classes, it is important to consider basic elements for the proper use of Facebook. For (Loving & Ochoa, 2011) there must be important considerations in an academic environment, such as the ideal method of communication and sending documents, making clear how the social network will be handled from the beginning, for example, some prefer create pages and others prefer to create groups. Are we talking about E-learning? Thatis, online learning. Maybe not totally, but the truth is that it is a resource that can be exploited, as a complementary tool to face-to-face, as it is done with other tools than to implement Virtual Classrooms.

Another interesting possibility of Facebook is to be able to establish a conversation in real time with any of the users, even if they do not belong to the network of contacts, through chat features that can be activated from any cell phone, including. That is, it could generate a discussion of the teacher with students or between students at any time and from anywhere. In the same way, the teacher could establish the necessary instructions to regulate an activity of this type.

Based on the foregoing, this article presents some of these possible educational uses of Facebook, seeking to generate a space for reflection on other possibilities and scope of this social network. This is a descriptive and preliminary exercise as part of a study on social networks in Higher Education currently carried out by the subscriber at the Universidad Nacional of Costa Rica, Chorotega Regional branch at north pacific side of the country, under the population in Nicoya Campus, located in the city of Nicoya, Guanacaste province. Basically, an exploratory survey was applied to students of the Information Systems Engineering career to determine their perception as students in courses where the teacher has used the social network Facebook to complement their courses. For purposes of this study, the population is 43 students from Guanacaste province. This survey was applied during the month of April 2017 in a virtual way through the Limesurvey.
Within the data of interest, we found:

Table 1
Devices used to access the Internet and social networks.

Device	Quantity	%
Laptop	42	97.67%
Stationary computer	15	34.88%
Cell phone	38	88.37%
Tablets	9	20.93%
Other	0	0.00%

Source: created by the author

It is important to affirm that, most students use the cellular mobile device to connect to the Internet and their social networks of preference (88.37%), they also use laptops and a very low percentage of the participants use stationary computers. Thus, there is ample opportunity to take advantage of the mobile resources and the cellular network of the country to implement new learning environments based on ICT, strengthening equitable access to teaching and mediated learning.

Table 2
Preferred and active social networks.

Social network	Quantity	%
Facebook	43	100.00%
Twitter	25	58.14%
Google+	32	74.42%
LinkedIn	10	23.26%
Other	11	25.58%

Source: created by the author

According to the data of the sample, the social network of preference is Facebook with 100% selection. So, it seems an opportunity for teaching and learning initiatives using this social network that is often used by students and focus efforts on it. The diversity of the use of a technology is often closely related to the domain and control over it, so it can be deduced that the students in the sample have a very high Facebook domain. Although there are other social networks such as Twitter or LinkedIn, they do not manage to reach a considerable percentage to make decisions about the platform to choose from in the event of formal use in education.

Table 3
Activities by the teacher through the social network.

Activity	Quantity	%
To solve doubts about the contents or exams.	27	62.79%
Official announcements and announcements of the course.	42	97.67%
Publish course documentation.	34	79.07%
Encourage discussion / reflection on topics of the course.	20	46.51%
Organize academic activities.	20	46.51%
Publish links to web pages related to the subject of the course.	36	83.72%
Publish videos related to the subject of the course.	25	58.14%
Publish images related to the subject of the course.	22	51.16%
Other.	2	4.65%

Source: created by the author

The Table 3 shows the use of activities related to the teaching process, all the options that were explored, mostly responding to 97.67%, the main activities are related to the sending of official communications. With the79.07% on the publication of course documents; data that is supported by (Loving & Ochoa, 2011) who report that Facebook will allow instructors distribute documents, either by messages or postings, manage lists of discussions between others A 62.79% indicated that questions of content or solved exams, but leaves it to the reader if you are doubts were resolved by the teacher or the students themselves, a situation that is a possibility as it is intended, as stated (Duffy, 2010) , exploiting the students' ability to share information and knowledge.

Finally, to reflect on this specific use of ICT, we proceed to cite some of the students' own evaluations that applied the survey by responding openly to the question: What do you like the most about having a Facebook group? or in some other social network for the course? (the answers are in the raw just as they were entered):

"The ease of making general inquiries and the possibility that any partner clarifies the doubts or the same teacher".
"Faster communication and more efficient document transfer due to the time people spend on social networks. (We are more connected to FB than to other media)".
"Undoubtedly one of the advantages of social networks for academic purposes is that people like me who do not have access to the internet at home more easily from the cell phone, and with this there is greater participation on the part of all colleagues and so there is a higher level of learning!".
"The communication, but I prefer e - mail, because it is more private".
"We could share documentation more easily, solve problems or concerns much easier and faster".
"The ease of reading the teacher's announcements and the links that were posted to improve our knowledge".
"It was interesting because it was in an English course and the truth is that the interaction between the teacher and the students through chats and posts was very good since everyone was participating".
"To be able to exchange ideas about some task".

V. CONCLUSION

Because of the impact of ICT, we speak of an information and knowledge society as the driving force that has transformed the dynamics of many areas of society and that leads to questions about access to information, digital gaps and opportunities to take advantage of ICT for better development opportunities. Therefore, taking into account the indicators provided by (Solórzano, 2008) so that the information and knowledge society can be developed, it is essential to take action to improve access to ICT, of which the following stand out: achieving coverage total access to the Internet by the government, offering access for free or subsidized by a tax to a public service (for example, the CECI).Likewise, the efforts to reduce the digital divide must then be moved in several axes from a systematic and integral point of view. These axes are access to ICT, connectivity, literacy for the use of technologies and the implementation of new learning environments. Consequently, the use of ICT should be encouraged to support training processes, taking advantage of dynamics that take maximum advantage of connectivity in widely used devices such as cell phones.

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