

# **Building and sustaining national ICT/education agencies:**

## ***Lessons from Uruguay (Plan Ceibal)***

*World Bank Education, Technology & Innovation:  
SABER-ICT Technical Paper Series (#09)*

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2016**



**To cite this publication:**

Severin, E. 2016. *Building and sustaining national ICT/education agencies: Lessons from Uruguay (Plan Ceibal)*. World Bank Education, Technology & Innovation: SABER-ICT Technical Paper Series (#09). Washington, DC: The World Bank.

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## Acknowledgements

The *World Bank Education, Technology & Innovation: SABER-ICT Technical Paper Series* explores a variety of topics and issues related to the use of information and communication technologies (ICTs) in the education sector.

The Systems Approach for Better Education Results (SABER) initiative seeks to improve the global knowledge base related to education systems analyses, assessments, diagnoses, and opportunities for dialogue. SABER-ICT aims to improve the availability of policy-related data, information, and knowledge on what matters most in using ICTs to improve the quality of education.

This publication series is made possible through generous support from the Government of Korea, most notably through the Korea - World Bank Partnership Facility.



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## Executive summary

Despite many initiatives that were introduced beginning in 1990, Uruguay had had trouble implementing a national policy to introduce ICT in schools, especially in primary education. However, in 2006, a new initiative -- 'Plan Ceibal' -- was announced to provide laptops for all students and teachers in government-supported primary schools over a three-year period. *Plan Ceibal* had three pillars: (1) equity, social inclusion and equality in access to technology; (2) technology as a means to achieve these goals; and (3) education, universal law that aims to equal opportunities. The implementation phase of the Plan Ceibal was carried out in four stages, including a pilot phase that began in early 2007. As a result of the initial phases of Plan Ceibal, all of these primary schools (with subsequent stages of the project focusing on all secondary schools, teachers, students and their families) had the opportunity to use and learn with ICTs.

The implementation of Plan Ceibal was heavily influenced by the specific characteristics of the country and of Uruguayan society. Operational issues related to the project's technological component (connectivity, computers, services) were handled directly by one institution, LATU, while another organization, ANEP, had oversight of the project's education components. A central decision-making and coordination body, the Ceibal Board, coordinated the activities of agencies which participated in various ways with Plan Ceibal and included representatives from key actor and stakeholder groups. As the project grew in scope and complexity, a new, specialized institution, Centro Ceibal, was created to oversee the strategic management of the project.

Despite its many notable achievements, Ceibal continues to face challenges in terms of technical and pedagogical support, digital learning content, sustainability and broadband Internet connectivity. Furthermore, while the integration of ICT in education activities should be facilitated by greater access to laptops, the intensive and appropriate use of ICT to promote new ways of learning and better educational outcomes remains a challenge for Ceibal. Going forward, strategies that consider detailed and coordinated actions to address issues related to curriculum, assessment, content and professional development of teachers will increase in importance, now that the initial challenge of providing increased access to ICT has largely been addressed.

Although Ceibal has an explicit educational purpose and has been implemented throughout the Uruguayan educational system, its reach and impact extends far beyond only schools. While it seeks to make a positive impact on schools and teachers' pedagogical practices, its broader purpose extends far beyond just the formal schooling sector, supporting advancements for children, families and in larger Uruguayan society.





# 1. Background

Uruguay is known for its advanced educational system and high (98%) literacy rate<sup>1</sup>, the highest in Latin America. 92% of children 14 years of age have completed six years of school<sup>2</sup>. Most schools in Uruguay are public (81%), which means they are run by the state. A smaller percentage are private schools (19%), subsidized through a specific tax exemption.<sup>3</sup>

Uruguay introduced universal primary education -- free, secular and compulsory -- in the nineteenth century. Rather unique from a global perspective, three institutions currently oversee activities in the education sector in Uruguay: the Ministry of Education and Culture (MEC); the National Agency of Public Education (ANEP); and the University of the Republic (UDELAR).<sup>4</sup>

The *MEC* is responsible for the coordination of national education. It promotes the country's cultural development and artistic, historical and cultural heritage; innovation, science and technology; and the preservation of human rights. It is also responsible for boosting the population's access to digital information. The MEC, however, is not responsible for managing the public education system -- that is the responsibility of ANEP.

Established in 1985, *ANEP* has the technical and administrative autonomy of an executive body, but without financial autonomy. Its main objectives are the establishment of the country's education policy; planning; operational management and administration of the public education system (including pre-school, primary and secondary and technical education; teacher training; and the supervision of the private schools sector. ANEP's governing councils are advised by the Technical Assembly Teachers (ATD)<sup>5</sup> and governed by a Central Board (CODICEN).<sup>6</sup>

The *University of the Republic* is the only public university in Uruguay. Access to public higher education is free and unrestricted.<sup>7</sup>

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<sup>1</sup> Hinojosa, J.E., Jara, I., & Brun, M. (2011). "Case study: Uruguay" in: UNESCO (2011).

*Transforming education: the power of ICT policies*. Paris: UNESCO.

<sup>2</sup> Edelman, A. & Fernández, A. (2009). CEIBAL plan "One Laptop Per Child" in Uruguay. *Revista de Antiguos Alumnos del IEEM*, Febrero 2010, Universidad de Montevideo, 24-42.

<sup>3</sup> Hinojosa (2011)

<sup>4</sup> *Ibid.*

<sup>5</sup> Edelman & Fernández (2009)

<sup>6</sup> Hinojosa (2011)

<sup>7</sup> *Ibid.*

## 2. Plan Ceibal: The Conception

In 2005 Uruguay was in the process of reformulating its national development strategies and, as part of this process, a new institutional framework was created to address problems and challenges related to the emerging 'information and knowledge society'. A number of related new agencies were created, including the Agency for Electronic Government and Information Society and Knowledge (AGESIC) and National Agency for Research and Innovation (ANII).<sup>8</sup> At the same time, links were established with One Laptop Per Child (OLPC) organization to explore the possibility of bringing that project to Uruguay.

Announced in December 2006, Plan Ceibal promised to provide a computer to every school and every public school teacher. Ceibal was one of the main projects of the socialist government of president Tabare Vazquez, and the administration felt that it was urgent to complete the initial project before the end of Vasquez's presidential term in 2009.<sup>9</sup>

Under the authority of the president, whose leadership, attention and commitment is widely credited with being of singular importance in the early years of Plan Ceibal, a political committee was created comprising a broad number of stakeholder groups, including the key institutions that managed the public education system, agencies and institutions in charge of 'digital development', research and innovation, and telecommunication authorities. The Technological Laboratory of Uruguay (LATU) was mandated to lead the implementation of Plan Ceibal, in charge of defining and implementing policies relating to the initiative.<sup>10</sup> President Vasquez not only pushed this project forward, but also gave authority to relevant institutions to streamline processes, facilitate decisions and have more budgetary discretion in order to make it happen. Within this operational framework, Plan Ceibal was constituted and implemented as a 'presidential project', supported by a national policy notable for an innovative institutional design that separated the management of key policy areas among different actors.<sup>11</sup>

LATU created a new, dedicated parallel organization to implement the Ceibal project. For administrative and accounting purposes within LATU, the project functioned as an internal body, with LATU providing administrative support and related services. In all other respects, the project was self-sufficient and had internal decisionmaking autonomy. At the beginning, the organization was extremely small and operated under a tight budget. Technical staff from both within and outside of LATU were on fixed-term contracts; most were quite young (less than a handful were over 30) and were characterized by high levels of initiative and motivation.<sup>12</sup>

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<sup>8</sup> *Ibid.*

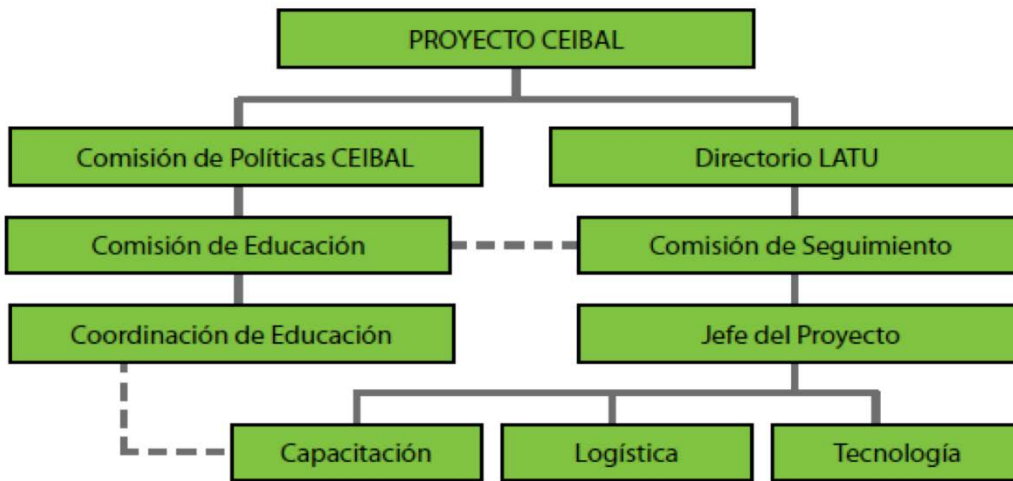
<sup>9</sup> *Ibid.*

<sup>10</sup> Bianchi, L. & Spiller, G. (2011/12). *Plan CEIBAL. Equidad, tecnología y educación para el desarrollo humano*. Montevideo: Centro CEIBAL.

<sup>11</sup> *Ibid.*

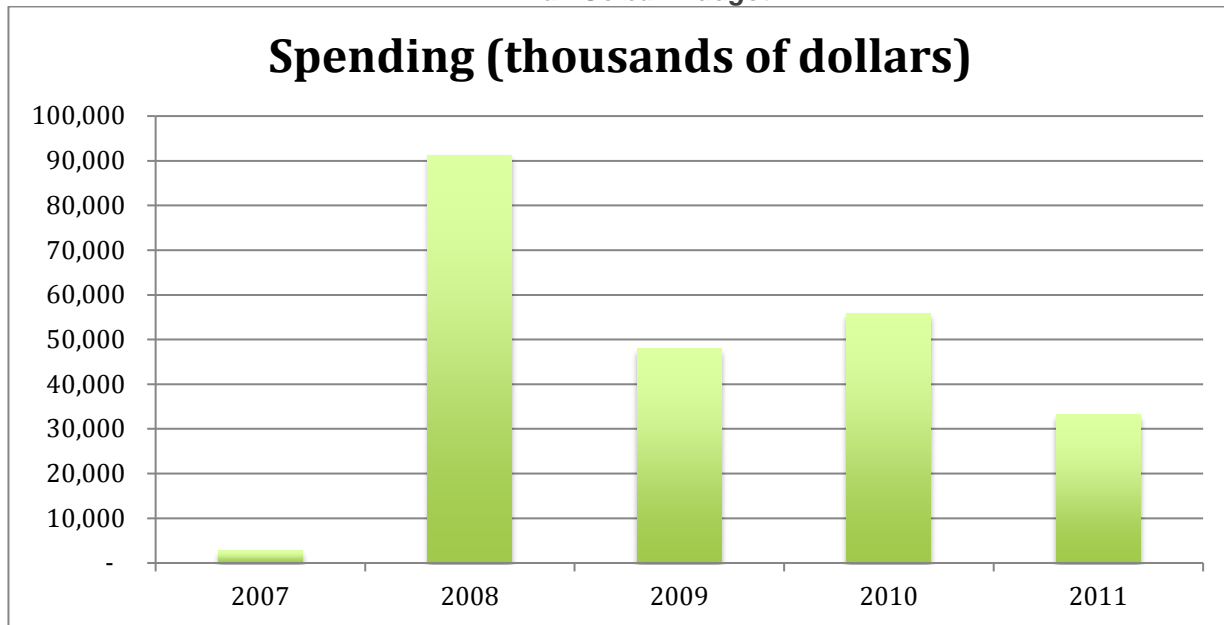
<sup>12</sup> Edelman & Fernández (2009)

**Ceibal: Organizational structure**



Public funds allocated approximately USD 100 per child per year to Plan Ceibal, which represented 5% of total public expenditure on primary and secondary education, a figure equivalent to .02% of the country's GDP. This amount included all costs (support and maintenance, teacher training, connectivity, logistics and other); the investment in hardware (laptops and servers) was amortized over four years.<sup>13</sup>

**Plan Ceibal: Budget**



<sup>13</sup> Bianchi & Spiller (2011/12)

### 3. The implementation of Plan Ceibal

The implementation of Plan Ceibal was heavily influenced by the specific characteristics of the country and of Uruguayan society, which differ in important ways from many other countries in Latin America (and indeed the world). Uruguay's small population, geographic position between Argentina and Brazil, historical development and, from a Latin American perspective, absence of major social disparities, contributed to and informed the way in which Plan Ceibal developed. These factors were important in enabling Uruguay's efforts to introduce so-called 'one-to-one computing', which in many other countries have experienced political difficulties, financial constraints and organizational challenges. From the very start, the project was highly localized in conception and experimental in nature.

From an organizational perspective, Plan Ceibal had a decision-making system based on consensus and participation, operationalized through a 'policy committee'. This is an essential feature of Uruguayan political culture and was considered a great asset when trying to implement and sustainability an initiative as ambitious as Ceibal. An emphasis on consensus building and the voicing of opinions of key stakeholder groups made related decision-making process sometimes slow, but, once decisions were made, buy-in from all stakeholders was assured and so implementation then proceeded swiftly. Operational issues related to the project's technological component (connectivity, computers, services) were handled directly by LATU, while ANEP had oversight of the project's education components.<sup>14</sup>

The implementation phase of the Plan Ceibal was carried out in four stages, including a pilot phase that began in early 2007. It also included three waves of expansion beginning in late 2007. From 2007 -- 2009, the initial stages of Ceibal implementation were characterized by efforts to provide a laptop to each child and public elementary education teacher. One of the major challenges of this phase was the relatively limited time available to implement the project.<sup>15</sup>

#### *Stage 1 (first half of 2007):*

On April 18, 2007, President Vasquez created a council to formally lead the Ceibal project, with LATU designated as the organization responsible for the project's technical and operational implementation. In May, the first pilot began in a small school of 150 students in the small town of Villa Cardal (population: 1290) in the country's Florida region, using laptops donated by the OLPC organization. At this stage of work, the team was quite small but highly motivated and capable, with team members recruited directly by LATU to ensure a rapid implementation.

One early challenge was that information about the project within the local community was not widely distributed, as ANEP, which was tasked with the process of information dissemination and local outreach, was more accustomed to working directly with schools, and not with other local stakeholder groups. This led to some basic challenges with project implementation, as key local actors and individuals did not feel sufficiently 'in the loop' on what was going on, and what was planned.<sup>16</sup>

#### *Stage 2 (second half of 2007):*

The project was quickly extended to the rest of the Florida region, which was soon completely covered. In October of 2007, the first 100,000 'XO' laptops and 200 servers were purchased

<sup>14</sup> Hinojosa (2011)

<sup>15</sup> Martínez, A.L. (coord.), Alonso, S., & Díaz, D. (2009b). *Monitoreo y evaluación de impacto social del Plan CEIBAL. Metodología y primeros resultados a nivel nacional*. Montevideo: Área de Monitoreo y Evaluación de Impacto Social del Plan Ceibal.

<sup>16</sup> Báez, M., García, J.M. & Rabajoli, G. (compiladores). (2011). *El modelo CEIBAL. Nuevas tendencias para el aprendizaje*. Montevideo: CEIBAL/ANEP.

through a competitive bidding process. By the end of the year, 100% of children and teachers in Florida had received their new computers (6,289 computers in total).

As in the first stage, the main focus of work in this stage was done by LATU and related to technical issues: equipment distribution; local reception and configuration; technical support; and connectivity. The implementation structure was markedly decentralized and featured a great deal of local autonomy. Initial trainings of teachers and schools inspectors, for example, were led by the local Augustine Center Ferreiro (CAF). The function of the 'Project Ceibal Pedagogical Coordination' was established under the auspices of the Primary Education Council, strengthening the role of the Education Commission within the project and aiding the expansion of Plan Ceibal beyond Florida into other regions of Uruguay.

As implementation roll-outs increased, the project received increasing (positive) press coverage, and word spread from communities which had already received their equipment and initial training. Initial distrust began to dissipate and public satisfaction grew. The support of local volunteers emerged and became increasingly key to local implementation activities, serving "to add value to the delivery of computers, stand alongside families, administrators, classroom teachers and the community, explaining and supporting the proper use of the new equipment."<sup>17</sup>

### *Stage 3 (2008):*

In stage three, more than 175,000 computers were delivered, with all schools across the country covered except for a part of the region of Canelones and the capital city of Montevideo and its surrounding metropolitan area.

The end of the second stage and the beginning of the third were marked by increased public support for the project and the participation of thousands of volunteers across the country. To help organize these volunteers, a national network of volunteer support groups (RAP) was established, building on and consolidating many local efforts, which grew rapidly and comprised over 1600 people from all regions departments and of all ages who actively supported Ceibal in their local communities.

Strong support also developed in local authorities, including in municipal councils that actively supported various components of the projects by, for example, covering some local expenses, providing transportation for volunteers and facilitating training activities. Complementing these local networks were virtual networks, including websites such as RAP CEIBAL, Reducativa, South OLPC CeibalJAM!, as well as numerous blogs by teachers who, individually or in groups, began to share information about their participation in the project on the Internet. Referencing and cross-linking with each other, these web sites supported each other in important ways, collectively facilitating greater access to information about the project and promoting its activities.<sup>18</sup>

In mid-2008, the Government of Uruguay began a dialogue with the Inter-American Development Bank (IDB), which led to IDB providing financial and technical support to Plan Ceibal, with specific attention to the interactions between pedagogy and technology and the exchange of information, know-how and best practices between schools. IDB support helped change the model of teacher education, introduce new digital educational resources, develop platforms and tools to record and share key academic data, support online measurement of student learning and enhance the ability of Ceibal to monitor and evaluate its activities.

A new team was formed to lead efforts related to "monitoring and evaluation", working in coordination with both LATU and ANEP. Its main objective was to produce valid and reliable information about the implementation, results and impact of Plan Ceibal, with a special focus on

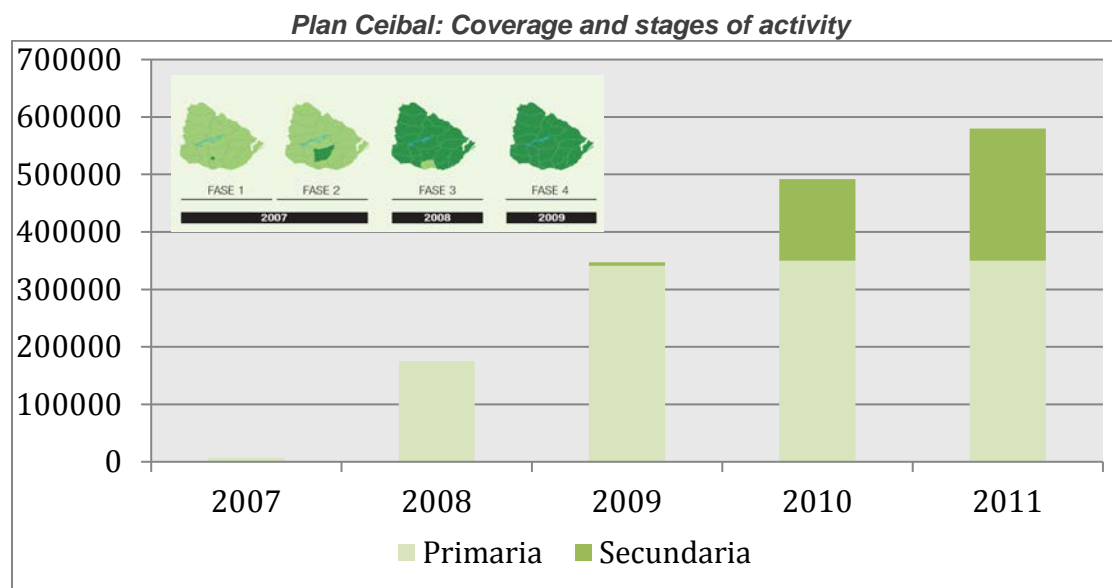
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<sup>17</sup> *Ibid.*

<sup>18</sup> *Ibid.*

the role of new technologies in reducing social inequities and broadening access to ICTs. Results from the work of this team became key to helping implementing groups overcome challenges and deepen the impact of the project.<sup>19</sup>

On December 15, a presidential decree extended Plan Ceibal to cover private educational institutions, as well as to students and teachers of the first years of public secondary education.



**Stage 4 (2009):**

By the end of 2009, distribution of laptops was complete in Canelones, as well as in Montevideo and the surrounding metropolitan area. 341,259 children and 18,000 primary school teachers had received their laptops, over 6,000 of which had also been delivered to secondary schools.<sup>20</sup> A second stage of evaluation commenced,<sup>21</sup> examining a nationally representative sample of teachers, principals, children and families, complemented by a qualitative study in 20 communities. In total, data collection considered 5,682 children in grades 3-5, 7620 families, 1050 teachers and 200 principals.<sup>22</sup>

Throughout these stages, the team within LATU grew, providing a solid backbone of both logistical and technical support for the Ceibal project. Over time, three new areas of activities were added, as requirements within the project grew: application development; volunteer coordination; and impact assessment. The information system and processes implemented by the Ceibal team at LATU enabled the tracking of all computer hardware throughout the stages and lifecycle of the project and featured an advanced mapping systems (using public satellite images from NASA) to aid in laptop distribution, local network designs, and server support, among many activities and responsibilities. A call center and a service center were established, and LATU also managed the tenders for purchasing technology for schools and to support the project's operations at LATU.<sup>23</sup>

<sup>19</sup> Martinez & Perez (2009), Hinojosa (2011)

<sup>20</sup> Hinojosa (2011)

<sup>21</sup> Salamano, I., Pagés, P., Baraibar, A., Ferro, H., Pérez, L. & Pérez, M. (2009). Monitoreo y evaluación educativa del Plan CEIBAL. Primeros resultados a nivel nacional. Montevideo: Área de Evaluación del Plan Ceibal.

<sup>22</sup> Ibid.

<sup>23</sup> Cyraneck, G. (2008). CEIBAL en la sociedad del siglo XXI. Montevideo: UNESCO.

The pedagogical components of the project were less developed. As the Ceibal project was led by LATU, and thus from outside the education system, it met with resistance from many teachers, and from ANEP as well. Other groups within the education system supported the concept and implementation of Ceibal but had neither the time nor the resources to move quickly in support of the technology implementation component of the project. Referring to institutional tensions between ANEP and LATU, the head of LATU noted that, "For a long time we had a fairly high level of conflict. Only now they have understood that we have no intention of replacing them in the management of the education system."<sup>24</sup>

The Ceibal Board helped coordinate the activities of all the agencies which participated in various ways with Plan Ceibal and included representatives from each of the entities involved. It met once a week to identify and analyze problems which had developed and defined next steps for action. Represented on the board were two main sorts of groups: LATU, which took care of logistics and technical execution; and the Education Commission, comprised of MEC and other education authorities (AGESIC, ANEP, CODICEN, ANTEL, ANII), which led the project's educational and social components. Over time, the interactions of these two sections of the Board helped slowly file down the rough edges in coordination and communication and helped in the construction of the necessary consensus, so that, eventually, the points of overlap and connection between the work of individual groups were less and less apparent, despite the fact that they worked highly independently on a day-to-day basis. The board democratically decided where and when laptops would be distributed, as well as how and when each individual entity would do its part in the process. It also analyzed specific cases and decisions were made on issues that only became apparent after a given implementation activity had started, such as those related to children lacking official identity numbers; immigrants; and schools without electricity.<sup>25</sup>

By the beginning of 2009, just over 40 people were working on the core team of Plan Ceibal. By the end of the year, headcount reached nearly 100, not counting the 500 teachers who were trained as "Ceibal Masters" to support the project at the local school level.

In late 2009, the project faced a major challenge. Impending presidential elections meant that, in March of the following year, a new government was expected. While Plan Ceibal was broadly popular across the population and no candidates seemed in favor of ending the project, project leaders sought to strengthen the institutional structure of the project in order to ensure its continuity after the election. One element of this effort was realized when the support of the Inter-American Development Bank for the project was finalized, which provided a sort of international guarantee that various activities would continue, but this represented only a partial solution. The contracts of most team members were due to expire on February 28, 2010, concomitant with the end of the Vasquez government. This represented a big risk for the project, as it was unclear the extent to which it would be able to continue to draw on the experience of the core team that had led the project since its earliest days. LATU had acted as an incubator for kickstarting Plan Ceibal, but it was not clear whether it was the appropriate institution to sustain the project going forward, even when considering the fact that the budget of Plan Ceibal was much larger than the operating budget of LATU itself. The scale to which Plan Ceibal had grown, and the increasingly varied and complex challenges it faced, helped give rise to questions about what kind of institution might be most appropriate to lead it going forward.

In this regard, three options were considered. The first was to delineate and separate out the various core functions, leaving LATU in charge of operational and technological work, ANEP in charge of education management ANEP, and creating another organization to assume strategic leadership (research, development and evaluation). A second option was to separate Ceibal from LATU as a new public-private partnership. The third option, which was the one that was

<sup>24</sup> Interview with Miguel Brechner (September 2009)

<sup>25</sup> Cyranek (2008)

adopted in the end, was to create a specialized public body, responsible for the strategic management of the Plan as a whole: the Ceibal Center (Centro Ceibal).



## 4. A new institution

Following this last phase of implementation, a key change was made to the way Plan Ceibal had been governed since its inception. On December 30, 2009 the Uruguayan Senate approved Law 18,640 ("Health Promotion and Education in childhood and adolescence, in the field of public education") that created a new Center for Social Inclusion and Technology (CITS). Following the adoption of this law, the implementation arm of Ceibal within LATU migrated to the CITS. The new law covered the ownership and maintenance of networks and servers which were part of the Ceibal project. The transfer also included programs, services and activities which had until then been performed by LATU. Finally, the law established that the transition process would be managed by LATU until the time that CITS was officially up and running, after which time LATU be part of the CITS Board.

Article 9 of the law expressly provided that the CITS, known henceforth as Ceibal Center (Centro Ceibal), would be committed "to promote, coordinate and develop plans and programs to support education policy, prevention and care for children and adolescents of Public Education." Specifically, CITS would "promote, coordinate and develop plans and programs for the educational use of ICT." With its own budget now allocated and assigned by law, Plan Ceibal became a project focused on "innovation and development", with a special attention to conditions of inequality, in order to ensure that all potential beneficiaries could made a meaningful use technology.<sup>26</sup>

Ceibal Center also assumed responsibility to respond to requests for support, advice and collaboration from other countries considering the use of ICTs in their education systems, so that lessons from the Ceibal experience could be shared with other groups introducing new technologies in education, reducing risks and shortening implementation times -- and therefore reducing costs as well.<sup>27</sup>

Under the auspices of the new Ceibal Center, a second evaluation began in July 2010. That year, a report shared the results of a related national survey effort, featuring an evolved set of indicators to assess progress in achieving project results and which identified areas of improvement under the objectives of the Plan Ceibal. This report focused on the evolution of access to computers and the Internet by Uruguayan families; maintenance of the XO laptop; the types and frequency of use by children and families; the incorporation of the tool into teaching and learning processes at the classroom and school; and the views of children, teachers and parents on the implementation of the Plan.<sup>28</sup> Additionally, the evaluation model considered the collection of data on outcomes and indirect impacts, taking into account the reduction of the digital divide and promoting digital inclusion as multidimensional challenges, including access to ICT; perceptions of children and teachers about owning computing equipment; and its impact on the country more broadly.<sup>29</sup>

By 2011, there were a total of 255 staff working directly on the implementation of activities under Plan Ceibal, both at Ceibal Center and within a dedicated team at ANEP.

<sup>26</sup> Bianchi & Spiller (2011)

<sup>27</sup> Ibid.

<sup>28</sup> CEIBAL. (2011). *Segundo informe nacional de monitoreo y evaluación del Plan CEIBAL, 2010*. Montevideo: Departamento de Monitoreo y Evaluación del Plan CEIBAL.

<sup>29</sup> Hinostrza (2011)

## 5. Conclusion and challenges

The success of Plan Ceibal was a result of three key characteristics of the project. *First*, the political support of the President of Uruguay was paramount in its inception and initial implementation. *Second*, the separating of implementation responsibilities related to technical and education issues. *Third*, Plan Ceibal was defined explicitly, and was deployed, as a 'project of innovation and development with special attention to the conditions of inequality', in order to ensure that implementation impacted all designated beneficiary groups.

The rapid implementation of Plan Ceibal was made possible due to the commitment of the country's highest political authority -- the President of Uruguay -- who brought together key actors and stakeholder groups from across political sectors, institutions and civil society to achieve a common goal. In a sense, it is possible to say that, along with the deployment of laptops, Internet and training, Ceibal was able to mobilize the Uruguayan society around this policy as if it were a "crusade", a renewal and re-imagining of the country's earlier "Vareliana Revolution" which had been the genesis of the national public education system in Uruguay in the nineteenth century.

It is important to note that Uruguay had institutions with the technical, organizational and leadership flexibility and capacity needed to manage and coordinate the implementation of the different dimensions of this complex project. The project's institutional design placed its technical and logistical functions within an organization which had the necessary flexibility for action, overseen and supported by a highly trained professional team. This division of effort -- leaving educational work within in the public school system, supported by an organization outside of the system -- accelerated the development and implementation of Plan Ceibal.

The first and obvious achievement of Plan Ceibal was to have secured access to technology, connectivity and content for groups across the country's entire population, offering equal opportunities to those who, under other scenarios, would likely have not had access to them for another decade. That said, the main impact that the project intended to produce in the long run relates to education and learning. The Ceibal experience has demonstrated that, regardless of the implementation and governance models model which support efforts such as these, those responsible for public policymaking need to include complementary strategies to ensure the professional development of teachers; the availability of appropriate digital educational resources; and the provision of technical and pedagogical support; alongside the procurement, distribution and maintenance of computer hardware.

Plan Ceibal was a product of institutional dynamism. Beginning with a small group of young and enthusiastic leaders, the institutional roles and activities coordinated by Ceibal Center evolved, changing as needed in ways consistent with the change in scale and scope of the project itself. The consensus building at the heart of the project played an important role in supporting the persistence and perseverance of the overall effort. Going forward, however, Plan Ceibal will have to address three important organizational challenges. The *first* challenge relates to the transition of key personnel, as those who have led the project since its inception, within both LATU and ANEP, will leave their jobs, taking with them much of the "social capital" that has been behind the collective construction of consensus that has characterized Plan Ceibal since its inception. New leaders will emerge with new ideas. The *second* challenge is the danger of routine. Once Plan Ceibal had rolled out across the country, fundamental technical challenges had been overcome and the project itself consolidated as a natural part of the Uruguayan educational landscape, maintaining the focus and priority of political authorities became an increasing concern. Finally, Plan Ceibal will face challenges related to its results and impact going forward -- or lack of them. In its initial stages, everyone understood that Plan Ceibal was a work-in-progress, but, over time, the project will need to demonstrate clear impacts and related

cost effectiveness of its activities. If, for example, Uruguayan educational outcomes in national and international tests show no improvements in the coming years, it may be difficult to maintain a consensus in support of the significant investments of resources which support the project in its initial stages.



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