Impacts of the workshops, qualifying and mediation of multipliers and sessions with users of digital inclusion programs in Brazil: an assessment from a multivariate analysis

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Abstract: This article aims ats evaluating the results of the process of digital inclusion among the supposedly included users of digital inclusion points, promoted by programs and projects of the Government and its partners, after having gone through qualification processes, workshops and other forms of mediation. The evaluation has as base the identification of variables that better explain the inclusion process and a multivariete analysis of these variables. Thus, factors had been identified that would allow to detect factors that have an impact in the inclusion process, such as the context of the user, his or her demographic profile, the social conditions, the use of and access to information and comunication technologies - ICTs, but also the evaluation, use and search of information by the user. An example is the search and employment of the information for the welfare of the community. In this study changes were detected to the degree in which explanations of variable or indicators are considered for the user to feel included, such as: sex, color/race, access to broadband Internet, infrastructure, available cellular telephone, available digital information in the Internet and social nets and a computer at home. The multivariate analysis selected that the determining factors of digital inclusion are in constant change, as the ownership of cell phone, a fixed telephone and computer at home. It was evidenced that the ones that say they are digitally included were people who believe that Internet changed their lives, know and use the Internet, participate in relationship sites, have the habit of reading the press and news in the WEB. In the study, the issues of schooling and range of income and geographic region continue to determine whether users feel included. Because of the universalization of cellular phones, this represents little to the included ones, which is different from having a computer at home. These results must be seen to the light of the research universe, of people of a disfavoured class, living in places with little telecommunications infrastructure, where the satellite is the most viable means to provide broadband Internet.

Keywords: Digital inclusion; Informational inclusion; Social inclusion; Social indicators; Logistic regression model; Evaluation of social programs and Information Science.

Aplicación e indicadores de inclusión social y sistema métrico de evaluación entre usuarios incluidos digitalmente que pertenecen a comunidades en estado de vulnerabilidad en Brasil

Resumen: Impacto de los talleres, formación y mediación de los multiplicadores (formadores de formadores) y las sesiones con participantes en los programas de inclusión digital en Brasil: una evaluación desde un análisis multivariable. Este artículo tiene por objeto evaluar los resultados del proceso de inclusión digital de los usuarios supuestamente incluidos en los puntos de la inclusión digital, promovida por los programas y proyectos del Gobierno brasileño y sus socios, después de haber pasado por procesos de capacitación, talleres y otras formas de mediación. La evaluación toma como base la identificación de las variables que mejor explican el proceso de inclusión y un análisis multivariado de estas variables. Los resultados obtenidos deben ser vistos a la luz del universo de investigación, de las personas de una clase desfavorecida, que viven en lugares con poca infraestructura de telecomunicaciones, donde el satélite es el medio más viable para ofrecer Internet de banda ancha.

Palabras clave: Inclusión digital; inclusión informacional; inclusión social; indicadores sociales; evaluación de programas sociales.

1 INTRODUCTION

Over the past ten years, the Eastern and Western societies have undergone profound economic, political and social changes, being forced to organize themselves and adapt their production structures and their information flow and transactional forms of communication, whether at the state level, the city or community. This process of transformation has not reduced its momentum. However, technological innovations and digital universalization of telecommunication services, especially the Internet, maintain a strong rhythm and have contributed significantly to other changes in organizations and citizen life from the second decade of the twenty-first century (CASTELLS, 2007). These changes, while they created and maintain significant gaps between two parts of society, the included and those excluded (who are often called as disabled or restricted simply by staying on the sidelines of the advances and benefits of information society or network, as it is sometimes labeled). The latter happens most often in a compulsory way and the excluded are not invited to participate in the transformation and adjustment in their ways of life, experiencing severe consequences, including direct impact on their cultures and even their survival (SORJ, 2007). Over the last ten years, through further globalization of the economy, the growth of capitalism and religious and ideological conflicts, we have had an exponential growth of information flow in sectors of society (BARRETO, 2007). We have also seen the emergence of new services and products of information and communication technology - ICT, either to support a growing flow of information and sometimes, to meet new media.

The trademark of the society in the decade that now begins is the presence of technological devices in the hands of people, especially those products that claim to facilitate interpersonal relationship and access to information and services provided or offered by organizations, governments and market. The communication via voice, via cell phone, that is surpassing the fixed telephone can now reach places away from big urban centers. The telecommunication circuits for only voice traffic are increasingly smaller in comparison to those dedicated to data. The availability of computer networks to allow access to information and services, mainly via the Internet, now becomes a matter of state policy, not just another market development for connection and service providers (BRAZIL, 2010). ICTs, especially, Internet access, have always been touted as promoting economic development and social benefits for citizens, but the demonstrations of this are brittle because often they have been based on reports of success. But gradually, evaluation and measurement of results, using more accurate methodologies, have taken part in projects for the development of digital inclusion programs. The construction of indicators and analysis of evaluations of citizen inserted in the information society have led countries to review their policies and invest in projects and plans for broadband, especially availability of the Internet for the excluded (BARZILAI-NAHON, 2008; BRINGER and CHALEZQUER, 2009).

ICT, or IT, first emerged in the academic and military, and continued their development in industry and business, and then forward, to organizations and government, coming only now, more strongly, to the homes of the citizens. Carr (2004), Harvard Business Review, pessimistically analyzes the ability of ICTs to constitute a competitive factor in business now, as is still desired and acclaimed by the providers or IT vendors. However, as to their possible impacts on society of Information or services, his undersding is different.

> *In fact, the Center of innovaction for the TI industry appears to be shifiting from the businesses to the costumer market. With home PCs increasingly being used for video editing, audio and image processing, and graphics-intensive gaming, the average home computer user today has a greater need for additional processing power and innovative new software than the avarage business user (CARR 2004, p. 149).*

Along with the increase in means of communications and telecommunication channels to meet the needs of society, we have had a growth in the repositories for storage, processing and retrieval of information, be it image, voice or text. The formation of large databases containing information of users is something quite recent, so part of your personal information which before was held by some organizations, are now concentrated in the hands of a few organizations or companies seeking information or promoting technical social networks. So we approach what is called cloud computing. The issue of storage of personal

information in a repository grows, and this has a major impacts on business models in the sector of production and distribution of information and knowledge, such as the segments of music, books and movies, and even in public administration. The recovery of abundant information in digital form, whether data, voice or image occupies information scientists and technologists (LEVY, 2001; BARRETO, 2007). Acceptable solutions are emerging in order to overcome difficulties in finding accessible and correct information on the Internet. It did not use to require many skills for the user to find the information or service they wanted, but they had to move to find in a library, an information center or a government agent. Now, the user can have greater access to global network computers at home, school, telecenter or work, but lacks the time or information litteracy to reach the desired database or department of Government. The solutions available on the Web practical and fast for the citizen, but as long as he is digitally included .

> Increasingly, the option of a hidden experience shows itself in a new information   technology   such as the Chat, Facebook, MySpace, Podcasts, RSS and Vodcasts. It looks like a Second Life is possible. The sweet sentiment of existence is lived by our other, an avatar of what we dream of, to live an experience without being there presentially (BARRETO, 2007, p. 31).

What is certain is that the presence of a rift or division between people in the information society will always exist and will cry out for some action and strategy, for when one breach is overcome, another arises. As an example, your phone is a tool to facilitate verbal communication, but suddenly communication text-messages, on the phone itself, can overcome communication via voice, which is happening in large cities. What will happen to those who are functionally illiterate? People who are across the street and not having access to information and knowledge perceive a gap facing them. Standing on the other side of the street means sufferin the callous indifference of the digital divide. Therefore, it is essential to make up the training, the mediation of information and the training of multipliers (MENDONÇA, 2008). Thus, two issues arise: first, the access to ICTs and retrieval of information by the individual and the search services available on the Internet, once limited to libraries and information centers. The second issue is the development of digital interfaces, to offer encouragement to the learners so that they never want to stop studying, thus avoiding another breach in the future. Passarelli (2007), in his book *Digital Interfaces in Education*, says that the open model of Internet is an ideal tool for anchoring and mediating the interaction and sharing of information and knowledge. If on one side factors such as position in higher social class, color or race, or more privileged to be younger, or by where you live and work and your education contribute significantly to the online access, there are also factors that hinder access to the Internet population. Examples are disparities in access for those who are disadvantaged, with low income, the elderly

and the poorly schooled, as well as residents of poorly assited geographic regions (MEDEIROS NETO and MIRANDA, 2010). As a response, or trailing that uncomfortable situation, initiatives arise, or efforts of civil society organizations, sponsors of the market and / or actions and government policies, such as programs and projects of digital inclusion, are made.

2 DIGITAL INCLUSION AND THE ICTs

Looking at the development of digital inclusion in the last decade in Brazil and the Western world, there is at least one significant change in the job of the researchers: the emergence of burning issues and the growing volume of financial resources. But the challenge remains, namely that of bringing excluded people to experience the complex world of the Information Society (PASSERRINO, 2007 and BRAZIL, 2010). The fact is that we have always had problems waiting for an interdisciplinary approach, and consistent or further analysis to be able to do research. At the beginning of the decade (2000-2002) we had a visionary and hopeful opinion of the Information Society. These views have acted as a driving force for research in various fields, market innovations and solutions presented and the government has developed programs and projects to tackle the digital divide. Among the visionaries, no doubt, Pierre Levy (2001) and Manuel Castells (2002) stand out. Their forecasts and their proposals on the network society and the possible positive favorable impacts of ICTs led agents to place developmental resources and efforts in poor communities. As example the above, this article has a leading digital inclusion program in Brazil and its partners as objects of analysis and evaluation. The program is GESAC and it promotes digital inclusion through a network platform of services and applications, offering tools, information technology and communications, digital resources and training (MEDEIROS NETO, 2008).

There are no doubts that the development of post-modern society is linked to the growth of the flow of information in cyberspace, provided that the participation is there at all. Levy (2001) and Castells (2002) and other thinkers and researchers continued to stress the potential of ICTs in the fusion of media and technology for universal access to information. The priority was to reduce the gap resulting from other chronic social inequalities. At the beginning of the decade, companies in the fields of telecommunications and information technology - IT, found a large space to sell their products and services, but few products were able to reduce the gap of excluded users, or to break the barriers of functional illiteracy and physical disability (PASSERRINO, 2007; CPqD, 2009). In this study it was found that a person with college degrees may double his chances of becoming included as compared to someone with only primary school, education being an enabler to reduce inequality. The possibility of cultural preservation of the people aroused changes in posture in public managers, the business leaders, and

movements of the third sector. But it was again Castells (2002) who drew attention to the power of ICTs, including the Internet as the main channel to access information and to preserve values in future society. "*The Internet is the fabric of our lives, having the ability to distribute the power of information throughout the domain of human activity.*"

The winds or promising ideas from the ICTs were not sufficient to reduce the digital divide. In fact, it even increased differences due to speed of the computerization of society. However, we had rather an understanding of the issue and its real volume. The concepts of inclusion, digital literacy, literacy, information literacy evolve, but the problem of digital divide was far from being resolved (MEDEIROS NETO and MIRANDA, 2009). Managers and researchers from the competence centers and universities, especially in 2005 and 2006, occupied themselves with the process or phenomenon of exclusion of individuals, and the interdisciplinary nature of digital inclusion, informational and social. The search and presentation of successful cases was one of the hallmarks of these years. Many researchers went to the workfield to verify the minimum requirements that a person should possess for rapid appropriation of ICTs. And there were many researchers who identified solutions and developed methods for multidisciplinary digital inclusion. In the second stage there were many proposals from educators, communicators, sociologists, technologists, and information science scholars who have incorporated this theme into their lines of teaching and research.

> The area of Information, Culture and Society is today, one of the most representative of Information Science in terms of scientific production and has the merits of proposing to reveal the contradictions of access to information in society (CABRAL, 2007, p . 45).

In Brazil, new approaches to promote literacy or just train in Information and Communication Technologies - ICTs, are being practiced, based on research or not, and some projects were proposed in addition to digital inclusion, through social inclusion. In June 2010, this was a part of the situation of Digital Inclusion - DI in Brazil. The Ministry of Communications (www.mc.gov.br) followed with its three DI programs : Digital Cities (around 10 pilot projects), Community Telecenters (6611 Points of Digital Inclusion – PDIs , implemented in all of Brazil), and GESAC Program (MENDONÇA, 2008), (with 11 385 points of presence in 4835 municipalities), this action features as a structure supporting more than 28 (twenty-eight) projects and programs: www.gesac.gov.br. The projects and actions of government are now in greater quantity and the list has grown over the past five years. The two largest attempts at making an inventory, most recently, are: The ID Map from IBICT / MCT, where 167 programs and 21 106 IDPs were pointed out, which includes computer labs: http://inclusao.ibict.br/mid / mid_estatisticas.php. The other initiative is the Centre of ID – ONID / SLTI of the Ministry of Planning, which lists 22 telecentres for

digital inclusion projects at: http://www.inclusaodigital.gov.br/outros-programas. It shows 5280 and 99 DI programs. Here are not included the computer labs in public schools that serve the school communities. As we can see the inventories are flawed due to steady growth, but they tend to overcome their inconsistencies. Thus, universalizing or facilitating access and use of ICTs is something considerable, however complex and comprehensive, requiring monitoring and evaluating. The bigger question is whether mediation to transfer information and knowledge is actually occurring in the process of digital inclusion of these initiatives.

3 MULTIVARIATE ANALYSIS IN DIGITAL INCLUSION

With the increase in facility to access information, any citizen has the right to know the actions and policies in his or her community. The construction of indicators is a permanent activity in Modern Society, and their use is a constant for a portion of the population generating evaluative opinion on social, economic and political aspects. Here we sought the construction of indicators and indexes to be exploited by governments and organizations as a way to check if the benefits and services funded by public taxes are shared (JANNUZZI, 2006). For example, are the shares of digital inclusion and access to information society portrayed in indicators, and are their values compatible with the possibilities and realities of Brazil? This is one of the questions addressed in this work. Previously, these indicators were usually focused only on the possession and use of technologies such as telephones, computers and Internet access, and some impacts of ICT access. The Government and the organizations were able to provide perspectives of the volume of technology use and access to information in aggregate form. However, they lacked the ability or desire to raise and narrow the search, on evaluation and use of information by the user (BARZILAI-NAHON, 2008).

The aim here is to reverse the focus of evaluations, namely, the lack of information on the importance of information in the life of citizens, whether periphery school students or they are patrons with public access to telecentres, especially the free ones. Users of Internet cafes were left out, for there is payment for the use and little concern with the mediation (CPqD, 2009; MEDEIROS NETO and MIRANDA, 2009). In this study, we seek the number of explanatory variables for users who feel digitally included, aiming at building at least one indicator (index) to measure the quantity of Digital Inclusion Points - DIP goers as promoted by the Government (MEDEIROS NETO, 2008). The basic function of the indicator (index) is to summarize in a single variable all explanatory variables, such as personal data, the accessibility to ICT, skills, and access or use to information and knowledge.

The purpose of this study was to trace and obtain evidence to evaluate the supposedly included user, based on data from the National Survey for Assessment of Program GESAC 2009 and to investigate the explanatory power of a set of variables. So the first task of this study was to identify the variables that have greater explanatory power, or rather which variables, whether inherent to the individual or acquired in the process of digital inclusion, contribute to digital inclusion, probabilistically. The second goal, linked to the first, was to verify a user's chances of being digitally included from the adjustment of a logistic regression model. The question is what happens with the probability of a user, of a certain educational level, in a certain income range, and belonging to a particular geographic region and possessing certain technological artifacts or virtual services when he is included digitally.

In this study a univariate analysis was employed from "variables measured from the responses of participants in the sample. At first, the dependent variable was adjusted with each independent variable as if it stood alone, ie., a univariate analysis. Second, it had a multivariate analysis of the key-variables identified in the first stage, examined together or simultaneously. The application of the two ways facilitated the explanation of certain influences and allowed to identify which variables were best explained separately and then together to promote digital inclusion. According to Mingoti (2007, p. 249), a good alternative or technical analysis, for these cases is the logistic model. In the Research on Evaluation GESAC - 2009 there were measurements made in quantitative and qualitative variables, here concentrated on the first.

3.1 DISCRIMINANT LOGISTIC ANALYSIS

The discriminant analysis technique was used to classify the users in the sample in which each element or user expressed his perception of how he or she felt digitally included or not. As the amount of possible variables that kept correlation was large, the analysis became more complex, by crossing of variables that work with at most 3 (three) variables (MEDEIROS NETO and MIRANDA, 2010). From this knowledge, through statistical methods, we opted for the elaboration of the mathematical function called classification rule or discrimination.

Discriminant analysis looked at the behavior of independent variables, besides the personal characteristics of users and their demographics, computer ownership, access to information on health and wellness on the Web, shopping, attending networking sites, and using information for the collective welfare (characteristics identified as influential). The results allows to identify the general profile of those digitally included, or not included, if this is the question (MINGOT, 2007).

3.2 LOGISTIC MODEL

Using the logistic model as an analytical tool to evaluate the constraints of the digitally included user, due to the fact that we count on a possible set of explanatory variables (independent) from two populations, including the digitally included (represented by the binary value 1), and the population of those not included if (the binary value 0), thus investigating the probability of a user belonging to any one of the two populations, as defined previously. For each component of the sample there was a response vector: $X = [X1, X2 ... Xp]$. The aim was to investigate the simultaneous effects of these variables on the variable response or dependent, if the user was included digitally. In this study the questionnaire completed by each user's sample contained quantitative and qualitative variables.

The logistic regression model can be described as a linear function that expresses the probability in terms of logarithm chances from a set of explanatory variables such as age, sex, race, geographic region, family income, skills and knowledge of the Internet, use of technology and access to information, in this case, creating a logistic regression model in linear scale "logit". For the univariate model, the link function "logit" brings odds or an advantage of an explanatory variable, separately; for the multivariate logistic regression model, the logarithm of the odds or advantages of the variables of interest (dependent).

In applying the model, values of B (beta) are estimated, a vector of unknown parameters. In analyzing these parameters, we must be attentive to its mark, which will show us a positive or negative association with respect to the reference category or basis used in addition to their magnitude. If B is positive, the factor Exp (B) is greater than one, and if not, if B is negative, the factor Exp (B) is less than one, indicating that the chances are diminishing. The following mathematical expressions (MINGOT, 2007, p. 249)

P(1) = prob(1\x) = exp (Bo + B'x) \ 1 + exp (Bo + B'x)

P(2) = prob(1\x) = exp (Bo + B'x) \ 1 + exp (Bo + B'x)

with p (1) + p (2) = 1 and the parameters that we estimate are: B1, B2, ... Bp in the study were calculated using the maximum likelihood estimator. The logistic model appears as follows: Z is a variable that takes the value 1 if the user answers YES to the sample and belongs to a population 1, and takes the value NO if it belongs to population 2 (CYSNE, 2005 and MINGOTI, 2007).

4 WORK METHODOLOGY

The chosen methodology sought to use the data collected by the National Research Programme for Evaluation of GESAC - 2009, and was based on Logistic Regression Model. In the study, the binary variable (1,0), "do you you feel you are a digitally included person" was considered dependent. It is noteworthy that the study of Medeiros and Miranda Neto (2010), has already made the considerations and detailed methodology for the survey research field.   This includes the statistical methods used, the target universe, the sampling procedure, and procedures for the questionnaire (CRESWELL, 2007).

This study had a descriptive, interpretative and evaluative character, thus it builds on the scale of measurement of each variable to construct the indicators (indexes) in order to arrive at the description and analysis of results. Qualitative methods were also used to complement the survey and the interpretation of results. The information was drawn from qualitative research and understands the analysis of open questions in the questionnaire and conducts to focus groups in all geographic regions of Brazil (CRESWELL, 2007 and JANUZZI, 2007).

POPULATION

The participants were users of PDIs (Point of Digital Inclusion), telecenters with free public access and hundreds of public schools throughout Brazil. The participants were mostly young people and children belonging to vulnerable classes of great urban centers, inner cities and rural areas, who had the opportunity to use the computer and Internet access, often just in the computer lab of their school, even when playing once a week, among several hundred colleagues. In October 2008, at the beginning of the survey, the PDIs totaled 3570, while in 2010 the amount of PDIs surpassed 11,000. Most of these users did not have all the paraphernalia of technology in their own home, as the wealthier classes, where the computer and the Internet have a different use and meaning. Although still in small numbers, there are also people like fishermen, maroon, indigenous and the elderly, who never dreamed of having a computer to use, and now have the opportunity to join this world for the first time (MEDEIROS NETO and MIRANDA, 2010).

SAMPLE

The sample selection, collection and tabulation of the data were part of the Research Assessment of GESAC - 2009, and lasted for six months, funded by the Ministry of Communications, with support from the School of Information Science and Documentation (FID) of the University of Brasília (UnB). The sampling strategy was based on: a) the predominant use of the Internet for field

research, b) the method for deepening research in the process of digital inclusion c) the user access to complete the questionnaire on the Web (www.gesac.gov.br), and d) use of statistical methods to reduce the size of the sample (RIBEIRO JUNIOR, 2004 and COZBY, 2006. The GESAC Assessment counted on the statistical work, coordination and validation of Joseane Padilha da Silva, MSc. in Agricultural StatisCITs and Experimentation - USP / ESALQ. It may be noted in Table I that the sampling error of the survey is less than the pre-set (two years of age) to calculate the sample with a confidence level of 95%. Therefore, the collected sample is representative of the regions of the country (RIBEIRO JUNIOR, 2004).

Table I: *Number of collected GESAC points, variability in age of responding subjects and sampling mistake.*

REGION	NUMBER SAMPLED	VARIANCE OF AGE OF THE RESPONDENTS	SAMPLING ERROR
Midwest	1342	1.072.145	0,5540
Norteast	1980	1.138.225	0,4699
North	2926	1.044.415	0,3703
Southwest	1212	1.252.909	0,6302
South	1507	664.427	0,4116

DATA COLLECTION

The survey was based on questionnaires via the web. At the stage of testing instruments, questionnaires were filled in Brasilia, Goias and Minas Gerais, and in training applicators of the research, the coordinators used the questionnaire on paper (about 10%) throughout Brazil. Similarly, regarding the administration, we used an online system as a way to complement and support of virtual research (CRESWELL, 2007). The GESAC Program portal, the list of e-mail (discussion) of the responsible state, and phone calls were the biggest facilitators for distribution of information and guidance to appliers, students and users (MEDEIROS NETO and MIRANDA, 2010).

DATA ANALYSIS

After the construction phase of the data, we proceeded to clean the database, eliminating about 20% of the questionnaires, which did not fit the established quality criteria. Thus, 9.224 questionnaires (nine thousand two hundred and twenty four) were considered valid for the study sample. We then proceeded to the analysis and interpretation of data for presentation of results. To ensure greater consistency in the responses, users under 10 years of age were withdrawn from samples.

The identification of variables or indicators and their categorization or classification used was as follows: intrinsic or personal attribute of the participant (age, sex, and color / race), socio-demographic (geographic region, family income, landline, cellular, and computer), skill (schooling, and how long you use the Internet), digital inclusion and competence (knows and applies on the Web, and accesses social networking sites), inclusion or information literacy (news on the Web, electronic shopping, information and well-being and health) and social inclusion (access baselines, and constant activity on the internet). The categorization was based on various studies (CYSNE, 2005; AUN, 2007; MORALES GARCIA, CARIDAD SEBADTIAN, GARCIA LOPEZ, 2008; MEDEIROS NETO, MIRANDA, 2009 and 2010) and supplemented from statistics and simulations in order to find variables that could explain or have an impact on the reasons that lead individuals to consider themselves included.

In data analysis, and study the quantitative values of each explanatory variable, we performed crosses of the dependent variable, those feeling included, with other socioeconomic variables, demographic and skills, knowledge and use of ICTs. Next, we used two methods to treat and describe the results: (i) univariate analysis, analysis of the probability of an isolated variable (those who evaluate, use and seek information), and (ii) multivariate analysis (a set of variables analyzed simultaneously).

5 RESULTS

ICTs bring motivation and can provide visible results, but costs are higher than for of traditional literacy, due to new components in the process, ie, teaching tools and methods to be appropriated by teachers and instructors to arrive at a feasible DI. The use of theoretical models did not fail to solve, often with the multiplicity of disciplines and an alternative approach to DI, from the cognitive process to the inclusion itself (PASSARELLI, 2007; MENDONÇA, 2008; MEDEIROS NETO and MIRANDA, 2009 and 2010). There were many who identified, on the other hand, the most perverse aspect in an emerging society, where many people live with no digital access in cities that are far from info-highways, and are kept away from the telecentres and laboratories. We here highlight the arguments of Sorj

(2007) and Demo (2003). Most users in this study lived in low-income areas (classes C, D and E) and had no telecommunications infrastructure and therefore, were outside the purview of those exploiting commercial ICT. The PDIs were implemented at these sites, implementing a solution based on satellite, where an antenna allowed access to the Internet, even with power from solar cells, but with a possible digital literacy implementation through the mediation of a teacher, instructor or monitor. "Possible", above, means the mediator did not always exist or was prepared to exercise his or her role.

At the end of the decade, a new concern emerged, the focus was to evaluate the processes of inclusion, with emphasis on efficiency, effectiveness, or impact of ICTs. But specifically the measurement of results, were not known, albeit it is necessary to investigate, and everyone agreed upon this. Authors and competence centers (AUN, 2007 and BARZILAI-NAH0N, 2008) raised this need to measure digital inclusion, especially since the process already is in place. The answer to the question remains: how many individuals are there who have undergone a process of inclusion, and broke through the gap, or are surfing the Web? Or the opposite, how many are left with only the rudiments of ICT use, and remain on the sidelines? The time using the Internet among those included, showed that about 20% were users of the Internet for less than a year, showing that the inclusion process is not as immediate in classes C, D and E. The use of Stats packages for application of models and multivariate and univarariate analysis had the participation of statistical specialist Francisca de Fátima Lucena of the Ministry of Social Development.

5.1 BASED ON UNIVARIATE ANALYSIS

At this stage, we investigated the correlation between the dependent variable and each variable from the independent ones, set in a univariate regression model. Table II shows the results of univariate and multivariate analysis. Here we have three (3) sets of columns. The first shows the frequency responses of sample participants for their questions. The second set of columns shows the data from the second set for the univariate analysis, ie, chance or average gain, lower limit (LL), upper limit (UL).The third set shows that the multivariate analysis, with the probability or expected chances in relation to the reference variable and the level of significance. Thus, in a first analysis of the observed values in Table II we can identify the contribution of factors within categories such as personal attribute, skill, own property and use of information, of varying influence power, separately, for feeling included. For example, the person when expressing that the Internet changed his or her life, also reveals a great chance to feel included, this variable is strongly related to the fact of feeling included, being able to explain separately, more than 3 times, ie has the greatest explanatory power of all, separately.

a) The fact is that other variables also have high explanatory power for one

person to *feel included digitally*: user who knows and applies the Internet, had more than 3 times the odds for those who do not know and do not use; those who seeks information about wellness (health, nutrition, environment, security) has a threefold higher likelyhood, and therefore safer to feel included, than those who do not seek this information; the user who reads the news on the Web was more than 3 times a greater likelyhood, compared to those not reading; and those who maintain ongoing activities on the Internet as a page, a blog, for example, were 2.89 times more likely, and those who have a computer at the house, (2.18 times). Table II shows these probabilities among others that are no less important. The individual who answered yes to one or more of these questions is more likely to feel included. A note of precaution is due for the univariate analysis.

b) This analysis is not conclusive to confirm the behavior of users who feel digitally included, because when we use univariate models we must assume that, in theory, there are no other intervening variables, besides the independent variable being considered in the model. In principle, we know that this fact does not occur in practice, but this assumption allowed the detection and deepening of the analysis of quantitative values and constitutes the basis for the next phase. When we do it separately, for example, it appears that the owning of a cellular phone has an explanation power of 2.26 times while having a fixed line was 1.74 times in relation to those who did not. However, you should see before examining the application of the multivariate model.

c) *Color / Race*: When we evaluated the Brazilian population as a whole, in 2005, Caucasians had the highest percentage of digitally included (79.77%) 15.32% for mulattoes, 2.42% for negroes, 1.83% oriental, Indian 0.16% and others 0.5% (AUN, 2007, p. 36). In this study, we had a somewhat different reality: a white person, still has more chances to be included, explicable on the basis of the survey and the time lag. Races such as oriental and indigenous were a minority in the sample – less than 3% of the sample population, and mulatto were the majority (43.8%). Thus, blacks were inferior to the white race, revealing a country that is mestizo with some white mixture. We opted to leave the races outside the analysis because of the little explanation they yielded, the results showing a reduction in influence or less discrepancy of individuals belonging to races to feel included.

d) *Gender:* the gender issue was significant for Internet access in 2005 in Brazil (CYSNE, 2007). But women have changed this situation permanently. Women are leaving a vulnerable minority status, even in social classes C, D and E. In this study, although the issue is not access to internet, there still is an opposite behavior: a man has less chance of being included, see Table II. And being female stood more chance of being included than to be a male. By hypothesis we conjectured that women might feel less included. It was found that this variable was significant in applying the univariate regression model. Thus, this variable was used in multivariate analysis.

TABLE II: Explanatory Power of each variable, as obtained through univariate models of "Is Included" and final adjusted multivariate model.

		Dou you feel included?			Univariate model OR (IC 95%)				Final adjusted model OR adjusted (IC 95%)			
		Yes	No	Total	ODDS	LL	UL	Value p	ODDS	LL	UL	Value p
Age					1,03	1,022	1,032	0,000	1,01	1,000	1,015	0,053
Region	North	1823	966	2789	0,99	0,877	1,120	0,882	1,25	1,087	1,448	0,002
	Northeast (ref.)	1259	661	1920								
	Sothwest	861	309	1170	1,46	1,246	1,718	0,000	1,48	1,229	1,784	0,000
	South	1069	375	1444	1,50	1,287	1,740	0,000	1,34	1,109	1,622	0,002
	Midewest	836	324	1160	1,35	1,155	1,588	0,000	1,50	1,244	1,809	0,000
Gender	Fem	3111	1310	4421	1,15	1,049	1,260	0,003	1,15	1,035	1,285	0,010
	Masc (ref.)	2737	1325	4062								
Race	Caucasian	2361	900	3261	1,29	1,164	1,430	0,000	1,08	0,945	1,226	0,266
	Oriental	168	75	243	1,10	0,832	1,459	0,498	1,41	1,016	1,954	0,040
	Afro-brazilian	631	317	948	0,98	0,842	1,139	0,786	1,02	0,861	1,219	0,785
	Mulattoes (ref.)	2488	1224	3712								
	Indigenous	130	63	193	1,02	0,746	1,382	0,924	1,08	0,763	1,534	0,657
	NS/NR	70	56	126	0,61	0,430	0,880	0,008	0,98	0,635	1,524	0,940
Schooling	Primary incomploete and complete (ref.)	1790	1240	3030								
	Secondary incomplete	1682	677	2359	1,69	1,511	1,891	0,000	1,16	1,016	1,320	0,028
	Secondary complete	760	249	1009	2,08	1,772	2,433	0,000	1,28	1,051	1,549	0,014
	Higher incomplete	453	116	569	2,66	2,143	3,294	0,000	1,23	0,947	1,587	0,121
	Hgher complete	898	195	1093	3,13	2,645	3,710	0,000	1,10	0,855	1,422	0,450
Family income	Less than 1 Minnimus wage (ref.)	696	458	1154								
	1 - 2 MW	2198	910	3108	1,59	1,380	1,830	0,000	1,28	1,092	1,490	0,002
	2 - 5 MW	1963	494	2457	2,61	2,242	3,049	0,000	1,53	1,274	1,827	0,000
	5 - 10 MW	568	118	686	3,17	2,515	3,989	0,000	1,41	1,073	1,844	0,014
	More than MW	127	42	169	1,99	1,377	2,876	0,000	0,97	0,643	1,449	0,864
	ND	296	613	909	0,32	0,265	0,381	0,000	0,43	0,346	0,525	0,000
Has a home landline	Yes	2398	752	3150	1,74	1,576	1,922	0,000	0,99	0,879	1,124	0,922
	No (ref.)	3450	1883	5333	1,77							
		Dou you feel included?			Univariate model OR (IC 95%)				Final adjusted model OR adjusted (IC 95%)			
		Yes	No	Total	ODDS	LL	UL	Value p	ODDS	LL	UL	Value p

Owns a mobile phone	Yes	4107	1347	5454	2,26	2,052	2,480	0,000	1,04	0,929	1,172	0,476
	No (ref.)	1741	1288	3029	1,50							
Has a computer at home	Yes	2698	726	3424	2,25	2,038	2,488	0,000	1,15	1,004	1,306	0,043
	No (ref.)	3150	1909	5059	2,18							
Internet chnaged your life	Yes	5163	1572	6735	5,10	4,559	5,697	0,000	2,28	1,991	2,601	0,000
	No (ref.)	685	1063	1748	3,39							
Use of internet	Knows and applies	4836	1347	6183	4,57	4,126	5,061	0,000	1,87	1,653	2,125	0,000
	Knows, does not appliy/does not know, does not apply (ref.)	1288	1012	2300								
How long use Internet	Less than 3 yaers (ref.)	3236	1976	5212								
	More than 3 yaers	2612	659	3271	2,42	2,185	2,681	0,000	1,06	0,932	1,201	0,384
Read news	Yes	4273	1110	5383	3,73	3,384	4,105	0,000	1,42	1,247	1,614	0,000
	No (ref.)	1575	1525	3100	2,81							
Internet shopping	Yes	1503	328	1831	2,43	2,137	2,770	0,000	1,01	0,865	1,184	0,884
	No (ref.)	4345	2307	6652	2,17							
Social networking	Yes	3709	1007	4716	2,80	2,550	3,082	0,000	1,25	1,095	1,417	0,001
	No (ref.)	2139	1628	3767	2,23							
Acess well-being info	Yes	3509	764	4273	3,67	3,327	4,057	0,000	1,43	1,251	1,627	0,000
	No (ref.)	2339	1871	4210	3,07							
Reference databese use	Yes	2761	624	3385	2,88	2,599	3,197	0,000	1,25	1,104	1,421	0,000
	No (ref.)	3087	2011	5098	2,08							
Activity in Internet	Yes	4266	1283	5549	2,84	2,582	3,127	0,000	1,19	1,045	1,356	0,009
	No (ref.)	1582	1352	2934	2,33							

5.2 BASED ON MULTIVARIATE ANALYSIS

In this second analysis we applied the multivariate logistic regression model, adjusted to investigate those who are digitally included. Analysis of the implementation of this model has the facility to estimate the chances of occurrence of an event of interest, with all the most significant variables in relation to its non-occurrence. The odds of the chances are presented in Table II, the probability or chance, and other statistical data showing changes in values or results compared with the first analysis of univariate model. For this, the adjustment was made with 95% significance level and margin of error of 0.5%. The predictor or explanatory variable for a user who feels that the Internet changed his life has a strong explanation of more than 2, to feel included. Following analysis:

a) Age: Profile of the Brazilian population collected in the Annual Survey of Brasil - CGI (2010b) regarding the use of ICTs, found that 13% were young people 10-15 years. Also, 13% were over 60 years. The survey covers the universe of all households and was performed more than 5 (five) years ago. But our sample of digitally included users attending free and public PDIs, showed a younger profile, where 37.2% were in this same age group. In this analysis we chose to verify the behavior of age regardless of the age groups and the analysis was not so rich. See Table II. The study presented by Medeiros and Miranda Neto (2010) showed the behavior of age groups, thus reduction of chances will increase with age, to some extent, since the range of 25 and 34 years showed the highest value.

b) *Geographic region*: About 80% of the GESAC PDIs were in the Northeast and North (MIRANDA MEDEIROS NETO, 2010). When the user is asked if economic conditions improved in the community, pointed with lower values in the Northeast, Southeast and South (around 25%), and higher values in the North and Midwest (32% and 35 %). In this study, we found the following descending order of chances to be included: Southeast, Midwest, South, Northeast and North. See Table II. At the end of the multivariate analysis only the Southeast, Midwest and South were significant.

c) *Schooling*: The indicator "use of electronic mail", by schooling level, grows out of elementary school (31.1%) and reached 76.2% for graduates, according to Medeiros and Miranda Neto (2010). This was the reason to use the lowest level of education as a reference. The present study showed an increase in the chance of inclusion according to an increase in the level of education. The order of chance found in univariate follows the same order of education level (Table II). In the multivariate analysis, highest levels of education: Complete highschool, Undergraduate incomplete and Graduate complete prevail.

d) *Family income*: The presence of ICTs in households in Brazil keeps its rate of growth in the last 5 years, but the determinants are still schooling, family income, geographic region and capacity building. Family income in l in bands of those who receive up to two minimum wages is 58% (BRASIL - CGI, 2010b). In

the study at hand, this same segment totaled more than 60% of the sample, explained by the presence of social or economic classes C, D and E. The reference category for analysis includes users with less than one minimun wage income. The model found that people with better financial condition, 2-5 and 5-10 minimum wages, are more likely to consider themselves included, see Table 3.

e) *Home Phone:* research Brasil - CGI (2010b) identified an unexpected growth of ownership of fixed telephone, after four consecutive years of decline. One hypothesis may be the increased purchasing power of citizens in classes C and D. This commodity has not yet become universal in Brazil as TV and radio have, but is approaching these. The study found that having a phone does not increase the chance to feel included. It is worth remembering that the univariate model showed a much greater explanatory power than a multivariate analysis, see Table II.

f) *Has a computer at home*: Computer ownership has grown over the last 5 years. In 2009, we had 34% of desktop and 5% laptop in all homes of Brazilians. However, one must be attentive to the number of computers without Internet access, probably due to the cost of Internet access in Brazil –CGI (2010b). Possessing a computer increases the chances for individuals to feel included, comparisons can be made with possession of telephone and mobile in the application of the multivariate model.

g) *Mobile phone:* The mobile phone is approaching universality (BRAZIL, 2010): 82% of Brazilian households already have it. Confirmed in the application of univariate model, where one can verify that the chance of a user who has a cell to be included was 2,26 times smaller than the chance of those who own a fixed one. In 2005, the chances of someone having a cell phone and access the Internet was 122.3% (CYSNE, 2007). In the application of the multivariate analysis model it is not significant. The fact is that the popularity of the mobile phone can yield an explanatory power to be included when it joins with the other variables. There was a tie in the multivariate analysis with computer ownership.

h) *How long have you used Internet*: It is noteworthy that the North and Northeast are the regions with the lowest penetration of Internet access at home, 13% of all households. This is the main reason for the increased presence of GESAC in these regions. The Southeast was ahead with 35%, according to CGI (2010). Then, access to and use of Internet time ended up being a significant factor, noting that the PDIs of this study are the regions of lower penetration of broadband, where access to most users were restricted to these points of digital inclusion. Table II show that the time of Internet usage increases the chances of feeling included digitally.

i) *Internet changed your life*: When asked if the Internet had changed the lives of the users (see Table 3), the lowest value for this indicator was found in the Southeast (66.4%), perfectly explicable, and the highest was Midwest (75.6%) (MEDEIROS NETO and MIRANDA, 2010). The chance of this user feeling digitally included was more than 2 times that of those who believed their lives had

not been changed by the Internet (see Table II). We noted that this variable has great power, being able to explain more than twice as chances recorded by other independent variables, ahead of other variables.

j) *Knows and applies on the Internet*: The frequency of users with commnad in operations and application on the Internet was high in the survey, higher than that in Linux, Windows and Word, for example (MEDEIROS NETO and MIRANDA, 2010). User actually knows and applies the technological tools, these being good reasons to feel included (1,87 times). Unlike those who do not use and do not command ICTs, or rather, lacked the ability to process digital inclusion, perhaps for lack of skill or training. Or simply, the presence of a monitor in the telecenter or lab to take questions. The user with the mastery of basic operations of computers and the Internet is more likely to be included.

k) *The user accesses networking sites*: We have seen an increasing number of users on social networking sites, the volume of this information is topping the search engines like Google, something to be evaluated in the coming months. In the study, most responded that they access Web sites, as opposed to those who do not access sites like Facebook or MySpace, for example. The chance of this user feeling included digitally was more than one (1) time bigger than those who do not participate in such social networks (see Table II). "The user accesses information efficiently and effectively." Users accessing the Internet can develop the ability to locate information. This represents the Digital Inclusion by access to information.

l) *I read news on the Internet:* Telecentres and laboratories (PIDs) in rural areas, highlighted here are the ones that are public and free, are more important for the communities to have access to the news that in urban areas (BRASIL - CGI, 2010b). In the study by Medeiros and Miranda Neto (2009) it came to 63.5% who read news on the Internet. "User critically and competently evaluates the information." The chances of this user feeling included digitally were more than one (1) time than those who do not read news sites, online newspapers and magazines by users of urban and rural areas. The user distinguishes Information among facts, views and opinion on the news published on the Internet. Here we see the informational inclusion in the evaluation of information by the user.

m) *I shop on the Internet*: Research from Brasil - CGI (2010b) showed significant growth in electronic commerce, as a probable effect of fiscal policies implemented to overcome the economic crisis of 2008. In the study, users of Classes C, D and E responded that *yes* they shop, but the amount was less than half of those who read news. The chances of these users to feel digitally included was higher than those who did not purchase any product or service (see Table II). "The user uses the information accurately and creatively." Shopping means that you organize information for practical application, a demonstration of digital inclusion in the use of information.

n) *I search for information related to wellness*: Here 50.4% of users said yes. "You look for information related to matters of personal interest." And the chance

of this user to feel digitally included was greater than 1 (one) time, as related to those who do not seeking information. The user searches for information related to various aspects of personal well-being such as professional interest, community involvement, the subject of health and recreational purposes. The informational inclusion can be seen by measurng the demand for information by the user (see results in Table II).

o) *Uses reference databases on the Internet*: Here it was found that 39.9% responded *yes*. It is believed that this "user uses the information accurately and creatively." And this user's chance to feel included digitally, as compared to those who did not, was much larger when viewed individually, and greatly reduced as a whole. This way the user organizes information for his or her practical application and for his/her community. Thus it was found that social inclusion could happen by contributing information to the community.

p) *Maintains ongoing activities on the Internet*: We had 65.4% of "users who participate effectively in groups to pursue and generate information." Usually, feeding their page or blog to the community, or working hard on a social network like MySpace or Facebook. The user shares knowledge and information with others. The chance to be included was representative in relation to activities that did not keep constant Internet activity. Thus, there was likelihood of social inclusion by the generation of information for the community (see results in Table II).

6 DISCUSSIONS AND CONCLUSIONS

In this article we study the behavior of users of the Points of Digital Inclusion - PDIs, who are digitally included, as promoted by the Government, its partners and arrangements. We evaluated whether they were able to use technology when available and their ability to access information from the virtual world for themselves and their community. For this analysis we used statistical methods and multivariate logistic analysis, which allowed to investigate the likelihood of a user to feel included. For it was needed to know the perception of those who claim to be digitally included, to investigate how they have appropriated ICTs, how and how much the benefits of ownership serve to their family and / or community. Personal characteristics were identified and abilities of the participant, which favor the cognitive process, and should be priorities in the learning process and content to be included in the workshops, trainings and mediations. This analysis and evaluation of the process of digital inclusion incorporates new disciplines and methodologies such as construction of indexes and indicators, and quantitative, qualitative and mixed methods (CRESWELL, 2007 and CPqD, 2009).

The results raised made it possible to measure the explaining power of an individual and group variable, among those collected in the analysis. The study found the likelihood of a user to be included, for example, revealing that a user of the Southeast is most likely to be included than one of the Northeast or the North.

The study was based on the universe of users of programs, projects and initiatives for digital inclusion, sponsored by the Federal Government in conjunction with State Departments of Education and non-profit organizations in Brazil (MEDEIROS NETO and MIRANDA, 2010). Consequently, access to social networking sites by the users had a power of explanation more than 2 (two) times or chance, when analyzed individually (univariate analysis), reducing a little more than 1 (one) time the chance to feel included when strained simultaneously (multivariate).

Brazil increased its telecommunication channels, whether physical or wireless networks. The television transmission via cable and satellite access have been expanded, even with the least assisted population. Access was one of the satellite technology solutions for underserved areas and serve to promote inclusion, but the speed limits of the band offered by this technology are still there. The digitization of networks has facilitated convergence, storage and retrieval of data and information (BRAZIL, 2010). Thus, we see that Brazil gradually recovers a more advantageous position as compared to its peers in Latin America, and even, on Russia, India and China (BRIC). Despite all the advances, the country still has a pent-up demand, specifically the Internet, mainly due to the high price for access to ICTs, it is certain that a little over one quarter of the households have Internet access. Ownership of computers already surpasses one-third of households (BRASIL - CGI, 2010b). The data analyzed here revealed that having a cellular phone or a landline phone in the residence is less important than having a computer at home, for a person to feel included. The fact is that Brazilian users of PDIs, from the poorer classes, in some way promoted by the government, the focus of this study, not yet fully met their expectations and wishes in terms of technology use and access to information. It is not allowed for him or her to have the information anytime and anywhere, according to their needs in the new society. Besides the quality of services,

Such as slow response time, lack of technical assistance in more remote regions, and lack information for users and managers of the PIDs at border points and the Brazilian Amazon.

ICTs were once again recognized as determining factors for the development, either in public policy and the attempt of offering a better quality of life for the population, favoring the achievement of citizenship. For Miranda, Simeon and Muller (2007) we witness, around the world, in developed countries and in the richest regions of Brazil, the provision of infrastructure in telecommunications, and information systems. And this has a consequence directly affecting the individual from information society, because "it generated a reengineering of the production activities of social organization based on networks and connections increasingly comprehensive and interoperable." As generation and provision of content and then, the "collective knowledge" via ICTs is built on inter-and trans-disciplinary foundations and in a multivocality of authorship. (P. 44).

However, the inability of the user facing ICTs at the PDIs, as promoted by the

Government and its partners, hinders the enjoyment of these benefits and these people's sharing in the information society. A good reminder is that the Internet, being the most representative among ICTs, leads the individual to feel a difference or impact on their social, political and cultural life (MORALES GARCIA, CARIDAD SEBADTIAN and GARCIA LOPEZ, 2008). Thus, we identified that the change of life due to the Internet has a strong correlation to feel included digitally. However, the more advances there are in service offerings, due to constant innovation, the greater the needs in terms of time and resources to include unprepared people or those who are deprived of basic requirements or ability to use ICTs (SORJ, 2003 and 2007). We see, in the midst of all this, a race against time, to include the individual. This is happening simultaneously to the impact of digitization of digital content traveling in new media, ranging from culture, to commercial and social relations. This brings the process of digital inclusion to be a major factor, comparable to the most basic needs such as education, health and sanitation services.

The degree of correlation between a user considering him or herself included and the main explanatory variables of the phenomenon, were investigated and measured. This confirms our hypothesis, ie, knowledge or skills in various ICT tools and resources, access to the digital content on the Internet, time of use of the Internet, all these strengthen the conviction of the individual to feel included in the new information society. In this study of digitally included, new variables or indicators have been identified and analyzed, such as reading newspapers and news on the Web, access to social networking sites, finding information on wellness and health, making purchases on the Internet. The variable of greatest explanatory power to feel included was information search of well being. It was found that the individual who accesses, uses, discloses and produces information has a strong correlation or perception that he or she is digitally included.

In this study of populations in a state of social vulnerability, in Brazil, once again we confirmed that indicators such as education level, age, family income, race / color, owning phone or computer at home, and location may influence the outcome of the inclusion. Other variables such as occupation and employment status, can take part in studies, when the issue is to evaluate simple access to the Internet (MEDEIROS NETO and MIRANDA, 2010). The use of electronic games, laptops, cell phone and cable TV may be part of investigations of access to and use of ICTs (CYSNE, 2005; BRINGUÉ, CHALEZQUER, 2009 and BRASIL - CGI, 2010b). In this paper we chose to analyze personal data, their socio-demographic, skills with ICT, plus access, evaluation, usage and demand of information. Another group variable was the distribution of information to their community and user participation of PIDs in the generation of information.

The Survey of Brasil - CGI (2010b) highlighted the growth of research activity on goods and services on the Internet. These rose from 50% in 2008 to 62%, in 2009, of the total number of Internet users in Brazil. This study showed that

almost two thirds of users maintain ongoing activities on the web. This means a change in the format of information communication, adoption of electronic government by the people, the process of digital inclusion and the life of the individual in society. This study confirms that those who are digitally included, those among the patrons at PIDs, have large variances in the indicators to use of technology, information access, information search, and information distribution. Some values are high, such as participation in social networking sites and other low, as buying on the Internet. We also identified unworked user information such as access to news on the Web, reflecting the lack of digital literacy and informational exclusion. This is a diagnosis that can help in reviewing the actions of digital inclusion. One must consider these aspects in the studies and analysis, besides those people who are outside any action or policy for digital inclusion by not having a computer with Internet access and lacking support to attend workshops and training, the most critical aspect of all this. So the effort is great and is to be done by all, government, market and society in general.

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