

The ethnical digital divide: internet access among indigenous peoples in Brazil¹

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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 the programs do not consider the follow through of internet access points after their implementation, as they do not provide for updates and repair or replacement of damaged or outdated equipment. Thus, the access points are easily and often subject to technical problems that result in underuse or even obsolescence. 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.

Our main argument is that 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.

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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)*. 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.

Many Brazilian indigenous movements have been using the internet as a political tool, a new space that allows Indians to draw attention to their causes, be they social or environmental. A relevant part of new indigenous leaderships⁴ see this specific technology 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 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.

Nevertheless, 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,

⁴ Anthropologist Gersem José dos Santos Luciano (2006a), who is a Baniwa Indian, uses the term *new Indian leaderships (novas lideranças indígenas)* 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, pastors, leaders of associations and so on. New leaderships are the mediators between traditional leaderships – ancestral leaders like caciques, clans, phratries or sibs' chiefs – and local, national or even international society.

most of them implemented after 2007⁵. On the 2010 Census, 817.963 Brazilians 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*, 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^o 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 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 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. After this introduction, we expose the method used to guide the analysis and achieve the results. On the third section, we make a review of relevant literature about indigenous digital divide in Brazil. On the

⁵ Reaching an exact number is difficult due to the low specificity of the records made available in the Gesac website, which does not make an exact distinction between villages/communities in indigenous lands and rural zone. <<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.

fourth, we focus on the physical challenges found in connecting indigenous lands to the internet. On the sixth, 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 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. The challenges we identify lead to the conclusion that 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 order to try and determine the level of digital inclusion made possible by Gesac in indigenous lands, we use the five New Information and Communications Technologies (NICT) 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, modem and internet connection;

3) Training in the use of computing tools and the internet – also know 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) and his personal network; and

5) The production and use of specific content – most of the content production for the internet is commercially oriented, thus aimed at the middle class or higher, both in terms of content itself and form.

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.

Based on these five levels, we pose the following questions: 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? What are these groups' infrastructural, cultural and political specificities? How does the internet fit into their lifestyles?

To test our hypothesis that Brazilian digital inclusion programs established on indigenous lands do not follow through with the internet access points after their implementation, we performed the observation of Gesac internet access point in the indigenous school Pamáali. This is a baniwa and coripaco school, 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. We also discussed and conducted interviews with actors involved in the implementation of digital inclusion programs aimed at indigenous peoples: ministries of Communications and Culture, Indian National Foundation (*Fundação Nacional do Índio* – FUNAI) and Amazon Protection System (*Sistema de Proteção da Amazônia* – SIPAM) officials, representatives of the third sector and Indians themselves.

3. Review of relevant literature

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 ICTs 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).

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 one. 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 leaders 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” (RENESE, 2011). 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 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 leaders to stay in touch with supporters and partners, to speed up communications among distant leaders and to formulate projects to obtain necessary resources for the school and for Baniwa and Coripaco peoples as a whole. Pamáali 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 dimension, 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”. 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”. Also, NICT “allow the indigenous existence before other individuals, and especially before the Indians themselves”.

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 NICT, 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, educations 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.

4. Internet access' passive dimensions

Despite indigenous experiences with NICT described above, 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).

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 do 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 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*)⁶ director, Nelson Simões, explained to us in an interview on April 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 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 support 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 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

⁶ RNP was the first Brazilian network to provide internet access in Brazil and provides connection to university and research centers.

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 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. After this news, state's Secretary of Environment and Sustainable Development decides to use underused optic fiber to transport data and provide internet to countryside populations. Brazilian energy corporation *Petrobras* has a 660 km optic fiber following and monitoring a gas pipeline that transports natural gas to Manaus from Urucum, located by Solimões River. This optic fiber will be extended to provide eight municipalities with internet access. A 1,800 km power line is under construction to connect Amazonas state, Amapá state and western Pará state to the Brazilian power grid. This line will cross forest areas and the Amazon River and shall carry an optic fiber cable that might be used by the State to provide better internet connection to these regions.

These three projects are one-off land-based alternatives to satellite connection, which is costly (deployment and use are expensive, bandwidth is limited and non-expandable, and lifespan is short). 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, you have to deactivate another. 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 point.

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 latter, when the CPUs arrive, the monitors are already 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 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 make some local governments unwilling to receive the access point and the population reluctant to be part of the management committee.

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. Marãiwawatsédé 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 would 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.

Additionally, Embratel, the company that won the Ministry of Communication bid to provide the service from 2010 to August 2013, is supposed to guarantee the quality of the connection. According to the Ministry of Communications, the company should provide for all necessary assistance 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. Pamáli School access point managers state that in 2010 they had to pay for half the costs of the Embratel 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 all the time to receive updates, which is unfeasible in indigenous lands with all the electricity constraints.

5. 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. These are very important elements because NICT 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 NICT 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 NICT 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 NICT. In order to sustain the operation of the access points on the long run, local populations also need to learn how to properly use, maintain and fix the equipment, as well as raise funds – through projects or other sources.

Ministry of Culture's program *Ponto de Cultura Indígena* (Indigenous Culture Point) offers digital cameras, audio recorders, video cameras, computers and other NICT 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, connection quality is not the only limiting factor 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 in 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 he gave us on February 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. 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 rates reaches 32,3% of the population. Many indigenous peoples living in their own lands do not speak Portuguese – especially women, children, the elders and traditional leaders – 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”. 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 of the 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 themselves mobilize and produce and translate content. Content production is something that has been promoted by the *Pontos de Cultura Indígena*, 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, in an interview

from March 2011, 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”.

João Ramirez, internet specialist and advisor for ISA and *Rio Negro Indigenous Organizations Federation (Federação das Organizações Indígenas do Rio Negro - Foirn)*, realized that the content produced by the *Pontos de Cultura* wasn't going online. In a workshop about social media in São Gabriel da Cachoeira-AM in March 2011, he proposed to the Indians to try and send CD-ROMs and DVDs with the material they produce to Foirn and ISA headquarters in the city and that the institutions send the disks to São Paulo so that he could upload the material from there.

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.

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”, says Danielle Pereira da Costa, Sipam's advisor, in an interview from March 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 NICT 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.

6. Conclusion

Digital inclusion provided by Gesac to indigenous lands' population is variable 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 NICT 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, we can say that there are still many barriers to the most elementary dimension of digital inclusion – physical transmission infrastructure and availability of equipment/connection. When the first dimension is assured, the limits at the following levels starkly appear.

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.

Digital inclusion may begin with access to infrastructure, hardware and connection, but does not need to follow from level 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.

Focused in providing internet access and equipment (first and second levels – the passive dimension of digital inclusion – and still a big issue in Brazil), Brazilian digital inclusion programs do not 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, that 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 show 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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