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The Ceibalitas in Uruguay: How Digital Educational Technology affects Social Cohesion

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THE CEIBALITAS IN URUGUAY: HOW DIGITAL EDUCATIONAL TECHNOLOGY

AFFECTS SOCIAL COHESION

by
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Abstract

Digital Information and Communication Technologies (ICT) have become a focal point in improving worldwide education. There have been many studies on the effects of ICT in schools on grades and careers after graduation, but not many have studied the social impact. This study focuses on the Plan Ceibal in Uruguay to see the impact of ICT in schools on social cohesion. The Plan Ceibal was the first Nation-wide one-laptop-per-child (OLPC) program in the world. For this reason, Uruguay can provide a look into the future for other nations as they implement OLPC programs of their own. This study uses data from the Latin American Popular Opinion Project (LAPOP) to compare the social capital, political capital, and labor capital of those who were exposed to the Plan Ceibal during grade school and those who were not in Montevideo, the capital of Uruguay. Further comparison with LAPOP's data on Santiago de Chile suggests there is a correlation between the Plan Ceibal a decline in political and labor capital.

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Introduction

On May 10th, 2007, President Tabaré Vázquez of Uruguay delivered the first *ceibalita* to

the students of the Italian school of Villa Cardal in the department of Florida. The school acted

as the trial round for the new government program, the Plan Ceibal. The Plan partnered with

Nicholas Negroponte's One Laptop Per Child (OLPC) program based out of MIT to supply

every teacher and student in public schools in Uruguay with a laptop computer, called *ceibalitas*.

The trial was deemed a success. Over the next year, the rest of the interior of Uruguay received

laptops, and in 2009 the *ceibalitas* arrived in Montevideo (Observador 2016). With this, Plan

Ceibal officially gave every public-school student and teacher a laptop. Since then, the Plan has

continued to be praised as an exemplary social program to decrease marginalization and

inequality through technology use in schools.

Computer technology has become an increasingly integral part of schools everywhere.

Those who push for its further incorporation see digital and computer-based information and

communication technology (ICT) as the equalizer in education, able to dissolve inequalities and

increase the social cohesion of their communities and countries. Uruguay is at the forefront of

this fight. There have been many studies that research the effects of *ceibalitas* on grades, tertiary

education attendance, and job prospects, but the social cohesion aspect has not been addressed.

Considering that technology theoretically breaks down many social barriers, such as location, to

put people in direct touch with others outside of their immediate circles, the *ceibalitas* could

affect the social composition of Uruguay. To that end, I will investigate if the Plan Ceibal has

increased social cohesion in Montevideo.

Social cohesion has become an increasingly pertinent issue on the global political stage.

According to the Economic Commission for Latin America and the Caribbean (CEPAL), social

cohesion is "the dialogue between institutional mechanisms of inclusion and social exclusions and the responses, perceptions, and disposition of the citizens in regards to how they operate" (CEPAL 2010, 16). Social cohesion includes a community's level of unity, the practices that exclude and marginalize others, and how they interact. With the advent of computer technology, the way that people form and maintain social connections has changed; therefore, our understanding of how social cohesion operates has changed (Kaztman 2010; Putnam 1995; Bond et al. 2012; Cao and Qian 2020). We need to understand these changes to use digital technology appropriately.

The presence of ICT in school is specifically important in this analysis because the educational system is an integral institution through which a person and a community's culture is formed. Bourdieu and Passeron (2014) postulate pedagogical action are the means through which culture is reproduced—formal pedagogy specifically is the means through which the dominant class reproduces itself and inequalities is maintained. Therefore, the presence of ICT in schools influences the way by which cultures are reproduced. It could work to increase or decrease inequalities, to reaffirm redefine, overthrow, or expand the dominant class. We must understand the effects of ICT in schools to develop practices and create policy that ensures it is beneficial rather than detrimental to the social cohesion of society.

The Three Capitals

Social cohesion as a concept is somewhat ambiguous and difficult to measure. For this reason, I lean on Bourdieu's theory of capital. Bourdieu conceptualized the transfer and creation of culture in pedagogical action through different types of capital: cultural, symbolic, economic, and social (1986). Each of these capitals represents a different aspect of any society that works together to define a person's socioeconomic class and the manner through which a community

interacts among itself. I use this idea to subdivide social cohesion into three forms of capital: social capital, political capital, and labor capital. These capitals differ from Bourdieu's in that they focus on the capital of society as a whole rather than that of an individual. Therefore, in this study, individuals do not own social, political, or labor capital themselves, instead, they are aspects of a community. I retain the term "capital" because each incorporates aspects of Bourdieu's capitals. Social capital refers to the level of unity of a community. Political capital refers to the level of a community's political engagement. Labor capital refers to the availability and status of employment and the level and equality of transfer of the aspects of human capital in a society. These capitals together describe different aspects of social cohesion.

Robert Putnam is the leader of research in social capital. He defines social capital as the "features of social organization such as networks, norms, and social trust that facilitate coordination and cooperation for mutual benefit" (1995, 67). Social capital involves the ties between people, the formation of groups, and how those groups view and relate to each other. He uses many variables to measure the level of social capital of a community include perception of other groups; feelings of belonging and trust, level of involvement with different groups, among others (Putnam 1995). For this study, I adapt Putnam's measures to define social capital as the strength and breadth of a community's social networks that work to create trust and norms within a society. ICT can affect the creation and structure of social capital because it is a social network. Communication applications like email and social media put students in contact with people outside their immediate vicinity (Kaztman 2010). This could help create social capital among groups that previously were not able to create it but could also decrease social capital by limiting the depth of relationships.

Political capital is akin to civic engagement. Thomas Ehrlich defines civic engagement as "working to make a difference in the civic life of one's community and developing the combination of knowledge, skills, values and motivation to make that difference" (2000, *vi*). Civic engagement involves both political and non-political ways through which people can improve their communities; however, political capital focuses on the political side of civic engagement, such as voting patterns, holding office, faith in the government, involvement in committees, and knowledge and use of public goods. This study focuses on the presence of these attributes in a community not in an individual, meaning political capital is the level of trust and engagement a society as a whole possesses in its political system. Education is very important to civic engagement: more educated people are more active in the political world due to higher levels of motivation and because the educated are relatively higher in social status, which makes them want to be involved more (Rasmussen and Nørgaard 2017). For this reason, ICT in schools can directly affect the political capital of the students because it changes the way a teacher teaches and education is conducted (Kaztman 2010). ICT could increase civic engagement by improving education and by making more people feel motivated to be involved but could lower it if education is worsened or if people do not feel as relatively competent as their peers.

Labor capital is similar to Gary Becker's human capital. He defines human capital as a person's "knowledge, skills, health, [and] values." (Becker 1994, 16). Human capital is embodied by the owner, so it is non-transferrable and directly influences a person's fitness for the workplace. Becker's human capital transfers to this study's labor capital by identifying what should be transferred through the society. A community that is high in labor capital will transfer knowledge, skills, health, resources, income, and values evenly. An important indicator for this is the status, quality, and availability of employment. Employment matters to social cohesion

because it is the central institution that determines social status; however, due to the computer

revolution, increasing standards of education, and residential segmentation, the gap between

middle class, lower class, and the jobless continues to widen (Kaztman 2010). This leaves many

people and even whole neighborhoods excluded from the formal economy, which has the effect

of excluding them from the life of the city around them (Wilson 1998). These hyper-

marginalized groups lose most contact with the wider life of their community and are left

without opportunities for social mobility. ICT in schools could help fight against this

phenomenon by increasing computer skills, providing access to better educational opportunities,

and bridging physical and socioeconomic barriers.

These three capitals narrow the scope of this study and provide more tangible ways to

measure the dependent variable. Through them, I hope to determine if and how technology has

influenced social cohesion.

The Study

My case is the capital city of Uruguay, Montevideo. I will investigate how social

cohesion has changed in Montevideo since the implementation of the Plan. The entire country is

under the Plan and data is available for the whole country, but I focus on Montevideo because it

is easier to see as a cohesive social unit. Expanding the case to the whole country would

confound the research by adding the variables of distance and distinct regional influences, which

would inhibit the subjects from acting as a single unit. Therefore, it is much clearer to look solely

at Montevideo rather than the whole country. The city contains half of the country's population,

however, so it still can provide a good representation of the national effects.

I will compare Montevideo's results with the most recent data from Santiago de Chile to

mitigate confounding variables present in this study such as the age gap, presence of other forms

of technology, and Uruguay's other social programs. Chile is similar to Uruguay in a lot of respects: geographically, historically, politically, and ethnically. However, Chile does not have a one-laptop-per-child program. There are many other differences between the two countries, but I believe they are similar enough to provide an example of what Uruguay would look like without the Plan Ceibal.

My dependent variable is social cohesion. I will measure this variable through three forms of capital: social, political, labor capital. I will measure social capital through involvement in groups and clubs, feeling of belonging, and neighborhood trust. I will measure political capital by looking at variables such as voting rates, interest in politics, political ideology. I will measure labor capital through income, employment status, and whether or not the respondent has a computer. Each of these sub-variables will point to the status of its respective type of capital, which I will then use to analyze how social cohesion has changed in Montevideo.

My independent variable is the Plan Ceibal. The Plan is a nationwide, government-sponsored program that provides each student in grade school with a laptop and access to Wi-Fi. The first *ceibalita* was distributed in 2007, though the Plan did not achieve its goal of ubiquitous coverage until 2009 (Plan Ceibal 2021). Now that eleven years have passed since the Plan Ceibal achieved full implementation, and thirteen since the Plan started implementation, some effects of the Plan should be visible.

I hypothesize that the Plan Ceibal not only affects education but also the political, labor, and social fabric of Montevideo. Efficient and effective execution of the Plan should cause marginalized citizens to be brought into the life of Montevideo. Therefore, I hypothesize the social cohesion of Montevideo should improve among students who participated in the Plan Ceibal.

I will use data from Vanderbilt's Latin American Popular Opinion Project (LAPOP). The survey contains information that pertains to all of my variables. It has data for more than ten years, extending back to before the implementation of the Plan Ceibal. I start my analysis with the data from 2010 since it is the first data set available after full implementation. I will use Chi-square tests to determine if there is a significant difference between those who benefitted from the Plan and those who did not. This will show how the relationship between my independent variable, ICT, and the different dependent variables has changed over time.

Social Cohesion and Its Three Components

The Development of Social Cohesion

Gustave Le Bon began the study of social cohesion in 1897 with his book *The Crowd*. He investigated the character of crowds—how they act and what holds them together. This study led him to develop a theory of the source and effects of collective behavior and contagion and how these two phenomena affect the individual. He claims people lose almost all agency when in a crowd as if they are hypnotized (Le Bon 1897). This conclusion has received much criticism as it neglects to consider individual opinions and beliefs. Despite these criticisms and the fact Le Bon does not specifically name social cohesion, this book prepared the way for later sociologists to research social cohesion in greater depth to understand how groups of people are unified.

Émile Durkheim continued to study social cohesion in his book *Suicide*. He studied the effect of social environments on suicide rates and found the level of social cohesion in society was strongly correlated with the suicide rate (Durkheim 1897). Though his results have been criticized for ecological fallacy, drawing too specific of inference on the character of individuals based on data from the group as a whole, this work provided the first comprehensive definition of social cohesion. Durkheim defines it as the quality that shows the dependence between individuals in a society which requires peaceful relations between individuals and strong social bonds (1897). Harmony and strong social ties together create a society that is interdependent and cohesive. Without them, Durkheim stipulates, a society will fragment.

Charles Cooley further developed social cohesion by studying primary groups. He studied these groups to understand the building blocks of a larger society. Primary groups are "characterized by intimate face-to-face association and cooperation" and are "fundamental in forming the social nature and ideals of the individual," the result of which is "the fusion of

individualities in a common whole" (Cooley 1909). Primary groups are the main social group of

an individual and constitute the source of an individual's ideals and characteristics. Not only that,

the group creates its own society that interacts with the rest of society according to its particular

characteristics. Cooley's primary groups allowed researchers to study more manageable blocks

of society between the individual and societal levels. This led to a better understanding of the

mechanics, role, and power of social cohesion in society.

Festinger, Back, and Schachter added to Cooley's work by creating a definition of group

cohesion. Rather than only studying the phenomenon and functions of primary groups

themselves, they studied what binds them together. They define group cohesion as an

individual's level of desire to remain in a group, which is fueled by influence, initiative, task

competence, and like-dislike (Festinger et al. 1950). This work first presented the mechanics of

primary group cohesion. By identifying the social mechanics of the primary group, researchers

have been able to understand what drives the social cohesion of the larger society.

Granovetter redirected the study of social cohesion to focus on weak ties. His study of

weak ties showed how primary groups link together to form a larger society. He argues weak ties

are more important to understanding social cohesion since they "are more likely to link members

of different small groups than are strong ones" (Granovetter 1973). Without weak ties, there is

nothing to bind different primary groups together, which leads to fragmentation. In this theory,

primary groups are the building blocks of society while weak ties are the glue between them. The

more people's groups overlap and form weak ties, the more socially cohesive a community is.

This theory allowed sociologists to expand their focus from just strong ties to all forms of ties. It

also provided a way to study the connections between primary groups to form a community.

In 1996, Judith Maxwell made the first official definition of social cohesion for the Canadian Policy Research Network. She defines social cohesion as "building shared values and communities of interpretation, reducing disparities in wealth and income, and generally enabling people to have a sense that they are engaged in a common enterprise, facing shared challenges, and that they are members of the same community" (Maxwell 1996). This provided the first comprehensive and modern definition of social cohesion. Maxwell was also the first to apply the theory of social cohesion to real policies. She drew on the past research to create a nationwide plan to decrease marginalization of all kinds and create a cohesive Canadian community. She led the way for other nations to similarly add social cohesion to its policy.

Alaluf expounded upon Maxwell's nationwide application of social cohesion further. He studied how nationwide social cohesion affects and is affected by economic policy and practice. He claimed the national phenomenon of social cohesion is built by and continued through a sense of national identity as a unified whole, which is fostered through tradition, culture, and language (Alaluf 1999). A nation needs tradition, culture, and language use that reflects all members of the nation to create and maintain a sense of national unity. If people and groups see themselves reflected in those customs, they feel as if they are a part of the nation. If not, they feel marginalized and excluded. The state's job, he says, is to work to maintain a culture that reflects its countries make-up and/or assimilate individuals into the national culture (Alaluf 1999). Alaluf's work connects society to the government to show how each affects the other. The major conclusion he draws is national policy matters to the cohesion of a state.

The Council of Europe was the next to develop a policy of social cohesion. They conceptualize national social cohesion as "the capacity of a society to ensure the well-being of all its members, minimizing disparities and avoiding marginalization" signified through (1)

equity and economic well-being, (2) dignity and recognition of diversity, (3) [civic] participation, (4) a sense of belonging, and (5) sharing of responsibilities (Europe 2008). This definition adds to the literature by providing categories that a nation can use to monitor its level of cohesion. These categories break down the idea of social cohesion into practical steps, which gives measurable goals for the policies of nations. Since then, many countries and international organizations have created their own definitions, goals, and categories for social cohesion.

Social Cohesion and Education

S. P. Heyneman continued to study the role of the state in social cohesion. Heyneman identified four major institutions that create cohesion of a nation: political organizations, social organizations, economic organizations, and educational organizations (Heyneman 2003). These institutions are the means through which people are incorporated and brought together into the life of the nation. They develop both strong and weak ties and link those ties directly to the state. Without the institutions, the people would be unable to participate in government and the state could not influence the people. They are all, therefore, necessary to maintain the cohesive culture of a nation.

Heyneman continued his study by investigating the specific role of education in social cohesion development. He lists five essential functions schools perform in this process: to teach the norms of a society, to act as a training ground for adult life, to give equality of opportunity, to incorporate a diversity of interests, and to arbitrate between different groups (Heyneman 2003). The school environment is the first place a person learns how to navigate his or her community outside of the family. It shows children their place within their society, teaches them how to interact with others, and provides them with the opportunities to succeed. It prepares them to be able to interact with the other three institutions of social cohesion later in life. Education is

essential to the creation of social cohesion and later participation in the other institutions of social cohesion

Pierre Bourdieu developed the mechanics of how education performs these five functions. He studied the role of education and pedagogical action in the transfer and acquirement of capital. Bourdieu categorized capital into four groups: economic, social, symbolic, and cultural capital, the latter split into three subgroups: embodied, objectified, and institutionalized cultural capital (Bourdieu 1986). These forms of capital are what give an individual or a group power in a society, meaning the dominant group is made up of those individuals that hold the majority of the capital. The dominant group needs a way to transfer its capital from itself to the next generation. In the modern age, Bourdieu argues, formal education is the means through which it passes down its capital in a way that is legitimized by their society (Bourdieu 2014). Formal education primarily transfers social capital, embodied cultural capital, and institutional cultural capital. Students learn how to socialize and develop a social hierarchy in the classroom. They receive embodied capital, which is akin to self-improvement or acquiring skills, through lessons and clubs in the school. Students receive institutional capital through the degree and rank they receive upon graduation, which directly contributes to their socioeconomic status and job prospects.

Bourdieu argued that inequalities are maintained through this system because while formal education can transfer capital, it is not the only institution able to do so. The family is the base institution that transfers capital to the next generation. It provides a student with every form of capital per the family's socioeconomic status. However, Bourdieu argues the "culture transmitted by the education system is more closely aligned with the culture of the dominant class, and the habitus of the dominant class are transformed into the tacitly accepted cultural

capital of schools, thus it is easier for individuals who already possess the cultural capital of the dominant class to achieve academic success" (Bourdieu 1986). When students step into the school building for the first time, those from dominant-class families already possess ample amounts of the capital the school could offer. This enables them to take advantage of opportunities and successfully take possession of the capital the school has to offer. Meanwhile, those from lower-class families come in at a disadvantage. Their capital is not aligned with the that of the school, so they start behind. This inhibits them from taking full advantage of a school's opportunities. In this way, schools reinforce the home life and ensure the dominant class can pass its capital successfully on to its children and maintain power in a way that the populace more or less accepts as legitimate.

This inequality is exacerbated further by the disparity of resources between schools. Which city the school is in, which school district it is a part of, and whether it is public or private influence how capable a school is at endowing its students with capital. Even though there are national curricula, studies have found local influence is still strong. One study found local people change curriculum and that teachers that reinforce lower-class disposition to be a follower are attracted to lower-class schools (Ronelle 1991). Despite efforts to standardize education to assist the lower classes, lower-class communities can emphasize or even change certain parts to match their community ideals. Furthermore, the very teachers that would reinforce lower-classes attitudes are drawn to and chosen by these schools. These two factors keep lower-class regions from providing the same standard of education as higher-class regions, leading to an unequal transfer of capital.

Current opinions believe technology in schools can theoretically fix these inequalities. Though people may be biased and difficult to standardize, technology is theoretically

controllable and unbiased. Technology could allow for standardized education in every school across any distance (Kaztman 2010). These two advantages give people hope that ICT in schools can help standardize the transfer of capital between and within schools evenly. Students should be able to receive comparable educations anywhere and everywhere. Equality is a central tenant of every definition of social cohesion—if ICT is effective in standardizing education, it will directly contribute to the increase of social cohesion. However, technology is just a tool. It could exacerbate or diminish inequalities like any other tool. Classrooms still require teachers, so bias can still be present. Switching to a tech-based curriculum could also put children of lower classes without experience using technology at a disadvantage. It is for these reasons that ICT in schools should be researched further.

The Three Capitals

Though Bourdieu has already categorized the major forms of capital, his focus is on individual capital rather than society-wide capital. In other words, he focuses on the power an individual has and how an individual acquires capital. This study focuses on society as a whole: how a community gains and wields capital for the benefit of the individuals. For this reason, I categorized my own forms of capital: social, labor, and political. These forms of capital are drawn from Bourdieu and the Council of Europe's five aspects of social cohesion.

1. *Social Capital*

Social Capital is the most important of the three forms of capital. Social capital influences the acquirement and outcomes of the other two to such a degree that labor and political capital are almost worthless without it. Bourdieu expresses that social capital "exerts a multiplier effect on the capital [an individual] possesses in his own right" (1986). Social capital provides the opportunity for an individual to use his or her political and labor capital. The more

social capital available, the more opportunities a person has to use his or her skills, and the more

they feel they can participate in the political process. This translates to the social capital of this

study in that without connection and trust within a community, there will be no transfer and use

of political and labor capital within that community.

James S. Coleman coined the modern definition of social capital. He developed his theory

to combine human agency with communal influence. Previously, researchers had mostly either

seen individuals as completely untethered or simply as cogs in a wheel. He combined the two

into social capital, defined as:

> "The value of these aspects of social structure to actors as resources that they can use to
> achieve their interests… [of which] three forms were identified: obligations and
> expectations, which depend on trustworthiness of the social environment, information-
> flow capability of the social structure, and norms accompanied by sanctions…[, and there
> is a] public good aspect: the actor or actors who generate social capital ordinarily capture
> only a small part of its benefits" (Coleman 1998).

Coleman's definition focuses more on the individual aspect like Bourdieu, so I do not use it in

this study. Nevertheless, the three forms of social capital and the "public good aspect" influence

the methodology of this study. The forms provide concrete variables to look for to determine the

level of social capital in a community. The "public good aspect" affirms that individual social

capital and societal social capital are related in that the individual contributes to the societal.

Individual social capital influences not just an individual's life and prospects but also the social

cohesion of a society.

Robert Putnam continued Coleman's work. He defines social capital as the "features of

social organization such as networks, norms, and social trust that facilitate coordination and

cooperation for mutual benefit" (Putnam 1995). This is the working definition for social capital

for this study. It focuses on society's health rather than individual advantages. He finds the

effects of high levels of social capital to be increased reciprocity and trust, reduced opportunism,

and an expanded sense of self (Putnam 1995). These effects increase levels of productivity, increase individual happiness, and improve politics.

Putnam determines the source of social capital, beyond the family, is involvement with secondary associations (1995). Secondary associations are groups like fraternal societies, nonprofit groups, religious organizations, and classrooms that meet regularly to achieve a common purpose. They are different from "tertiary societies" such as AARP because secondary associations provide direct interaction between people. Putnam finds "members of associations are much more likely than nonmembers to participate in politics, to spend time with neighbors, to express social trust, and so on… [which] is true not only across time and across individuals, but also across countries" (1995). Secondary associations are a global necessity to build community. When people feel they have a group and a purpose, they are willing to expand their circle and become involved with and improve other people's lives and their community. The decline of secondary associations signifies the decline in social capital along with all its benefits. For this reason, I specifically research involvement in secondary associations study to determine how social capital has changed in Uruguay.

Unfortunately, Putnam finds involvement in secondary associations is declining in the US. He hypothesizes that increased screen time could be a contributing factor. He speculates that technology "has made our communities (or, rather, what we experience as our communities) wider and shallower" (Putnam 1995). Putnam calls into question the ability of technology to increase social capital. Though technology expands our circles to groups outside of our own, it can prevent the creation of deeper relationships.

If Putnam's speculations are true, introducing technology into schools could prove disastrous for the next generation. It would inhibit the students from acquiring social capital in

the school environment. According to Paulsen, "education is often the only socialization agent, in youth, outside the family and peers" (Paulsen 1991). The school system is the place where a person learns the rules of socializing. If technology, for all its benefits, keeps students from learning how to interact and prevents them from creating bonds, students with technology in schools will be at a severe disadvantage to those who do not.

Cao and Qian's study support Putnam's hypothesis. They study the effect of technology use on Chinese foreign exchange students in the US. They find "those students who solely rely on online contact but lack direct contact with culturally different students may have reduced intentions to initiate intercultural interactions in the real world, thus possibly decreasing global attitudes" (Cao and Qian 2020). While the use of technology combined with in-person contact leads to increased social capital among Chinese students in the US, overuse of it has disastrous effects on both their social life and global attitudes. Over-users become distrustful of people different from them and do not try to build relationships. This result places doubt on the supposed benefit of technology that it expands a person's circle of influence and thereby increases social capital. If technology is increasing contact with others outside of a person's group without in-person contact, it could lead to less trust and acceptance rather than more. Research on the effect of ICT in schools on social capital is necessary to determine its effects on the social capital development of students.

2. Political Capital

Political capital, also called political participation civic engagement, or civic efficacy involves voting, participating in politics, and interest in politics. The level of education and political capital are very strongly correlated since "the highly educated may become more motivated and cognitively able to understand politics, and they may acquire social status,

network centrality and other resources that are important to engage in politics" (Rasmussen, Rye, and Nørgaard 2017). Education gives people the knowledge, confidence, and credentials to make political decisions. Without it, people could feel less capable of learning and disregard the influence of the politics of their nation. For this reason, the formal education system is very important to cultivate political capital in youth.

However, school systems can influence students to simply accept political situations as unchangeable facts rather than empowering them to become politically involved because they can unwittingly confirm class effects. Schools can do this through reinforcing class socialization students receive at home, structuring themselves to treat class groups differently, put different groups on different tracking processes, and emphasizing different parts of the curriculum (Ronelle 1991). By treating lower-class students differently, these students graduate without the confidence and skills necessary to influence their governments. Not only that, but confirming class effects also makes students feel comfortable with being marginalized. Ronell found lower-class students don't feel included or comfortable at school, but are just as satisfied with the school as upper-class students (1991). This prepares students to simply accept the fact they are marginalized. They feel excluded and powerless, but they are indifferent to it nonetheless.

ICT in schools changes the way students are being educated. This can have the effect of increasing political capital and decreasing inequalities or the opposite. Not only that, technology can affect people's political decisions. One study found that social media can influence people to vote (Bond et al. 2012). This suggests the presence of ICT in schools could shape the students in a way previously unheard of. The study stipulates the voting advertisements must be socially based rather than information-based, so if students can use their ICT socially, other's ideas and social pressures could influence their political beliefs and practices. Studies such as these

highlight the importance of studying the effects of technology in schools on student's political capital.

3. *Labor Capital*

Labor capital is similar to human capital, defined as "the resource related to expertise and knowledge, represents knowledge resources converted easily across the organizational settings" (Sun Li Liu 2020). Human capital, akin to Bourdieu's embodied cultural capital, is the skills people have that can transfer to their jobs and other occupations they hold. These skills are acquired through education, previous work experience, and outside leadership roles. The job status someone attains influences both their income level and socioeconomic position (Kaztman 2010). Human capital relates to labor capital because it shows what society should distribute to its members. A community possesses more labor capital when there is a more equal distribution to all of its citizens.

Education is the first source of labor capital. In Bourdieu's study, he finds pedagogical action is one of the primary ways students receive embodied and institutionalized cultural capital, by teaching them the skills necessary to work, showing them how to function in a workplace, and giving them the degree and qualifications to get a job (Bourdieu 1986). The educational system is the most important state institution to prepare the next generation to be productive members of society. Not only that, education allows students to break out of their socioeconomic status. Blau and Duncan found that other than a person's father's job and education level the most significant indicators of socioeconomic status were education level, initial occupation, and current occupation (1967). Education is the first indicator of socioeconomic status, directly contributes to the second, and indirectly leads to the third. Many other studies confirm these results (Zhou et al. 2016; Robertson 1997), proving education is very

important in the creation of labor capital. For this reason, it is important to study how ICT in schools changed education.

There have been many studies on the effects of the Plan Ceibal on educational achievement. These studies suggest the Plan has had no effect or a negative one (Yanguas 2020; Rivoir and Lamschtein 2014; de Melo, Machado, Miranda, Viera 2013; Kaztman 2010). These studies argue that the *ceibalitas* act as stumbling blocks for the teachers as they teach their students (Rivoir and Lamschtein 2014). The teachers are not trained to use the computers, but they are obligated to incorporate them in their lesson plans anyways. This adds a layer of difficulty for the teachers as they teach the lessons. Furthermore, many students do not know how to take care of their computers—though there is complete access to technology theoretically, the number of broken computers puts many students at a disadvantage still (Rivoir and Lamschtein 2014). The lower-class students are the ones who are less likely to know how to take care of their *ceibalita*, so this disadvantage hits them disproportionately hard. These are just two problems researchers have found with the Plan Ceibal that make it an inhibitor to the learning process and therefore detrimental to labor capital rather than a help.

Whether or not ICT helps or hurts the learning process, knowing how to use technology is a valuable skill. In Kaztman's study, he found that the base skills required for every job are increasing (2010). This is due to an increased average level of education and the ubiquity of technology. Knowing how to navigate a computer is a critical skill today; for this reason, ICT in schools is valuable to make these new students "computer natives." When the students graduate, they will already know how to navigate the technological side of the professional world, which adds to their labor capital. They will be better prepared to get a job and have increased access to jobs. The job market is very spatially segmented, making it oftentimes difficult for people to find

the right job because they live too far away (Kaztman 2010). Access to technology can bridge the spatial divide by allowing people to work from any location. Implementing ICT plans in schools teaches the students the valuable and necessary skills required of our digital age. Studies are required that look at the effects of ICT in schools on labor capital to ensure we this tool appropriately.

Plan Ceibal: The Logical Next Step

The Plan was the logical next step in continuing the foundational narrative of Uruguay. Uruguay, like any other country, has its nationalistic version of history to unify its citizens and foment patriotism. Uruguay's history highlighting its's democratic process, peace, and equality. The Plan Ceibal served as a new example to continue this narrative and increase pride in the Uruguayan people.

The foundational narrative begins with "The Eastern Strip," as it was called then, which was a fringe territory for both the Spanish and Portuguese empires (Reyes Abadie et al. 1974). Though it provided a lot of opportunity as a port given it lies at the banks of the Rio de la Plata, no one was able to settle it for many years due to the land's natural inhospitality and the fierceness of the native Charrúas. Therefore, the Iberian powers left the Eastern Strip alone as they split up their empires. In the meantime, Hernandarias sent the first set of cattle to roam the Uruguayan Plains freely in 1611 (Reyes Abadie et al. 1974). Over the next sixty years, the cattle multiplied, making the Eastern Strip a "mine of meat and leather." The overabundance of cattle finally allowed Europeans to settle the land. It provided both an easy source of food and a lucrative trading product.

The Jesuits established missions first, and the gauchos were soon to follow. These two peoples paved the way for settlers and merchants to come later. Portugal was the first of the empires to establish a city in 1680: Colonia del Sacramento (Reyes Abadie et al. 1974). Through this settlement, they gained access to the herds of cattle and a port on the Rio de la Plata. However, the Spaniards were not inclined to give up the Eastern Strip. Over the next century, the Eastern Strip was a war ground between Portugal and Spain. During this war, Captain-General Zabala established the now capital of Uruguay, Montevideo. The city became the main

stronghold of the Spanish army and its chief port. The Spaniards finally defeated the Portuguese out of Uruguay in 1777 (Reyes Abadie et al. 1974). The Eastern Strip was now under Spanish control though many Portuguese remained in the Northern territories.

Uruguay remained a fringe state throughout the rest of its colonial history (Reyes Abadie et al. 1974). Because of this, it was never a strong seat of power for any foreign power, which allowed it to escape vestiges of imperial power and the Spanish social hierarchy after gaining independence, which eased its transition to self-rule and democracy. Captain-General Zabala and other notable figures built the country well in Spain's absence. Zabala took charge of Montevideo and attracted people to settle there who were of good social standing and well-educated and implemented democracy from the beginning (Reyes Abadie et. al 1974).

Zabala fastidiously built up the port and the surrounding countryside, making the city a prospering trade city. Britain, seeing the continued growth of Montevideo and its surrounding land, tried to take control of its mercantile sector from Spain over the latter half of the 18th century—achieving that end for a brief moment at the beginning of the 19th century (Reyes Abadie et al. 1974). Tired of being passed between powers, Uruguay decided to gain independence. General José Artigas led Uruguay to expel Spanish power from the Eastern Strip in 1811. Uruguay joined the new country of Argentina, but Artigas quickly revolted again to gain autonomy. However, Brazil took over Uruguay and held it for twenty years. It was not until Britain brokered a treaty between Uruguay and Brazil that Uruguay finally gained its independence in 1828.

The new-born country founded itself on democracy, but it quickly broke out in civil war. The Guerra Grande between Uruguay's two political parties, the Blancos and Colorados, lasted from 1838 to 1865. In the end, two parties established neither won (Pivel Devoto 1994). They

agreed to base decisions on discussion and diplomacy rather than war in the future, which set

Uruguay on a period of prosperity and modernization and has served as a precedent since. The

state expanded and established many new institutions, including secular, free, and compulsory

education in 1876 (Rama 1857). Countless people emigrated to Uruguay, making it a melting pot

of almost entirely European peoples. President José Batlle y Ordoñez ushered in the height of

that prosperity at the turn of the century. The country had a booming economy at the time, and

Batlle y Ordoñez took full advantage of it by rapidly modernizing the country. He secularized the

state, established welfare programs, and extended the right to vote to women (Lindahl 1971).

These advancements placed Uruguay politically far ahead of any other country in Latin America,

though the middle of the 20th century was very tumultuous, Uruguay has largely retained its

status as one of the most progressive countries in Latin America.

The Great Depression sent Uruguay into a spiral it would not escape for fifty years.

During the depression, there was a rise in civil unrest combined with a conservative reaction

(Borucki 2017). The president matched the civil unrest with equal measures of fierce repression.

After escaping the Depression, another economic depression hit Uruguay in the 1950s. Again,

repression matched unrest, which in the 1960s led to the creation of the Tupamaros, an anti-

government militant group. The violence continued to escalate into the next decade, which

caused President Pacheco to declare a state of emergency in 1969 (Alonso and Demasi 1986). He

suspended civil liberties and doubled military funding to flush out the Tupamaros. The military

continued to gain power until it struck a coup and took over in 1973.

The military dictatorship ruled Uruguay for twelve years. Though it had high hopes to

bring Uruguay out of its economic spiral, the oil crisis of 1973 caused Uruguay's economic

situation to only worsen (Caetano and Rilla 1987). Repression and crimes against humanity

continued throughout the dictatorship until the military handed over control to the people once again in 1985 (Caetano and Rilla 1987). With a new president and congress, Uruguay re-took the path of democracy and has remained on it since. The dictatorship has made Uruguay even warier of military action, abuses of power, and suspending civil liberties than it was before. It has served as a reminder for Uruguayans through multiple economic repressions and exchanges of power between political parties to remain respectful of the democratic process.

This narrative has some holes in it. One example is that Montevideo was not just populated by respected, educated Europeans. Rather, there were many slaves, single women, gauchos, and Native Americans among the first settlers (Bracco 2004). This fact discounts the popular notion in Uruguay that they are a unique country of educated immigrants. Also, there was continued violence for many years between the two political parties after the Guerra Grande (Pivel Devoto 1994). The history of Uruguay has not been as peaceful and clean as the traditional narrative would say.

However, this history provides context for some of the motivation behind the Plan. The Plan Ceibal grew organically from Uruguay's nationalistic history in a way it could not have in another country. Uruguay's status as a fringe state during colonial times forced it to learn how to rule itself early on. Since it chose to rule itself democratically from the beginning, it already had a long history of democracy and equality by the time it gained independence. The Guerra Grande showed Uruguayans the consequences of a fragmented society, which convinced them even more of the importance of social cohesion. They recognized that education would play a central role in the creation of cohesion, so they implemented state-funded, secular, free, and compulsory education early. Now, every child in its education system a personal computer and free access to

Wi-Fi. The Plan Ceibal serves as another example of Uruguay's dedication to equality and

progress. It does not just increase social cohesion but also acts as a source of nationalistic pride.

Analysis

I analyzed the Latin American Popular Opinion Project (LAPOP) based out of Vanderbilt University to determine the effects of the Plan Ceibal on social cohesion. The data is freely accessible on the LAPOP website in multiple formats. This survey provides records of respondents opinions, beliefs, income, and other socioeconomic indicators. This is very useful because it allows me to measure the social, political, and labor capital of both the *ceibalita* and non-*ceibalita* groups to see if there is a difference between them. Researchers complete a similar survey in all Latin American countries every two years; therefore, there is a lot of data, but the questions are not entirely Uruguay-specific. While still very useful, the data is not directly concerned with the Plan Ceibal, since that is only an Uruguayan program. This does facilitate comparison between countries, however, which I took advantage of to control some of the confounding variables of the study by using Santiago de Chile's data.

I have analyzed data for every other year from 2010 to the most recent data set. The dependent variable is social cohesion, split into the three types of capital, social, labor, and political. The independent variable is whether or not the respondent had a *ceibalita* while in grade school. To operationalize the dependent variable, I chose specific questions from the survey that reflect the three types of capital and ran Chi-square tests to determine if there was a statistically significant difference between the ceibalita and non-ceibalita cohorts. I operationalize the independent variable by dividing the respondents based on age. Those that turned 18 before the Plan in 2010 went into full effect comprised the non-*ceibalita* group while those who turned 18 after full implementation comprised the *ceibalita* group. I chose 18 as the dividing year because it should be the age the majority of the respondents when they graduate. I turned age into a dummy variable: the *ceibalita* group received a 1 and the non-*ceibalita* group

received a 0. The *ceibalita* group continued to grow larger over the year as the cut-off age

increased. By 2018, the last year of data available, the cut-off age was 27. I do not use any

respondents under the age of 18 because the respondent should still be in school. This is not a

perfect operationalization as Uruguay has a very high level of students that drop out and repeat

grades (Yanguas 2020). It is not unlikely that there are some of 19, 20, and even 21-year-olds

that were in high school in 2010. Furthermore, it does not include students that dropped out

before the implementation of the Plan.

Results

The following tables show the results of the Chi-squared tests used to determine the

statistical significance between the *ceibalita* and non-*ceibalita* groups and the response rate of

each group for each question. The sections align with my three forms of capital: social capital,

political capital, and labor capital. Below in Table 1 is the population size of the Uruguayan

ceibalita and non-*ceibalita* groups. Labor capital differs in population size because I removed all

participants past the age of 60, the typical retirement age for Uruguay.

Table 1
The population sizes for the two Uruguayan cohorts

Cohort	2010	2012	2014	2016	2018
Non-*ceibalita* (Social and Political Capital)	586	560	533	506	883
Ceibalita (Social, Political Capital)	36 (5.79%)	46 (7.59%)	67 (11.8%)	97 (16.1%)	290 (24.7%)
Non-*ceibalita* (Labor Capital capped at 60)	429	498	362	334	366
Ceibalita (Labor Capital capped at 60)	36 (7.74%)	46 (8.46%)	67 (15.6%)	97 (22.5%)	290 (44.2%)

Source: Data adapted from the Latin American Popular Opinion Project (LAPOP)

1. *Social Capital*

I chose four variables as indicators for social capital. I chose the variables because they

are consistent with how Putnam's measures for social capital. These variables should shed light

on whether there is a statistical difference between the social capital of the *ceibalita* and non-

ceibalita groups. Table 2 below shows the result of the Chi-squared test.

Table 2
Chi-squared statistic for difference in social capital between *ceibalita* and non-*ceibalita* groups

Variable	2010	2012	2014	2016	2018
Community Perception	4.909	1.983	***14.776	***619.088	***679.138
Asist a Religious Organization	2.417	1.04	*7.394	***604.883	***662.191
Assist a Community Committee	3.14	.265	4.607	***609.448	***662.659

Source: Data adapted from the Latin American Popular Opinion Project (LAPOP)
*p < .10, **p < .05, ***p < .01

In Table 3, I report the responses for each variable for both groups from 2018 to

determine which way the different groups lean. For community perception, I simplified

LAPOP's four-degree range to two degrees: trustworthy (yes or mostly) or not trustworthy (little

or no). For the last two, I simplified the four-degree response range to yes (biannually, biweekly,

and weekly) or no.

Table 3
Response for both the *ceibalita* and non-*ceibalita* groups for social capital in 2018

Cohort	Community Perception	Assist a Religious Organization	Assist a Community Committee
Non-*ceibalita* (27<)	Trustworthy (72%) Not Trustworthy (28%)	Yes (17%) No (83%)	Yes (15%) No (85%)
Ceibalita (18-27)	Trustworthy (70%) Not Trustworthy (30%)	Yes (14%) No (86%)	Yes (7%) No (93%)

Source: Data adapted from the Latin American Popular Opinion Project (LAPOP)

For the most part, the difference between the two groups becomes statistically significant

by 2016. Community perception or trust starts to be statistically significant at 1% by 2014. In

2018, 72% of the non-*ceibalita* group reported their community was trustworthy. The *ceibalita*

group reported only 70% were. Though small, there is a statistically significant loss of 2% of

community trust in people that were exposed to *ceibalitas*.

As for assisting a religious organization, there is a statistically significant difference at

10% in 2014 that tightens to statistically significant at 1% in 2016 and 2018. In 2018, the non-

ceibalita group responded 83% did not attend church services at all while 17% did attend with varying regularity. The *ceibalita* group reported 86% did not attend church while 14% did. There is 3% less participation in religious organizations in those who were exposed to the Plan Ceibal.

The third variable, assisting a committee to improve the community, spikes to statistical significance in 2016. In 2018, 85% of the non-*ceibalita* group reported they did not attend a community committee while 15% did. The *ceibalita* group reported 93% did not while 7% did. Those who were exposed to the Plan Ceibal dropped in their community engagement by 8%.

On the whole, there seems to be statistically significant evidence that respondents who were exposed to the Plan Ceibal while in school have dropped in social capital. Therefore, there is an inverse correlation between participation in the Plan Ceibal and social capital. But what is most interesting is the year 2016. What happened that year that suddenly made all the variables statistically significant? The answer could be simply that the *ceibalita* group gained a critical mass that allowed the tests to reach a conclusive level or that the Plan Ceibal has more effect if a student participates in it longer. Conversely, it could be that the older students matured and were able to show the real effects of the Plan Ceibal. Further research is required for this year to see if the spike in 2016 is just a statistical fluke or significant.

2. *Political Capital*

I chose four variables as indicators for political capital. These variables or similar ones are used in Bond et al.'s study and Rasmussen and Nørgaard's study. They should demonstrate whether there is a difference in political capital between the *ceibalita* and non-*ceibalita* groups. Table 4 below shows the statistical significance for the Chi-squared tests between the two groups.

Table 4
Chi-squared statistic for difference in political capital between *ceibalita* and non-*ceibalita* groups

Variable	2010	2012	2014	2016	2018
Follow the news	6.202	***16.895	***17.189	***628.352	***697.067
Participate in Protests	1.428	1.371	*.036	***604.013	***657.683
Interest in Politics	*7.543	3.819	***14.626	***633.159	***675.064
Political Ideology	5.182	**20.09	10.662	***616.43	***666.585
Voted	--	--	--	***756.035	***773.899

Source: Data adapted from the Latin American Popular Opinion Project (LAPOP)
*p < .10, **p < .05, ***p < .01

I report the responses for each variable for both groups from 2018 in Table 5 below to determine which way the different groups lean. For following the news, I split the responses into yes (daily or weekly) and no (a few times a year or month). Participation in protests is already split into yes or no. I split Interest in politics into yes (very interested and interested) and no (little interest and no interest). I split LAPOP's 10-point scale of ideology into left (1-5) and right (6-10). I report yes or no for the voting rate.

Table 5
Response for both the *ceibalita* and non-*ceibalita* groups for political capital in 2018

Cohort	Follow the News	Participate in Protests	Interest in Politics	Political Ideology	Voted
Non-*ceibalita* (27<)	Yes (95%) No (5%)	Yes (14%) No (86%)	Yes (58%) No (42%)	Left (65%) Right (35%)	Yes (90%) No (10%)
Ceibalita (18-27)	Yes (88%) No (12%)	Yes (17%) No (83%)	Yes (55%) No (45%)	Left (67%) Right (33%)	Yes (40%) No (60%)

Source: Data adapted from the Latin American Popular Opinion Project (LAPOP)

In political capital, the 2016 effect is not quite so strong, though every variable is statistically significance at 1% by that year. The first variable reports how frequently respondents check the news. The difference between the *ceibalita* and non-*ceibalita* group quickly became statistically significant at 1% in 2012 and remained at that level until 2018. In 2018, 95% of the non-*ceibalita* group checked the news regularly while only 5% did not. In the *ceibalita* group, 88% checked regularly while 12% did not. There is a 7% drop in keeping up with the news in the *ceibalita* group.

The second variable asks if respondents participated in a protest within the past twelve months. There was a statistical difference at 10% in 2014 which grew to 1% in 2016 and 2018. The non-*ceibalita* group reported 14% participation in protests while the *ceibalita* group reported 17%. In general, those who participated in the Plan Ceibal are more active by 3% in protests.

The third variable measures how interested respondents are in politics. The difference is statistically significant at 10% in 2010 and significant at 1% in 2014, 2016, and 2018. In 2018, 58% of the non-*ceibalita* group reported being interested while 42% were not interested. The *ceibalita* group reported 55% were interested while the other 45% were not. The group that was exposed to the Plan Ceibal was 3% less interested in politics.

The fourth variable reports the respondent's political ideology. Political ideology became politically significant at 1% in 2016 and remained there for 2018. In 2018, the non-*ceibalita* group reported 65% were left while 35% were right. The *ceibalita* group reported 67% were left and 33% were right. There is a significant increase at 2% in left-leaning ideology in the *ceibalita* group.

The fifth variable is the self-reported voting rate. I only have the voting pattern for 2016 and 2018 because the survey only asks about the most recent presidential election before that year. The *ceibalita* group was not old enough to have voted in a presidential election until the 2016 survey. Because there is only one data point, it is impossible to view a trend over time. Nevertheless, Uruguay just had a new presidential election at the end of 2019, so the next data set will provide more information on how the voting rate has changed. In 2018, the non-*ceibalita* group reported a 90% voting rate while the *ceibalita* group reported a 40% voting rate. The voting rate is inversely correlated with the Plan Ceibal. In general, the *ceibalita* group has less political capital than the non-*ceibalita* group.

3. *Labor Capital*

I chose three variables to serve as indicators for labor capital. I chose the first variable to look at what new skills the *ceibalita* group gained, and I took the other two from Wilson. Retirement benefits begin in Uruguay at 60, so I exclude all respondents over that age for these three variables to control for non-working, retired respondents in the non-*ceibalita* group. These questions should demonstrate if there is a statistical difference in labor capital between the two groups. Labor capital is the most prone to confounding by the extraneous variables of age and general technology presence, so it is unlikely I will be able to draw any definite conclusions. Table 6 below shows the results from statistical tests for the presence of *ceibalitas* and labor capital.

Table 6
Chi-square for difference in labor capital between *ceibalita* and non-*ceibalita* group

Variable	2010	2012	2014	2016	2018
Have a Computer	0.552	0.039	0.827	***444.247	***1179.504
Labor Status	***80.802	***94.114	***82.664	***513.185	*1392.12
Income Range	11.506	16.359	13.799	***486.931	***1211.47

Source: Data adapted from the Latin American Popular Opinion Project (LAPOP)
*p < .10, **p < .05, ***p < .01

Below (Table 7), I report the responses from these tests. I report yes or no on whether the respondent has a computer. I report whether the respondent is employed, unemployed, or a student for labor status. I split the economic status of the respondent into high, middle, and low income. I place all respondents who earn less than 17,500 Uruguayan Pesos monthly in the lower class, respondents who earn between 17,500 and 72,600 Uruguayan Pesos monthly in the middle class, and respondents who earn more than 72,600 Uruguayan Pesos monthly in the upper class. I base these cut-offs on the Uruguayan government's definition of the different economic classes (Uruguay Natural).

Table 7
Response for both the *ceibalita* and non-*ceibalita* groups for labor capital in 2018

Cohort	Have a Computer	Labor Status	Income Range
Non-*ceibalita*	Yes (67%)	Employed (79%)	High (10%)
(27-60)	No (33%)	Unemployed (20%)	Middle (59%)
		Student (1%)	Low (31%)
Ceibalita	Yes (60%)	Employed (53%)	High (6%)
(18-27)	No (40%)	Unemployed (20%)	Middle (62%)
		Student (27%)	Low (32%)

Source: Data adapted from the Latin American Popular Opinion Project (LAPOP)

Possessing a computer becomes statistically significant difference at 1% between the two groups in 2016 and remains significant in 2018. In 2018, 67% of the non-*ceibalita* group had a computer while only 60% of the *ceibalita* group did. This result was surprising since I would expect the Plan Ceibal to make students more dependent on computers. The only explanation I can think of is they cannot afford a computer. Though the non-*ceibalita* is 7% more likely to own a computer, that does not speak to computer proficiency. Another test will be required to determine the effects of the Plan Ceibal on computer proficiency

Labor Status is significant at 1% throughout the study. Therefore, we are unable to draw any conclusions about the effect of the Plan Ceibal on labor status. Other studies have suggested the effect is negligent, but a more intricate analysis would be needed to answer that question.

Income is statistically significant starting in 2016 at 1%. The non-*ceibalita* group has 4% more respondents in the high class, 3% fewer respondents in the middle class, and 1% fewer in the low class. The non-*ceibalita* group, then, is more likely to have wealthier members. I was surprised by the fact that the difference did not become significant until 2016. The fact this phenomenon has occurred strongly twice and is present in political capital leads me to suspect that the 2016 effect is due to the *ceibalita* group gaining a critical mass rather than any other explanation, but more research is required to prove that hypothesis.

4. *Chile*

I pulled LAPOP data for Chile for 2018, split the respondents along the same age line, and ran the same tests on the same variables. The tables below show first the results of the Chi-square test and the responses from the respondents (Table 8) then the population size of each cohort for the Chilean group (Table 9). I only changed the response specification for the income range to match the currency of Chile. The low class is comprised of respondents who earn less than 255,000 Chilean Pesos per month, the middle class between 255,000 and 830,000 Chilean Pesos, and the high class above 830,000 Chilean Pesos. The results are below.

Table 8
Chi-square for difference between the Chilean groups and the responses of each group in Chile in 2018

Variables	X^2	Non-*Ceibalita* (age 27<)	*Ceibalita* (age 18-27)
Community Perception	***1429.461	Trustworthy 65%	Trustworthy 66%
Assist a religious organization	***1455.18	Yes 50%	Yes 33%
Assist a community committee	***1428.378	Yes 27%	Yes 19%
Follow the news	***1443.1498	Yes 70%	Yes 87%
Participate in Protests	***1459.122	Yes 8%	Yes 19%
Interest in politics	***1453.652	Yes 29%	Yes 37%
Political ideology	***1431.78	Left 66%	Left 69%
		Right 34%	Right 31%
Voted	***1489.615	Yes 66%	Yes 60%
Have a computer	***1445.976	Yes 57%	Yes 73%
Labor status	***626.071	Employed 57%	Employed 44%
		Unemployed 24%	Unemployed 23%
		Student 19%	Student 33%
Income range	***536.223	High 18%	High 22%
		Middle 42%	Middle 61%
		Low 40%	Low 17%

Source: Data adapted from the Latin American Popular Opinion Project (LAPOP)
*p < .10, **p < .05, ***p < .01

Table 9
The population sizes for the two 2018 Chilean cohorts

Non-*ceibalita* Cohort (Social and Political Capital, age 27<)	1269	Non-*ceibalita* Cohort (Labor Capital, age 27-60)	362
Ceibalita Cohort (Social, Political Capital, age 18-27)	149 (10.5%)	*Ceibalita* Cohort (Labor Capital, age 18-27)	149 (29.2%)

Source: Data adapted from the Latin American Popular Opinion Project (LAPOP)

There is a significant difference between the two groups for every variable. The statistical difference in Uruguay, then is not unique, meaning it is unlikely the *ceibalitas* caused the *ceibalita* group to differentiate from the non-*ceibalita* group. However, the Plan Ceibal could have affected the trajectory of the differentiation. In social capital, the *ceibalita* group is 1% more trusting of their community in Chile, while in Uruguay the *ceibalita* group is 2% less trusting. The Chilean *ceibalita* group reported 17% less religious attendance than the non-*ceibalita* group while the Uruguayan reported 3% less. The Chilean *ceibalita* group reported 8% less attendance to committees for the improvement of their communities while the Uruguayan reported 8% less attendance as well. In social capital, the trajectories are the same towards less social capital

In regards to political capital, the Chilean *ceibalita* group reported 17% more keeping up with the news while in Uruguay it was a 7% decrease. The Chilean group increased protest participation by 11% while the Uruguayan increased only 3%. The Chilean group reported an 8% increased interest in politics while the Uruguayan a 3% decrease. The Chilean group reported a 3% increase in left-leaning ideology while the Uruguayan reported a 3% increase in left-leaning ideology. The Chilean group reported 6% fewer votes while the Uruguayan reported 50% fewer votes. Overall, the Chilean *ceibalita* group has more political capital than the Uruguayan *ceibalita* group in comparison to their respective non-*ceibalita* groups. This could indicate the Plan Ceibal has decreased political capital among its beneficiaries. However, that is

difficult to determine considering the political climate of Chile at that time. The survey was conducted in the year leading up to the Chilean Social Outbreak led by students, which would serve to increase the younger group's political involvement. More research is needed to determine if the Plan has diminished political capital in its beneficiaries or if the political climate of Chile influenced its *ceibalita* group to become more politically active.

In regards to labor capital, the *ceibalita* group in Chile reported 16% more computers than the non-*ceibalita* group. In Uruguay, it was a 7% decrease. In Chile, the *ceibalita* group is 1% less likely to report unemployment while the Uruguayan *ceibalita* group reports the same level of unemployment as the Uruguayan non-*ceibalita* group. The Chilean *ceibalita* group reports 4% more in the high class, 19% more in the middle class, and 23% less in the low class. The Uruguayan reports 4% less in the high class, 3% more in the middle class, and 1% more in the low class. Overall, the Chilean *ceibalita* group seems to have more labor capital in comparison to the Chilean non-*ceibalita* group than the Uruguayan *ceibalita* group does in comparison to the Uruguayan non-*ceibalita* group. This could provide some evidence there is a correlation between the Plan Ceibal and decreased labor capital

Conclusion

This study attempted to answer the question of whether the Plan Ceibal has affected the social cohesion of Uruguay by analyzing the difference in social, political, and labor capital of the respondents who were exposed to the Plan Ceibal and those who were not. The age difference and the general increase in the presence of technology confounded the study, but I attempted to mitigate them by conducting the same analysis for the 2018 data for Chile and comparing the two countries. Though there are many other factors involved I was unable to

control for, I believe this study indicates there could be a correlation between participating in the Plan Ceibal and changes in political and labor capital.

While the difference in social capital does increase in significance over time, a comparison with the Chile data leads me to conclude that is due to the critical mass hypothesis. Social capital is decreasing among the younger group, but that is a trend in many other countries as well, like Chile as shown by this study and the United States as shown by Putnam (1995). Therefore, I am unable to confirm there is a correlation between the Plan Ceibal and social capital.

Political capital does not have as strong of a critical mass effect in 2016 as social capital, which leads me to believe the effect is more likely to be due to other factors than gaining a critical mass of respondents. Furthermore, the political capital of Chile and Uruguay went in different directions. The difference may be due to the distinct in the political climates of the two countries, but it could provide evidence that the Plan Ceibal has impacted the political capital among the *ceibalita* group in Uruguay.

While labor capital does not seem to be correlated with the presence of *ceibalitas* when analyzing just the Uruguay data, in comparison with Chile, it seems the Plan is correlated with decreased labor capital among the *ceibalita* group. This could provide evidence that the *ceibalitas* are acting to decrease labor capital rather than as a tool to promote education and increase individual's human capital. However, once again there are too many confounding variables to draw definitive conclusions.

Table 10 on the next page consolidates the data given throughout this section for the year 2018 for both countries. This summary table is to be used for an easy side-by-side comparison of the data for both countries.

Table 10
A side-by-side comparison of the 2018 data for Uruguay and Chile

Variable	Uruguay	Chile
Social, Political Capital Non-*ceibalita* Population	883	1269
Social, Political Capital *Ceibalita* Population	290(24.7%)	149
Labor Capital Non-*ceibalita* Population (18-60)	366	362
Social, Political Capital *Ceibalita* Population (18-60)	290	149
Community Perception (X^2)	***679.138	***1429.461
Assist a Religious Organization (X^2)	***662.191	***1455.18
Assist a Community Committee (X^2)	***662.659	***1428.378
Follow the News (X^2)	***697.067	***1443.1498
Participate in Protests X^2	***657.683	***1459.122
Interest in Politics (X^2)	***675.064	***1453.652
Political Ideology (X^2)	***666.585	***1431.78
Voted (X^2)	***773.899	***1489.615
Have a computer (X^2)	***1179.504	***1445.976
Labor Status (X^2)	*1392.12	***626.071
Income Range (X^2)	***1211.47	***536.223
Community Perception (*Ceibalita* cohort %)	Trustworthy (70%)	Trustworthy (66%)
Assist a Religious Organization (*Ceibalita* cohort %)	Yes (14%)	Yes (33%)
Assist a Community Committee (*Ceibalita* cohort %)	Yes (7%)	Yes (19%)
Follow the News (*Ceibalita* cohort %)	Yes (88%)	Yes (87%)
Participate in Protests (*Ceibalita* cohort %)	Yes (17%)	Yes (19%)
Interest in Politics (*Ceibalita* cohort %)	Yes (55%)	Yes (37%)
Political Ideology (*Ceibalita* cohort %)	Left (67%)	Left (69%)
	Right (33%)	Right (31%)
Voted (*Ceibalita* cohort %)	Yes (40%)	Yes (60%)
Labor Status (*Ceibalita* cohort %)	Employed (53%)	Employed (44%)
	Unemployed (20%)	Unemployed (23%)
	Student (27%)	Student (33%)
Income Range (*Ceibalita* cohort %)	High (6%)	High (22%)
	Middle (62%)	Middle (61%)
	Low (32%)	Low (17%)

Source: Data adapted from the Latin American Popular Opinion Project (LAPOP)
*p < .10, **p < .05, ***p < .01

Discussion

In the end, I found possible correlations between participation in the Plan Ceibal and a decline in political and labor capital. Though the Plan does not seem to cause the decline in social capital, it has not effectively improved social capital. Even though my results are subject to extraneous variables, the fact remains that the Plan has not been effective. Even if it did not cause the general decline in social cohesion, it has not been effective in preventing it. Therefore, my hypothesis is incorrect. Why is the Plan unable to attain the goals it set out for itself? To answer this question, Matías Dodel created a theoretical structure to analyze the effectiveness of ICT in schools. He specifies four stacking levels of analysis: access, usage, appropriation, and outcomes (Dodel 2015). Each level builds on the previous one, so effective ICT plans should start with the lower levels and work up. However, analysis of the effectiveness of these plans should start from the top and work downward in the direction of outcomes, appropriation, usage, and access.

By using this framework, I hypothesize the missing link in the Plan Ceibal is usage and, surprisingly, access. The outcomes of the Plan Ceibal are not what was desired as found by this study and others mentioned in the literature review. There is an overall decrease in social cohesion rather than an increase. Since the outcome is not what we desired, we move on to appropriation.

Appropriation is when the user has control over ICT and can use it in a significant and useful manner (Dodel 2015). In other words, appropriation is when a student has a good level of computer and related skills. He or she will be able to use technology well in social, political, and labor capacities. According to the study by Rivoir and Lamschtein, though students in Uruguay are undertaking projects like making a blog and using learning applications, the students are not

appropriating computer skills sufficiently (2014). Other studies have found similar results (Yanguas 2020). These students are not appropriating more skills through the Plan Ceibal.

Appropriation stems from usage. Many studies have found the students are not using the computers appropriately. Observation of classrooms and interviews with teachers show that the students mainly use the computers to download information, surf the web, play games, and communicate (Melo et. Al 2013; Yanguas 2020; Rivoir and Lamschtein 2014). These forms of usage are not conducive to learning skills but for entertainment and fact-checking. The students are not learning new skills because they are not using their computers effectively. This is because the teachers do not possess enough computer literacy to adequately teach the students (Rivoir and Lamschtein 2014). The inadequacy of the teachers forces the students to rely on other resources to learn computer skills, which can widen the gap between classes since upper classes will have better resources to do so. Therefore, Plan Ceibal is not increasing social cohesion because it is intensifying the divides that already existed in Montevideo.

Though access is theoretically ubiquitous, it is limited due to extraneous factors related to class. Many students and their families, primarily of rural and lower classes, do not know how to take care of their computers, so they break them. Because of this, the number of children who can use their laptops is far less than 100%. Rivoir and Lamschtein in their study of four schools in the suburbs of Montevideo found the greatest number of students with laptops on any given day in any school was only 50% (Rivoir and Lamschtein 2014). Those without computers had to share with those with computers, which diminished the value of their education and complicated the educational process.

By using this framework and other studies, I hypothesize usage and access are the weak links in the Plan Ceibal. Access is also a source of inefficiency, but usage accounts for far more

of the problems. The solution lies in teacher training. They are not computer natives and have received inadequate or no training in their use. As a result, teachers are unable to use computers appropriately and are unable to teach the students how to use them to appropriate skills to achieve the outcomes desired. The students and their parents likewise do not know how to maintain their *ceibalitas*, so they break. The chance that a student can maintain a computer, learn skills, and get positive results lies in their class background. In that case, Plan Ceibal exacerbates class distinctions rather than fixing them. Those who naturally have access to resources to learn how to use and care for a computer will gain political and labor capital while those who do not will not. The solution lies in better training for teachers on basic computer use and how to use teaching applications and in better training for students and parents on computer care and maintenance. Without better training, the Plan will remain an obstacle in the learning process and development of social cohesion.

In the future, a more robust study will be required to determine the true effect of the Plan Ceibal on social cohesion. Such studies will need to find new ways to circumvent the age and the increasing general presence of technology effects. Furthermore, they should most likely gather data themselves that asks questions that are geared better towards a study of this kind. Such research would include a survey with Plan Ceibal-specific questions (such as personal opinion regarding the Plan), ethnographic study of how the *ceibalitas* are used in the classroom, and the inclusion of more test countries like Argentina and Costa Rica. These studies are necessary to determine the true effects of digital ICT on learning and how to better use it to improve the social cohesion of education systems.

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