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CHALLENGES FACED IN OVERCOMING INDIGENOUS DIGITAL DIVIDE IN BRAZIL
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CHALLENGES FACED IN OVERCOMING INDIGENOUS DIGITAL DIVIDE IN BRAZIL

DESAÍOS ENCARADOS PARA SUPERAR LA BRECHA DIGITAL INDÍGENA EN BRASIL.

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Resumen

El objetivo de este trabajo es identificar el nivel de inclusión digital realizado por el programa brasileño de inclusión digital Gobierno Electrónico - Servicio de Atención al Ciudadano (Governo Eletrônico - Serviço de Atendimento ao Cidadão - Gesac) en tierras indígenas. Nos guiamos por el sistema de inclusión digital del sociólogo brasileño Bernardo Sorj, quien identifica cinco niveles: 1) la existencia de una infraestructura física de transmisión, 2) la disponibilidad de equipamiento/conexión, 3) capacitación en el uso de herramientas informáticas e internet, 4) la capacidad intelectual e la integración social, e 5) la producción y uso de contenidos específicos.

Nuestra hipótesis es que, a pesar del discurso oficial alineado con los debates sobre las sociedades del conocimiento, en la práctica, Gesac todavía está operado por un determinismo tecnológico. Para probar esta hipótesis, realizamos la observación del punto de acceso a internet en la escuela indígena Pamáali, ubicado en la zona noroccidental de la Amazonia brasileña. También hemos discutido y llevado a cabo entrevistas con los actores involucrados en la implementación de programas de inclusión digital dirigida a los pueblos indígenas: los ministerios y funcionarios de la Fundación Nacional del Indio (FUNAI), representantes del tercer sector y los propios indígenas.

Los desafíos que identificamos llevan a la conclusión de que la brecha digital indígena es sólo una de las varias brechas a que los grupos indígenas son sometidos desde tiempos coloniales, siendo una consecuencia más de estas divisiones a la vez que también las acentúa. Mientras las acciones de inclusión digital del gobierno brasileño dirigidos a los pueblos indígenas no se hagan e implementen como parte de una política indígena más amplia y no tengan en cuenta las especificidades de estos grupos, estas iniciativas se limitarán a brindar conexión a internet y la donación de equipos que serán subutilizados o se deterioran rápidamente.

Palabras clave

Brecha digital indígena, brecha digital, Gesac, movimientos indígenas, TIC.

Abstract

This paper's objective is to identify the level of digital inclusion made possible by Brazilian digital divide program Electronic Government - Citizen Attention Service (Governo Eletrônico - Serviço de Atendimento ao Cidadão - Gesac) on indigenous lands. We are guided by Brazilian sociologist Bernardo Sorj's five level digital inclusion system: 1) the existence of physical transmission infrastructure, 2) the availability of equipment/connection, 3) training in the use of computing tools and the internet, 4) the intellectual ability and social integration, and 5) the production and use of specific content.

Our hypothesis is that, despite an official discourse aligned with the discussions on the knowledge societies, in practice, Gesac is still operated by a technological determinism. To test this hypothesis, we performed the observation of the internet access point in the indigenous school Pamáali, of Baniwa and Coripaco ethnicities, located in the northwestern area of the Brazilian Amazon. We also discussed and conducted interviews with actors involved in the implementation of digital inclusion programs aimed at indigenous peoples: ministries and Indian National Foundation (FUNAI) officials, representatives of the third sector and indigenous themselves.

The challenges we identify lead to the conclusion that indigenous digital divide is just one of the several divides to which indigenous groups are subjected since colonial times, being one more consequence of these divides at the same time that it also accentuates them. As long as Brazilian government's digital inclusion actions aimed at indigenous peoples are not created and implemented as part of a broader indigenous policy and do not take into consideration the specificities of these groups, these initiatives will be limited to providing internet connection and donating equipment that shall either remain underused or will rapidly deteriorate.

Keywords

Indigenous Digital Divide. Digital Divide. Gesac. Indigenous Movements. ICT.

1. Introduction

Brazilian indigenous peoples living in their own lands have late access to Information and Communication Technologies (ICT). Internet access started to be available in indigenous lands only in 2003, almost ten

years after commercial internet was implemented in the country in 1995. Due to traditional peoples' low economic potential and the consequent lack of interest of telecommunication companies in developing infrastructure in these regions, internet access implementation in indigenous lands was only possible through state intervention. Most of the internet access points located in indigenous communities are provided under the Ministry of Communications' digital inclusion program Electronic Government – Citizen Attention Service (Governo Eletrônico – Serviço de Atendimento ao Cidadão – Gesac) and are not for private use. Gesac offers free internet access mainly by satellite link; which makes it possible to serve the most distant and isolated regions. Internet service is provided directly by the Ministry of Communications itself or in partnership with other federal, state, municipal, third-sector or even private entities' initiatives.

By the end of the 1990's, Brazilian government, in face of the enormous disparity in the deployment of ICT in the country, especially on telephone and internet networks, begins to acknowledge the need for a digital divide policy. The will to engage in the universalization of ICT is made official with the launch of the Information Society Program, with the objective to "integrate, coordinate and stimulate actions towards the use of information and communication technologies, in a way that contributes to the social inclusion of all Brazilians in the new society" (Ministério da Ciência e Tecnologia, 2000, p. 10). Gesac is first thought of in the context of this program, which ends up being unofficially discontinued seven years later. In 2001, the document General premises on the digital inclusion of Brazil's electronic government states that the right of access to the digital world includes two spheres: a technical/physical one (awareness, contact and basic use) and an intellectual one (education, training, knowledge generation, participation and creation). With the evolution of the Electronic Government Program in the 2000's, access to the internet is officially advertised as a tool to promote citizenship and thus social inclusion. By the beginning of the 2010's, the Gesac Point Manual (2011) argues that "the challenge of building a bridge between the simple access to information – the first step of the knowledge society – and true digital inclusion passes through connection" (p. 9).

Despite official discourse around information and knowledge societies and digital inclusion, almost ten years after the arrival of the internet in indigenous lands, access points are still limited in numbers and operate in very precarious conditions. A partial survey carried out by anthropologist Nicodème de Renesse pointed out around 111 internet access points located in indigenous villages in 2010, most of them implemented after 2007¹. On the 2010 Census, 817,963 Brazilians (less than 0.44% of total Brazilian

1. Reaching an exact number is difficult due to the low specificity of the records made available in the Gesac Web site, which does not make an exact distinction between villages/communities in indigenous lands and rural zone.

See Gesac Web site: <http://www.gesac.gov.br/administracao-de-pontos/localizacao-dos-pontos-de-presenca-em-operacao>.

Renesse (2011) also points out the extreme fragmentation of programs and actors, ambiguous records and lack of access points' tracking, which does not allow to differentiate whether a given point was approved or deployed.

population) declared themselves to be Indians. They belong to 238 different peoples, speaking 180 different languages. Almost two thirds of them live in the countryside, which comprehends indigenous lands. According to Instituto Socioambiental (ISA), a Brazilian Public Interest Civil Society Organization, there are 682 indigenous lands in different stages of official recognition by the end of 2012 in Brazil. They represent 13% of the Brazilian territory. For all practical purposes, we can assume that 13% of the Brazilian territory, 112,870,218 hectares – more than the area of France and Spain put together –, are covered by only 111 internet access points that should serve more than 500,000 people.

Furthermore, from data collected on the 1st Indigenous Symposium on the Uses of Internet in Brazil (1° Simpósio Indígena sobre Usos da Internet no Brasil), which Renesse helped to coordinate in 2010, the researcher concluded that around 70 to 80% of internet access points located in indigenous areas either do not work because they are damaged or are not properly configured, because the access points are not completely installed or because the agreements have expired, or they are not used due to lack of trained users in the community.

In this article, we try to identify the challenges to be overcome in order to have an effective democratization of internet access among indigenous peoples. We question the level of digital inclusion made possible by Gesac on indigenous lands. Our hypothesis is that, despite an official discourse aligned with the discussions on the information society, and more recently on the knowledge societies, in practice, Gesac is still operated by a technological determinism. It means that it is hoped that technology alone – the availability of internet connection and computing equipment – will be enough to promote social participation and citizenship among the beneficiary community. Thus, the program and other initiatives that use its connection do not consider the follow through of internet access points after their implementation, as they do neither provide for updates and for the repair or replacement of damaged or outdated equipment nor for continuous training to the users. Thus, the access points are easily and often subject to technical problems that result in underuse or even obsolescence. We hope the results of this research are taken into consideration by public managers, new Indian leaderships and third sector activists when conceptualizing new digital inclusion initiatives or evaluating and reformulating old ones.

This article is divided into six sections. In section two, we expose the method used to collect information about Gesac access points located on indigenous

lands and, in section three, the theoretical framework used to guide our analysis and achieve the results. On the fourth section, we make a review of relevant literature about indigenous digital divide in Brazil. On the sixth, we investigate who are the Indians using ICT and what they are doing with it. On the seventh, we focus on the physical challenges found in connecting indigenous lands to the internet. On the eighth, the analysis is centered on the human variable to unravel the indigenous' potential for active appropriation of the internet. And finally, we conclude.

One of the constraints we found is the enormous difficulty of access to indigenous communities and transport, which causes some equipment to arrive there already damaged. Once there, the equipment is subject to misuse or might even remain untouched for fear of breakage due to the population's lack of training or even interest. The challenges we identify lead to the conclusion that indigenous digital divide is just one of the several divides to which indigenous groups are subjected since colonial times, being one more consequence of these divides at the same time that it also accentuates them. Therefore, as long as Brazilian state's digital inclusion actions aimed at indigenous peoples do not take into consideration the specificities of these groups and are not part of a broader indigenous policy, these initiatives will be limited to providing internet connection and donating equipment that shall either remain underused or will rapidly deteriorate.

2. Method

In 2011, we conducted a field research on the indigenous school Pamáali, one of the first indigenous locations to receive a Gesac internet access point, in 2003. This is a primary and secondary school of the indigenous ethnicities Baniwa and Coripaco, one of the first indigenous educational centers in Brazil built and administered by the Indians themselves, founded in 2000. It is located in the Alto Rio Negro Indigenous Land, situated at the northwestern area of the Brazilian Amazon, on the border of Brazil, Colombia and Venezuela. This indigenous land is part of São Gabriel da Cachoeira, the Brazilian municipality with the highest concentration of Indians, 77% of its population (Census 2010).

At Pamáali School, we performed a non-participatory observation of the uses of ICT by teachers and students. We applied a closed questionnaire on the subject to 55 of the 56 students attending the school that year and made in-depth interviews with the seven teachers. Besides them, we also interviewed one of the four members of the school's staff, the secretary. We

also gathered the students' perceptions of communications tools in a three-day workshop we promoted on the subject to the secondary students. The students came from 12 different Baniwa and Coripaco communities located along the Içana river and its effluents and they were 18 years old in average – the younger one was 11 years old and the older, 37. Just a few were Coripaco and only ten were girls. Among the seven teachers, only one was female, most of them aged between 25 and 30 years, and two were Tukanos, one, Coripaco and all the others, Baniwa.

We also conducted in-depth interviews with other indigenous leaderships involved with Pamáali, such as a former teacher, the deputy mayor of São Gabriel da Cachoeira and a Rio Negro Indigenous Organizations Federation (Federação das Organizações Indígenas do Rio Negro - Foirn) director, all of them Baniwa Indians; and internet or indigenous matters specialists, such as internet specialist and pioneer in Brazil, João Ramirez and ISA's consultant Laíse Lopes Diniz.

Before heading through the indigenous lands to the school, we took part in a workshop promoted by ISA and Foirn about social networks and Web tools. The workshop was conducted by João Ramirez – who later became a consultant to ISA – aimed at indigenous leaderships from several indigenous communities of the Rio Negro region with the objective to show the Indians how to publish content on the Web through open tools such as YouTube, Wordpress, Twitter and Flickr, for example. During this workshop, the participants talked about the uses of ICT on each community and the difficulties they faced.

In 2013, we had the opportunity to cross all the material gathered in the field in São Gabriel da Cachoeira in 2011 with information from semi-structured interviews and talks we conducted with officials from the ministries of Communications and Culture, the Indian National Foundation (Fundação Nacional do Índio - FUNAI), the Amazon Protection System (Sistema de Proteção da Amazônia - SIPAM), National Learning and Research Network (Rede Nacional de Ensino e Pesquisa - RNP) and three mayors from cities located in municipalities with significant indigenous population.

We also analyzed all the primary and secondary sources of official information and statistics we could find on Gesac, Pontos de Cultura Indígena (Points of Indigenous Culture – the indigenous digital divide program from the Ministry of Culture) and Amazon Protection System (Sistema de Proteção da Amazônia – Sipam) Telecenters related to indigenous peoples.

3. Theoretical Framework

Technological determinism places the technology at the center of social, economical and cultural processes (Romani, 2009; Saéz, 2010; UNESCO, 2005; van Dijk, 2005), which leads to the thinking that technology alone would be able to fix problems of inequality, democracy, freedom, social relationships, and community building (van Dijk, 2005). Even United Nations Educational Scientific Cultural Organization (UNESCO) imbued this determinist thinking by the end of the 1970's, when the discussions around the information society took shape with the rapid development and diffusion of ICT in developed countries. At that time, UNESCO thought that "the adoption of informatics by Third World countries and the implementation of a policy in this area will allow them to access the same level of development that industrialized countries" (as cited in Camacho, 2006; Stillo, 2012), development being the linear advance of science and technology (Stillo, 2012).

However, over the years, with the advances in technology and the deepening of digital divide around the world, it has been noticed that "giving someone a computer and an Internet connection does not solve any of these problems" (van Dijk, 2005, p. 5). Contemporary scholars are overcoming the conception of digital divide as a mere repercussion of social divide and the digital inclusion as the driving force for social change. Several authors are now talking about numeral divides: scientific, educational, cultural and even cognitive; related to different variables, such as geographic localization, ethnicity, age, gender, language, employment, educational, social and cultural backgrounds, etc., and their combinations (Stillo, 2012; UNESCO, 2005; van Dijk, 2005). Dutch professor Jan A. G. M. van Dijk (2005), for example, presents the digital divide "as a sequence of different kinds of access, the multitude of causes of this process, and its potential consequences" (p. 14) in opposition a primary one-dimensional view of the digital divide as the difference between ICT haves and have-nots. For the author, different kinds of digital divides "are byproducts of old inequalities, digital technology *is* intensifying inequalities, and the new inequalities *are* appearing" [original emphasis] (van Dijk, 2005, p. 5). Thus, even with the development and the spread of technology, social gaps continue to be significant in society.

In order to try and determine the level of digital inclusion made possible by Gesac in indigenous lands, we searched for a theoretical model that would go beyond technological determinism, allowing us to examine the indigenous digital divide not only as a technical matter, but also as skills and usage

issues. Van Dijk (2005) decomposes digital skills into three distinct sets: instrumental (the ability to technically operate computing equipment), informational (the ability to research, select, process and apply information) and strategic (the ability to use this information to improve one's position in society). In this article, we are guided by the five new information and communications technologies universalization indicators identified by Brazilian sociologist Bernardo Sorj:

- 1) The existence of physical transmission infrastructure – transmission systems, such as electric or TV cables, telephone, satellite or radio;
- 2) The availability of equipment/connection – usually computer, modems and internet connection;
- 3) Training in the use of computing tools and the internet – also known as e-literacy, can be either formal or informal;
- 4) The intellectual ability and social integration – “the possibility of using the information available on the internet as a source of knowledge and intellectual and professional development depends on the user's previous training” (Sorj, 2003, p. 68) and his personal network; and development depends on the user's previous training” (Sorj, 2003, p. 68) and his personal network; and
- 5) The production and use of specific contents suitable for the needs of the various segments of the population.

For Sorj, each of these levels is a precondition for the next and will determine the usefulness of the previous levels, in a linear progression. Levels one and two constitute the passive dimension of the access to the internet while the last three define the potential of active appropriation. Researcher Víctor Manuel Marí Saéz (2010) points out appropriation as “the ability to claim for one's self and incorporate what is not possessed (the technology) from what is already known and had (cosmovisions, imaginaries, operation and organization logic)” (p. 8).

This active dimension of internet access is well explored by researcher Kemly Camacho (2006), who addresses the digital divide by three basic approaches, that follows the evolution of this concept through time:

- a) Infrastructural approach: the possibility/difficulty to have computers connected to the internet;
- b) Capacitation approach: the capacity to use these technologies, or digital literacy;

- c) Use of resources approach: the limitation/possibility that people have to use the resources available online.

It is interesting to notice that the infrastructural approach encompasses Sorj's levels one and two and the capacitation approach matches Sorj's level three while the resources approach goes beyond Sorj's level five. It is not clear if the capacitation approach is limited to the abilities related to the use of digital technology or also involves one's global intellectual abilities, while the social integration mentioned by Sorj is not found in Camacho. On the other hand, while Sorj's level five is limited to content – and the informational and strategic skills defined by van Dijk (2005) focus on information –, Camacho has a broader view of digital possibilities, not focused only on information. She talks about resources, which, in our view, could include the plethora of applications and services available online, going beyond the content paradigm, much related to static media.

Considering this contemporary multidimensional approach, in order to assess the digital inclusion promoted by Gesac on indigenous lands, we pose three main questions:

1. What are the logistical problems concerning the implementation of computing equipment, commissioning provision of internet connection and even the creation of physical infrastructure to accommodate internet access points in indigenous territories?
2. Who are the Indians using the internet, what for and how?
3. Besides poor infrastructure, are there educational, intellectual, cultural, social and/or linguistic barriers that further hinder the access to the internet by indigenous peoples?

4. Review of relevant literature

Spanish sociologist Manuel Castells (2001) defines the information society as the network society founded on the power of information. This kind of society is built around a new paradigm, the one of information technology, that, according to Castells (as cited by Werthein, 2000), has the following fundamental features: information as its raw material, the high penetration of the effects of new technologies, the dominance of the network logic, flexibility and the increasing convergence of technologies. UNESCO (2005)

highlights that information society is based on technological breakthroughs and searches for a concept that encompasses much broader social, ethical and political dimensions. This would be the concept of “knowledge societies, where knowledge is a public good, available to each and every individual” (p. 18). For the organization, “knowledge societies are about capabilities to identify, produce, process, transform, disseminate and use information to build and apply knowledge for human development. They require an empowering social vision that encompasses plurality, inclusion, solidarity and participation” (p. 27).

UNESCO (2005) points out that the role of knowledge in our societies has been revolutionized by the growth of the internet, mobile telephony and digital technologies, that play a role both in economic (through innovation and productivity) and human development. Also, that information is a knowledge-generating tool, but not knowledge itself. The organization acknowledges the existence of a knowledge divide, widened by the digital divide, and that there is still a long way to knowledge societies. This knowledge divide “adds up the cumulative effects of the various rifts observed in the main areas that make up knowledge (access to information, education, scientific research, and cultural and linguistic diversity)” (UNESCO, 2005, p. 22). It is rooted in what UNESCO calls gaps between forms of knowledge and gaps within different kinds of knowledge, that cover inequalities in the distribution of cognitive potential and the unequal value put on different types of knowledge in the knowledge economy.

In Brazil, few researchers are interested in indigenous digital divide and the number of works on this theme is still quite restricted, even though it increases year by year. Chilean researcher Alejandra Aguilar Pinto, PhD in Information Science, is a pioneer on the subject and has been studying the integration of indigenous peoples in the information society since 1999, when she started her master research on indigenous Information in Latin America and the Caribbean. On her PhD research, Pinto went to study information and digital inclusion practices in Kariri-Xocó and Pankararu Brazilian Indian tribes. The researcher remarks that in Brazil indigenous peoples’ contacts with ICT are marked by restricted access to hardware. This exclusion happens not only in relation to digital media, but it is inscribed in a historical context continuum marked by lack of access to all kinds of information since colonial times. Official documentation “since the beginning was prejudicial towards the native populations, not only for their artistic and literary creations, but also in formal institutions, such as libraries and archives and in information services/products” (Pinto, 2010, p. 7).

At the present time, indigenous populations are not considered to be potential customers by telecommunications companies, and developing communications infrastructure in indigenous territory is not a primary concern for the government. It is up to the Indians to file a request for a Gesac antenna by elaborating a project proposal, submitting it to governmental digital inclusion programs and hoping for its eligibility and for the programs' availability. On his masters thesis, Baniwa Indian Gersem José dos Santos Luciano (2006a), PhD in Anthropology, addresses the projects market issue and how indigenous peoples are to adapt to "white" institutions and way of doing things in order to survive and achieve concrete improvements on their living conditions. Projects are a "white man's" artifice to gather resources to Indian causes from different sources, such as the public, private or third sectors, religious organizations and cooperation agencies.

In a global context marked by a high level of concern with environmental issues and the questioning of industrial society and the developmentalist model, indigenous movements position Indians as important actors for sustainable development. Ethnodevelopment projects put aside the image of the barbaric Indian and recover some useful aspects of the romantic view of the Indian, such as the role of protector of the forest. Ethnodevelopmental projects market guarantees the legitimacy of indigenous organizations at the same time that it justifies the maintenance of indigenous ways of life in the contemporaneous world. French anthropologist Bruce Albert (2007) identifies the use of two distinct discourses by indigenous movements and leaderships. There is a legalist discourse concerning citizenship and access to public policies operating in the national sphere in Brazil and there is an ethno-ecologist discourse, which is effective in a global scale.

In November 2010, Belgian anthropologist Nicodème de Renesse helped to coordinate the 1st Indigenous Symposium on the uses of Internet in Brazil at the Universidade de São Paulo (USP) with representatives of 16 different indigenous peoples to discuss among themselves the uses of the internet in their communities. Renesse identified a very clear distinction between two trends in indigenous digital inclusion projects' courses and destinations. On the one hand, we have the groups that include media in a political project. Among them, the internet is at the political project and decisions' service, which, in their opinion, makes the leaderships and the entire group stronger. On the other hand, we have the groups that don't incorporate media in a governance plan, or don't even have such a plan. In these groups, internet use is limited to the external agenda of project partners, colliding with the group's internal organization and generating conflicts. Many traditional

leaderships see the internet in the hands of the young ones as “a threat to their authority, to the social order and to the group itself” (Renesse, 2011, p. 24). Moreover, indigenous attendees of the Symposium realized that they all deal with problems that are common to all of them: outdated equipment, slow and intermittent connections, lack of technical assistance and lack of access to software.

Many of these problems were also identified by Brazilian communications researcher Isis Valle Rodrigues da Costa in her field research among Baniwa Indians in the Alto Rio Negro Indigenous Land in the beginning of 2011. Costa went to the Pamáali School in order to observe and analyze the use of the internet by students, teachers and other new Indian leaderships. Costa found out that, despite indigenous will to use internet as a learning tool, several obstacles – from poor connection to lack of electricity, equipment and training – make its use restricted to a select number of teachers, usually school and ethnodevelopmental projects’ managers. The internet is a tool used by new leaderships to stay in touch with supporters and partners, to speed up communications among distant leaderships and to formulate projects to obtain necessary resources for the school and for Baniwa and Coripaco peoples as a whole. Pamáali’s Gesac access point and the school itself are political tools used to (re)construct Baniwa and Coripaco identities and to fight for self-determination. The school blog (pamaali.wordpress.com), created in 2007, is the most important visibility tool for the Baniwa people.

The visibility issue is treated by Xenya de Aguiar Bucchioni on her master thesis (2010), in which she studied the Online Indians Network (Rede Índios Online), a network of various indigenous peoples in search of human, cultural, social and economic development that maintains the website Índios Online (<http://www.indiosonline.net>). Bucchioni identifies two dimensions of visibility in indigenous discourses; one linked to existence and the other to the notion of protagonism. According to the researcher, indigenous appropriation of digital environment is part of the need for existence in the eyes of the world and is linked to a historical resistance process. The protagonist dimension refers to the possibility of construction of an ‘alternative’ communication space, guided by themes other than those dictated by traditional media, and it is an important factor in the process of identity construction. This aspect, in the words of Bucchioni (2010), is an “essential element for the symbolic reworking of indigenous cultures in order to insert them in building the future and in the present context” (p. 50). Positioning themselves as protagonists of their lives and destinies allows the emergence of projects for the future. The researcher captured from her

indigenous interviewees “a strong sensation of empowerment arising from the technological appropriation and integration into cyberspace” (p. 60). Also, ICT “allow the indigenous existence before other individuals, and especially before the Indians themselves” (p. 101).

Indigenous blogs is one of the subjects studied by linguistic researcher Lucimar Luisa Ferreira in her current PhD research about the circulation of Indian perceptions and perceptions about the Indians on the internet. Among others, Ferreira analyses three Baniwa blogs also analyzed by Costa – Pamáali School included –, and whose authors have been interviewed by this communications researcher and have attended the 1st Indigenous Symposium on the Uses of Internet in Brazil. Ferreira understands that blogs are a privileged place to make the circulation of senses forbidden or silenced throughout Brazilian history. She finds that new indigenous leaderships see the access to ICT, specially the internet, as the conquest of a space to claim their rights and diffuse and exchange indigenous knowledge. Cultural specificities, digital inclusion itself, indigenous rights, environment, health, education and art are recurrent topics on indigenous blogs. Most of the time, even if the authors show themselves individually, they are presented as part of a whole. The voice is plural, it is the voice of the people they represent, in a persuasive tone that tries to attract and engage the audience to the indigenous causes and dialogs at the same time with the local reality and with a globalized world.

6. Internet as a political tool

From the review of the literature on the indigenous digital divide in Brazil and from our field research, we notice that the internet is mainly seen as a political tool by the Indians. New indigenous leaderships are the first ones in the indigenous world to have access to ICT. It happens in the urban centers, where they constantly need to be for their political fight. The term new Indian leaderships (*novas lideranças indígenas*) is used by Luciano (2006a) to identify non-traditional Indian political leaderships that emerge to occupy functions and positions that do not follow cosmologic indigenous principles, such as captains, teachers, health workers, reverends, association leaders and so on. New leaderships are usually younger than traditional leaderships – ancestral leaders like caciques, clans, phratries or sibs’ chiefs – and are the mediators between them and local, national or even international society. These young Indians are therefore the main interlocutors of indigenous development projects between their communities and development agencies.

Consultants from the non-governmental organizations and other entities that work with the Indians teach them how to use typing machines to write reports about projects carried out on indigenous communities. With the popularization of computers, they are encouraged to migrate to the new device, available on the offices of these organizations. With the arrival of the internet, the computer becomes the main tool to access invitations for proposals from Brazilian government programs, development agencies and other fund providers and to submit proposals. Before the internet, proposals and other documents had to be delivered by postal service and it would sometimes take over six months to receive an answer from fund providers. By the end of the 2000's, many invitations for proposals forms are only available on the internet, for online proposals.

Slowly but surely, indigenous organizations begin to buy their own computers. Thus, when equipment and internet connection from Gesac arrive on indigenous lands, some communities already own a computer for the use of the new leaderships, which was the case of Pamáali, for example. More indigenous organizations and new leaderships begin to have personal computers on indigenous lands as laptops become more and more affordable. On the other hand, this equipment and all the possibilities they provide remain alien to most of the Indians living in their own lands, especially those who don't speak Portuguese and whose contact with the outside world is very restricted or inexistent. As already observed by researchers interested in the use of ICT by social movements (see Saéz, 2010), those who use the internet the most, not only for political activities, are those who are already committed to organizations and offline political activity.

With Gesac connection available on indigenous territories or on military bases on the Amazon forest, the use of ICT tools becomes very regular amongst new indigenous leaderships. They use online communications tools such as e-mail, MSN, Skype, Google Talk and now Facebook to speed up communications between leaders situated on different communities and among themselves and those in the cities. Institutional websites are amongst the most consulted, in order to stay up to date with invitations for proposals and to submit projects so as to obtain financial resources and other sorts of support from the outside world. These projects are also formulated with the help of online resources. Last, but not least, the internet arrives as a new space where they can draw attention to their causes, be they social or environmental, through the use of social networks such as blogs, Facebook and Twitter. Social networks reach both the general public and fund providers (existing and potential ones), what Baniwa new leaderships consider very

promising, as reported by Raimundo Benjamin, the Baniwa teacher responsible for Pamáali's Gesac access point in 2011:

Before the blog, the partners, the fund providers from abroad, they were curious, wanting to know what was going on at the school. What was really going on, who the students are. They read the reports, but it's not... it's different, isn't it? It's not like having a picture or having constantly updated news." (Raimundo Benjamin, personal communication, May 24, 2011)

Due to the scarcity of ICT resources, the poor reliability of Gesac connection and electricity restrictions, there is very little time to use the internet and other ICT resources for personal purposes. According to indigenous values, the collective interest is more important than the individual. A relevant number of new indigenous leaderships see the internet as a way to fight prejudice since they can, for the first time, represent themselves without external mediation and (re)build the indigenous image before national and international populations. For the past two or three decades, many Brazilian indigenous peoples have been reassuming identities and mores they once left aside as a survival strategy against political, economic and religious pressures. At the same time, they declare themselves to be Brazilian citizens, in other words, rightful individuals. The internet has a central role in this operation.

Baniwa Indians is an ethnicity with a rather successful story with ICT, which is not the case of all Brazilian indigenous groups, as presented on the Review of relevant literature. Traditional leaderships can be very resistant to new technology, and power allowed to new leaderships is variable from group to group. Generally, new leaderships have to act on the sayings of the elders, and if they don't succeed in convincing the elders of the importance of ICT, equipment is simply left aside. The main arguments new leaderships have been using to convince traditional leaderships are educational and cultural ones.

Since the second half of the 20th century, indigenous communities experience the exodus of the young ones that move to the cities seeking formal education and don't return to indigenous lands. The integration of computers and the internet into indigenous schools to be used as educational tools that would prevent kids from moving out drew the attention of some elders. Many times it is also the schools that are stimulating the use of ICT to promote cultural revival. In days when many indigenous traditions have been

lost and young Indians are more and more interested in the white men's way of life, the young ones are being impelled to research among the elders the myths and knowledge of their peoples. This is a way to involve different generations in a common project. What the young ones find is registered in drawings, pictures, videos, recorded interviews, books. In 2005, for example, Pamáali students, under a project called Mitoteca, registered 58 Baniwa myths both in Portuguese and in the Baniwa language. A CD and a booklet were published from these registers.

7. Internet access' passive dimensions

Despite indigenous experiences with ICT described on the previous sections, in Brazil indigenous lands inhabitants find themselves in a situation of almost complete communicational and informational isolation. To provide access to the first two levels of digital inclusion established by Sorj – transmission infrastructure and equipment/connection – in such isolated communities is a huge challenge. These first two levels are internet access' passive dimensions – usually the focus of Brazilian digital inclusion programs, but “only part of the preconditions to make internet a public service” (Sorj, 2003, p. 63).

To address the complexity of providing transmission infrastructure, equipment and connection to indigenous populations, we take the Brazilian Amazon as a case in point, where 53% of all Brazilian Indians live, according to 2010 Census, and where over 98% of Brazil's indigenous lands are concentrated, according to 2012 data from ISA. Due to the dense vegetation and the abundance of watercourses, there are very few paved roads crossing the forest. The lack of roads is a big obstacle not only to vehicular traffic, but also to data transportation, given that transmission cables are usually buried along the highways. The same applies to electric cables. The profusion of watercourses and the lack of paved roads make it almost impossible to lay cables in the region. As a result, until 2010, the capital of Amazonas state – the biggest Brazilian state, with thrice the area of Spain –, located in the heart of the Amazon, was connected to the internet only via satellite and radio. Brazilian national backbone went as far as Porto Velho, the capital of Acre, more than 650 km away. Only in 2011 Manaus was connected to the internet via cable by two backbones; an Embratel cable with 2.5 Gb capacity and an Oi cable with 10Gb.

If even the biggest urban center of Amazonas state is so precariously connected to the internet, the situation on the countryside can only be worse, especially on isolated areas. Many indigenous communities are not

even served by the postal service. In 1998, Brazilian government privatized its telecommunications companies and failed to impose effective mechanisms to regulate the market and foster competition. As a consequence, the expansion of telecommunication infrastructure is left in the private sector's hands, subjected to market principles. The few public pay phones located in indigenous villages work via satellite and solar electricity and remain a limited and non-reliable tool, as we found out on our field research. A very limited number of families living in indigenous villages that experienced significant development and evolved into urban centers start to have landlines, but it takes up a sizable share of indigenous families' income. Mobile phone service is only available at urban centers, where there is usually no competition, mobile reception is very poor and 3G network is even worse.

Most of the population living in the interior of Amazon is riverine. National Learning and Research Network (Rede Nacional de Ensino e Pesquisa - RNP)² director, Nelson Simões, explained in an interview (personal communication, April 4, 2013) that rivers would be the natural way to build telecommunications infrastructure in the region and this would be the answer to deficient access: "You don't have to go through the roads, there are no roads. You don't have to go through railways, there are no railways". Nevertheless, Simões (personal communication, April 4, 2013) realizes "it is very difficult to build an underwater infrastructure, specially on the Amazon River, with its strength, riverbed sediment, strong currents, branches and all the debris this river carries". RNP is studying the possibility of implementing an underwater cable that would go from Belém – capital of Pará state – to the Brazilian border with Peru, covering more than 3,000 km of forest with internet connection. On cable anchorage points, connection would be distributed via Long Term Evolution (LTE) technology, a standard for wireless communication of high-speed data for mobile phones and data terminals that supports 4G. This would provide riverine populations not only with broadband internet, but also with TV and telephone.

However, this would be a long-term project that would require a partnership between public and private sectors and huge investments. Simões (personal communication, April 4, 2013) admits that "until now nobody thought about this as a solution, it is quite audacious to put a cable like this in the Amazon river. (...) It is another world, things don't work there". He remembers that Embratel had tried for several years to cross Negro River to get to Manaus. To finally connect their backbone to the city, they had to make a special cable that is actually made up of three cables; if one fails, there are

2. RNP was the first Brazilian network to provide internet access in Brazil and provides connection to universities and research centers.

two others, two redundancies to try and maintain the connection stable in the city. And even with the redundancies, in 2011 Manaus lost its connections for four hours; cellphones wouldn't work, neither would credit or debit card payments, banks went offline.

The lack of telecommunications infrastructure on the Amazon and indigenous territories in general is not an isolated issue, quite the contrary. It is difficult to build physical transmission infrastructure because telecommunications infrastructure needs to rely on preexisting infrastructures, such as utility poles and roads, usually inexistent on indigenous lands. For this reason, for instance, the state of Amazonas is not included in the Brazilian national broadband plan launched in 2010. Satellite connection is costly: deployment and use are expensive, lifespan is short and bandwidth is limited and non-expandable. As of 2013, 12,000 Gesac access points cost Brazilian State R\$3.3 (about US\$1.65) millions/month, or R\$39.6 (about US\$19.8) millions/year. Gesac satellites currently operate at full capacity and, in order to activate a new access point, another has to be deactivated. Most access points have nominal download and upload speeds of 512 Kbps and 128 Kbps, respectively, but the guaranteed download speed is only 6.7% of nominal speed, 34 Kbps. In 2006, an access point located in cities like Rio de Janeiro and Belo Horizonte would cost R\$1,200 (about US\$600) per month, while it would cost R\$70 (around US\$35) per month to provide cable internet access to the same location.

Most indigenous villages are not connected to the power grid, so the antenna and all hardware run on solar energy and/or on gasoline generator. But not all access points receive a solar panel or have a gasoline generator, so sometimes equipment is available but there is no electricity to power it. Both solar energy and satellite connections depend on climatic conditions, when it is raining or cloudy and, in some cases, at night, connection downgrades or even goes offline. The batteries used to store solar energy go lazy, and neither its replacement nor replacement or repair of any other equipment is provided for under digital inclusion programs. This consists a serious issue to indigenous communities because "due to their isolation and poor transportation conditions" much of the equipment arrives at their destination already damaged. Oftentimes equipment delivery is piecemeal. First they receive the monitors, for example, and then months later, when the CPUs arrive, the monitors are no longer fit for use because of poor storage conditions. To arrive in many indigenous communities you have to travel for a few days on a tiny metal boat (voadeira) – to arrive at Yanomami village Auaris, for example, it takes 45 days by boat –, in many cases you have to

cross a waterfall on the way. Some equipment is damaged during the trip to indigenous villages, some because they were poorly stored for too long in the city (sometimes for years) waiting for a transport solution, others are damaged during installation or when used for the first time due to lack of technical knowledge of the beneficiaries. In Alto Rio Negro Indigenous Lands, there are lots of stories of computers in the bottom of the river, for example.

It is recommended that access points have a management committee, comprising members of the community who would be responsible for its maintenance and sustainability. The committee is rarely established, though, often due to financial reasons. Federal government provides Gesac connection and basic equipment necessary for the access point to be operational; local government should provide staff and basic infrastructure to the access point, such as an accessible and secure location with electricity. The staff would be part of the management committee, responsible for providing free service to the community and managing the access point's resources. Concerns about securing financial resources to provide free service, ensuring equipment maintenance and updates, and purchasing supplies such as paper and printer ink – in other words, the sustainability of the access point on the long run – make some local governments unwilling to receive the access point and the population reluctant to be part of the management committee. When they do receive the access point, it usually lacks proper management. It is not rare that telecenters operators lack business savvy and technological skills to manage the space. This and the poor regulatory process lead to scrapping or obsolescence of the physical infrastructure.

That being said, the lack of a long-term sustainability policy for the access points and the implementation of a clear regulatory framework are among the main issues faced by Gesac and adjacent digital inclusion actions. The effective implementation and continuation of digital inclusion programs – as with most governmental actions or policies – is still a big challenge in Brazil. The management of public internet access points is still a fertile ground for discussion and improvement. It is a key factor to the availability of physical infrastructure (transmission, equipment and connection) but goes beyond the passive dimension established by Sorj because it is highly dependable on the intellectual ability and social integration of access points operators.

Additionally, there is the issue of sustainability of the continuous operation of the internet connection, which is susceptible to technical problems. The telecommunication company that wins the Ministry of Communication bid to provide the service is also responsible for the technical assistance of local

connections, at its own expense. Nevertheless, there is much delay on the provision of support for isolated access points because it is too expensive to send support personnel to these locations. Pamáali School access point managers state that in 2010 they had to pay for half the costs of the technician's trip, providing boat and other resources in order to have him come to try and fix a problem with the access point connection that had been going on for several months. Indigenous access points are subjected to constant connection problems due not only to the specificities of the satellite service already explained, but because the modem should be on continuously to receive updates, which is unfeasible in indigenous lands, with all the electricity constraints.

This difficulty to have technical support is only one of the consequences of structural problems Brazilian indigenous peoples are subjected to since colonial times. Just as the digital divide is one more gap that adds to pre-existing divides, as aforementioned: education, cultural, scientific, cognitive. We can see that the geographic isolation of indigenous communities turns out to reinforce other kinds of isolation, not only technological. If we take a deep look into indigenous life conditions and compare them with the surrounding societies, it is very clear that they are below average. Indians present lower health and educational indicators and more nutritional deficiencies and are still fighting for existence before Brazilian government, for more than 30% of Indian population has no civil registration. Furthermore, indigenous geographic and political isolation is also reflected on the paucity of statistic and qualitative data about their life conditions.

Indigenous groups lost much of their traditional territory during the expansion of western civilizations throughout Brazilian territory. Landless or restricted to small pieces of lands, they became marginalized, second-class citizens. They lost the access they once had to natural resources that sustained their way of life and gained little access to western commodities and public policies. In 1988, a new constitution acknowledges indigenous rights to lands traditionally occupied, which made the fight for these territories and its wealth the center of the Indian question at the beginning of the 21st century. Defining which portions of territory is traditionally linked to each group, the extension of such lands and relocating national population living on them is a long and complicated process, marked by uncertainties. Government officials argue that only once this territorial issue is solved, they can extend public policies to these populations. This includes the most basic ones, such as the deployment of roads, the construction of schools, health

centers and the allocation of professionals to work on these locations or the capacitation of local populations, etc.

There is a very interesting case of a Sipam access point that was to be installed at a Xavante indigenous school in Mato Grosso State. Marãiwawatsé-dé Indigenous Land was long occupied by farmers who built a small town there. By the end of 2012, Brazilian government determined its repossession by Xavante Indians and the expelling of all local non-indigenous population. But that was not all. To proceed with the repossession, Brazilian justice commends the demolition of all existing infrastructure, including the school where the access point should be installed, where a base to the Sipam antenna had already been built by the city hall. Thus, the access point will be installed elsewhere, in a non-indigenous location and the Xavante group will remain unattended.

8. Indigenous' potential for active appropriation of the internet

The last three digital inclusion levels established by Sorj – training, intellectual ability and social integration, and production and use of specific content – define the potential for active appropriation of the internet. These are very important elements because contemporary ICT are not only interactive, but require pro-activity from the user. The potential usefulness of these technologies depends on the user capacity to select, analyze, comprehend and evaluate hardware, software, services and contents for individual and personal use. According to Sorj, this second dimension of digital inclusion can only be achieved once the first one is satisfied. The second dimension will also determine the first one's usefulness. However, from the last section, we learn that this second dimension can also be a precondition to the first one's existence.

To begin with, a group's social integration – the fourth digital inclusion level defined by Sorj – is a determining factor to whether it will have access to ICT infrastructure and equipment or not. In the case of the Indians, they are a marginalized population not taken into consideration by telecommunications companies. To have access to digital inclusion policies, they need to organize themselves and try and submit a request to the government, which requires social and intellectual skills and connections. Then, once they succeed in receiving infrastructure, equipment and internet access, despite the difficulties in transportation, these might easily break due to lack of training in using such technologies. Costa and Renesse gathered narratives about Indian communities that rapidly (in a matter of hours or days) went back

to ground zero after benefiting from digital inclusion programs due to equipment misuse. Due to the lack of financial resources to repair or replace hardware, broken equipment is discarded or simply left aside. Reportedly desktop computers have been thrown away the day after they were installed because they no longer worked.

According to government policies, internet access points provided by digital inclusion programs should not become a free cybercafé. They are supposed to be knowledge dissemination centers, offering courses that are to be arranged by the management committee. Committee members should be trained in operating and managing access points and using ICT and convey this knowledge. Some federal government programs provide training for a limited period, such as a year, but then it is up to the committee to ensure its continuity. Distance Education tools are also used, but the connection is a limiting factor in some locations. Public managers consulted for this research suggest that communities benefiting from digital inclusion programs should engage in campaigns and prepare other project proposals to address issues such as replacement of broken or outdated hardware, financial sustainability of access points, including daily-use material and staff compensation. We understand that training needs to go beyond teaching the Indians how to use ICT. In order to sustain the operation of the access points on the long run, internet access points operator also need to learn how to properly use, maintain and fix the equipment, as well as raise funds – through projects or other sources – and properly manage the points' resources, be they financial, technological or human.

Ministry of Culture's program Ponto de Cultura Indígena (Indigenous Culture Point) offers digital cameras, audio recorders, video cameras, computers and other ICT tools to foment and promote organized indigenous cultural initiatives. Gesac connects some of these points to the internet. Indians are trained in the use of these technologies, but only up to a basic level. For example, about the digital video editing workshops, Ministry of Culture highlights that the workshops are not enough for one to master video editing software, but are a space for discussing and understanding broad concepts related to video editing process, such as rhythm and continuity.

Training in the use of the technology is the third digital inclusion level defined by Sorj. It can be formal, through courses or workshops, or informal, through self-learning and knowledge exchange. Informal training in particular depends on the user's intellectual ability and is made easier by the appropriate social interactions. But even the fruits of formal training are

conditioned by these two factors, which constitute Sorj's fourth digital inclusion level. As told by a consultant for the Ministry of Communication, Rodrigo Fonseca (personal communication, January 31, 2013), connection quality is not the only limiting factor in implementing Distance Education in certain access points. Sometimes, the life experience of the local population requires the physical presence of the teacher and the concrete demonstration of virtual world principles that are too detached from their reality. "I arrived at the indigenous village, tried to explain a copy/paste, the person stood there not understanding how copy/paste works on the computer. I used a fruit basket to show how copy/paste works", Fonseca reports in an interview (personal communication, January 31, 2013).

As we can see, e-literacy goes far beyond the acquisition of technical skills. The potential for active appropriation also depends on the individual capacity for abstraction, on the comprehension of the logics inherent to the virtual world and is intimately linked to the intellectual and cognitive gaps. Moreover, e-literacy begins with traditional literacy itself, an important issue of the indigenous situation in Brazil. Illiteracy rate in the Brazilian population aged 15 or more is already high when compared to developed countries, 9.6%, according to 2010 Census. Among indigenous peoples, it is even higher, 23.3%, in Portuguese or in indigenous languages. Among Indians living in their own lands, this rate reaches 32.3% of the population. One possible explanation to this rate is the low number of indigenous schools and the precariousness in which they operate. The scholar census of 2005 identified 2,323 indigenous schools in Brazil, attended by 163,693 students. An important part of these establishments, 34.2%, doesn't have a building of its own and operates in makeshift locations. Only 31.9% are connected to the national power grid and more than half, 50.8%, don't have any source of electric energy. Only 13.2% of the teachers working in these schools have higher education, most of them, 64.8%, only attended secondary school and others not even that. Most of the indigenous students, 81.2%, are attending primary school and just a few, 2.6%, secondary school. Furthermore, there is a remarkable age/grade distortion: half the students attending preparatory to third grade are older than 11 years old.

That being said, we notice that the structural problems faced by indigenous populations do not affect only the passive dimension of digital inclusion, the deployment of technical infrastructure. They also accentuate the cognitive and intellectual divides, have an impact on the potential active appropriation of ICT and are a key issue for the building of indigenous knowledge societies. Many indigenous peoples living in their own lands do not speak Portuguese – especially women, children, the elders and traditional leader-

ships – and those who do speak it do so as a second language, not a mother tongue. Sorj (2003) affirms that “while an important part of developing countries’ population is drown in illiteracy and semi-illiteracy, internet access universalization, independently of infrastructural expansion, will remain a chimera” (p. 68). The language barrier is the first one to be overcome and it is a double hurdle for indigenous peoples: first, Portuguese, and then, English, because many technical words and expressions don’t have a Portuguese translation and neither do most of the services available online. Not to mention that most online content is in English.

Many scholars studying indigenous digital inclusion in Latin America address the language as a big issue to be solved in order to promote and facilitate the use of the internet by the Indians. There’s much criticism to the fact that most of the content is in English and many demands for the creation of content in indigenous languages. However, that will never come to pass unless the Indians mobilize themselves to produce and translate content. Content production is something that has been promoted by the Pontos de Cultura Indígena program, but the choice of the language is up to the Indians.

Indigenous peoples have been producing all sorts of content, from texts to photos and videos – content created by the Indians for the Indians both in Portuguese and indigenous languages, as verified by Pinto, Costa, Renesse, Bucchioni and Pereira. Nevertheless, uploading the content is a problem because of the quality of Gesac connection. Daniel Benjamin, a Baniwa teacher, explains how difficult it is to update his blog baniwaonline.wordpress.com from indigenous lands:

It takes too long when it is a document too heavy, image... Video is impossible, impossible. It is not possible. Just low resolution image you can upload, one or two in the whole body. A good image is difficult, takes too long. (Daniel Benjamin, personal communication, May 1th, 2011)

João Ramirez, internet specialist and advisor for ISA and Foirn, realized that the content produced by the Pontos de Cultura wasn’t going online. During the workshop about social media in São Gabriel da Cachoeira-AM in March 2011, he proposed that the Indians try and send CD-ROMs and DVDs with the material they produce to Foirn and ISA offices in the city and that the institutions send the disks to São Paulo so that he could upload the material from there. In his conception, that would be a way to promote Rio Negro peoples and their political fight.

The number of people who speak Portuguese, their abstraction capacity and literacy level is variable among each indigenous group; just as each indigenous group's proximity and contact with national population and access to infrastructure and public policies is not the same. Despite a general tendency to think of Brazilian indigenous groups as a homogeneous population, each people had a distinct relationship with Portuguese colonialism and the constitution of Brazilian national state. Therefore, each indigenous people insert themselves in different ways in a society that intends to be national. We can find a generalization of indigenous situation in Brazil in the writings of Brazilian indigenist Darcy Ribeiro. This is how Ribeiro describes the Indians who survived the colonization processes and are considered "integrated" to national society:

Stranded around national population, to whose economic life they are incorporated as manpower reserves, or specialized producers of certain articles for the commerce. In general they live confined into parcels of their ancient territories, or deprived of their lands, wander from one place to another. Some of these groups lost their original language. Equally mestizos, wearing the same clothes, eating the same food, could be mistaken with their neobrazilians neighbors, if they weren't sure themselves that they constitute a distinct people, if they didn't keep a sort of loyalty to this ethnic identity and weren't defined, seen and discriminated as "Indians" by surrounding population. (Ribeiro, 1993, pp. 433-4)

In the state of Acre, grassroots populations – indigenous peoples, riverine peoples, maroons and rubber tappers – form a group known nationwide since the movement led by famous rubber tapper Chico Mendes in the 1980's, the Peoples of the Forest Network (Rede Povos da Floresta). Even living in isolated regions, thanks to its organization, political articulation and visibility, the members of this Network were already benefited by at least three different digital inclusion programs. Amazonian populations from the north of the state of Mato Grosso live close to soya fields and benefit from the region's economic and infrastructural development. "They already have tablets, there is wireless internet available there", says Danielle Pereira da Costa, Sipam's advisor (personal communication, January 25, 2013), "it's a setting in which there is no longer a need for programs [digital inclusion programs like Gesac] because other things are already happening, including the broadband policy". In Rio Grande do Sul state, on the other hand, indigenous peoples live close to the rural and urban national populations, but

are still marginalized, face significant prejudice and have limited access to public policies.

These are examples of the external dimension of social integration. There is still the internal dimension, already addressed by Renesse (2011) and also observed by us in our field research. Digital inclusion programs need to be aligned with the communities' objectives and rules, dictated by traditional leaderships. New leaderships do not have the autonomy to act outside of traditional leaderships' rulings. So, even if a community receives a Gesac antenna and equipment, if the elders say they are not to be used, they remain untouched and waste away. The introduction of internet and other ICT generates divergent or even conflicting positions inside indigenous communities. Many elders think the young will privilege online life over traditional community activities, which is seen as a threat to social order. On the other hand, young generations tend to question traditional leadership legitimacy if they outright reject new technologies and do not consider having an information and communication plan for the people.

9. Conclusion

Digital inclusion provided by Gesac to indigenous lands' population varies from region to region, from people to people, and even inside each community, from individual to individual, making it impossible to make a unique portrait of indigenous digital inclusion in Brazil. Interethnic contact happens in different contexts and ICT are appropriated in distinct ways by each community and by each individual inside a specific community, usually according to the individual's social role. In general, those more interested in the internet are those politically active, usually members of indigenous organizations that fight for indigenous rights, that got to know ICT as important tools for their activism. For them, ICT have the potential to speed-up communications among them and their partners, which simplifies the implementation and monitoring of ethnodevelopment projects. Digital space is also a visibility tool, a place where Indians can speak for themselves without the interference of external mediators such as missionaries, journalists and NGOs and have their voice amplified through the use of social networks, for example. The young ones are more likely to be attracted to ICT, whereas the elders can be very suspicious of technology. New indigenous leaderships need to know how to convince traditional leaderships of the ICT's importance for the community in order to have its use authorized.

The geographic isolation of indigenous communities and the lack of infrastructure on indigenous lands make it a big challenge to bridge the most elementary dimension of digital divide: the deployment of physical transmission infrastructure. Especially on the Amazon forest, the placement of transmission cables is very complicated due to the absence of paved roads, where cables are usually laid on, and the enormous abundance of watercourses. Communication infrastructure is usually a secondary structure that relies on previously existing infrastructure, such as roads or rails, power grids or pipelines, usually unavailable on indigenous territories. Gesac made it possible to contour this overall lack of infrastructure through the use of satellite connection. Still, it requires electricity and the transport of equipment such as antennas, not to speak of computers themselves and other hardware. Poor transportation conditions might lead to hardware damages even before their arrival on indigenous communities. Once there, there are also issues of inadequate equipment storage conditions and lack of capacitated personnel to handle them. Isolation and transport conditions are also a barrier to proper technical support.

Bridging this first dimension of digital divide does not guarantee the beneficiary's integration to the digital world. The provision of ICT equipment by itself does not assure that they will be available to local population, because they can arrive on the communities already damaged, or they can break on the very first uses due to lack of training of the beneficiaries. Also, this physical dimension of digital divide, that Sorj (2003) calls passive, encompasses several other divides that emerge continuously with technological evolution. Access to outdated or up to date technology, both in hardware and software, and different internet connection speeds will determine ICT's online and offline resources that one will be able to make use of. From our interviews and field research conducted at Pamáli School, we observe that Gesac satellite connection works poorly, is intermittent and unreliable and the connection speed limits the use of multimedia resources such as photos, videos and voice and video calls. The study of these aspects of digital divide's passive dimension requires a qualitative study of equipment and connection available on Gesac access points.

Structural problems to which indigenous peoples are subjected since colonial times, such as lack of education, access to information and even the lack of basic services on indigenous lands, such as electricity, are an important barrier to the active appropriation of ICT. It is an oversimplified vision of social dynamics to think that technology alone will foment social, economic and democratic development, notably, as pointed out by Andres et al

(2007), “in populations that are too submerged in extreme poverty, without basic food, electricity, water, shelter, literacy and many other basic infrastructures to think about the deployment of internet” (p. 4). Even if technology deployment is assured by a public program such as Gesac, structural problems may not allow them to reap the possible benefits of the technology. For a deeper look into this matter, we recommend a future analysis on indigenous digital divide based on van Dijk (2005) partial exclusions view, that contemplates four kinds of access: access to motivation to use digital technology, material access, digital skill access and usage access (number and diversity of applications, usage time).

In general, we can say that in Brazil there are still many barriers to the most elementary dimension of digital inclusion: physical transmission infrastructure and availability of equipment/connection. When this first dimension is assured, the limits at the following levels starkly appear. However, in opposition to Sorj, we don't see a linear progression between each level. On the contrary, more than a simple linear progression, we identify an interdependent relationship between the five levels of digital inclusion systematized by the Brazilian sociologist, not a direct and inevitable condition of existence and determination of utility. Moreover, we see an almost tautological relationship between digital inclusion levels in programs aimed at disadvantaged sectors of society, lowly educated and highly illiterate, as it is the case of the Indians. Many Indians do not know how to use computing equipment because there is none available while many others damage and break hardware and loose connections due to misuse, because they do not know how to handle the equipment.

Digital inclusion may begin with access to infrastructure, hardware and connection, but does not need to follow from level's one to five. We see these levels much more related to the perceptions and conceptualizations of digital inclusion scholars through the years than to the use of technologies by individuals in the present. In indigenous communities, many people own a computer (second level) even if there's no internet network (first level). Many young people have cell phones (second level), even if there is no mobile service (first level), and use them to take photos, videos and save and exchange digital contents such as music (fifth level) although they never top-up their prepaid phones. The lack of internet access and mobile service or their limitations doesn't mean that indigenous lands population doesn't have access to new media in its broader sense. However, we consider that full digital inclusion is only reached when each of the levels identified by Sorj is embraced and developed continuously and in an integrated manner.

Going further on the definition of digital divide proposed by van Dijk (2005) and already presented on the Theoretical framework section, the statements that summarize the author's core argument on a potential theory of the digital divide condense the dynamic nature of this phenomenon:

1. Categorical inequalities in society produce an unequal distribution of resources.
2. An unequal distribution of resources causes unequal access to digital technologies.
3. Unequal access to digital technologies also depends on the characteristics of these technologies.
4. Unequal access to digital technologies brings about unequal participation in society.
5. Unequal participation in society reinforces categorical inequalities and unequal distribution of resources. (van Dijk, 2005, p. 14)

With all that being said, we confirm our hypothesis that, despite an official discourse aligned with the discussions on the information society and on the knowledge societies, in practice, there is still a vision that the simple disposal of internet connection and computing equipment will promote social participation and citizenship among the beneficiary population. Gesac, Pontos de Cultura Indígena and Sipam telecenters' managers seem to understand that effective appropriation of internet in the terms defined by Marí (2010) – “the ability to claim for one's self and incorporate what is not possessed (the technology) from what is already known and had (cosmovisions, imaginaries, operation and organization logic)” (p. 8) –, and thus effective digital inclusion, is only possible with more complex sociocultural arrangements. However, financial and human resources are limited and the logistics involving the provision of digital inclusion services that goes beyond the offer of internet connection is very problematic to be implemented nationwide in such a large country as Brazil. Hence, most of the efforts of digital inclusion actions are still on the deployment of transmission infrastructure, which we well understand to be still a big issue in Brazil.

While mainly focused in providing internet access and equipment (first and second levels – the passive dimension of digital inclusion), Brazilian digital inclusion programs have not developed a logistic system that allows them to do a systematic follow through of internet access points after their implementation. From our interviews, we found out that they do not provide for updates and repair or replacement of damaged or outdated equipment nor for continuous training to the users and management committee. This

is left in the hands of the beneficiary communities, which need to organize themselves to ensure the access points' continued operation in the long run, the projects market being a feasible solution to this matter.

Nevertheless, the problem of implementation and continuation of digital inclusion programs on indigenous lands goes beyond technological infrastructure and economical and institutional obstacles to internet access. In Brazil, there isn't a federal Indian policy that addresses the different aspects of life of indigenous peoples. What you have are one-off, isolated actions to mitigate the impact of crises, there are no sequential actions contemplated in medium and long-term plans. The general lack of infrastructure and access to public policies emphasize the geographic isolation while at the same time being aggravated by it. Municipalities, states and the union have a tremendous difficulty in aligning themselves to meet the needs of indigenous peoples, who have an enormous cultural diversity and relate in distinct ways with the national society.

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Fotografías



Batteries used to store solar energy at Pamáali School



Gesac Antenna and solar panels at Pamáali School



Gesac Antenna and solar panels at Pamáali School



Gesac internet access point at Pamáali School



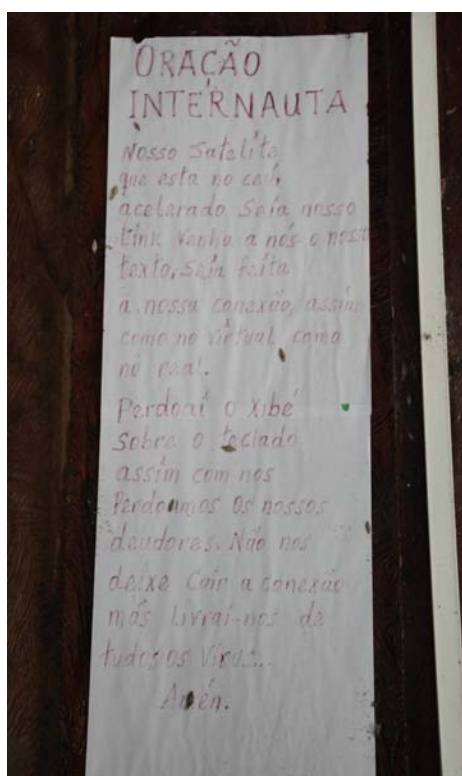
Pamáali School



Teacher choosing a tune to be played during a soccer game at Pamáali School



Teacher using a computer at Pamáli School



Websurfer prayer on the wall of Gesac internet access point at Pamáli School



Teachers taking notes during an assembly at Pamáli School