

Research Article

One Laptop per Child and Bridging the Digital Divide: The Case of Plan CEIBAL in Uruguay

Lucía Pittaluga

luciapittaluga@gmail.com
Researcher
Universidad de la República
(UDELAR)
Gonzalo Ramírez 1926
Montevideo 11200
Uruguay

Ana Rivoir

ana@fcs.edu.uy
Researcher
Universidad de la República
(UDELAR)
Constituyente 1502
Montevideo 11200
Uruguay

Abstract

This article analyzes the changes experienced in the digital divide as a result of the implementation of a one-laptop-per-child national policy. The program has been implemented in Uruguay since 2007, and it is known as the “Plan CEIBAL.” It is an adaptation of the One Laptop per Child (OLPC) project devised by the Massachusetts Institute of Technology (MIT). Two sources of information have been used: The annual household survey called Encuesta Continua de Hogares (ECH), prepared by the Instituto Nacional de Estadística (INE) of Uruguay, and interviews conducted among relevant local officers and adult persons from households equipped with Plan CEIBAL laptops. It was concluded that Plan CEIBAL has helped to narrow the digital divide in terms of access to computers and Internet connectivity from education centers. Furthermore, additional changes have been verified regarding other aspects of the digital divide relating to the acquisition and use of computers for human development purposes typical of one-laptop-per-child schemes.

1. Introduction

A paper prepared by the Economic Commission for Latin America and the Caribbean (ECLAC; Katzman, 2010) maintains that, aided by the digital revolution, the skills associated with the mastering of information and communication technologies (ICTs) are essential assets that every person needs to have to make the most of the opportunities emerging from the economy, the state, and the community, functioning as tools that enable a person to participate fully in a contemporary society. However, the way the market works in Latin America and the Caribbean (LAC) has resulted in high inequality levels regarding access to ICTs. Such inequalities, as Katzman puts it, “translate into serious social exclusion threats and represent a challenge to the reasons for the integration of societies that claim the vigorous presence of the State to universalize access opportunities to new technologies” (ibid., p. 27). The educational system has a leading role in the struggle to universalize access to ICTs, the author concludes.

The process aiming at the integration and use of ICTs in educational systems has been taking place in LAC since the late 1980s and early 1990s. The one-laptop-per-child (1:1) model was first implemented in 2007,¹ and it was quickly disseminated throughout the region (Severin & Capote, 2010).

Plan CEIBAL (Conectividad Educativa de Informática Básica para el

1. “One-laptop-per-child” makes reference to the proportion of laptops available for each child who attends school, which means that each pupil is given one laptop.

Aprendizaje en Línea), which began in 2007, also falls within the 1:1 model; in fact, it is the world's first experience with such a project on a nationwide scale.² It was based on the One Laptop per Child (OLPC) project introduced by the Massachusetts Institute of Technology (MIT).

The purpose of this article is to account for the effects of Plan CEIBAL regarding the digital divide in households and the community. The digital divide is understood here in a manner that is both complex and multilayered. To this end, we take into consideration the uses given to the laptops distributed under Plan CEIBAL, as well as the processes that their collective incorporation into the household and the community has entailed.

The first part of this article discusses the main theoretical concepts that guided this work, and then we briefly describe the contents of Plan CEIBAL. The third part of this article explains the methodology used, while the fourth part presents an analysis of the impact of Plan CEIBAL on the digital divide. This analysis is based on the data gathered through the annual Uruguayan household survey called Encuesta Continua de Hogares (ECH) prepared by the Instituto Nacional de Estadística (INE). The fifth part of this article examines the uses and acquisition of Plan CEIBAL laptops, based on information gathered through interviews conducted among qualified interviewees and adult persons from households equipped with at least one Plan CEIBAL laptop. The last part of this article presents the main findings and conclusions.³

2. Bridging the Digital Divide for Human Development

From the perspective of the school of thought that maintains that development mainly consists in the progressive expansion of human capacities (Sen, 2000), knowledge is one of the main human capacities, while ICTs are privileged means through which knowledge is produced and disseminated. Nowadays, ICTs are associated with essential aspects of human life, and as such, their use may be deemed to be a right (Accuosto, 2004; Cortés & Dubois,

2005; UNDP, 2001). On the one hand, these technologies represent progress for humankind, but on the other, they result in a new inequality known as the "digital divide."

As several authors point out (Mansell, 2002; Stewart, Gil-Egui, Tian, & Pileggi, 2006), the first meaning of "digital divide" made reference to the division between those who had and those who did not have access to ICTs. However, that was a reductionist approach, though one on which infrastructure and connectivity expansion policies were founded. The dynamics of markets, government procedures, and the regulation of ICTs and services were prioritized.

With the assumption that the benefit for the population is direct and automatic, this approach overestimates ICTs, since it concludes that social well-being and development are achieved by simply introducing them to the communities (Cortés & Dubois, 2005). However, it is clear that the digital divide reproduces inequalities that already exist in societies (Mística, 2002).

The digital divide is the consequence of other development gaps which, in turn, cause it to deepen further. There is a recursive relationship at play in which inequalities feed back upon each other: the digital divide, itself born of inequality, thus contributes to the consolidation of other exclusions. It is obvious that specific efforts are required to attain human development; that is, policies must be implemented to reduce digital inequalities and other inequalities in parallel (Afonso & Soarez, 2006; Gascó-Hernández, Equiza-Lopez, & Acevedo-Ruiz, 2007; Sassi, 2005).

Hargittai (2004) states that the digital divide features several dimensions, such as the access to technology, the autonomy of individuals, the social support on which the user relies, the individual's abilities, and the types of use. According to this author, digital inequality shows the consequences that access to ICTs may have, as well as their differentiated uses for social stratification.

Knowing how many people use the Internet is not as relevant as knowing why and for what pur-

2. Argentina launched a 1:1 program in 2007 in the province of San Luis (although 10,000 laptops were promised, as of 2010, only 7,500 had been delivered); Brazil implemented a pilot program the same year, though in this case, as promised by the government, 150,000 laptops were delivered (Severin & Capote, 2010).

3. This article is based on research financed by the Comisión Sectorial de Investigación Científica (CSIC) of the UDELAR (Rivoir, Pittaluga, di Landri, Baldizán, & Escuder, 2010).

pose the Internet is used (Castells, Tubella, Sancho, Díaz, & Wellman, 2007). In this context, the uses given are fundamental to devising a more complex concept of the digital divide. We need to know whether people make a “meaningful use” or a “significant use,” and we also need to be able to determine when ICTs are effectively used, including uses that place them in combination with other communication instruments. To make meaningful use of ICTs, users must know the tools involved—which to use and when to use them, as required for specific individual or collective objectives. This type of use depends on the capacity and possibility of producing one’s own content, of accessing useful knowledge and information in one’s own language, and of performing critical analysis of the information (Attwell, 2001; Camacho, 2001; Martínez, 2001; Selwyn, 2004; Warschauser, 2003).

To contribute to human development, policies should prioritize ICT appropriation processes; meet communities’ needs; and lay special emphasis on people’s capacities, generation of content, and knowledge (Gómez, Delgadillo, & Stoll, 2003; Mística, 2002). This means that, without specific policies, or with policies biased to only give regard to access to technology, human development will not be attained, and the existing inequalities will do nothing but grow.

Plan CEIBAL in Uruguay is an initiative aimed at promoting human development. Studying its effects on the digital divide will help us to understand this type of policy.

3. Plan CEIBAL: Description and Implementation

Plan CEIBAL was implemented at the request of the then President of Uruguay, Tabaré Vázquez. It was planned as a measure against the existing inequalities regarding access to ICTs, and to that end, it was presented as a project for social inclusion.

The main purpose of the plan was, and remains, to attain equality in access to information through the distribution of laptops and the provision of Internet connectivity services to all the schools and

districts in the country. Such services are accessed through the distributed laptops, which have been designed especially for the needs of children. They have basic operating features that enable them to work in such different environments as classrooms, homes, or even public places. This, in turn, offers a number of possibilities for teaching purposes. The project intends to have a major social impact on the relationship between the school and the family, promoting the abilities needed to succeed in a 21st-century society across the whole length of a child’s life in an attempt to bridge the existing digital divide.

As a starting point, Plan CEIBAL distributed one laptop to each child in first through sixth grade attending a public primary school in Uruguay, as well as to the children’s teachers. The plan was first implemented during the first half of 2007. The distribution of laptops to all public schools in Uruguay was conducted in four phases and completed by the end of 2009.⁴ In 2010, the plan went on to include secondary schools.

People call these laptops “XO” after the laptop model name, and also “*Ceibalitas*.” Designed for children’s educational use (ReducaWIKI, n.d.), they feature Internet connectivity and video camera with audio, and they also include educational software. Furthermore, thanks to local developers, some applications have been introduced to improve the laptops’ Internet connection, hardware, and software.

By 2011, more than 500,000 laptops had been distributed and several activities and complementary projects had also been implemented, which shows that Plan CEIBAL is not merely a policy aiming at narrowing the digital divide in terms of computers and the Internet (Garibaldi & Ibarra, 2011). Three educational portals⁵ were created, as well as a pedagogical project (CIEBAL, 2010). Training courses were delivered to more than 20,000 teachers, and over 500 support and catalyst teachers had been hired.

Additionally, the plan provided all public educational centers and certain public places with Internet

4. These phases were as follows: Phase 1 (first half of 2007), School No. 24 in Villa Cardal, District of Florida (200 laptops donated by One Laptop Per Child [OLPC]); Phase 2 (second half of 2007), the rest of the District of Florida; Phase 3 (2008), all the districts in Uruguay, except for Montevideo and its metropolitan area (District of Canelones); and Phase 4 (2009), Montevideo and Canelones.

5. See www.ceibal.edu.uy, www.edu.mec.gub.uy, and www.uruguayeduca.edu.uy

connection services. Today, almost every child who attends a public school has a wireless Internet connection.⁶ Access to the Internet at home is possible to the extent that the home is located near an educational center or a public place with the required infrastructure. One essential purpose of the plan is to provide wireless connectivity to households such that anyone desiring to access the Internet will be able to do so without walking more than 300 meters from his or her home. However, this goal has not been accomplished yet.⁷

4. Methods and Techniques

4.1 Quantitative Method

The ECH, which has been conducted uninterruptedly by the INE since 1968, serves as the statistical database for our study. As its name indicates, it is a survey conducted on a permanent basis that gathers information 365 days a year. The surveyed person is any household member older than 18 years of age who possesses both full mental capacity and sufficient information on the rest of the household members. The ECH data for years 2004, 2006 (called "Encuesta Nacional de Hogares Ampliada") and 2007–2010 (most recent survey available as of this date) were used.⁸

Throughout the years, the ECH added questions on the access to and uses of ICTs, as well as on the acquisition of Plan CEIBAL laptops. Since 2001, the ECH has included questions related to the introduction of computers and Internet connection to the household. In 2006, the ECH also included, for the first time, questions on the use of computers and the Internet. Since 2008, this module of questions has been permanently incorporated into the survey.

In 2009, the ECH first included a question on whether the household was equipped with a Plan CEIBAL laptop.⁹

Before using the ECH, we determined first whether the survey was correctly estimating the number of laptops distributed. This was verified on two different occasions. By December 2008, the distribution of *Ceibalitas* had concluded in every district of Uruguay except Canelones and Montevideo. The 2009 ECH, which began on January 1 of the same year, was supposed to reflect the number of laptops in the households in that part of the country. According to official Plan CEIBAL data, as of December 2008, 163,081 *Ceibalitas* had been distributed, while in June (according to 2009 ECH), the number of *Ceibalitas* distributed was 159,140.¹⁰ The difference between the *Ceibalitas* actually delivered and the estimated number of *Ceibalitas* delivered was 3,941 laptops, which is considered to be an acceptable magnitude of error.¹¹

By December 2009, the distribution of laptops throughout the entire Uruguayan territory had been completed. The factor that rendered the future 2010 ECH results variable was the distribution of laptops to the class of students who began primary school in 2010, as *Ceibalitas* were also given that year to secondary school students and sold (at a subsidized price) to secondary school teachers. According to official Plan CEIBAL data, as of December 2010, 406,023 *Ceibalitas* (without taking into consideration the ones given to secondary school students or teachers) had been given away. The ECH 2010 estimated the number of *Ceibalitas* in households to be 407,270. The difference is 1,247

6. Approximately 10% of the schools have no Internet connection. These are mainly rural schools which have no electric power and are not part of the electric power transmission system of Uruguay.

7. In 2010, only about 50% of the households in Montevideo and other urban districts equipped with at least one XO laptop had Internet connection by being within a distance of 300 meters or less from a school or other wireless-equipped public place. For rural households, this percentage was 38% (Plan CEIBAL, 2011).

8. For the technical data obtained from the ECH, as well as the microdata from every year, see the INE website <http://www.ine.gub.uy/microdatos/microdatosnew2008.asp#ech>

9. See the questionnaire (the questions related to ICTs can be found in modules D and E5) of the 2010 ECH at <http://www.ine.gub.uy/microdatos/microdatosnew2008.asp#ech>

10. This moment of the year was selected because the distribution of *Ceibalitas* in Canelones and Montevideo began in July, which means that the incidence of the number of *Ceibalitas* in households began to vary, whereas during the first six months, no such variations were noted.

11. This difference may be due to the pilot distributions made in Montevideo and Canelones during the last quarter of 2008. Moreover, it may also be due to the distribution of laptops taking place not in the surveyed households, but in institutions such as Instituto del Niño y el Adolescente del Uruguay (INAU), among secondary schools, and at the Universidad del Trabajo del Uruguay (UTU).

Table 1. Surveys Conducted by Case and Type of Neighborhood.

District	UBN	FBN	ST	Total surveys conducted
Florida	18	14	19	51
Maldonado	17	17	16	50
Rivera	22	13	11	46
Salto	16	16	13	45

Source: Prepared by the author based on the total surveys conducted.

laptops, which was also deemed an acceptable difference margin.¹²

4.2 Qualitative Method

Interviews were used to analyze the impacts of Plan CEIBAL on the digital divide and human development. This qualitative methodology allowed for the adoption of a useful holistic perspective in the study of a complex phenomenon (Taylor & Bogdan, 1986). Thus, the analysis was enriched with explanatory elements, since the flexibility of interviews helped to reformulate the data-gathering tools, based on the information needs that became clearer as our fieldwork progressed (Valles, 1997).

Information was collected at the community and CEIBAL home levels. A total of 39 interviews were conducted on a wh- question basis with locals who were acquainted with the plan (school directors, regional inspectors, authorities, and local experts) in order to know how the program had developed in their towns, and to gather information on the current dynamics and characteristics of the activities performed and in progress.

Surveys were also conducted among adults from 192 households whose children were beneficiaries of Plan CEIBAL. The questionnaire used had wh-questions that covered the following aspects: socioeconomic characteristics of the home and socioeducational characteristics of the person surveyed; opinion of the ICTs in general; changes observed in children, the home, and the neighborhood/town after the implementation of Plan CEIBAL; description of the different uses given to the *Ceibalita* (by whom and for what); and opinion on the benefits of Plan CEIBAL. Fieldwork was conducted November 2009–May 2010.

A theoretical sample was designed to select the persons to be surveyed based on three criteria. First, four socioeconomic regions of Uruguay were selected with the purpose of covering all the existing diverse backgrounds (Veiga & Rivoir, 2004).

Second, the households were classified into three groups: unfavorable background neighborhoods (UBN), favorable background neighborhoods (FBN), and small towns (ST). The homes were selected based on the characterization of the school background, and a subsequent comparison was made with the socioeconomic situation of the home indicated in the form. A school from the district capital with a favorable or very favorable background was selected, as well as another school with an unfavorable or very unfavorable background. The ST sample allowed for the incorporation of a background different from the urban context in terms of the limited opportunities available as a result of the reduced supply of goods and services in towns with these characteristics. The towns selected had fewer than 1,000 inhabitants and only one public school, and they were more than 70 km away from the district capital.

Third, the homes selected for the surveys had to have been part of Plan CEIBAL for at least one year, so as to control the time of exposure to the plan. This is considered to be the period during which the *Ceibalita* were fully incorporated into the dynamics and routine of users.

Table 1 below shows the distribution of the 192 surveys conducted by geographical location and socioeconomic stratum.

The analysis of the surveys was made using hand-recorded answers, which were later transcribed to a spreadsheet. This allowed for several

12. It is logical that the ECH may reflect a smaller number of laptops than the ones distributed. However, in this case, the distribution to secondary school teachers and students renders the calculation even more uncertain, since we do not positively know what they might have answered when asked whether or not they had a Plan CEIBAL laptop at their home, given the fact that the program is very much identified with primary education.

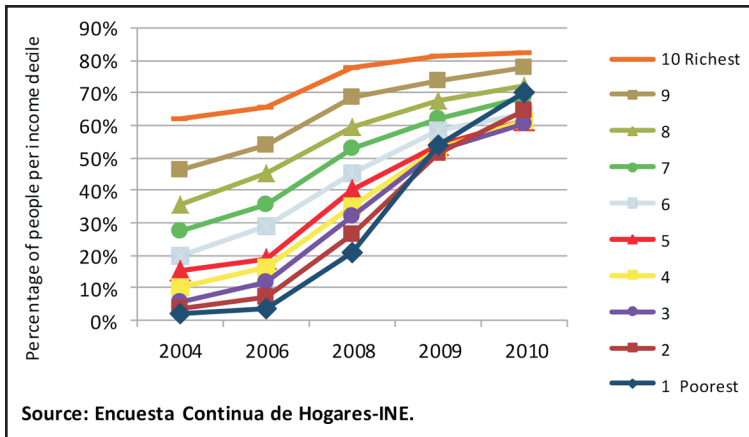


Figure 1. Access to computers at households. Percentage of people in each per capita income decile (without leasing value, excluding rural locations and towns with a population of less than 5,000).

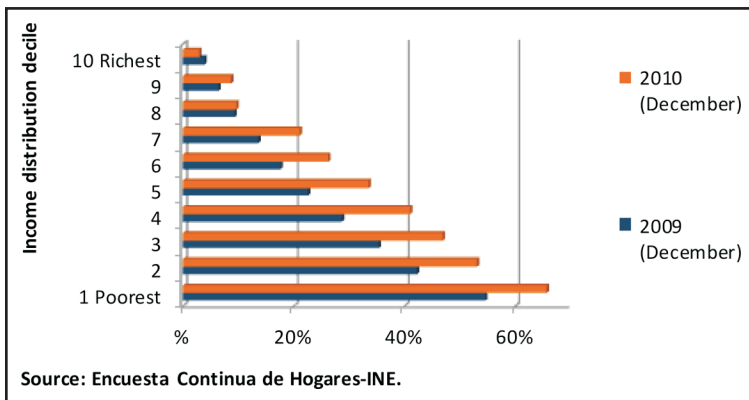


Figure 2. Percentage of people in each per capita income decile living in a CEIBAL home.

crossings of information (home background, connectivity at home, possession of computer or not, and access to the Internet at home, among others). Afterward, each survey conducted was further analyzed to find thorough explanations for each answer.

5. An Overview of the Impact of Plan CEIBAL on the Digital Divide

This section analyzes the ECH data for the country to make a first observation on how the implementation of Plan CEIBAL has impacted the digital divide

13. In fact, the distribution of Ceibalitas began in 2007 and continued, en masse, in 2008. However, it was not until 2009 that the ECH included a question on Plan CEIBAL.

14. "CEIBAL homes" are those households equipped with at least one Ceibalita.

in Uruguay. To that end, we first examine the evolution of the possibility of accessing computers from households. Then, we study the geographical reach of Plan CEIBAL, and finally, we analyze how the plan has affected the places from which the Internet can be accessed, and why this is important to bridge the digital divide.

5.1. The Impact of Plan CEIBAL on the Possibility of Accessing Computers from Households

Figure 1 shows the evolution in the access to computers from households by income decile from 2004 to 2010. Since 2008, the pace at which households from the lowest income deciles have acquired computers has accelerated. In December 2009, 50% of the five lowest income deciles managed to access computers from their households, and in 2010, the poorest decile reached the same access percentage as the better-off decile 8.

The bridging of the gap between the rich and the poor with respect to the access to computers in households, as compared with previous data, is basically due to the implementation of Plan CEIBAL. This follows from the data in Figure 2, which shows that the members of the poorest deciles received laptops under Plan CEIBAL en masse between 2009 and 2010.¹³ Indeed, in December 2010, 65.7% of the respondents from the poorest sectors (from the first per capita income distribution decile) stated that they lived in a CEIBAL home¹⁴ (54.6% in December 2009), while that percentage was 53.1% for the people in the second decile (42.3% in 2009), a proportion that continued to fall as the income deciles increased.

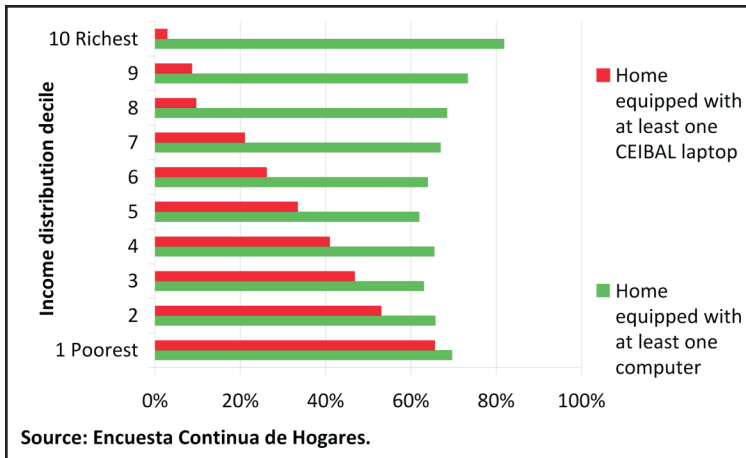


Figure 3. Access to computers and to Plan CEIBAL laptops. Percentage of people in each per capita income decile living in households equipped with Ceibalitas and computers of any sort. December 2010.

In 2010, 43% of people living in CEIBAL homes were from the two first deciles. This means that almost half the people who owned a *Ceibalita* were part of the poorest sectors in Uruguay. This result, though predictable, is not obvious, since the *Ceibalitas* were not distributed to children from poor homes, but to public school students.

One limitation of the ECH is that it is not possible to know whether the homes that received a *Ceibalita* already had a standard computer. That is, the respondents were asked, on the one hand, whether the home was equipped with a computer (whether it was from Plan CEIBAL or not), and on the other, if the home had a Plan CEIBAL laptop. Figure 3 compares the data from the households which had a computer of any sort with the data from the households whose members had at least one Plan CEIBAL laptop.¹⁵

It can be observed that practically all of the richest households' computers do not come from Plan CEIBAL (82% of people from those homes are equipped with at least one computer, and only 3% say that they come from Plan CEIBAL). On the other hand, the poorest households' computer equipment comes almost completely from Plan CEIBAL. Indeed, in decile 1, almost 70% of the people answered that they lived at a home equipped with at least one computer, and 66% also stated that they resided at

a household equipped with at least one *Ceibalita*. So, only 4% of people from those poor homes say that they have a computer that did not come from Plan CEIBAL.

Also, it is quite likely that the *Ceibalitas* were the first computers at those households. From the data shown in Figure 1, we can observe that, in 2006, barely 3% of the people in income decile 1 had a computer at their homes (versus 60% in the richest decile), while four years later, in 2010, access to computers had reached 70% of the same decile (as compared with 83% in the richest decile). The fact that so many

poor homes were so quickly equipped with computers can only be explained by the distribution of *Ceibalitas*.

Between 2004 and 2010, the percentage of people who could access the Internet from their homes (Rivoir et al., 2010) varied slightly for the people in the lowest income deciles. It may be concluded from this that the distribution of *Ceibalitas* has, to this date, only impacted people's access to computers from their homes, and not yet people's access to the Internet from their homes. This is not a coincidence, since, as mentioned above, the strategy adopted by Plan CEIBAL regarding connectivity does not have, for the time being, the purpose of providing Internet connectivity from households.

In sum, these first data show that the digital divide has narrowed in terms of possession of computers at homes in Uruguay, and that the narrowing we have seen is very likely a consequence of the implementation of Plan CEIBAL.

5.2. Geographical Distribution of Plan CEIBAL

The distribution of *Ceibalitas* in Uruguayan territory is associated with the distribution of the population in general. Although Table 2 shows that *Ceibalitas* were distributed until December 2010 within Uruguayan territory in a way that prioritized cities of the

15. It should be noted that the percentages are taken using as a basis the same number of people from the appropriate income decile.

ONE LAPTOP PER CHILD AND BRIDGING THE DIGITAL DIVIDE

Table 2. Regional Distribution of the Population Living in CEIBAL Homes.

December 2010		
	Distribution of the population living in CEIBAL homes	Distribution of the total population
Montevideo	29.70%	38.10%
Cities of the interior (more than 5,000 inhabitants)	49.10%	42.80%
Cities of the interior (less than 5,000 inhabitants)	11.70%	10.60%
Rural areas	9.50%	8.50%

Source: Encuesta Continua de Hogares-INE

Table 3. Access to a Computer by Region and Type of Computer (Percentage Over the Total Population of Each Region).

	Interior without Canelones.			Montevideo and Canelones.		
	Without computer at the household.	With computer at the household (not under the Plan CEIBAL)	With computer at the household (at least one under the Plan CEIBAL)	Without computer at the household.	With computer at the household (not under the Plan CEIBAL)	With computer at the household (at least one under the Plan CEIBAL)
December 2008	46.9%	53.1%*	NA	52.1%	47.9%	NA
December 2009	40.4%	20.1%	39.5%	31.4%	43.0%	25.7%
December 2010	36.2%	22.0%	41.8%	29.7%	28.9%	41.3%

Source: Encuesta Continua de Hogares-INE (*includes Ceibalitas)

interior to the detriment of Montevideo, in small towns (those with less than 5,000 inhabitants) and rural areas, the percentage of people living in households with *Ceibalitas* is similar to the distribution of the total population.

To analyze the manner in which the impact of Plan CEIBAL evolved as the plan continued to expand throughout the entire national territory, the Uruguayan population was grouped according to place of residence into two regional groups: the Interior, excluding the district of Canelones,¹⁶ and Montevideo, including Canelones. Group 1 comprises almost 43% of the country's total population, while Group 2 represents the remaining 57%.

As mentioned above, the regional division resulted from the fact that the *Ceibalitas* were distributed at different stages and within different geographical areas. In December 2008, Plan CEIBAL had completed the distribution of laptops in all the cities of the Interior, excluding the district of Canelones, and by the end of 2009, the distribution of laptops

was completed in the districts of Montevideo and Canelones.

Table 3 shows the progression of Plan CEIBAL throughout the years based on its geographical reach. As indicated above, the ECH did not include questions on Plan CEIBAL until year 2009, which means that the CEIBAL homes can only be distinguished from that year forward. The situation as of December 2010 was similar for both areas in terms of the percentage of CEIBAL homes, whereas the Interior (excluding the district of Canelones) continued to lag overall in the digital divide, since it had a larger percentage of homes without computers.

In sum, from the data presented here, we may conclude that Plan CEIBAL has encompassed, in a relatively homogenous manner, the entire national territory, both from the perspective of different areas (capital city, cities of the interior, small towns, and rural areas) and from the perspective of the different districts that represent the political division of the country.

16. Canelones is, after Montevideo—the capital city—the second most populated district in Uruguay.

Table 4. Place From Which the Internet is Accessed by Type of Access to Computer and Region (Percentage of the Total Population Older than 5 years of Age in Each Region)

July 2009

	Interior without Canelones.			Montevideo and Canelones.		
	Without computer at the household	With computer at the household (not under the Plan CEIBAL)	With computer at the household (at least one under the Plan CEIBAL)	Without computer at the household	With computer at the household (not under the Plan CEIBAL)	With computer at the household (at least one under the Plan CEIBAL)
Household	3%	76%	29%	3%	83%	*
Work	23%	26%	10%	26%	32%	*
Educational center	18%	11%	45%	11%	11%	*
Friend's home	26%	10%	9%	33%	15%	*
Public place	5%	2%	25%	1%	1%	*
Cybercafé	55%	17%	19%	61%	16%	*

Source: Encuesta Continua de Hogares-INE (*unrepresentative data).

5.3. The Impact of Plan CEIBAL on the Places from Which the Internet can be Accessed

Tables 4 and 5 show the existing correlation between the places from which the Internet can be accessed and the type of computers present in households. Again, we take into consideration the state of things after the first half of 2009 (Table 4) in order to verify any changes as of December 2010 (Table 5).¹⁷

It follows that people who own a computer (although not one given under Plan CEIBAL) access the Internet from their homes, while those who do not have a computer at their homes access the Internet from cybercafés. This home-cybercafé use polarization pattern could be observed in the two geographical groups, and it was more pronounced in the regions where Plan CEIBAL was not yet implemented (Montevideo and Canelones in the first half of 2009). The users at CEIBAL homes break this use polarization, since priority access was transferred to educational centers (and, in the cases of Montevideo and Canelones, also to households).

The role of the place from which the Internet is accessed for information technology literacy is a highly discussed issue among policy makers. On the one hand, Robinson (2001), among others, main-

tains that the abundance of cybercafés in Latin America reflects the lack of public policies implemented by the region's countries, which leave the supply of Internet access services to the market. What Robinson is most concerned about is that the proliferation of cybercafés shows the consumption model of only specific types of available tools, such as chat sites or services; e-mail accounts; music services; and access to pornography, favorite artists, and shopping websites, underrates the potential of ICTs. On the other hand, Katzman's work (2010) on the social impact of the incorporation of ICTs into educational systems in LAC, to which we referred earlier, also stresses the importance of the places from which the Internet is accessed. The author concludes that access to the Internet from educational centers may put the different types of access from polarized economic strata at the same level and compensate the less-favored sectors. This is, without question, the major role that Plan CEIBAL has had in Uruguay.

In addition to the access from educational centers, a greater correlation between the persons from CEIBAL homes and the use of the Internet in public places can be observed. This certainly reflects the connectivity policy of the plan, which prioritizes not only educational centers, but also public places. These newly connected public places signify a differ-

17. It should be noted that the columns in the tables do not total 100 because the places from which people access the Internet do not exclude each other, which means that people access the Internet from several places.

ONE LAPTOP PER CHILD AND BRIDGING THE DIGITAL DIVIDE

Table 5. Place From Which the Internet is Accessed by Type of Access to Computer and Region (Percentage of the Total Population Older than 5 years of Age in Each Region).

December 2010.

	Interior without Canelones.			Montevideo and Canelones.		
	Without computer at the household.	With computer at the household (not under the Plan CEIBAL)	With computer at the household (at least one under the Plan CEIBAL)	Without computer at the household.	With computer at the household (not under the Plan CEIBAL)	With computer at the household (at least one under the Plan CEIBAL)
Household	8%	86%	45%	3%	93%	52%
Work	22%	25%	8%	26%	34%	11%
Educational center	21%	11%	54%	13%	11%	49%
Friend's home	33%	11%	10%	45%	16%	19%
Public place	9%	2%	19%	2%	4%	10%
Cybercafé	37%	9%	11%	52%	6%	15%

Source: Encuesta Continua de Hogares-INE.

ent way of living in a neighborhood or town, which can be associated, in turn, with the reach of wireless network Internet connections. As we shall explain below in greater detail, public places thus become new learning and meeting places, especially for children, though they can also be used by adults who do not have Internet connection at their homes.

To sum up, we may conclude that the data analyzed reflect the first impacts of this nationwide policy. There are positive signs of Plan CEIBAL's impact on the narrowing of the digital divide, since the difficulty of accessing computers from the home has been mitigated and the polarization of the places from which the Internet is accessed (home-cybercafé) has been broken. This has happened because educational centers have emerged as new privileged access places, a strategy that constitutes a powerful mechanism to put people from polarized socioeconomic strata at the same level.

6. Use of Plan CEIBAL for Human Development

This section analyzes the surveys conducted with local officers and adults from CEIBAL homes. The purpose is to know what adults and children use the *Ceibalitas* for in towns and neighborhoods—and specifically, at their homes. Thus, we intend to understand the ways in which Plan CEIBAL has helped to bridge the digital divide.

6.1 Plan CEIBAL at the Local Level

The first aspect that follows from all the surveys conducted is the impression caused by the mere sight of children carrying their *Ceibalitas*, due to the strong visual and symbolic impact implied. Children are frequently seen looking for places with wireless signal to access the Internet to play or listen to music online. This is an activity they perform either alone or accompanied by their peers or adults at schools, parks, and other public places.

This can be mainly observed in UBNs, since 67% of the persons surveyed from that background expressed that children are more frequently seen in public places with their *Ceibalitas*, especially in places with Internet connection. The same happens with 59% of the persons surveyed from FBNs, while in STs, the effects associated with public places are less significant, since only 39% of those surveyed made reference to it.

In these public gathering spaces, some interactions take place which were described by a parent from the city of Florida thusly: "Families go to the park, adults talk and drink *mate* while children play and connect to the Internet. Children approach other children when they see that they have an XO. It serves as an excuse to meet new people." This shows that this technology causes not only children, but also adults to socialize, and that in those interactions, personal and virtual experiences are combined.

This everyday experience that children have with their computers in public places causes people to change the way they perceive the new possibilities that are offered by the *Ceibalitas*. For instance, a mother from an ST said: "Town children feel they are exactly like city children." Another mother expressed that she had never thought that her child would have a computer, because only people in cities or with greater purchasing power could have access to those goods. This perspective on the access to this type of goods, in turn, helps people to feel that they have equality of opportunities and inclusion, which is also confirmed by the local officers surveyed.

In a nutshell, the 1:1 feature of Plan CEIBAL causes public places to become new learning and meeting places where children who have no Internet connection at their homes can go to access networks. This has a symbolic impact on the perception of opportunities and access to these goods by the less-favored sectors of society, and it also leads to changes in what the neighborhood or city looks like in the eyes of its inhabitants. This is a particular characteristic that results from the ubiquitous aspect of the one-laptop-per-child policy.

6.2 Dynamics of Homes after the Incorporation of ICTs

The research work confirms that Plan CEIBAL has been clearly noticed in the home. More than half of the people surveyed mentioned some kind of specific change taking place at home since the implementation of Plan CEIBAL. This was even more significant in homes in UBNs and STs, where approximately 60% of the total adults reported some sort of change. The homes in FBNs are the ones that mentioned this kind of change the least (43%). According to those surveyed, this is because they already had access to computers and the Internet, which means that the incorporation of this tool was not a novelty for those homes.

Sharing information and the work jointly performed by children, parents, and other relatives through the XO were the two most highlighted aspects (51 out of the 102 people who observed changes at their homes made reference to them). In several households, the people surveyed (15 out of 102) noted that they were more relaxed because their children were kept amused with their laptops. However, this was also mentioned as a reason for conflict, because the use of the *Ceibalita* also gave

rise to arguments among siblings (20 out of 102). Other cited changes in the household included the fact that children stayed at home more, were more entertained, and helped their siblings more. Furthermore, the persons surveyed made reference to changes in the rules and curfews imposed on children to establish limits and adjust computer uses.

After analyzing the explanations given by the people surveyed concerning the changes brought about in the home, it is clear that these were the result of programs and applications of the XO, and of the new activities proposed at schools. In that regard, the people surveyed stated that one of the most frequent uses of the XO at home was the search for educational materials. Audiovisual tools, such as cameras or music players, are also used. These activities are more significant in the poorest homes, since children from those backgrounds did not have those tools before. In 37 cases, the people surveyed stated that household members could now communicate through the *Ceibalita* with relatives and acquaintances living outside the city or in other countries (17 of those cases came from small towns, showing that, in these areas, the use is much more widespread).

Finally, respondents also stated that children feel more encouraged to learn and explore. Six respondents described it as a change in their home. As pointed out by a mother, "They spend quite a lot of time reading books in their XOs. They play more with their XOs and have acquired a taste for music thanks to the Tam Tam." Another mother stated that "[the children] are more into exploration. If they go outside to the garden and see butterflies, then they go and search for information on them."

The home dynamics were mainly modified due to the children's new habits and activities resulting from the use of the XO, either because of the instructions given by school teachers, or because of their own curiosity. Access to new sources of information and communication and some new family bonds in terms of home cooperation and exchange are also evidenced, as well as the existence of conflicts among siblings concerning the use of the laptops. Children have been especially affected by this, since no changes are observed in the home as a result of the practices or habits of adults. It is clear that the less-favored homes are the ones that have benefited the most from the distribution of these tools.

6.3 Uses and Advantages of the Ceibalita

With regard to the use and advantages of the XO, research has confirmed that children are the main users of Plan CEIBAL laptops (90 surveyed children pointed out that they are the only users of their laptops, and only 57 of 192 persons reported that their parents also use them).

The first relevant piece of information is that very few respondents have realized that the incorporation of this technology into their homes has allowed them to solve a problem or meet a need (the answer of 140 out of 192 surveyed people was an emphatic “no”). The adults who use *Ceibalitas* do so to give support to their children, or to work or help them with their homework. This use is intensified when there is an Internet connection at home. Only 15 cases of use by adults for purposes of their own, for appropriation of the device, or for learning purposes were recorded. The reasons were the solution of employment or work issues; health, housing and public services issues; and cultural and entertainment purposes.

A thorough analysis of the answers given regarding why adults do not use the laptops shows that they do not believe that they would benefit from their use, and that they feel that spending time to learn how to use them would be too large an investment. One of the reasons emphasized by one of the adults surveyed was that “maybe we have not considered it important,” which proves that they are not aware of how useful this tool may be. Some mothers from UBNs and STs have argued that using the XO was difficult for them, that they did not know much about it, and that they were afraid to touch it and delete information or break it. However, these mothers are homemakers, and as such, they are in permanent contact with their children, something that causes them to be more acquainted with the XOs than the children’s fathers, who are not at home so many hours a day and have little contact with school activities.

In households in FBNs, however, the reason that parents do not use the XO is their preference for standard computers. They also mentioned that they found it difficult to use the XO, because they were not familiar with its operating system. Another reason cited was the fact that they considered the *Ceibalita* to be the exclusive property of their children and not for adult use.

In all the cases analyzed, the use of the XO by

the children while not at school and at home was primarily for entertainment purposes. This may include downloading games from websites, watching videos, listening to music, filming, and taking pictures. As regards specific educational purposes, it was verified that children do use their laptops to study when teachers or some adult encourages them to do so. Several parents have noted this difference, since they have more than one child and could observe that when teachers use the laptop, children use it, too—and when teachers do not use it, children do not use it, either. Furthermore, school work requires that an adult person be involved to help children, and this causes them to get acquainted with that technology.

About 25% of those surveyed pointed out that children have been more eager to learn and explore since Plan CEIBAL was implemented. In favorable backgrounds, this phenomenon has grown even stronger, as a third of those respondents refer to it as a change experienced by children.

When asked if they consider that the plan has favored the education of children, the vast majority of those surveyed (181 out of 192) replied that they observed positive impacts. Among the negative answers we find those who claim that the *Ceibalita* is an outrage against traditional learning techniques (writing with pencil and paper, sketching maps, reading, among others). Some parents argued that the introduction of computers was not beneficial because the children cannot access the Internet from their homes, while others maintained that their children’s teacher did not use it, and as a result, their children only used them to play.

From the analysis of the answers given by parents concerning changes in the use of the *Ceibalita* by their children throughout time, we could identify an evolution with two different trends. On the one hand was the evolution of those who make an intensive initial use of the device that progressively weakens and ends in a less intense use; and on the other was the evolution of children who intensify the use of their laptops with the passing of time.

According to the answers obtained in the surveys regarding how frequently and for what *Ceibalitas* were used both before and now, most of the children from the surveyed homes (89 out of 146 answers) have followed the first trend. This means that after their initial enthusiasm, children have tended to use their laptops progressively less. Some

of the reasons for which the use of *Ceibalitas* is discontinued or lessens in intensity are the repetitive use of the same applications, technical problems or breakdowns, failure to use them at school, and the lack of Internet connection at home. The existence of another computer at home also contributed to this.

According to the second trend, children increase the use of their laptops or maintain the intensity of the initial use (57 out of 146). Some of the reasons found for this is that children who continued using their laptops for entertainment purposes sometimes changed and upgraded the games they used, that their use was required at school or by their teachers, that the uses were diverse and not for entertainment purposes only, and that these children whose use has not dropped off either have Internet connection at their homes or live in homes that are located near a place with Internet connection. Moreover, what children who have shown this trend have in common is that they belong to households that were not equipped with computers before Plan CEIBAL was implemented, and that they live in UBNs or STs.

In a word, it follows from the data analyzed that the use of *Ceibalitas* by adults is not a significant aspect of acquisition and human development processes.

Additionally, the availability of *Ceibalitas* constitutes an important educational resource, especially to access material and information and increase the motivation for learning. In turn, the differentiated trends in the evolution of the use of *Ceibalitas* by children show how important encouragement by educational centers or adults in the child's background is to consolidate the meaningful use of computers and contribute to the narrowing of the digital divide.

7. Conclusions

The purpose of this article is to show the extent to which a one-laptop-per-child initiative like Plan CEIBAL, implemented in Uruguay in 2007, has both helped to narrow the digital divide and increased the use of ICTs for human development.

We found that Plan CEIBAL has contributed to the bridging of the digital divide in terms of the possibility to access computers and the Internet from educational centers. Laptops have been distrib-

uted homogeneously throughout the Uruguayan territory, including small towns and rural areas.

The implementation of Plan CEIBAL has broken the polarization of the places from which the Internet can be accessed (homes as opposed to cybercafés), since it has facilitated access from educational centers and new public places. This is very important, since we know that access to the Internet from educational centers is a powerful mechanism that puts children from polarized economic strata at the same level. Furthermore, this work also verified the creation of public places for gathering, information exchange, and cooperation purposes, and also for learning through ICTs. These observations lead us to wonder whether the indicators of Internet connectivity at households and educational centers are sufficient to account for the access and use of computers by part of a specific population influenced by one-laptop-per-child universal public policies.

The use of XO in CEIBAL homes is proof of the digital inclusion of the least favored sectors of society. This resource mitigates inequalities associated with access to information and communications, which causes opportunities to arise mainly for the socioeconomically, culturally, and geographically less-favored sectors. The use of *Ceibalitas* shows learning benefits for children, and even though adults also use them, they do so to a lesser extent. The ubiquitous nature of this technology translates into the gathering of children with laptops at public places, which is seen as a symbol of inclusion and equality in society.

Finally, despite universal access to laptops and the possibility to access the Internet from their homes, the children who use this technology in a meaningful way for self-development have proven to be those who have the support, guidance, and encouragement of adults. Without such support, children may cease to use their laptops or may only do so for entertainment purposes.

These conclusions confirm that even mere access to laptops can make an enormous contribution to human development in excluded populations, as such access facilitates further access to communication and information. It also consolidates the relationship between digital inequalities and other types of inequalities, and shows that unfavorable background neighborhoods or cities are those where the beneficial uses for human development encounter

more difficulties. In the case under analysis, we can observe that the contribution that the one-laptop-per-child policy makes to narrow the digital divide may be a very small one if the target population does not receive additional stimuli and support. If schools fail to fulfill their roles—especially those in the least favored areas—children may not make the most of the opportunities that this policy gives them through the access to computers and Internet connectivity. ■

References

Accuosto, P., & Johnson, N. (2004). *Financing the information society in the south: A global public goods perspective*. Prepared for the Association for Progressive Communications (APC) by the Third World Institute. Retrieved from <http://www.apc.org/en/system/files/financing.pdf>

Afonso, C., & Soarez, L. (2005). *Desenvolvimento humano e a apropriação das TICs* [Human Development and ICTs Appropriation]. Available at CGI.br (Comitê Gestor da Internet no Brasil) [Internet Management Committee of Brazil]. Pesquisa sobre o uso das tecnologias da informação e da comunicação 2005 [2005 research on the use of information and communications technologies]. São Paulo, 2006 (pp. 27–30).

Attwell, P. (2001). The first and second digital divides. *Sociology of Education*, 74(3), 252–259.

Camacho, K. (2001). *Internet: ¿Una herramienta para el cambio social? Elementos para una discusión necesaria* [Internet: A tool for social change? Elements for a necessary discussion]. Retrieved from <http://www.sulabatsu.com/publicaciones/internet-%C2%BFuna-herramienta-para-el-cambio-social-elementos-para-una-discusi%C3%B3n-necesaria>

Castells, M., Tubella, I., Sancho, T., Díaz, M., & Wellman, B. (2007). *Proyecto Internet Catalunya: La sociedad red en Catalunya*. [Catalonia Internet Project: The network society in Catalonia]. Retrieved from http://www.uoc.edu/in3/pic/esp/sociedad_red/informe.html

CEIBAL. (2010). El proyecto pedagógico [The pedagogical project]. Retrieved from <http://www.ceibal>

[.edu.uy/Articulos/Paginas/Ceibal%20%20El%20proyecto%20pedag%C3%B3gico.aspx](http://www.ceibal.edu.uy/Articulos/Paginas/Ceibal%20%20El%20proyecto%20pedag%C3%B3gico.aspx)

Cortés, J., & Dubois, A. (2005). *Nuevas tecnologías de la comunicación para el desarrollo humano* [New communication technologies for human development]. Retrieved from http://biblioteca.hegoa.ehu.es/system/ebooks/15190/original/Cuaderno_de_trabajo_37.pdf

Garibaldi, L., & Ibarra, M. (2011). *Plan CEIBAL: Mucho más que distribución de computadoras, La Educ@ción* [Plan CEIBAL: Not just the mere distribution of laptops, Educ@tion]. *Revista Digital*, No. 145, May, Organization of American States. Retrieved from http://www.educoas.org/portal/La_Educacion_Digital/laeducacion_145/studies/EyEP_garibaldi_ES.pdf

Gascó-Hernández, M., Equiza-Lopez, F., & Acevedo-Ruiz, M. (2007). *Information communication technologies and human development: Opportunities and challenges*. Hershey, PA: Idea Group Publishing.

Gómez, R., Delgadillo, K., & Stoll, K. (2003). *Telecentros . . . ¿Para qué? Lecciones sobre telecentros comunitarios en América Latina y el Caribe* [Telecenters . . . what for? Lessons on community telecenters in Latin America and the Caribbean]. Montevideo, Uruguay: Fundación Chasquinet, IDRC.

Hargittai, E. (2004). Internet access and use in context. *New Media and Society*, 6(1), 115–121.

Katzman, R. (2010, October). *Impacto social de la incorporación de las nuevas tecnologías de información y comunicación (TIC) en el sistema educativo* [Social impact of the incorporation of new information and communication technologies (ICTs) into the educational system]. ECLAC, Social Development Division, Serie Políticas Sociales No. 166, Santiago, Chile, October 2010.

Mansell, R. (2002). From digital divides to digital entitlements in knowledge societies. *Current Sociology*, 50(3), 407–426.

Martínez, J. (2001). *Internet y políticas públicas socialmente relevantes: ¿Por qué, cómo y en qué incidir?* [The Internet and socially relevant public policies: Why, how and on what should we influence?]. In M. Bonilla and G. Cliche (Eds.),

- Internet y sociedad en América Latina y el Caribe [Internet and society in Latin America and the Caribbean]. Quito, Ecuador: FLACSO-IDRC.
- Mística, Comunidad Virtual Mística. (2002). *Comunidad virtual trabajando la Internet con visión social. En otro lado de la brecha: Perspectivas latinoamericanas y del Caribe ante la CMSI* [Virtual community working the Internet with a social vision. On the other side of the divide: Perspectives in Latin America and the Caribbean before the World Summit on the Information Society (WSIS)]. Caracas, Venezuela: RedISTIC.
- Plan CEIBAL. (2011). *Segundo informe nacional de monitoreo y evaluación del plan CEIBAL* [Second national monitoring and assessment report on Plan CEIBAL]. Departamento de Monitoreo y Evaluación del Plan CEIBAL [Department of Monitoring and Assessment of the Plan CEIBAL]. Retrieved from <http://www.CEIBAL.org.uy/docs/Segundo-informe-nacional-de-monitoreo-y-evaluacion-del-Plan-CEIBAL-2010.pdf>
- ReducaWIKI. (n.d.). Proyecto OLPC-Plan Ceibal. Retrieved from http://www.reducativa.com/wiki2/index.php?title=Proyecto_OLPC_-_Plan_Ceibal
- Rivoir, A., Pittaluga, L., di Landri, F., Baldizán, S., & Escuder, S. (2010). El Plan Ceibal: Impacto comunitario e inclusión social [Plan Ceibal: Community impact and social inclusion]. Retrieved from <http://www.observatic.edu.uy/inicio?p=437>
- Robinson, S. (2001). *Conferencia: El jardín de los senderos: Caminos que se bifurcan* [Conference: The road garden: Forks-in-the-road]. Retrieved from <http://www.eslared.org.ve/articulos/scott/scottconferencia.pdf>
- Sassi, S. (2005). Cultural differentiation or social segregation? Four approaches to the digital divide. *New Media & Society*, 7(5), 684–700.
- Selwyn, N. (2004). Reconsidering political and popular understanding of the digital divide. *New Media & Society*, 6(3), 341–362.
- Sen, A. (2000). *Desarrollo y libertad* [Development and freedom]. Barcelona: Editorial Planeta.
- Severin, E., & Capote, C. (2010). *Modelos uno a uno en América Latina y el Caribe: Panorama y perspectivas* [One-laptop-per-child models in Latin America and the Caribbean: Overview and perspectives]. Washington, DC: Inter-American Development Bank (IDB).
- Stewart, C., Gil-Egui, G., Tian, Y., & Pileggi, M. I. (2006). Framing the digital divide: a comparison of U.S. and EU policy approaches. *New Media & Society*, 8(5), 731–751.
- Taylor, S., & Bogdan, R. (1986). *Introducción a los métodos cualitativos en investigación* [An introduction to qualitative research methods]. Barcelona: Paidós.
- United Nations Development Programme (UNDP). (2001). *Informe sobre desarrollo humano 2001: Poner el adelanto tecnológico al servicio del desarrollo humano* [Human Development Report 2001: Making new technologies work for human development]. Washington, DC: UNDP.
- Valles, M. (1997). *Técnicas cualitativas de investigación social: Reflexión metodológica y práctica profesional* [Social research qualitative techniques: Methodological reflection and professional practice]. Madrid: Síntesis SA.
- Veiga, D., & Rivoir, A. (2004). *Desigualdades sociales en el Uruguay* [Social inequalities in Uruguay]. Ed. Fac. Ciencias Sociales, Universidad de la República, Montevideo.
- Warschauser, M. (2003). *Technology and social inclusion: Rethinking the digital divide*. Cambridge, MA: MIT Press.

Copyright of Information Technologies & International Development is the property of University of Southern California, USC Annenberg Press and its content may not be copied or emailed to multiple sites or posted to a listserv without the copyright holder's express written permission. However, users may print, download, or email articles for individual use.