2022

Educating to Compete: Pandemic-Era Patterns of Technology Incorporation in the Southern Cone

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Honor Thesis Project
Department of Political Science
at Macalester College
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April 2022

ABSTRACT

Education has become a championship match. Global competition has defined many periods in history, but in the last two decades it has emerged within the knowledge economy, shaping education systems across the world. During the COVID-19 pandemic, the different levels of perceived educational resilience exhibited by states shaped their global competitiveness. Focusing on the Southern Cone of Latin America, this thesis explores the connection between globally competitive educational systems, access to Information Communication Technologies (ICT) and educational resilience during the pandemic through a multivariate regression model. Considering the profound disruption of education caused by the pandemic, I utilize a comparative study to explore the political history of education public policy on ICT in Argentina and Uruguay as well as how these countries handled contingency plans during 2020. In order to explain the varying levels of educational resilience that the international community perceived it is necessary not only to analyse the effectiveness of ICT-oriented responses but also the way these countries ensure education continuity for the most vulnerable sectors of the population. My findings hint at patterns of global positioning in both the degree of pre-pandemic ICT incorporation in education as well as the differentiated educational priorities addressed during 2020.

DEDICATION

I would like to dedicate this Thesis to my siblings. Alejo, Victoria and Juan Francisco were incredibly brave through out the pandemic, striving to continue their studies in the face of uncertainty. Your commitment with your education inspired my project.

AKNOWLEDGEMENTS

I would like to sincerely express my most profound gratitude towards my supervisor, Paul Dosh, who guided me at every stage of this project with genuine care. Thank you, Lesley Lavery with your input, I was able to look at my research with a different perspective and a more critical eye.

Secondly, I would like to express my gratitude to Amy Damon and Lisa Lendway for their beneficial advice and suggestions for my thesis. I humbly extend my thanks to Jake Mohan and Trisha Daigle from the MAX Center who helped me conduct the appropriate edits.

I would also like to thank my peers from the Honors cohort for always encouraging and supporting me. Sophia, Rock and Lucien, thank you for the hours you spent giving me constructive feedback and for sharing this journey with me.

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ICT	Information Communication Technology
WB	World Bank
IDB	Inter American Development Bank
WEF	World Economic Forum
UN	United Nations
WHO	World Health Organization
PCI	Plan Conectar Igualdad

FOREWORD

"I woke up the morning of the 9th of March, absurdly excited in spite of it being so early. I swiftly put on my school uniform and jumped into my black moccasin shoes that my mom had shined on last night. I took the time to comb my hair and get rid of the remnants of my blue nail polish. I didn't want to get scolded on my first day in *secundaria*. So excited at the prospect of seeing my classmates after the long summer break, I ran to the kitchen to have breakfast with my dad who was reading the news on his phone. As I took a bite of my toast with *dulce de leche*, my dad commented something about a virus that was having European countries on edge. I remember how bizarre I found its name, as I imagined the virus wearing a crown. Soon enough, I wouldn't find it so funny.

Three days later, the WHO declared a global pandemic, and a week later, classes had been canceled country-wide due to the imposed quarantine. I don't remember how long it took us to begin learning on zoom. To be honest, I barely remember what we learned for the first few months. I was lucky enough to have my dad's old laptop to connect to the sessions; some of my classmates use their smartphones or couldn't connect at all. On rainy days, when the Wifi was at its weakest, we were allowed to turn off our cameras, and I would just stare at the empty squares that all my friends had become. Every time I complained about being zoom-schooled, my mom reminded me of my privilege: there were so many kids learning only from the educational shows in the national TV channel or textbook pictures that their teacher would send on Whatsapp. I didn't get why kids in other countries were able to go back in person while we were fed up with the lockdown. After a year without schools, I would have done anything to go back."

Maria Victoria Torres.

CHAPTER 1

Introduction

International competitiveness changed during COVID-19. On top of the global concern for public health, the pandemic's detrimental impact on education systems around the world has put immeasurable pressure on states to guarantee both future economic success as well as their international standing. Since the turn of the millennium, we can identify a global trend of states focusing investments on the improvement of educational systems as a way to acquire international recognition. The World Economic Forum (WEF) defines competitiveness as "the set of institutions, policies and factors that determine the level of productivity of a country" and is closely tied to education because human capital increases productivity. Competitiveness of a country directly correlates with the level of the life standards reached (Yildiri Keser, 2015, p.59). Furthermore, according to former Russian president Dmitry Medvedev, "human capital is becoming the main area of global competition, (...) the most important and the most dynamic facet of modern industry." He proposed that this form of competition would become "severe" in years to come due to the emergence of a global realization: educated countries access the leading positions (Medvedev, 2015, p.114-115).

There are major incentives for countries to pursue "world-class" education and recognition for high-quality human capital. Within the knowledge economy, nations must position themselves competitively because it may have benefits to industry promotion and economic standards. A knowledge economy is a system of consumption and production based on intellectual capital. Each participant positions its national knowledge system in the global scene by improving and developing more competent institutions. Countries deemed competitive prioritize innovation in their education system and are rewarded by exemplifying inter-

national standards. Then, they attract students pursuing higher education and employers seeking qualified human capital. Thus, countries have an incentive to compete in this arena.

If incorporating information communication technologies (ICT) was already a key priority in the education sector, it became more urgent during 2020. The pandemic demonstrated the importance of ICT as many people became reliant on digital connectivity to perform daily activities. It became evident that productivity and efficiency were also linked to the knowledge and use of digital technologies. The transition to remote learning made the practical benefits of incorporation of ICT in the education system highly visible, as ICT became the most important factor for education continuation. When the possibility of a quick recovery and an easy solution to the crisis was discarded, the pandemic challenged governments around the world to quickly provide an efficient and flexible response to the thousands of students and teachers affected. The answer came in the form of screens, when students around the world became dependent on electronic devices and internet connectivity not only to access earning material but also to participate in the education system. The transition to remote learning and each country's capacity to deliver quality education hinged on their material infrastructure and educator training on ICT. Thus, it highlighted the different levels of development and global competitiveness on education within regions and within countries.

Despite the global scope of the 2020 pandemic, prior levels of development and infrastructure acquisition led to uneven impacts across countries and regions. Latin America suffered from significant learning losses. In terms of *learning poverty*[1], Latin America reached a dangerous 62 percent on the learning poverty index, in contrast to the already concerning 51 percent predicted before the pandemic (World Bank Report on Education Crisis in Latin America, 2021). In the midst of the pandemic, my time in Argentina made me aware of the public discourse that expressed that some neighboring countries seemed to be containing the pandemic more efficiently and that their education responses could serve as

[1]The World Bank defines learning poverty as the "share of children who are learning-deprived or have not achieved the Sustainable Development Goal 4.1.1b of minimum reading proficiency standard, and/or are schooling deprived, defined both in terms of access and flow, as measured by the share of children who are either out of school or showing significant age-grade distortion" (World Bank 2019).

examples for the region. This public perception came from international experts and organizations praising some strategies in their situation reports and press releases. Titles such as "The successful case of Uruguay: the Only South American Country Defeating the Virus" or "Uruguay: a Good Example of Education During the Pandemic" flood the news (Jara A., 2020; Fernandez, 2020). In other words, some countries were perceived as more competitive than others in their educational response to the global crisis. But were they? Or was it the perception of educational resilience that was creating the comparison? And what role did ICT play in shaping perception of education resilience in the Southern Cone?

Thus, I designed a study to answer the following research question: How does ICT access prior to the pandemic affect perceived education resilience during 2020 both globally and in the Southern Cone? I believe that countries with higher levels of ICT incorporation had an easier transition to remote learning, thus presenting a more comprehensive response for education continuity. This thesis proceeds as follows: Chapter 2 presents my theoretical framework, which combines elements of international relations scholarship with global economic theory, defining key terms and underlying assumptions of the study. Chapter 3 contextualizes the research through a literature review on the impact of ICT in development, particularly in Latin America's schools. It reviews scholarship that attempts to link ICT incorporation with perceived educational achievement and the ambiguous outcomes presented by empirical studies. It also offers a contextual background of pre-pandemic patterns of ICT incorporation in Latin America. In Chapter 4, I use a multivariate regression analysis to determine the statistical nature of the relationship between perceived education resilience during the pandemic and ICT incorporation. To complement this quantitative method of inference, I use process tracing to conduct a most-similar comparative case analysis of Argentina and Uruguay. Chapter 5 then explores and compares public policy in Uruguay and Argentina in the context of the Southern Cone, which sought to incorporate ICT as a way to advance education before and during the pandemic. It provides an in-depth examination revealing that pre-pandemic public policies that encouraged or hindered ICT availability in the public school system that may have significantly affected both actual and perceived educational resilience and competitiveness in

the long term. Then, Chapter 6 reveals that the actions each country's administration set as their priority for educational resilience lead to a differential course of action that affected its perceived success. In particular, this chapter looks at how the educational responses align with the international recommendations, as well as how the countries leaders interpreted their responsibilities providing education continuity to the most vulnerable populations. It emphasizes the importance of flexibility as well as the notorious international praise of Uruguay's school reopening plans in May 2020. Finally, Chapter 7 concludes the thesis addressing limitations as well as proposing aspects for future research in this area.

This thesis contributes to both the literature on global competition on education and ICT usage for development of human capital at the national level, by exploring public policies related to it. At the same time, it expands the literature on educational resilience, looking particularly at the beneficial effects of ICT during the pandemic as well as how well-established school reopening plans and hybrid teaching alleviate the educational crisis. My thesis thus aims to contribute to the evidence on the long-term benefits of government policies and investments on ICT incorporation to the education system, especially in Latin America's Southern Cone. This is not only vital for understanding the present crisis and preparing for eventualities in the future. It also shows positive ways to recover from the learning losses during 2020 and the future implications of a globally competitive education system.

CHAPTER 2

Background

2.1 Global Competition in Education

In a globalized world, international relations are vital for states. The way states interact and are perceived on the global stage could signify opportunities for economic development, cultural exchanges and technology transfer, or the opposite. The constructivist school of thought interprets this reality through the idea that state *identities* are constructed through actions and rhetoric from the different actors of the system. Why does the US view North Korea's five nuclear weapons as more threatening than the 500 guarded in the United Kingdom? The constructive perspective asserts that material difference appears to matter less when we consider the reputation of each state (Wendt. A, 1995). These identities are socially constructed over time through diverse processes. Among them, the rhetoric that actors in the global stage employ to refer to different states and assign meanings to the states' different material capacities or the actions they carry on. Some of the most influential actors dictating this rhetoric in the international system are International Organizations (IO) such as the United Nations (UN) and the World Bank. Due to their institutional power, the ways IOs refer to states and their actions actively shape their identities (Barnett Duval, 2015).

One way in which states construct their identities is through global competition. Throughout the literature that describes trends in international competition, readers face the challenge of lacking a consistent definition. Some authors assume that competition implies an antagonistic relationship (Kuptsch Pang, 2006, p.7). Others understand states as self-interested actors that seek security through the accumulation of power, mostly through military might (Mazaar et al., 2020). Oth-

ers simply rely on international rankings as 'proxies' for 'competitiveness' at a global scale (Hazelkorn, 2014). In this context, competition should be understood as a measure of a state's abilities to maximize its reputation and status, implying that state measures are compared to each other.

Emerging perspectives on global competition retain the notion of antagonism between states, but open the discussion about new fields. Some authors highlight the increasing display of global competition and perceptions of "great power" in cyberspace (Segal, 2020; Myatt, 2021). Segal (2020) describes the 'Tech Cold War' between the U.S. and China, stressing the desire for digital and technological supremacy. Similarly, Myatt (2021) suggests that the digital age offers smaller states – traditionally considered 'weak' in realist perspectives of IR – the opportunity to gain a comparative advantage on the world stage. On the other hand, Maazar et al. (2020) recognize that competition emerges through the ambitions of economic prosperity, technological advantage and regional influence but global competition ultimately remains in display through military might.

Meanwhile, IOs, such as the World Economic Forum, describe competitiveness as the drive to outperform other countries' productivity and achieve rising prosperity and this understanding is crucial to move forward towards more constructive notions of global competition (Cann, 2016). Global competitiveness diversifies the group of actors participating and the ways of achieving such status. Part of this perspective includes the understanding of corporations and companies as the emergent agents driving the national competition. In her analysis of the "changing nature of global competitiveness" in the 21st century, Shaker (1999, p.38) focuses on what aspects make firms and companies more competitive. She highlights the role of human capital as the most important aspect for companies to develop in order to become more competitive: "human development [is] a key ingredient in competitiveness." In other words, knowledge is understood as the way to achieve competitiveness in the productivity frontier, not the field where competition takes place. Similarly, Abella (2015, p.190) argues that the fact that companies and capital move to countries with a "rich supply of well-trained engineers and managers" can explain part of the Cold War patterns of student exchanges and education. This is but one of many incentives for a state to aim for a highly competitive

global perception in education.

2.2 The Knowledge Economy

States around the world have transitioned to compete in the knowledge economy. Knowledge has historically been associated with power, yet only at the beginning of the new millennium was it recognized as an economic asset. The development of an economic system that praises the consumption and production of intellectual capital has thus become known as the "knowledge economy." Internationally, participating and benefiting from such a system has become a priority for many states that observe the creation and use of knowledge, as predisposing people to "different levels and kinds of outcomes in quality of life, learning, creativity and innovation (Rooney et al., 2005 p.2). It has become particularly attractive because it displaces physical and financial capital (to some extent) from the center of attention, focusing instead on human beings and their capacities. In this sense, the knowledge economy could be perceived as offering equal opportunities for participation to states, regardless of their current economic status. However, this perception leaves out the rules of the game advanced through institutions of global governance.

International organizations advance the idea that participating in the knowledge economy should be done through technological and information systems. Given the already laid out global influence from IOs on, their perception of global competitiveness in the knowledge economy is crucial. The World Bank highlights four fundamental requisites for any state to fully participate in the knowledge economy. First, education and training of the population in order to create and share knowledge as a product. Second, information infrastructure is required to effectively collect, spread and take advantage of the existing knowledge. Third, the World Bank highlights the need for economic incentives to innovate, as well as institutional regimes to enable an environment that supports and protects novelty. Finally, the fourth aspect represents the need for innovation systems such as educational institutions, think tanks, research groups, and networks that foster collaboration for knowledge acquisition (World Bank, 2013). Failing to adhere to

one or all of these requirements hinders the ability of a nation to actively participate in the knowledge economy. Then, it is no surprise that "national policies for encouraging knowledge generation, knowledge acquisition, knowledge diffusion, and the exploitation of knowledge have become the most pressing priorities in the science, research and education policy regimes" (Peters Humes, 2003).

Similarly, placing higher institutions as the new actors in the national quest for global competitiveness illuminates the importance of human capital. This view centers global competition in the field of education (particularly professional and higher education) which denotes the emerging importance of this area as the landscape of competition (Dale, 2005). Many authors suggest that competition has rather transitioned to focus on private actors (Marginson, 2007; Wedlin, 2011; Chirikov, 2016; Musselin, 2018). The scholarship parts ways on the role of states in higher education institutions. While Musselin (2018) neglects the influence of national policies, norms, and goals, others like Marginson (2007; 2016) acknowledges the competition in higher education operating on the global, national and local spheres. He recognizes that higher education institutions remain "(...) increasingly essential to the strategies of national policy makers for economic competitiveness and international cooperation," and warns about the dangers of modeling higher education "as nothing but a world-wide competition of individual institutions in which difference in national context and potential are obscured" (Marginson, 2007, p.6966). Then, institutions become agents of the state, not only validating the national government's goals for quality education, but also representing the state's pursuit of status in the global competition for education.

The analysis of the knowledge economy leads to scrutinizing competition in the talent market. The *talent market* functions within the knowledge economy, representing the desire for high-skilled labor in more creative sectors. As opposed to outdated theories, the New Growth theory in economics asserts that investment in endogenous forces such as human capital and knowledge increases returns in the long term rather than decreasing them[1]. Originally oriented towards human resources practices for companies, the idea of a talent market speaks about an effective resource allocation not only to mobilize talented people towards better

[1]The neoclassical theory argues that increasing the labor force in the economy diminishes the returns.

opportunities they qualify for, but also towards opportunities that allows them to unleash their potential, acquiring new skills and knowledge (Bryan et al. 2006). When we consider national states as actors, this means orienting efforts towards capturing, retaining and educating talented individuals as assets. For that reason, training and teaching becomes a national project of both economic and social development, while also improving an individual's life quality.

At the same time, attracting talented students also plays a role in the state's desire to capture and retain a high-skilled labor force. In their study about the US performance on the "global competition for talent", Douglas and Edelstein (2009, p.1) assert that the US's decline of market share of international students "correlates with the rise in perceived quality and prestige of EU institutions". In higher education settings, students choose between competing products, such as the education or training received by any higher education institution. Even when individual factors influence student's decisions the most, it is possible to generalize one factor driving their decision making process. As students often bear the cost of education (whether monetary or the opportunity cost of investing their time), they consider the quality of the education received as the main determinant of where to study. This dynamic results in governments competing in education quality to gain prestige over other countries (Demange et al., 2020). Therefore, understanding the role of universities and higher education institutions within the knowledge economy is crucial. Higher education institutions "invest in, exploit, and utilize technology (...)" while attracting, employing, and retaining talent (Florida, 2006).

Politicians and stakeholders tend to specify state education ambitions in terms of the number of 'world-class' universities in their territories, yet the area where states can truly prove their level of competitiveness is in the efficiency of their national public education system. When countries design their policy agendas and elaborate the budget for their national education system, they pursue a variety of goals. Arguably, in the past, the aim of education was specifically to prepare young people for future employment in a local context, and to facilitate the induction of the younger generation into a socially cohesive, national citizenry (Maxwell et al. 2020). Yet, with the rise of globalization and the prominence of the knowledge

economy as a field for competition, scholars have identified the appearance of *cosmopolitan nationalism*. This concept represents the "pressures within national education structures to promote internationalization and a global gaze, while also seeking to remain locally relevant and a primary contributor to national projects of economic development, social cohesion and creating the 'right kinds' of citizens" (Maxwell et al. 2020). Among the dual nature of the observed objectives, one can also identify the states' desire for global recognition for the success of achieving those educational goals.

Although the majority of scholarship explores global competition in terms of higher education differentials, there are many incentives to address this phenomenon at lower levels. Many case studies for individual countries highlight the state's commitment to achieve the provision of a globally competitive national education (Cox, 2006; Fierros Kornhaber, 2008; Nguyen, 2016; Maxwell et al., 2020; Mullen, 2020). This is especially true within the knowledge economy, where education becomes a synonym for development and long-term productivity. During his review of Chile's educational reforms in the 1980s, Cox (2006) recognized the global pressure imposed by international assessment and the use of an international comparative viewpoint as a constant source of knowledge and evaluation. Meanwhile, Mullen (2020) highlights Canadian educational reform focusing efforts on improving their scores in international assessments as part of "Canada's commitment to being a global superpower."

Other comparative studies have also illuminated a different trend: countries seeking international relevance through the portrayal of strength and innovation in their national education systems. Many studies acknowledge that one of the main reasons why states look to improve their national performance on education comes from their commitment to become a global superpower (Fierros Kornhaber, 2008; Maxwell et. al, 2020; Muellen, 2020, Paveling et al. 2019). Maxwell et al. (2020) compare educational policies in Israel, South Korea and the United States on their attempt to "internationalize" their education for two main reasons: to create a competitive workforce in the world market and "to gain greater technocratic control". Nguyen (2016) explores the Vietnamese view of human capital as an innovative commodity in global competition for talent. Similarly, even when

Fierros and Kornhaber (2008) fail to substantiate the link between rankings on international assessments and national economy standing, they provide a thorough review of U.S. educational actions since *A Nation at Risk*, highlighting in them the country's goal of "boosting students' international standing".

2.3 International Perception in Educations

The international order is highly dependent on appearance. Thus, achieving remarkable results in strategic areas, such as the knowledge economy, represents a priority for states. Because of the vast differences across countries, the emergence of international standards allows the technical comparison that triggers competition. Since 2004, rankings have not only intensified cross-country comparison, but also they began attracting "the attention of policymakers and the academy, challenging perceived wisdom about the status and reputation, as well as quality and performance (...)" of educational institutions and systems around the world (Hazelkorn, 2014). In other words, rankings and international standards are crucial to understand the pursuit of status within the knowledge economy.

Achieving international standards in education is the primary avenue to be recognized as globally competitive. Understanding *internationally competitive standards* as "a high standard that all students can hope to achieve and should be urged to achieve" helps to make the individual the centerpiece of the puzzle (LeMahieu Bickel 1996 as cited in National Research Council, 1997). However, more often than not, these standards leave behind the individual and look for collective or general performances. This is because the international standards are defined by benchmarking high-achieving students in other countries, continually reevaluated to stimulate progress over time (National Research Council, 1997). Then, the use of international standards provide further incentives for countries to be perceived as globally competitive because they can serve as an example to set the international standards themselves. To account for the diversity of education systems and facilitate cross-country comparisons worldwide, UNESCO proposed the International Standard Classification of Education as a framework with uniform and internationally agreed definitions and educational qualifications (...)" (ISCED,

2011). Yet, they do not set expectations of performance or quality for the states, rather global performance is constructed and shaped through other mechanisms that are highly dependent on international relations.

In practice, the recognition of a country's educational performance by international organizations and experts benefits their global standing in the knowledge economy with all the advantages that it entails. International organizations produce global benchmarks comparing countries with one another and that process can act as a significant source of indirect power in world politics (Broome et al., 2017). In this context, the institutional power of international organizations perpetuates the relevance of some countries to the international system as main sources of standards. Institutional power "works through socially extended relations [that] enable some actors to shape the behavior or circumstances of socially distant others" (Barnett Duvall, 2005). Then, international organizations can advance certain agendas and standards on a global scale when it comes to education. The World Bank and the OECD constantly produce recommendations for education programs and policies that mirror decisions taken in the global north. Many scholars that study this dynamic recognize it as biased and exclusionary (Fougner 2008, Kramarz Momani, 2013; Broome et al., 2017; Zhang Wu, 2019). Yet, it creates the illusion of accessibility and thus the incentive for most countries to pursue status in the knowledge economy.

One of the principal ways in which states seek to outperform their competitors is through international assessments that produce rankings. For some authors, today's rankings signify national reputation and status in the global market which enhances students' choices and promotes the identification of best practices (Hazelkorn, 2014; Shahlberg, 2006). Again, the majority of the literature takes issue with the idea of following internationally set standards, because of the highly problematic consequences that may arise (Ruby, as qtd. by the National Research Council, 1997; Wedlin, 2011; d'Agnese, 2015; Tsai and Li, 2017; Engel and Frizzell, 2015; Mølstad et al., 2017). These include the lack of local contextualization, insufficient mechanisms for legitimization, the imposition of a particular ideology and perspective of success, the inconsistency between the aim and the result, and the customary dynamics emerging from the pressure to outperform

other competitors.

When looking at national quality for education systems, two international assessments contribute heavily to the international stance of a country: the TIMSS and PISA tests. The Trends in International Mathematics and Science Study (TIMSS) was first introduced in 1995, proposing a comparative study measuring international trends in mathematics and science achievements at 4th and 8th grade every four years. In 2019, TIMSS data was collected from 64 education systems at 4th grade and 46 at 8th grade (NCES, 2021). The TIMSS are a recognized predecessor of the Programme for International Student Assessment (PISA) tests, arguably today's most famous international student assessment. As an initiative from the Organization for Economic Cooperation and Development (OECD), the PISA-based tests were first launched in 2000 as a voluntary assessment that countries could choose to administer. It provides comparative data on 15-year-olds' performance in reading, mathematics and science plus additional modules undertaken accordingly which is not directly linked to the national curriculum. During the most recent assessment in 2018, 79 countries participated. Although neither assessment encompasses the majority of countries, they provide the most efficient cross-country comparison which produces hierarchical relations among them as a consequence. In fact, Harris and Jones (2017) highlights international assessments, specifically PISA, as dominant global actors in geopolitical educational reforms. Yet, achieving the top on international ranking is but one way in which states seek to display their competitiveness.

This chapter introduces key terms and ideas that are crucial for the chapters to come. Global competition in the knowledge economy as well as the constructivist theory of international relations frame both my literature review and methodology. In the next chapter, the literature points at the adoption of information communication technologies as a catalyst for perceived and actual global competitiveness. Additionally, the scholarship highlights distinct regional trends on their understanding of how a competitive education system should look, rooted in international development theories as well as international organizations standards.

CHAPTER 3

The Knowledge Economy, ICTs, and the Road to Educational Competitiveness

3.1 The Road to Education Competitiveness

Global competitiveness as a concept implies both high levels of education and ICT availability and usage. The concept varies across organizations but academically speaking, the WEF Global Competitiveness Index has been widely accepted as a measure due to the quality of their data compared to other rankings. Three of the 12 pillars to measure global competitiveness are related to education, thus revealing the importance it takes in worldwide standing. Technological infrastructure lies as another requirement of a globally competitive country which has proven to enhance development in all other areas, particularly in education. These technologies can contribute to universal access to education, equality in instruction, quality in teaching and learning and the professional development of teachers, as well as to more efficient management and administration of education systems. Thus, they are essential to achieving more egalitarian societies (UNESCO, 2014). Due to the many benefits of facilitating teaching and learning, it is logical that ICT access is considered one of the parameters to measure global competitiveness in education.

3.1.1 ICT

Over the last three decades, the literature exploring the relationship between Information Communication Technologies (ICT) and global competitiveness has been abundant, both at the firm and the country level. Studies that link global competitiveness to success within the knowledge economy recognize ICT for rendering individuals the ability to use and disseminate knowledge at speed (Seki, 2008; Yunis et al., 2012). Using panel data on telecommunication, Seki (2008) calculates the effect of ICT on Total Factor Productivity, claiming that "the power of economic competitiveness of a country depends on the productivity of its ICT sector" (Seki, 2008, p.74). This relationship is further supported by the Global Competitiveness and Global IT report overlapping on eight countries on their top ten ranking on global competitiveness and network readiness (Global Competitiveness, 2016-2017; Global IT report 2016).

Yet, scholars believe that for ICT to have a substantial effect on national development it should be understood as a complex system of interconnected factors. To further represent the dynamic and inferred causal relationship between ICT maturity and global competitiveness, the two-wheel model 3.1.1 is proposed as an illustration (Yunis, 2009). Studying the enabling capabilities of ICT maturity for economic growth and global competitiveness, Yunis (2009) draws upon existing literature to display all the factors that intervene in that connection, explaining each aspect in detail. He argues that understanding this dynamic through the model "offer a powerful means to predict outcomes pertinent to global competitiveness" that might serve both global IT researchers and government strategists advancing their agendas. The two-wheel model shows how one of the factors intervening in the causal relationship between ICT maturity and global competitiveness is readiness, expressed through education and human development. Similarly, Sein & Harindranath (2010) distinguish between ICT "use" and "perception" in the development field, i.e. not only as a commodity, but also as a knowledge enabling artifact that allows countries to craft their own technological and developmental agendas. Then, ICT is perceived as a proxy of progress, when it is used to empower communities and individuals (Sein & Harindranath, 2010).

In the international development scholarship, ICT have been praised for their

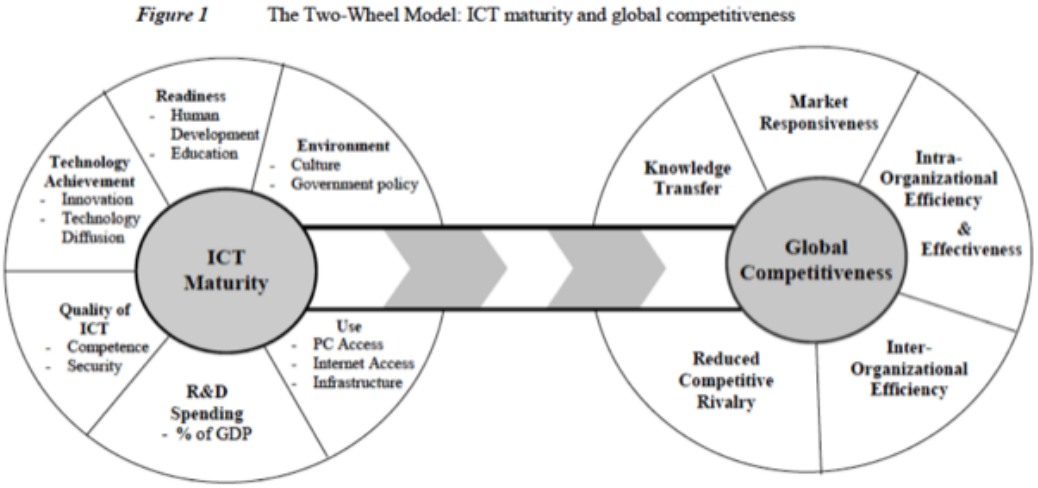

Fig. 3.1.1: Two Wheel Model, sourced from Yunis, 2009

ability to alleviate poverty, improve economic conditions and empower marginalized individuals in the developing world (Loh, 2013, p.2). ICT are particularly relevant to education when we apply the capabilities framework when understanding their impact on societies. The capabilities approach works as a normative structure that seeks to recognize human life quality in the development process, where development is understood as an expansion of humans' ability and freedom to live the life they value (Stewart & Deneulin, 2002, as cited in Haenssgen & Proochista, 2018, p. 64). This approach not only offers a perspective on how scholars evaluate 'development', but it has also been applied more widely within development studies to analyze the impact of development processes and interventions on people's lives (Haenssgen & Proochista, 2018).

Likewise, the sustainable livelihoods approach improves understanding of the livelihoods of the poor. It organizes the factors that constrain or enhance livelihood opportunities, and shows how they relate. It can help plan development activities and assess the contribution that existing activities have made to sustaining livelihoods. The sustainable livelihoods approach is a way of thinking about the objectives, scope, and priorities for development activities. It is based on evolving thinking about the way the poor and vulnerable live their lives and the importance of policies and institutions. It helps formulate development activities that are: People-centered, responsive and participatory, multilevel, conducted in

partnership with the public and private sectors, dynamic and sustainable (Serrat, 2017). As education is the main focus of this study, this approach can help understand how policies that seek to improve education opportunities can contribute to a sustainable livelihood in the future.

Studies suggest that while both ICT use and education individually increase productivity, the interaction between both variables have a significant positive effect on the outcome (Flaminano et al., 2020). In other words, the use of ICT for learning and teaching enhance the impact that human capital has on labor productivity and economic growth. These results are consistent with the literature relating the incorporation of ICT to education systems with poverty reduction, socio-economic transformation and global competitiveness (Aftab & Ismail, 2015; Yidiz, 2016). Meanwhile, studies that account for the difference in development levels among countries when studying the relationship between human capital and economic development, demonstrate that primary and secondary education may be more relevant that higher education in developing nations (Petrakis & Stamatkis, 2002, p.519). This finding is crucial for establishing a research strategy, as well as for practical considerations in resource allocation. Similarly, researchers found that a country scoring one standard deviation higher than another during the 2012 PISA exam, would lead to a 2-percentage-point higher annual long-term GDP growth rate (Hanushek & Woessmann, 2012, p.276).

On the other hand, some scholars raised questions about the real impact of ICT for development beyond the assumption that they are inherently beneficial. Harvey (2011) argues that there is no such thing as a determinist relationship between technology and development, but rather, that any implementation of ICT should carefully consider the socio-economic context to truly be effective. She also describes the 'hype' that international organizations created about ICT initiatives in developing countries, even when the implementations were not always successful or sustainable. Similarly, Tolani-Brown et al. (2011) conclude that many ICT related education public policies in developing countries are not based on evidence or data but rather on the intuition of benefit and international influences. These critiques are consistent with the theory of institutional power held by international organizations and their standard setting practices.

3.1.2 Education quality: How do we compare it across countries?

Although measuring *education quality* is extremely challenging considering the disparities between countries, comparing the learning outcomes can be an appropriate substitute. Indeed, the lack of consensus about what educational quality stands for represents an obstacle to creating more efficient systems (Toro Balart, 1994, p.203). UNESCO (2004) proposes to measure education quality according to five dimensions: 1) the student's characteristics, 2) their context, 3) the enabling inputs (or materials that enhance the learning), 4) the teaching inputs, 5) the learning outcomes. The information that these five dimensions require can be collected to produce indicators to explore aspects that can enhance education quality.

The way ICT enhances teaching inputs has been studied at different scales. Local case studies in developing countries reveal the need for contextualization in the ICT initiatives and the importance of teacher training to fully harness the benefits of technologies for education (Sanchez et al. 2011; Shalkh & Khoja, 2011; Guoyuan et al, 2011; Tondeur et al. 2015). Studies at the country level reveal that investment and improvement of ICT infrastructure, providers coordination, and training are all significant actions that policy makers can take to improve their global competitiveness (Yildiz, 2016). Banerjee et al. (2007) find that positive patterns of ICT initiatives and learning outcomes on students in India highly depend on the pedagogical incorporation of ICT. In the content analysis study of more than 85 papers related to teacher pedagogical development, Hu et al. (2021) emphasize how crucial teacher training on ICT is to foster quality learning. Furthermore, ICT initiatives can have differential effects on the student's learning outcomes according to their pre-existing proficiency levels (Linden, 2008, p.5).

Among the many incentives, studies of ICT incorporation and technology usage in classrooms around the developing world have shown positive changes. A study that evaluated the application of the Intel Essential Course in 2009 offered an array of benefits. Indeed, the implementation of ICT based content shifted teachers' preconceptions on how students learn while implementing new teaching strategies as well as strengthening their own ICT skills (Light, 2009). For interna-

tional and regional comparison in particular, test scores have been used as a proxy indicator of learning outcomes, in particular the PISA and TIMSS tests stand out for their contributions to the international stance of a country in terms of learning outcomes. Delen et al. (2011) use hierarchical linear modeling to find that familiarity with ICT and exposure to technology has a positive effect on Turkish students' math and science PISA scores. Similarly, Srijamdee & Pholphirul (2020) find that the use of ICT for educational purposes favorably impacts PISA scores for students in Thailand.

In opposition to the development theory, many studies regard the use of ICT to boost education achievements with skepticism. Papanastasiou (2002) finds a negative relationship between the use of technology (i.e. computers) and the TIMSS scores in Cyprus, Hong Kong and the USA. The author reaches similar conclusions when scrutinizing the use of computers and the science scores for students in the PISA 2000 (Papanastasiou et al., 2003). Ziya et al. (2010) find similar results for the 2006 PISA evaluation on mathematical literacy Furthermore, Zhang et al. (2016) encounters a negative correlation between the use of different types of specific mathematics-related computer programs and students' mathematics achievement in American students taking the National Assessment of Educational Progress (NAEP). They offer a plausible explanation for this as they believe that the students with low mathematical proficiency may use these computer-based mathematical programs for remedial purposes (Zhang et al., 2016). Then, Kunina-Habenicht et al. (2020) investigate the application of 'ICT Engagement' in Germany and Switzerland with the PISA 2015 reading scores and find a small but statistically significant negative correlation between the student's use of ICT at school and at home (for both learning and entertainment) and their PISA scores. Similar to Zhang et al. (2016) the authors also propose the use of ICT as a remedial mechanism for low reading skill students, hinting at the endogeneity bias of the relationship.

Indeed, the relationship between ICT incorporation and student achievement appears to be ambiguous. In Glewwe et al.'s (2011) review of empirical studies on school characteristics impacting student achievement, they illuminate the ambiguous results brought up by the availability of computers. Out of 26 estimates

coming from different studies, 16 showed positive correlations but only 7 were significant, while the other 10 were negative, with only one significant correlation (Glewwe et al., 2011). Considering the uncertainty described, the authors warn about the implementation of policies that aim at increasing the number of computers in the classrooms mainly due to their cost. Given that the potential of ICT to enhance people's abilities to teach and learn has been ambiguous, developing countries have concentrated efforts incorporating ICT in the area of education guided by the powerful international perception around them. The Global South has been investing in ICT initiatives for many years, especially in Latin America.

3.2 Latin America

Due to the intricate connection between human capital and economic development, Latin America as a region has implemented several policies following projections that aim to improve education. In fact, scholars celebrate the regional progress considering that less than 10 percent of students completed secondary school in 1960, while today the region has achieved almost universal primary education compilation and high rates of high school graduation (Burns & Luque, 2015). Yet, in the last two decades improvement strategies have transitioned from focusing on the quantity of school years achieved by students to the quality of such education.

The influence of international organizations on education policies in the region can be found in the series of educational reforms that the region undertook in the 1990's. In the last years of the 20th century, Latin American states began significant changes in order to align their education systems with the "larger movement to transform public management and social policies" in the region (Betancur, 2007, p.4). These reforms sought new ways to finance investment in public education and were led by the IOs (Betancur, 2007; Farenzena, 2018). Betancur (2007, p.4) suggest that the most relevant "moving forces" impulsing this change were multinational agencies, in particular the World Bank and the Inter-American Development Bank. Farenzena (2018, p.601) believes that the educational reforms were a display of the state's commitment to UNESCO's call for countries to invest

6 percent of their GDP on education initiatives (UNESCO, 2005). Although the reforms did not mention the inclusion of ICT, this instance shows the regional influence that the IOs and multinational agencies possess.

In particular, the scholarship suggests that Latin America as a region equates ICT with progress and competitiveness, especially in the area of education. This means that there is an understanding that to be competitive within the knowledge economy, education must incorporate ICT. The root of these perspectives on ICT can be traced back to the ideas of progress advanced by IOs through their normative power that sets standards for states' development. The prominence that the Interamerican Development Bank and ECLAC have in the region enhanced their influence in the understanding of ICT as a tool for development for Latin American countries. Specifically, IOs point at the use of ICT to bridge both the digital divide and the gap between different socioeconomic levels nationwide. For example, in 2006, ECLAC stated that the use of ICT in education "represents the perception of education as a strategic space to overcome the digital divide" (Sunkel, 2006, p.21). Similarly, the IDB published a report focused on technology and learning and how to promote effective programs that grasped the benefits of ICT for education. In the report, the writers state that besides increasing learning, new technologies "open opportunities for reducing the gap between socio-economic groups" as well as "greater success in the labor market for the youth" (Arias Ortiz & Cristia, 2014, p.3). These reports exemplify the trend that IOs have been promoting for the last two decades indicating ICT as an equalizing factor in education within and between countries.

In order to take advantage of the benefits that ICT offer to education, Latin America as a region followed the MIT Lab triggered international education trend called One Laptop Per Child (OLPC). This development initiative aimed to find a solution to the lack of material access to digital devices and connectivity infrastructure in developing countries by distributing low-cost, individually connected laptops for every student. Thus, during the 2000s many countries in the region eagerly followed developed nations by incorporating technology devices into their educational plans. National versions of the OLPC program began to be deployed between 2007 and 2008, and by 2012, Latin America accounted for 82 percent

of the laptops distributed, with the two biggest providers being Peru (902,000 laptops) and Uruguay (585,000 laptops) (Cristia et al., 2012). Yet, the material access to digital devices alone was soon found not to be enough.

The evaluations conducted for the different OLPC initiatives in the region offered skeptical results regarding the expected achievement of educational goals. Research conducted by the IDB in 2012 found that although intense access to the laptops generated positive outcomes in cognitive skills, it did not lead to measurable positive effects in academic performance (Cristia et al., 2012). Other similar findings pointed at the lack of significant impact from the incorporation of technology in the education system, but the explanation behind the results pointed at the lack of meaningful engagement of those technologies inside the classroom. Due to lack of proper training, teachers only utilized ICT for classroom-level teaching 2 percent of the time by 2015 (Burns & Luque, 2015). During the 80s and 90s, countries in the region focused on increasing ICT infrastructure and access because they were merely regarded as tools for teaching and learning (Sunkel, 2011). Yet, the increased awareness of the so-called "21st century competencies" has made ICT the subject matter itself (Stauffer, 2021). Scholars argue that the goal of programs and public policies that focus on the use of ICT for education has been associated with "quality and efficiency" as well as with "promoting equity" nationally and internationally (Sunkel, 2011; Escribano Hervis, 2017; Marin et al., 2020). In other words, "even when the education system is an organization adapted to the intrinsic reality of each nation, it should also adapt to globalization and the expansion of technology to remain at the vanguard [i.e. competitive]" (Marin et al., 2020) or "get out of the global trend's margin" (Sunkel, 2011). One example of this is the Brazilian program *Ensino Presencial com Mediação Tecnológica* (in-person learning with technological mediation) run by the Amazonas state to reach students in remote communities that could not access primary and secondary education. A media center in Manaus transmits virtual classes in real time to more than 40,000 students who interact directly with the teacher using conference tools (Inter-American Dialogue, 2020).

In a similar vein, changes in how students engage with content has proven beneficial for increased learning. The use of ICT contributes to a more fruitful learning

environment through conducting projects, independent research and connecting school content with student lives (Windschitl, 2002, as cited in Light, 2009). The Innova Schools network in Peru, for example, has connected 54 private schools and 43,000 students since 2011. These students spend 70 percent of their classroom time in group projects and the remaining time in self-learning through educational platforms; this is one example of how ICT can be used to enhance traditional learning (Inter-American Dialogue, 2020). Another set of positive changes has been observed in the strengthening of relationships among students, teachers and parents, making students more confident in working together, relying on teachers as mentors rather than as the sole sources of knowledge and by relating content with societal needs and applying it within their community (Light, 2009). This suggests that incorporating ICT into the educational system produces benefits that empower individuals with both hard and soft skills.

3.3 Educational Resilience

The concept of educational resilience has been studied at most depth at the individual level (both for teachers and students), with the main idea conveyed being the ability to overcome challenging circumstances to achieve adequate learning outcomes(Speck et al., 1994; Wasonga et al., 2003; Frankenberg et al., 2013). Resilience theory (Rutter 2013), states that resilient individuals are able to cope with distressing situations better than those with less resilience. When it comes to education, resilience theory has been widely applied to individuals experiencing adversities such as natural disasters, armed conflicts, or even extreme poverty; in other words, any situation that creates vulnerabilities. In that sense, education for disaster risk reduction (DRR) aims to empower children impacted by catastrophes to overcome them.

Although the literature has paid more attention to endogenous factors that contribute to individual educational resilience, there are exogenous factors in play as well. McMillan and Reed (1994) assert that school and classroom learning environments represent a crucial factor affecting resilience. Among those factors, the authors list exposure to technology. Furthermore, other scholars have also

found ICT useful in enhancing educational resilience. Izturis et al. (2010) review the differential effect of the physical and digital application of an educational DRR initiative in Venezuela, concluding the latter represents the most effective pedagogical strategy. Similarly, another study working with a Kenyan girl-only student sample concluded that the implementation of pedagogical uses of ICT in mathematics education positively impacts the students educational resilience in mathematics (Lugalia et al., 2013).

Moreover, even when scholarship has associated the concept with student achievements in conflict and war settings and extreme poverty environments, the term has recently been used by International Organizations to express the need for education continuity during the 2020 Pandemic (Waxman et al., 2003; UNESCO 2021). For Latin America in particular, international entities such as the World Bank, UNICEF, UNESCO and ECLAC have set 'educational resilience' during and after the pandemic as a goal for education systems (e.g., ECLAC/UNESCO, 2020). Given the observed relationship between education and global competitiveness, educational resilience during and after the pandemic is but another way for countries to display desire for progress and growth in the global scene. The positive relationship between ICT use and educational resilience is further supported by a narrative-inquiry base study conducted in Nepal during the pandemic (Subedi & Subedi, 2020). The authors reveal that the self-learning of ICT use during the pandemic reduced the anxiety of students, teachers, parents and school leaders, making them more resilient to respond to the educational challenges.

The COVID-19 pandemic emphasized the importance of ICT on education, making them the most important factor for educational resilience. The crisis tested each countries' infrastructure and digital literacy as well as its ability to rapidly implement efficient and innovative strategies to deal with the unforeseen challenges of remote teaching and learning. Educational resilience became a goal for all countries, especially for the Latin American region as one of the most affected by the virus.

3.4 Contributions

This thesis contributes to the writings on technology, education and international competition in several ways. First, it addresses the literature gap on the interaction effect of ICT use for education and global competitiveness in the form of educational resilience. Indeed, there are plenty of studies focusing on the relationship between ICT and global competitiveness, ICT and education or human capital and global competitiveness, but very few addressing the three of them. Second, it adds another dimension to the existing literature on the knowledge economy by complementing it with international relations and global governance theory to frame the scene in which this kind of global competition occurs. Third, at the time of writing, the uncertain nature of the pandemic makes analysis of the current situation extremely crucial to inform decision-making processes at all levels. Based on the foregoing literature, this study differs from the others by analyzing the potential link between educational resilience perception and global competitiveness. Finally, with its regional focus, the study contributes to the body of knowledge on the potential advantages of ICT incorporation to education systems in Latin America, both in the short and long term.

CHAPTER 4

Measuring Pandemic Perceptions of Competitiveness through ICT and Educational Resilience

How does ICT access prior to the pandemic affect perception of educational resilience during 2020 both globally and in the Southern Cone? The goal of this chapter is to examine ways to answer that research question empirically. Thus, I explore how the incorporation of information communication technology (ICT) in public schools prior to the pandemic has affected the international perception of each country's education competitiveness and resilience during the pandemic. In particular, this thesis pays attention to the Southern Cone of Latin America, addressing the gap in scholarship on the regional association of a globally competitive education with access to technologies and digital literacy. By using the 2020 pandemic as an exogenous factor of shock for all countries, one can not only observe the way each has responded to the challenges, but also the way the international community perceived these countries in relation to each other. This exploration is of utmost importance because it might not only provide evidence on the benefits of ICT for education but it may also shed light on future steps that policy makers may take to improve educational resilience.

Due to the limitations of both qualitative and quantitative research methods, my study complements a multivariate regression analysis with process-tracing. On one side, small-N studies like the case study comparison, tend to be intensive

rather than extensive, making it difficult to achieve external validity for the findings since they may not be reflective of the general trend. On the other hand, large-N methods such as regressions present shortcomings as they rely almost exclusively on the quality and availability of the data. Although one may be able to establish statistical confidence in the relationship and estimate its magnitude through regressions, relying solely on the model outcomes limits the understanding of why and how these mechanisms operate in different contexts. Thus, the combination may help to address the shortcomings of both.

In this particular study, the data presented multiple challenges due to two main reasons: 1) the novelty of the situation and its rapid changing nature; and 2) how understudied the concept of educational resilience has been in this context. The available data allowed me to operationalize these complex concepts only to a certain extent. However, my work can serve as the foundation for further research in this area, guiding researchers interested in measuring educational resilience or the implications of ICT incorporation. The regression analysis I propose, evaluates the correlation between ICT incorporation in schools prior to 2020 with education system resilience during the pandemic, while controlling for the level of COVID-19 impact and other factors that may influence perceived education resilience.

In 2022, the COVID-19 pandemic remains a prominent factor affecting the lives of virtually all people around the world. Yet, this thesis focuses exclusively on the year 2020 due to the introduction of a viable vaccine. The emergency approval of the Pfizer vaccine on December 11, 2020, opened a wider range of factors to consider in the strategic display of global competitiveness.. Technically speaking, the first countries with access to the vaccines were those that initially invested in the scientific experimentation required for the development of the vaccine (like the United States or the United Kingdom), or those countries that negotiated deals with producer countries (such as Argentina, which got access to the SPUTNIK vaccine through negotiating with Russia). Either way, the vaccine race opened a new dimension to explore the effects of global competition in completely uncharted conditions. Thus, I took the strategic decision of ending the analysis in December 2020 in order to limit the scope of the research and avoid the overwhelming uncertainty about the constantly changing nature of public policies and governments'

responses.

The chapter will proceed as follows: Section 1 outlines the argument and the hypothesis tested; Section 2 presents the data collection and the specific variable selection, as well as the initial description of their distributions; Section 3 details the estimation strategy for the regression; Section 4 reveals the findings of the regression analysis and Section 5 discusses the interpretation of those results according to the literature; Section 6 details the limitations of the study to then move forward to the process tracing mechanism in Section 7.

4.1 Hypothesis and Argument

Based on the literature review and the observational information I gathered during the time I spent in Argentina during 2020, this thesis advances the argument that ICT incorporation in education systems –as a sign of global competitiveness– raised the perceived education resilience of countries during the pandemic. The specific hypothesis to be tested is: **Countries with greater ICT incorporation in public schools prior to the pandemic will be perceived as having more resilient education systems during the crisis.** On the other hand, the null hypothesis can be stated as follows: There is no effect of ICT incorporation in the perception of education resilience in the countries. The underlying implication is that countries with high levels of ICT incorporation previous to the pandemic, will have a smoother transition to remote learning, with the opposite being also true. The perceived resilience exhibited by the educational system directly relates to a country's global competitiveness. Thus, countries with perceived success will likely be praised by international organizations, and policies that resemble theirs will be recommended for the rest of the region.

4.2 Data and Variable Description

This study incorporates data from three main sources: The School Questionnaire module from the 2018 PISA tests conducted by the OECD, the Oxford COVID-19 Government Response Tracker (OxCGRT) and the UNICEF School

Closure database. Additionally, I include control variables from the World Development Indicators. All data sets are available online but with different levels of accessibility. The OxCGRT was open for the public, and it was relatively easy to obtain it from the Github repository of the company. Similarly, the UNICEF School Closure and the World Development Index databases were available online in excel format. Then the answers to the PISA School Questionnaire required a somewhat more time-consuming processing given its size and scope.

The PISA School Questionnaire was a supplemental module from the international assessment and it was filled by the principals and headmasters of all the schools taking part in the 2018 exams. The questionnaire was administered either digitally or paper-based, depending on the format the country chose to administer the PISA tests. The data records the survey completion date to be between April and June of 2019. The survey records the administration responses about school demographics, available resources, source of financing, teacher training, and ICT availability.

The OxCGRT is an ongoing project that collects and monitors the public policy responses to the pandemic from 180 governments. It includes 23 indicators that either record dichotomous, continuous or categorical variables in terms of the different levels of success in global responses to the spread of the virus. Dummy variables include lockdown mandates, unemployment support, school closing, among others; while continuous observations include time-series data on COVID-19 detected cases and COVID-19 related deaths. Original indexes include variables such as stringency levels for the different government mandates and level of government economic support to vulnerable populations. According to the OxCGRT working paper, the data is collected from sources available to the public such as newspapers and government websites and briefs so it can be triangulated. Plus, all their additional coding is available on their Github repository.

Then, the UNICEF School Closures database records the government decisions of 199 countries regarding school mandates. Among its variables, it includes the number of days for academic break and instruction, the number of days schools were partially or fully closed and the days they were open. The information comes from a larger data collection effort from UNESCO and tracks changes from March

11, 2020 until February 2, 2021.

Finally, the World Development Indicators (WDI) database is a compilation of cross-national data compiled and updated by the World Bank. Its main purpose is to offer statistics for international comparisons on global development and the fight against poverty. The data can be easily accessed through the Databank.

4.2.1 Dependent Variable

This study presents the perceived education resilience as the dependent variable (DV). The literature points at the fact that school and classroom environments are highly determinant of education resilience for student learning in crisis settings, including the exposure to technology. This variable is coded as an index which uses the UNICEF School closing variables to create a discrete scale for country results. The aspiration to display education resilience during the pandemic represent not only countries' ability to preserve their human capital but also the desire to appear globally competitive. Thus, the way this study measures perceived education resilience during the pandemic consists of the *quantity* of days that educational services were provided in a country plus the *quality* of education in each country. For the quantity, the UNICEF data sets provide specific amounts of days schools were open, partially open, partially closed and fully closed, as well as the days when instruction was provided and days when it was not. Thus, I first calculated the proportion of the year[1] each country: 1) kept schools fully open; 2) provided instruction; 3) fully closed schools; and 4) remained on academic break. I did not include the partially open and partially closed days because there was not a general standard of what that measure implied other than what was reported but the countries. Then, I proceeded to rank the list of countries available based of those proportions. Because the *Open Rank* and the *Instruction Rank* indicate education resilience, countries with the highest proportions received the higher rankings, whereas for the *Closed Rank* and the *Academic Break Rank* the counties with higher proportions received the lowest places in the rank because they suggest inadequate preparation and less educational resilience. Not including the

[1]here the proportion is out of 328 not 365 days because of the data was collected from March 11th to February 2nd

variables that capture partial actions allowed me to had proportions that did not canceled each other. This allowed me to operationalize a discrete additive index for quantitative measures of schooling, adding the four rankings as follows:

Schooling Index= OpenRank+ InstructionRank+ Closed Rank + BreakRank

On the other hand, the qualitative part of the dependent variable highlights the perhaps subjective way education resilience was perceived during the pandemic. The variable relies on proxies to be fully operationalized. Defining education quality varies between countries and different actors may have different definitions but according to UNESCO, most agree on three principles: relevance, equity of access and outcome, and the respect for individual rights (UNESCO, 2004). Looking to address those points, I opted to prioritize the first two for logistical reasons. I utilized the international rankings conducted by the CEOWORLD magazine, which annually analyzes and compares 93 countries on Education Quality and Opportunity. I chose this particular index because the methodology the organization uses to measure education draws from a vast array of international sources, reflecting on the international perception of education systems around the world. Then, the researchers evaluate countries through 16 indicators to create two indexes that grade each country on a 100-point scale. I combined both rankings on their 2020 edition for said index to act as a proxy for 'perceived quality of education'.

Educational Resilience = Quantity + Quality

Educational Resilience= Schooling Index + (Education Quality Index + Education Quality Index)

4.2.2 Independent Variable

The main independent variable (IV) corresponds to the level of ICT incorporation achieved when the pandemic first impacted a country's education system. Previous studies reviewed in Chapter 2 attempted to measure the effect of ICT initiatives on different outcomes of educational success for students. Usually, these studies concentrate on the material availability of digital devices. My thesis differs from them because the independent variable attempts to capture both the

material availability as well as elements of digital literacy and ICT-related training in schools. This variable is operationalized as an index coded using the data collected from the PISA School Questionnaire 2019. I do not expect significant changes from June 2019 to March 2020, so the data remains relevant to depict the access to ICT the public schools in the countries possessed pre-pandemic. The survey was conducted by the OECD states, among which we find the following Latin American countries: Argentina, Brazil, Chile, Colombia, Dominican Republic, Mexico, Panama, Peru, and Uruguay. This is a modest sample compared to other regions, but there is no other data as current or reliable as this one measuring ICT infrastructure and use. I also filter my data to only include public schools in the sample to have a more accurate representation of the effect of public policies that aim at increasing the use and availability of ICT in schools.

Consistent with the literature about education resilience, the answers of two specific questions were extracted from the questionnaire to create the index: "To what extent do you agree with the following statements about your school's capacity to enhance learning and teaching using digital devices?" and "Does your school have any of the following?" In the case of the first question, it was followed by eleven statements that the school administrators were meant to strongly disagree, disagree, agree or strongly agree with (variable series SC155). All of them were coded as separated variables and relate directly to ICT [see Appendix 1]. For example, "digital devices at the school are sufficiently powerful in terms of computer capacity" or "teachers have the necessary technical and pedagogical skills to integrate digital devices in instruction". For the second question, the survey respondents answered Yes or No to statements about their schools possessing "a program to use digital devices for teaching and learning specific subjects "or "regular discussions with teaching staff about the use of digital devices for pedagogical purposes" among others (variable series SC156) [see Appendix 1]. The questionnaire included a variable for the number of available computers per student at modal grade and the proportion of available computers that were connected to the internet.

To create the index at the country level, I assigned a value to each answer in variable series SC155 weighting those that revealed higher levels of ICT availability

more. Statements from respondents that "disagree" or "strongly disagree" reveal no ICT incorporation and were coded as 0, while "agree" and "strongly agree" as 1 and 2 correspondingly. Similarly, I assigned the dummy variable series SC156 a 1 for a positive answer and a 0 for the negative. Then, to include the number of available computers per student and the proportion of those connected to the internet, I used the quartiles of the distribution of the answers to split the data in three levels each, assigning a higher value to those in higher levels. I added each variable to code the index for each school and I filtered the data to include only the public schools. I focused on public schools only, because their access to ICT is highly dependent on the public policies that each government enacts in that area. Finally, to account for the within-country differences, I calculated the average *ICT index* for all the schools in each country and I ended up with 51 country observations. The index ranges from approx. 8.9 to 25.6 as shown in the summary statistics table.

4.2.3 Control Variables

I introduced five control variables coming from the OXCGRT dataset. Because this data is collected on a daily basis, I obtained the average metrics for 2020. In the case of COVID-19 cases and deaths, I had to drop the missing observations to obtain the averages for 2020. The missing cases were concentrated mostly at the beginning of the pandemic which seems reasonable considering that there was minimal awareness of how COVID-19 affected individuals. The following graph shows the ten countries most affected by COVID-19during 2020. The data is consistent with the existing publications and news released in 2020, considering that the sample does not include the statistics for China, India or Iran. Moreover, with that information I calculated the Case Fatality ratio to use as a measure of robustness.

Additionally, I introduced five other control variables from the WDI that are consistent with the literature. Previous studies highlight the differential effect that ICT usage has, according to the level of development that a country has achieved (Pham, 2014; Yildiz, 2016) In addition, the literature suggests that countries require a minimum level of education to perceive the positive effect of ICT on

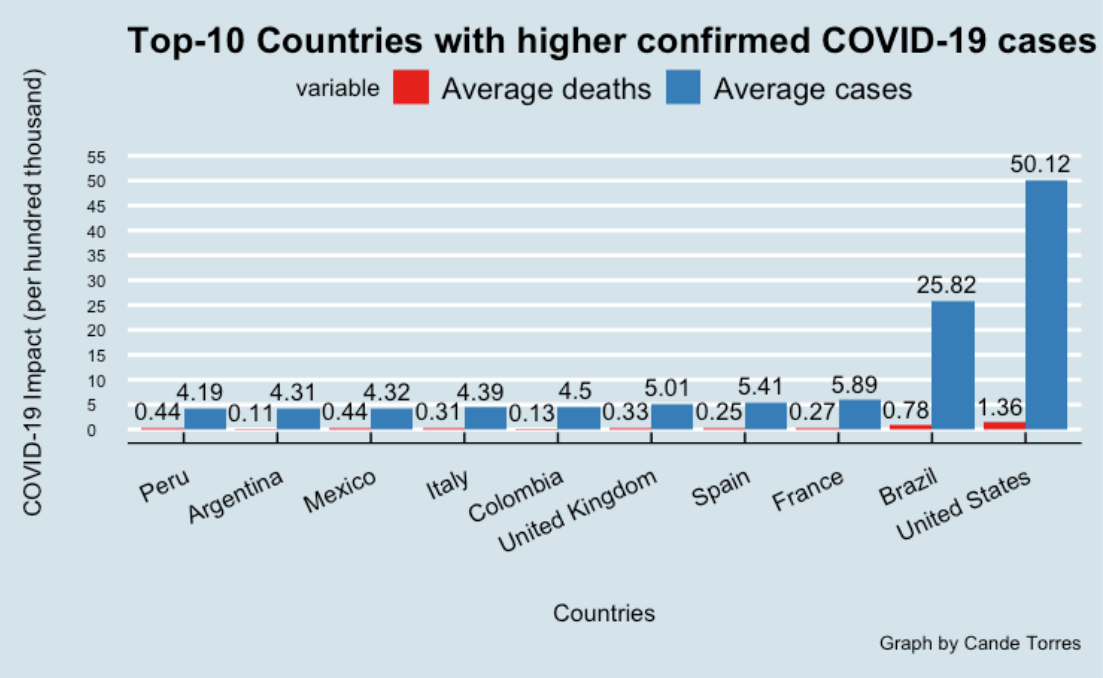

Fig. 4.2.1: Graph showing Top-10 countries suffering the most Impact from COVID-19 over 2020. Data from OXCGRT

human capital (Flaminiano et al., 2020). Thus, I incorporate GDP per capita (a standard proxy for development) and literacy rate for adults above 15 years old as control variables. Then, I used the number of hospital beds, physicians and nurses (per 1000 people) to control for the strength of the health system in the countries. The health metrics data available differ for each country but range from 2010-2019. Because the health system is rigid and inelastic, the data available will suffice[2]. Similarly, the literacy rate data ranges from 2011-2020 and the GDP per capita variable used corresponds to the 2020 data collection for all countries. Table 4.2.1 shows all controls and the purpose for including them.

[2]In Section 3.6 I address the limitations that the operationalization of this control may bring due to the emergency investment that many countries did on their public health systems in preparation and response to the pandemic.

Control Variable	Use
Number of COVID-19 cases	Used as proxies for the level of contagion each country was experiencing.
Number of COVID-19 related deaths	
Overall Government Response Index	Records how response of governments has varied over all indicators in the database, becoming stronger or weaker over course of the outbreak.
Stringency Index	Records strictness of 'lockdown style' policies that restrict behavior
Economic Index	Records measures such as income support and debt relief
GDP per capita (current USD)	Used as a proxy for income, development.
Literacy rate, adult total (percentage of people ages 15 and above)	Percentage of people age 15+ who can read and write with understanding a short simple statement about their everyday life.
Physicians (per 1000 people)	Used as proxies for the strength of the health system.
Hospital beds (per 1000 people)	
Nurses and midwives (per 1000 people)	
Critical Fatality Rate	The Critical Fatality Rate (CFR) is the ratio between the total number of cases and the total number of deaths from a determined illness, which in this case is COVID-19. This is a measure of the pandemic's impact.

Table 4.2.1: Table detailing all control variables and the purpose for including them

4.2.4 Descriptive Statistics

Table 4.2.2 presents the summary statistics for the variables. The information needed to conduct the study were not available for all states, thus yielding a total sample of 50 countries. The mean value on the ICT index is 16.461, which is almost double of the average obtained in Argentinean schools (8.9) and above the regional average obtained in Latin America (11). In fact, Argentina obtained the smallest value in the index as it represents the minimum value of the distribution. Although Uruguay is relatively closer to the mean (11.338) it is still below the

sample average but really close to the regional average. The maximum value corresponds to Qatar (25.5), followed by China (24.9) and UAE (23.8). Appendix 2 examines the distribution of the variables of interest as well as detailing the transformations conducted to deal with heteroskedasticity.

Variables	**N**	**Mean**	**SD**	**Min**	**Max**	**Range**	**SE**
ICT index	51.00	16.46	3.89	8.89	25.59	16.70	0.54
Educational Resilience	51.00	455.73	186.32	97.00	879.00	782.00	26.09
Log GDP per capita	50.00	9.83	0.90	8.35	11.66	3.31	0.13
Literacy Rate	50.00	97.95	1.91	93.23	99.96	6.73	0.27
Strengh of health system index	50.00	6.08	1.60	3.00	9.00	6.00	0.23
COVID-19 cases	50.00	276155.28	783990.64	1366.38	5012137.53	5010771.15	110873.02
COVID-19 deaths	50.00	9240.03	23148.98	10.65	135930.19	135919.54	3273.76
Stringency index	50.00	55.45	9.47	34.47	75.66	41.19	1.34
Government Response	50.00	52.29	6.24	37.13	65.87	28.74	0.88
Containtment of the virus	50.00	52.13	7.50	35.23	69.06	33.83	1.06
Economic Support	50.00	53.40	16.18	18.26	83.26	65.00	2.29
Health Policy Index (2020)	48.00	8.65	1.23	6.13	11.32	5.19	0.18
Critical Fatality Ratio (squared)	50.00	15.69	7.08	5.56	45.25	39.69	1.00

Table 4.2.2: Summary Statistics

4.3 Estimation Strategy

Using OECD countries as the primary unit of analysis, the study centers on their response to the pandemic during the year 2020. The primary estimating equation is:

$$
\begin{aligned}
\textit{Education Resilience}_i = \beta_0 & \\
& + \beta_1 ICTIndex_i \\
& + \beta_2 ConfirmedCases_i \\
& + \beta_3 ConfirmedDeaths_i \\
& + \beta_4 GovernmentResponseIndex_i \\
& + \beta_5 StringencyIndex_i \\
& + \beta_6 EconomicSupportIndex_i \\
& + \beta_7 ContainmentIndex_i \\
& + \beta_8 LiteracyRate_i \\
& + \beta_9 logGDPperCapita_i \\
& + \beta_{10} HealthSystemConditionsIndex_i \\
& + \epsilon_i
\end{aligned}
$$

In this equation, β_0 is the intercept term. β_1 is the coefficient of the main independent variable, i.e. the average score obtained at a country i on the ICT availability index. β_2 represents the coefficient of the number of confirmed COVID-19 cases in country i. Similarly, β_3 is coefficient of the number of confirmed COVID-19 related deaths in country i. β_4, β_5, β_6 and β_7 are the coefficients obtained introducing the scores that country i obtained on the government response index, the stringency index, the economic support index and the containment index from the Oxford COVID-19 Response Tracker. β_8 and β_9 control for the level of development in the country and β_{10} for the health system conditions in each country i. Then, i accounts for the standard error.

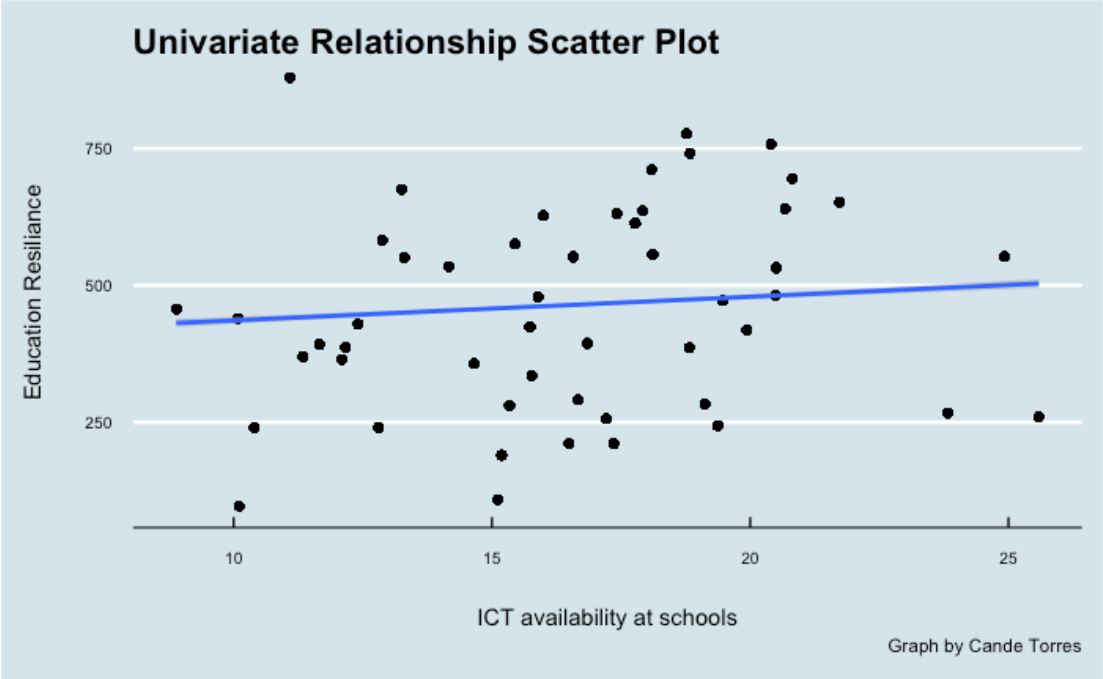

Fig. 4.4.1: Scatter Plot showing the Univariate Regression

4.4 Findings

The multivariate regression results are presented in Table 4.4.1, containing the different models implemented. Model 1 follows the OLS method and runs a simple linear regression to understand the relationship between ICT in schools and the perceived education resilience during the pandemic. This relationship is graphically represented in the scatter plot of fig. 4.4.1. The coefficient shows a positive relation, because a 1 unit increase in the index of ICT incorporation in schools (on average) can be associated with 8 units increase in the Education resilience index, but it is not statistically significant. Additionally, according to the R squared value for Model 1, only 3 percent of the variation in perceived education resilience can be explained by the ICT index. Model 2 introduces the average COVID-19 related cases and deaths to control for the impact of the virus during 2020. It shows similar results to Model 1 and none of the coefficient estimates are statistically significant.

On the other hand, Model 3 runs the regression introducing the World Development Indicators indicators GDP per capita (log), literacy rate and strength of health system, which produces a fundamental shift in the relationship between the dependent and the main independent variable, changing the sign of the coef-

	(1)	(2)	(3)	(4)	(5)	(6)	(7)
Intercept	321.412***	306.601**	−2143.249	−1404.855	−732.289	−865.082	907.515
	(114.003)	(119.198)	(1527.737)	(1674.895)	(1514.440)	(1513.752)	(1555.457)
ICT in schools Index	8.160	8.554	−6.639	−4.100	−2.339	−2.247	5.214
	(6.744)	(6.954)	(6.184)	(6.950)	(6.072)	(6.117)	(6.091)
COVID-19 Cases		−0.000	−0.000	−0.000			
		(0.000)	(0.000)	(0.000)			
COVID-19 Deaths		0.002	0.001	0.003			
		(0.004)	(0.004)	(0.004)			
Log GDP per capita			146.865***	89.296*	121.738***	121.249***	
			(35.793)	(46.443)	(39.940)	(40.564)	
Literacy Rate			13.241	11.323	4.135	5.045	−3.856
			(15.653)	(16.834)	(14.904)	(14.960)	(16.120)
Strengh of Health System Index			−6.684	−2.746	−14.734	−14.003	29.975
			(23.349)	(26.189)	(23.760)	(23.935)	(20.538)
Government Stringency Index				−9.099	−6.636**		−9.869***
				(25.293)	(2.779)		(2.822)
Health Policy Index (2020)				15.524	24.398	47.543*	37.483*
				(96.850)	(19.523)	(25.955)	(20.925)
Government Response to the Pandemic Index				3079.655			
				(32057.948)			
Containtment of the virus Index				−2690.153		−10.243**	
				(28055.604)		(4.520)	
Government Economic Support				−383.482			
				(4008.104)			
Critical Fatality Ratio (squared)					−8.294**	−7.685**	−7.224**
					(3.225)	(3.227)	(3.523)
R^2	0.029	0.050	0.466	0.513	0.555	0.550	0.449
Adj. R^2	0.009	−0.012	0.390	0.359	0.475	0.469	0.367
Num. obs.	51	50	49	47	47	47	47

$^{***}p < 0.01$; $^{**}p < 0.05$; $^{*}p < 0.1$

Table 4.4.1: Statistical models

ficient. From the newly introduced controls, the log GDP per capita coefficient estimate is the only one statistically significant. Moreover, Model 4 also presents a negative non-statistically significant association of the main independent variable ICT index and a significant coefficient with GDP per capita. Model 4 introduces the set of control variables for the country's pandemic response. The adjusted R squared measure shows that 51 percent of the variation in perceived education resilience can be explained by the variables included in Model 4. This is not even half of the variation, which hints at the unrepresented mechanisms affecting the main independent variable. The variable inflation factor (VIF) test on Model 4 found concerning levels of multicollinearity between many variables that affected the results and needed to be addressed in latter models.

Then, Model 5 did not include the problematic variables, as it can be seen in the table. In order to check the robustness of the results, I replaced COVID-19 cases and COVID-19 deaths with the Critical Fatality rate squared (the transformation was done in order to normalize the distribution). The coefficient is negative and significant. In a similar vein, Model 6 runs the regression replacing the Government Stringency Index with the Containment Index. Both variables are multicollinear because they capture some of the same information. In fact 9 out 14 variables in the Containment Index help build the Stringency Index. The essential difference lies on the focus on Health that the Containment Index provides (as the rest of the variables focus on public heath policies)(Hale, 2022). Both variables are statistically significant at the 5 percent level when they are not included together. Model 5 and Model 6 stand as the preferred specification strategy after addressing multicollinearity issues. Finally, Model 7 runs the regression without controlling for GDP per capita, the only variable that has remained consistent across models. Model 7 provides a positive correlation between ICT incorporation at the school level and education resilience for countries in the sample. However, this coefficient is not statistically significant.

4.5 Discussion

The results of the most complex models show a negative yet not significant relationship between ICT incorporation prior to the pandemic and the perceived educational resilience displayed by the countries at the preferred specification (i.e. Model 5 and 6). With these results in mind, the model fails to reject the null hypothesis. In other words, the regressions do not offer evidence that there is a significant measurable effect of ICT incorporation in the perceived education resilience for countries during the pandemic. Additionally, the small sample size further compromises the confidence that can be placed in the model outcomes. The results are not consistent either with the literature of ICT usage for education outcomes or for education resilience reviewed in Chapter 2. There are few empirical studies attempting to measure education resilience in other contexts –let alone during the pandemic- which makes it difficult to contrast my results with the rest of the academic literature.

The regression results, especially that of Model 7 raises the following question: Why is controlling for levels of development so critical in the regression? The decision of including or not the log GDP per capita as a control variable in the models proved to be determinant of the Beta 1 coefficient of the effect of ICT incorporation in perceived education resilience. According to the United Conference of Trade and Development (UNCTAD), ICT impacts on the broader economy, society and environment arise from the ICT supply and demand observed at the country level. Then, the UNCTAD lists the country level education, skills, income and existing infrastructure as factors highly influencing the supply and demand for ICT (UNCTAD, 2011). Triangulating information with the Human Development Index results that the sampled countries achieved in 2020 revealed that all the countries in the sample are considered "developed" to different extents. Then, GDP per capita was not only correlated with ICT incorporation, but also highly determinant of the perceived education resilience. The models that did not include GDP per capita were confounding the effect of development with the effect of ICT incorporation. Because countries with higher levels of development (as measured with GDP per capita) tend to invest more on ICT incorporation in education, it also mattered for the perceived educational resilience they displayed during the

pandemic.

Subsequently, the regression results shed light on the importance of utilizing efficient controls for COVID-19 impact on countries. As presented in the table, the variables included to control for COVID-19 impact (cases and deaths) were not significant on their own. Only when both variables were used to calculate the average critical fatality rate (included as a quadratic term in the regression) for the countries did it become significant at the 5 percent level. Model 5, 6 and 7 show that a 1 percent increase in the CFR decreases educational resilience from 8.2 to 7.2 units in the index, which is consistent with the observed global trend.

Finally, the multicollinearity between government stringency index and the containment index constrains the model to include either variable but not both. Model 5 and 6 reveal that both are significant at the 5 percent level, although government stringency becomes significant at the 1 percent level in Model 7 when GDP per capita is not included in the model. In spite of this, I believe that there is no difference between including either variable as a control because both satisfy the control for the public sector's attempt to contain the effect of the virus.

Unfortunately, I cannot conduct the same exploration for Latin American countries in a meaningful way due to the small sample size. Figure 4.5.1 shows a visual comparison of the countries available for the region in terms of their average score of ICT incorporation. These results are consistent with the reality of ICT incorporation explored in Chapter 5, especially those of Argentina and Uruguay's differentiation. As it can be observed, Uruguay does not rank highest among all countries as Chile does, yet it is still recognized for its education management and resilience during the pandemic. The descriptive analysis motivates the incorporation of process-tracing as a way to explore ICT incorporation, as well as other factors that might be related to the perception of educational resilience.

4.6 Limitations

There are multiple limitations conducting a study such as the one presented above. Specifically, attempting to measure the impact of ICT has been deemed challenging for many reasons including contextual differences among countries, the

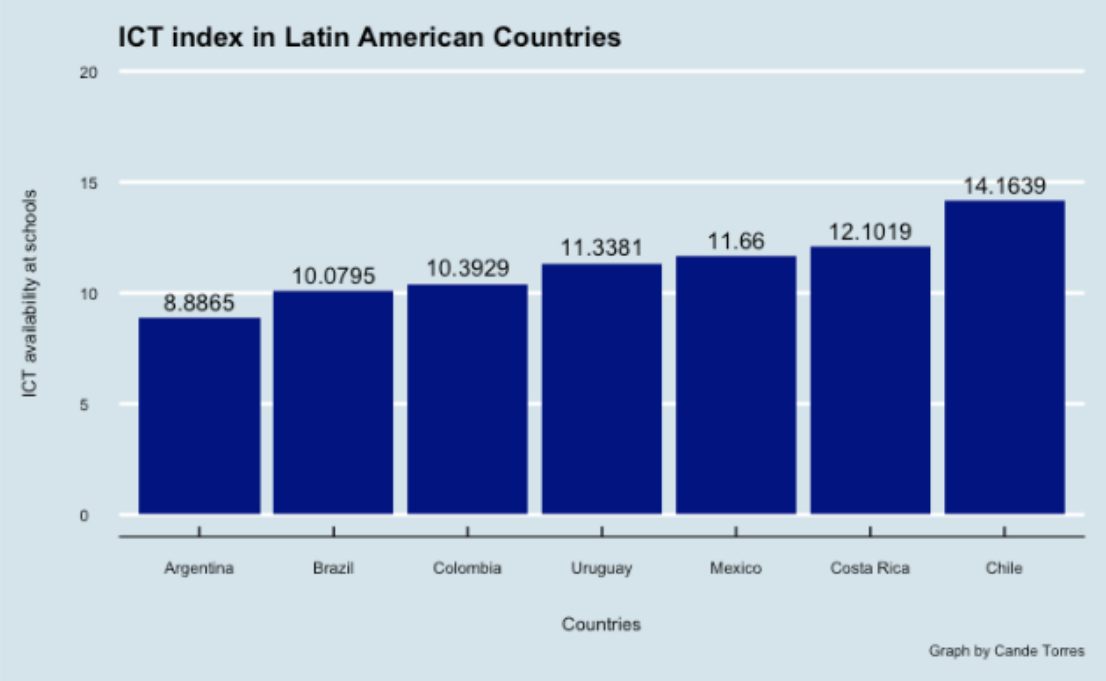

Fig. 4.5.1: Bar Plot showing the different ICT incorporation levels in Latin American Countries

rapidly changing nature of technology, and the indirect changes facilitated by ICT (as general-purpose technologies) (UNCTAD, 2011). Nevertheless it is crucial to keep studying the impact of ICT initiatives empirically to enlarge the body of knowledge about the best ways to employ them for development purposes. As long as the limitations of the study are clearly understood, the insights remain consequential.

For this study in particular, the first limitation came from the pre-processing of the data, which was time consuming and required deep scrutiny. The variety of sources and the high difference of observations in each data set presented a trade-off between sample size and information availability. As mentioned before, the independent variable of interest was coded from the answers of the PISA school questionnaire which offered the most complete information of the level of ICT incorporation in public education. In order to use that information, the insights were limited to the countries that participated in the PISA tests in 2018.

Second, I expect omitted variable bias given the operationalization of the dependent variable through the use of proxies that do not account for the full definition of education quality observed by UNESCO. However, the results remain relevant because it still captures the perceived quality of education for the coun-

tries. Similarly, the list of controlled variables are missing plausible explanatory variables that could confound the results. For example, although a variable measuring the number of physicians, nurses and hospital beds was introduced as a control for the strength of the health system, it does not account for the recent investment that many countries claim to have conducted towards the healthcare personnel and the medical equipment during the pandemic. Other missing variables could be the political commitment on ICT in education, the enrollment on ICT specific programs and teacher training on ICT. Although the UNESCO Institute of Statistics (UIS) recorded these variables until 2012, it excludes most developed countries which does not allow me to use the information for this regression given the sample. A current omitted variable that could be added in latter revisions of the thesis is the Gini coefficient. As a "summary measure of income inequality", it could provide insights about the differential opportunities in education and individual access to digital devices (Census Bureau, 2021). This data is available for some countries in the World Bank Database, ranging from 2011 to 2019. The possibility of omitted variable bias puts the internal validity of the models in question.

Third, according to recent studies there is reason to believe that under-reporting in COVID-19 cases and COVID-19 deaths occur in greater frequency in some countries more than others (CMMID, 2021; Unnikrishnan, 2021). Researchers have used Bayesian calculations to code a predictive model that returns the Critical Fatality rate adjusted for under-reporting, but this was only used for data on China. Hence, the proposed models to account for this situation are neither fully established nor easily applicable to my data. Thus, I do not account for the underreporting of the CFR in my study.

4.7 Moving Froward with Process-tracing

The results from the regression analysis did not establish a causal relationship between ICT incorporation and the perception of education resilience during the pandemic. However, it shed light on the different mechanisms that affect the relationship, such as the GDP per capita, the critical fatality rate and the government

containment strategy. The lack of consistent statistical results for the independent variable of interest makes it incredibly important to use case studies in order to process-trace the relationship previously tested. In Chapter 4, I use process-tracing to address the shortcomings of statistical analysis by linking causal mechanisms with outcomes. Through the systematic examination of diagnostic evidence and within-case analysis, one can observe the causal process at work. Thus, I present the most-similar case study comparison between Argentina and Uruguay where I explore how the variation in perceived educational competitiveness relates to the similarities and differences between state policies for ICT incorporation to their respective education system. From figure 4.5.1 we can see that Uruguay is around 3 points higher than Argentina on the scale of ICT incorporation in public schools. Yet, it is not the highest in the region considering Chile's position. What else can explain their perceived success on education resilience during the pandemic? The complexity of international relationships and events happening in the world are most certainly a result of multiple factors, and process-tracing might not be able to explain all of them. Yet, it can certainly add confidence to the evaluation of the proposed hypothesis.

CHAPTER 5

ICT patterns of Incorporation in the Southern Cone

What is Uruguay's secret for education success? In 2020, many journalists and news organizations around the world were seeking an answer to that question (Taborda, 2020; Taylor, 2020). Meanwhile, headlines mentioning Argentina were concerned about "the widening of the educational gap" and the lessons that "the neighboring country" could offer (Tuchin 2020; Fenandez, 2020). All overlapped on the centrality of technology for pandemic education and how pre-pandemic efforts impact today's responses. At the same time, Chapter 1 and 2 revealed that information communication technology (ICT) incorporation within the fabric of the education system is crucial for the perception of global competitiveness in Latin America. This is significant considering how vital technology became to create resilience in times of crisis. When the pandemic forced countries to suspend in-person education, ICT became the primary avenue to education continuity and resilience.

Thus, it is essential to revisit the regional public policy trend related to ICT that Latin America adopted before the pandemic, paying close attention to Uruguay and Argentina. Understanding the political history of public policies such as Plan Ceibal in Uruguay, compared to Plan Conectar Igualdad or *Connect Equality* in Argentina, is crucial when explaining the differential levels of education resilience. Given the regional trends in ICT use for education in the Latin American region, both before and during the pandemic, how can one interpret the different efforts of these two countries?

This chapter complements the quantitative analysis with process tracing, pre-

senting case evidence of the relationship between educational resilience and ICT incorporation, specifically focusing on the Southern Cone of Latin America. In this thesis, process-tracing adds to the empirical analysis examining case-based evidence for the purpose of cross-validation. That is, rather than drawing causal inferences from the analysis, it will be used to support or contradict my primary hypothesis: **Countries with greater ICT incorporation in public schools prior to the pandemic will be perceived as having more resilient education systems during the crisis**. I base the case study comparison on evidence provided by secondary sources, informed by my experience living in Argentina in 2020. On one hand, my own positionality as an Argentine citizen facilitated my access to reliable sources, primary sources written in Spanish and a deeper understanding of the social impact coming from the pandemic and government response. On the other hand, my identity awareness kept me constantly rechecking my personal biases in favor of objectivity.

Following the literature review, I limited the scope of my research for logistical reasons to a period that encompassed the regional trend of ICT incorporation that began with the new millennium. For the same reason, the end point of the research looking at Uruguay and Argentina's ICT responses is the end of the year 2020, even though the pandemic has continued until the time of writing. In general, the regional focus and the use of these cases allows me a deeper insight into the causal mechanisms that reinforce the effect of information communication technologies on education resilience to corroborate the outcomes of the regression analysis. This chapter proceeds as follows: In Section 4.1, I introduce the case study comparison; Section 4.2 details the evolution of ICT incorporation in Latin America's education systems as a whole before the pandemic; and Section 4.3 focuses on the cases of Argentina and Uruguay. Section 4.4 explores the regional trend in public policy response to the pandemic in the area of education first, and Section 4.5 then proceeds to investigate the individual cases of Argentina and Uruguay. Lastly, Section 4.6 concludes the chapter, situating it in relation to Chapter 5 and the larger perspective of this thesis.

5.1 Case Selection

Argentina and Uruguay are ideal for a most similar case-study comparison that can illuminate the effect of ICT incorporation pre-pandemic with the level of perceived educational resilience in Latin America during the pandemic. Located in the Southern Cone, both counties share similar colonial histories, demographics, cultures and political institutions. Their major difference can be found in the geographical extent of their territory, since Uruguay occupies roughly one tenth of Argentina's area[1]. Consequently, the population density differs significantly between the states as Argentina has 45 million people (2020) and Uruguay only 3.5 million (2020). Economically, although both countries follow an export-oriented agricultural model with free-market tendencies, Uruguay's GDP per capita has increased significantly in the last few years compared to Argentina's (15,438 USD vs. 8,442 in 2020). In addition, both countries have a long tradition of social expenditure for welfare and a focus on equality in their public policies. In other words, these countries have common characteristics that, due to modest variations, work as a control; thus, they can be accounted for as causal factors in the differences found in education resilience.

In the area of education, both countries share a similar trajectory. Consistent with the regional educational reform undertaken in the 1990s, both Argentina and Uruguay concentrated their efforts on reinvigorating education. The reform proposed the decentralization of education management from a central authority to a federal distribution. Betancur (2007) suggests that while Argentina followed that model, Uruguay retained its centralized administration of education. In order to increase the literacy rate and the average education years of the population, both countries began planning for expanding investment for education.

Argentina and Uruguay also share ideological similarities in terms of the government's approach to education provision. Although this has varied across governments, in both places there is a social common understanding of the government's responsibility for providing high quality public education regardless of the economic inclination of the party in power. Some authors believe leftist govern-

[1]Argentina occupies 2,780,400 km2 (1,073,500 sq mi), while Uruguay's territory is approximately 176,000 square kilometers (68,000 sq mi) (CIA, 2022).

ments substantially accentuated the investment in education (Satyro et al., 2019). In particular, the education policies established during the mandate of the Justicialista (Peronist) Party in Argentina and the Frente Amplio (Broad Front) party in Uruguay innovated the most in the education sector. Both governments belong to the regional trend of the "Pink Tide," which consisted of the rapid electoral success of leftist and center-leftist governments at the beginning of the new millennium (Ellner, 2018). In Argentina, the kirchnerista political orientation was in place for over a decade during the presidencies of Nestor Kircher (2003-2007) and Cristina Kirchner (2007-2015). In Uruguay, the Frente Amplio governed from 2005 to 2015 during the consecutive presidencies of Tabaré Vazquez and José Mujica.

Under Pink Tide governments, both Argentina and Uruguay passed legislation that spent higher percentages of their GDP on education. In 2005, Argentina enacted the National Education Finance Law, which targeted an expenditure equal to 6 percent of GDP – as suggested by UNESCO – by the end of the decade. It also set a minimum teacher salary to guarantee equal pay across the provinces. The same year, Uruguay's Frente Amplio increased the education spending to 4.5 percent of GDP and in 2008 established the Law for General Education (Law 18.437), which raised it to 6 percent (Betancur, 2007; Farenzena, 2018; Satyro et al., 2019). Although neither country reached the target of 6 percent of GDP, leftist governments in both Argentina and Uruguay successfully enacted sustained increases in education spending. This trend is visible in figure 5.1.1, particularly the decline in Argentina beginning in 2014. This is not a minor detail, considering that the government transitioned to a center-right ideology only after December 2015, when the Macri administration took over.

The Pink Tide governments of both countries relied on legislation to move toward universal access to free quality education. Both countries are among the highest Latin American countries in terms of literacy rates. As part of the education transformation of the 2000s, a new regional trend of data-driven education initiatives emerged. Figure 5.1.2 shows a steady increase in the literacy rate for both countries. The graph shows a slight decline for Uruguay in 2010 as well as for Argentina in 2014 (which mirrors the decline in investments portrayed on figure 5.1.1).

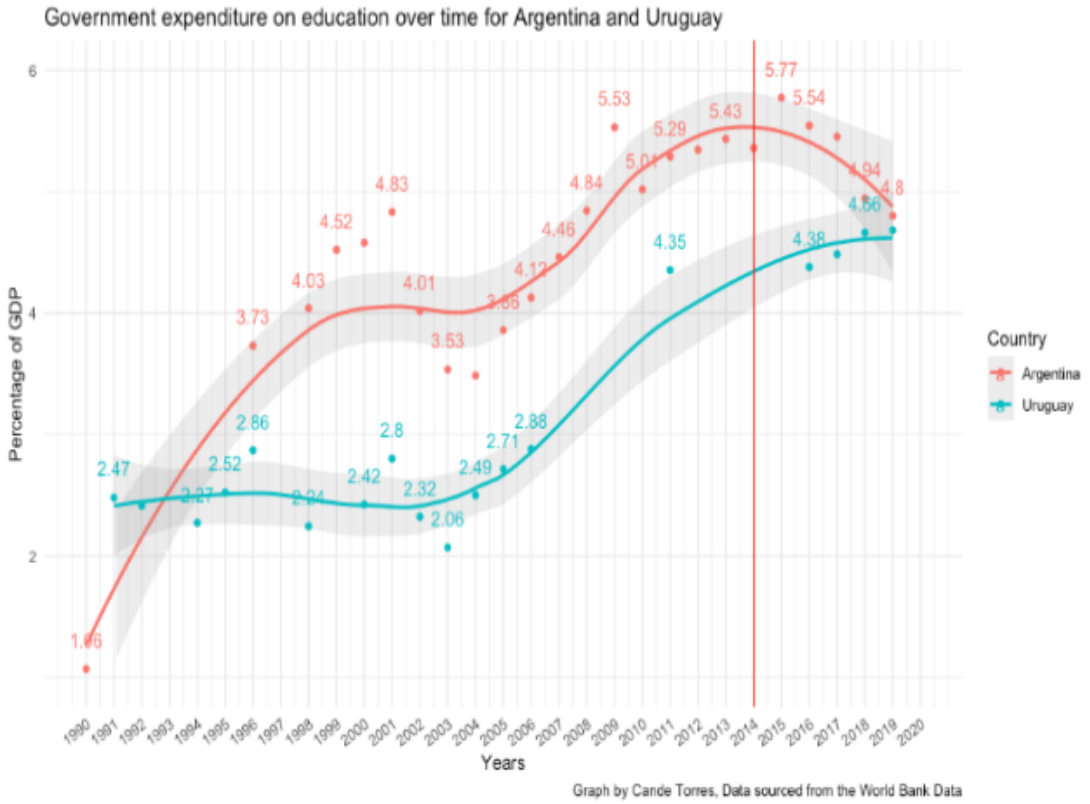

Fig. 5.1.1: Government Expenditure on Education Overtime for Argentina and Uruguay. Data retrieved from the World Bank Data

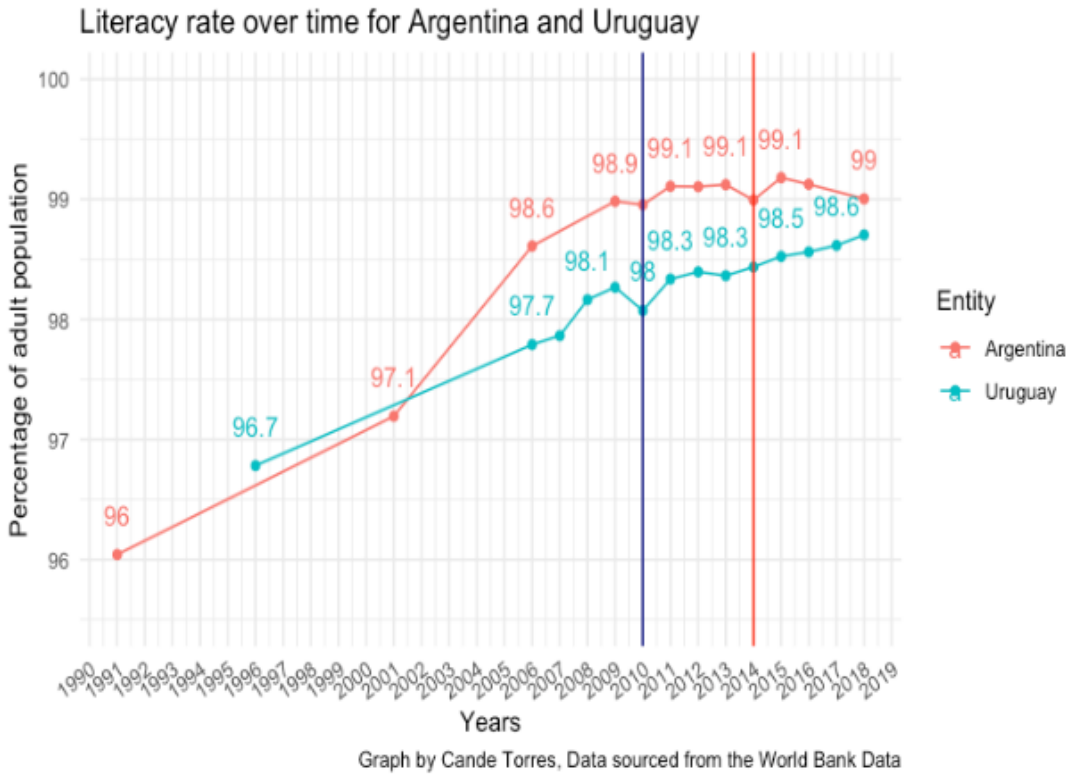

Fig. 5.1.2: Literacy Rate overtime for Argentina and Uruguay. Data retrieved from the World Bank Data

Both countries have 12 years of compulsory education, divided into primary and secondary education. In Uruguay, 30 percent of the total population participate in the mandatory education system as students, 95 percent located in urban areas and 5 percent in rural environments (Sosa Ambrosi, 2021, p.9). Meanwhile in Argentina, the student percentage of the total population was around 25.6 percent in 2019 (INDEC, 2019a). The specific ratios of rural and urban students are not available, but according to UNICEF Argentina the age group including youth from 12 to 17 years old living in rural areas accounts for approximately 11 percent of the total population, with 89 percent of the youth located in urban areas (UNICEF, Argentina, 2020, p.17)

International trends in competitive education have drawn the attention of many scholars whose work examines Argentina and Uruguay in a global context. Cedrez Perez (2012) focus exclusively on comparing Uruguay's competitiveness with other countries in the Southern Cone. Likewise, D'Onofrio (2014) compares Uruguay's education metrics with Finland's, as both countries are globally praised for its education system. He argues that Uruguay should replicate the level of investment that developed countries sustain in the education system to achieve similar levels of human capital as a means for development. As part of the Center of Studies for Uruguay's Development (CED), Gili (2017) presents an analysis of Uruguay's performance on the 2017 World Economic Forum ranking for competitiveness, arguing that the country's position since 2006 (60th-80th) is heavily influenced by its innovation scores. Although Uruguay is well positioned with an education rank of 4.6, the weakness of the country lies in the perceived quality of education according to the survey undertaken (Gili, 2017). On the other hand, Escoriaza et al. (2015) analyze Argentina's performance on the 2015 WEF Global Information Technology Report compared to the rest of the world, then laying down the country's educational capacity. Similarly, other authors justify their choice to study education patterns in countries like Argentina because their decisions raise new questions about the global economy and new ways of integrations through education competitiveness (Ramos-Monsivais Lizeth, 2020)[2]. All these studies signal the level of attention these countries pay to the comparative

[2]Ramos-Monsivais & Lizeth (2020) study Argentina, Chile, Costa Rica and Mexico's higher education trends, focusing on each country's global competitiveness.

advantages that education can bring to Argentina and Uruguay in the integration of the global economy.

Although both countries align in terms of their educational approaches, a fundamental difference separates them: The global perception of Uruguay's educational competitiveness compared to that of Argentina. International organizations have praised Uruguay's educational performance compared to the regional patterns. For example, the Inter-American Development Bank (IDB) has highlighted Uruguay's education performance in the area of ICT as an example of a "success story" about how technology can increase a developing country's competitiveness (Zucchetti et al., 2020). During the pandemic the tendency to compare both countries in terms of how they were containing the virus grew significantly, especially regarding the learning losses it occasioned. Both news sources and international organizations praised Uruguay's contingency strategy and "leading" example for the region. At the same time, Argentina's lack of strategic planning for education resilience led the country's government to be criticized both domestically and internationally.

Following the investigation of the outcomes obtained in the regression analysis and the distribution of the individual variables, Uruguay and Argentina emerged as the best cases to compare in this situation after considering other countries from the Southern Cone[3]. Due to the general similarities in their education systems, I believe that the patterns of ICT incorporation in both countries previous to the pandemic and the policies enacted during the pandemic can explain the different levels of education resilience. This cross-country analysis may shed light on broader patterns of education resilience occurring around the world during the pandemic. For that reason, it is vital to understand the ICT incorporation pattern previous to the pandemic, both in the country as well as the individual countries.

[3]Although I considered adding Chile to the case study comparison, I had to narrow the scope in the interest of time. In the future, adding it would be extremely beneficial considering the high levels of ICT incorporation Chile showed in the index.

5.2 Latin America: ICT Incorporation Before the Pandemic

Latin America has come a long way since declaring the UN's 8th Millennium Development Goals declaring states' responsibility to "make available the benefits of new technologies, especially information and communications" (United Nations, 2000). In response, Latin American countries passed the Florianopolis Declaration in July 2000, agreeing on their "shared aspiration to be fully integrated as members of the Information Society by 2005 through operating with sustained efficiency, equity and sustainability within the knowledge economy" (ECLAC, 2000). This was the first regional commitment to enhance development through investment in Information Communication Technology, especially in the area of education.

In spite of the improvements achieved around the world in this area over the last two decades, such progress has been unequal across regions. For example, according to the Inter-American Development Bank (IDB), only 33 percent of Latin America's high school students attend schools with adequate internet bandwidth, which is less than half the 68 percent average reported by OECD countries in the 2018 PISA (IDB, 2020). This example illustrates global disparities, yet the potential observed by effective ICTs application to education in Latin America offers great insights on the regional trend as well.

To address the issue of ICT training for teachers, there have been valuable initiatives in the region, even when they might not yield optimal results. As part of their national programs of ICT incorporation to the educational systems, teacher training became a central part of initiatives such as *Ampliando Horizontes* in Honduras, *Enlaces Mundiales* in El Salvador, Project Canaima in Venezuela, and general teacher education in Nicaragua and Ecuador (Valliant, 2013). Among those programs, Uruguay and Argentina's national versions of the OLPC (Plan Ceibal and PCI respectively) were commended for their strategic positioning of teachers' digital training as central for their program deployment (Valliant, 2013). Other projects included partnerships between governments and private companies such as Microsoft and Intel Educar to provide digital competency workshops for the general teacher training in virtually all countries of the Southern Cone (Burn,

2011). However, a survey conducted in Paraguay during the pandemic revealed that only 56 percent of teachers had been trained in the use of ICT for education (Picon et al., 2020). Meanwhile, a similar study conducted in Chile (with a smaller sample size) revealed that only 30 percent of teachers admit not having acquired formal training in ICT for teaching, however only 36 percent of respondents feel actually prepared for virtual classrooms (Ferrada-Bustamante et al., 2021). These scenarios exemplify the reality of the region's ICT incorporations previous to the pandemic.

Despite the progress achieved in ICT incorporation, Latin America remains deep within a long-term learning crisis. To perform a deeper analysis, the World Bank created a new indicator to compare countries in terms of *learning poverty*, defined as:

> the share of children who are learning-deprived or have not achieved the Sustainable Development Goal (SDG) 4.1.1b of minimum reading proficiency standard, and/or are schooling deprived, defined both in terms of access and flow, as measured by the share of children who are either out of school or showing significant age-grade distortion. (World Bank 2019)

The average measure of learning poverty for the region of Latin America and the Caribbean was 51 percent by 2020, noting the great variability within the region, ranging from 37 percent in Chile to 75 percent in Honduras (World Bank, 2021).

To understand regional learning poverty it is crucial to examine the enormous gap in educational application of ICTs between Latin America and other regions. For example, the regional teacher readiness to incorporate ICTs is quite lower than in other places. In the European Union, by 2019 over 90 percent of teachers had reported to have been using computers and internet for school work for a period of four or more years, while in Latin America, only 60 percent of them had the skills to integrate digital devices in their teaching (European Commission, 2019; IDB, 2020). The evidence shows clearly that the region is far behind in grasping the full potential of technologies for teaching and learning; even when this is a result of a regional trend of economic instability, governments show unequal efforts at improving the situation.

5.3 ICT Incorporation Pre-Pandemic in Uruguay and Argentina

Previous to the pandemic, Uruguay and Argentina followed the regional trend, investing in infrastructure projects to facilitate the adoption of ICTs in a wider range of areas. In the area of education in particular, both countries established national versions of the international non-profit One Laptop per Child (OLPC) which aimed to equalize access to digital technologies for secondary school students country-wide. Although both countries share similarities in the implementation of this initiative as national programs, the trajectory and degree of government involvement distinguished the level of success in each case. In fact, to understand the different levels of ICT incorporation up to the moment of the pandemic, it is vital to understand the impact of these public policies in both countries.

Uruguay replicated the One Laptop per Child (OLPC) as a national education policy, calling it "Plan Ceibal" or Digital Education Program at National Level[4]. Uruguay became a pioneer in the region by being the first country deploying the plan at a national scale (Zucchetti et al., 2020). Its strategic planning in 2006 and consequent incorporation as a public policy in 2007 occured under the presidency of Tabare Velazquez, along with other education policies that sought to increase the literacy rate. Named ceibal after Uruguay's national tree, the plan aimed to incorporate technological innovations in primary and secondary schools, although these objectives were later redefined as part of a more comprehensive strategy of improvement. Initially, the plan did not differ greatly from other OLPC policies implemented around the world because the laptops—called "ceibalitas"— were distributed in public schools without providing teacher training or pedagogical support (Ceretta y Canzani, 2016 cited by Caballero de Luis 2017). Yet, throughout its three different stages of the project, it achieved a comprehensive reach to different aspects of digital literacy and accessibility (Zucchetti et al., 2020).

In 2009, with full coverage of students and teachers in the public system, the plan was extended towards the private sector. The following years, online libraries and educational platforms became part of the program while some schools began

[4]Programa de Educación Digital a Nivel Nacional

to offer workshops on technology and robotics. The digital platform CREA was made available for teachers to help them organize learning content, provide additional material and assign homework to the student recipients of the Plan Ceibal. In 2016, almost ten years after the program's launch, the director of Ceibal Foundation claimed that every single student and teacher from primary and secondary school had access to a device, and the statistics shared in the website claim that 99.7 percent of students and teachers possessed access to internet connectivity by May 2021 (Cobo, 2016). In US dollars, Uruguay invested $562 million until 2016 and from then on around $56 million annually to sustain the program (Caballero de Luis, 2017).

In terms of public support, the program has not only been widely accepted but also praised. According to the results of a population survey conducted in 2009, 94 percent of parents supported the program while for headmasters and principals it was 92 percent of support (Evaluación Ceibal, 2009; as cited in Caballero, 2017). According to the same survey, 71 percent of the population perceived students and their families as taking advantage of the resources provided by the Plan Ceibal, with only 7 percent in disagreement. The perception of advantageous usage seems to be linked to internet connectivity, yet 83 percent of the population believed the Plan improved such connectivity as well (Evaluación Ceibal, 2009). In general, parents and principals agreed that the program had mainly a positive impact on children overall (Rivoir, 2011). The widespread approval of the program seems to be linked to the common dominant perspective that Information Communication Technologies (ICT) are positive in itself. According to researchers Pittaluga and Rivoir (2012), many of the adults interviewed believed in the benefits of ICTs and internet on education "but could not explain or give examples of why and how." Additionally, respondents valued the Ceibal positively due to the program being based on equality in open access to ICTs and the increase in opportunities it implies for the youth, especially in small locations and adverse contexts (Rivoir, 2017).

Negative opinions of the program consisted of three primary criticisms. First were the negative changes experienced in the teaching materials. People claim kids prefer to use the laptops to perform research rather than consulting more

traditional sources of information such as books and encyclopedias (Rivoir, 2017). The perception that online research is "easier" is relative, yet concerns about the veracity of information obtained online and the children's capacity to distinguish faulty information, ended up impacting the opinions on the program itself. Second, others' negative opinions arise from the content children can access from the laptops, suggesting the exposure to violence and pornography. Third, others reject the program due to the lack or sluggish use of the materials from untrained teachers. If teachers do not take advantage of the resources, then the program and all the investment seems undervalued.

The Plan Ceibal has been scrutinized by the Uruguayan government in the past to measure its impact on ICT access. Following the results of the Encuesta Continua de Hogares, or Continuous National Household Survey, from 2016, authors agree that one of the biggest achievements of the program has been to reduce the ICT access gap between socio-economic levels. In fact, a recent evaluation highlights the importance of "the exponential nature of the growth of Plan Ceibal's Internet traffic at an aggregate level (i.e. the entire education system)" (Mateu et al., 2018). Download traffic increased 13-fold between 2011 and 2015 while CISCO VNI "reported that global Internet download traffic grew 5 times in the same period" (Mateu et al., 2018).

Evaluating the impact of Plan Ceibal has been challenging, especially regarding the use of ICTs for educational purposes. According to Caballero de Luis (2017), achievements in national evaluations for primary school have remained proportional since 1996, but the author also presents a review of different evaluations of the program highlighting its values and limitations. Ceretta and Canzani (2016) summarized key results discovered by a variety of scholars:

1. Ferrando, Machado, Perazzo y Vernengo (2011) found positive impacts in 6th-grade math, but little impact in reading and school motivation.
2. De Melo, Machado, Miranda y Viera (2013) studied the differential impact of the plan in mathematics and reading for third grade, finding no impact from 2006-2012.
3. Kachinovsky et al. (2012) observed that the use of the laptops

from Plan Ceibal had positive impacts on cognitive and linguistic development for studitnes in 4 schools.

4. Ceretta and Picco (2013) observed that the Plan Ceibal laptop has not been incorporated into teacher's extracurricular activities or modified their teaching methods.

The diverse results emerging from these studies resemble the global trend displayed in Chapter 2, where the review of empirical studies on the impact of ICT-related initiatives on education offered ambiguous results.

In the greater scheme of global competitiveness and human capital development, scholars have not found statistical evidence on the effect of access or use of digital tools on student performances in standardized testing (Mateu et al., 2018). As of 2017, Uruguay's achievements in the PISA tests had remained steady since 2003 (Uruguay, 2017; Caballero de Luis, 2017). Yet the changes can be perceived in unmeasured indicators of soft skills such as socio-emotional changes in learning, self-motivation, etc. By partnering with Global Network for Deep Learning (NPDL), Uruguay was the first developing nation attempting to readdress pedagogies with a new focus. According to the literature, the deep learning framework allows "students [to] develop competencies and capacities that prepare them to be creative, be connected, be capable of solving problems in a collaborative way as well as being holistic and good citizens contributing to the common well and also creating it" (Fullan et al. 2013, cited by Mateu et al., 2018).

On the other hand, in 2010 president Cristina Kirchner launched the Argentinean Plan Conectar Igualdad or *Connect Equality* (PCI) under the Decree 459/10. As part of the kirchnerista approach to social welfare, this public policy sought to reduce the technology access gap in the population, improving the literacy and utilization of ICT. The program followed the structure of the OLPC global initiative, distributing laptop computers to students and teachers in public secondary schools. In the Uruguayan case, the supply of technological devices was meant to come with the appropriate training for use and a pedagogical program to follow with the new tools. The process of implementation incorporated educational, political, industrial and infrastructure goals for Argentina. Additionally, the PCI followed the National Education Law of 2006 that announced a fixed

budget of 6 percent of Argentina's GDP for financing equity in education. As a state policy, the PCI looked to coordinate the agendas of multiple public and private actors with the goal of improving the level of technological infrastructure, enabling widespread connectivity and bridging the technological divide. Internationally, the PCI was recognized by the United Nations Development Program (UNDP) and the Iberoamerican Youth Organization (OIJ) as one of the "20 Best Practices in Public Policies for the Iberoamerican Youth" in 2012 (ANSES, 2021).

In 2018, the government of President Mauricio Macri transitioned from a socialist approach to a neoliberal one. The new president critiqued the PCI as part of the public policies of the former administration, claiming that "distributing laptops to schools without connectivity was similar to distributing meat without a grill to cook"[5] (Matias de Santi, 2019). The program was then discontinued and became part of a larger initiative, "Aprender Conectados" or Learn Connected, with the objective of "achieving digital alphabetization" rather than the former one of bridging the technology gap. This decision was highly criticized, especially during the pandemic, when the lack of technological devices diminished the continuity of education through remote learning and teaching. In fact, the original devices depreciated extremely quickly due to the lack of updates, to the point where they were sold in the streets for less than 15 USD. In figure 5.3.1 I captured one of the PCI laptops when a young man attempted to sell it to me in La Matanza, Buenos Aires.

[5] "¿De qué servía repartir computadoras si las escuelas no tenían conectividad a internet? Es como repartir asado y no tener parrilla, no tener para prender el fuego".

Fig. 5.3.1: Image by author taken August 18th 2021 in La Matanza, Buenos Aires, Argentina

The public opinion regarding the PCI is known to be openly biased. In fact, many authors in academic writing about the topic recognize this situation, disclaiming their neutrality upfront in their studies (Seijo et al. 2020; Alderete and Formichella, 2016). The perspectives on the program are polarized according to political views, and vary from immeasurable complements to heartless critiques. As opposed to Uruguay, where Plan Ceibal garnered widespread support regardless of the party politics behind it, in Argentina it plays a great role in its evaluation. During the years the PCI was implemented—and even nowadays—governmental organizations reported successful statistics while the opposition in the media presented it as a failure. To make an objective evaluation of the program researchers usually collect their own data during fieldwork and report their experiment designs and the validity of their results.

The evaluation of the results of Argentina's PCI have been deemed "diverse and heterogeneous" (Seijo et al., 2020). In terms of device distribution the pro-

gram seems to have been objectively positive in the first few years. According to Minister of Education Alberto Sileoni, within the first year of the program's implementation, the laptop was recognized as the first technological device in 29 percent of households belonging to students' beneficiaries (Ministerio de Education, 2012; as cited in CONICET). At the same time, according to the National Survey on Access to ICT (ENTIC) conducted at the end of 2011, 52.8 percent of Argentinean households possessed a device, as opposed to 46.9 percent the year before (INDEC, 2012; as qtd. by CONICET, 2013). However, the Center for the Implementation of Public Policies for Equity and Growth (CIPPEC) presented a study showing that in 2015 investment in digital education fell significantly, fell again in 2016, rose slightly in 2017, and fell to its lowest level in 2018 (Matias de Santi, 2019). According to data retrieved from the National Treasury, the number of laptops distributed in 2015 was 443.192 compared to only 49.980 in 2018. Additionally, regarding connectivity, the article by Benitez Larghi and Zukerfeld report that 43 percent of students assisted by the PCI stated that their schools never had Internet connectivity, while 57 percent declared that Internet services never or almost never worked in their schools (Seijo et al., 2020).

In terms of educational achievements and improvement in learning and teaching strategies, there is a lack of studies examining the PCI's impact on academic achievement. However, Alderete and Formichella (2016) propose the use of propensity score matching (PSM) to examine whether the difference in average academic achievement in the PISA tests of 2012 between PCI beneficiaries and non-beneficiaries appears statistically significant. Despite finding higher grades obtained by students of the same socio-economic characteristics participating in the PCI than those who were not, the authors report that the results do not imply a major qualitative difference in academic achievement due to the low difference in average scores between groups (Alderete Formichella, 2016). Similarly, in the evaluation of Plan Ceibal in Uruguay, any academic impact cannot be solely attributed to the program. Yet the authors claim that "the minimal impact on academic achievement is evidence that the program, though still in the early stages [by 2016], [was] not being used to its full potential" (Alderete Formichella, 2016).

Among the critiques made of the PCI, some authors make reference to the

original negligence of the OLPC, which expected a passive "ICT evangelization" through the distribution of devices, "believing it would improve the bad quality of the national education systems" (Seijo et al. 2020). In other words, the program is criticized for not supporting the distribution of devices with proper training, especially for teachers. It is worth noticing that the Plan Ceibal in Uruguay received similar critiques. Moreover, many critics point at the fact that students seemed to be more capable of operating laptops than the teachers, leading many schools to limit the use of laptops in class (Seijo et al., 2020).

While in Uruguay the distribution of laptops and educational material encompassed both the public and private sector, the PCI only covered the public system and those schools under the government's sponsorship, i.e. private schools partly subsidized by the government. This raised the question of how egalitarian the program actually was if it excluded half of the students in the country. The problem was that using private education as an indicator of socio-economic level was not a determinant of actual access to technology in the country, since many low-income families strived to send their children to private schools given the public knowledge that the public system offered a lower quality education.

Many authors have observed the intrinsically political nature of the program. Authors have claimed that every decision in the design of the program can be understood in the political dimension and context of the state policy. The best example for this is the efforts to achieve the so-called "digital sovereignty" of the program in 2013. From the beginning, the program sought to distinguish itself from OLPC, the foreign initiative, by not implementing the OX-1 laptop model and switching to a Classmate type of laptop. Even when the decision was primarily based on the lack of infrastructure needed for the OX-1 (highly dependent on wireless connectivity), it also followed the set of "anti-imperialist" policies that characterized the Kirchner administrations. Similarly, in 2013, the software was also replaced through import substitution by the nationally designed Huayra operating system. When the PCI was discontinued in 2018, it made evident the tight link between the public policy and the party politics in Argentina.

5.4 Public Policies to Mitigate the Pandemic's Impact on Education: Regional Trends in Latin America

During the pandemic, Latin America did not develop a systematized framework of response to the education crisis, compared to other regions such as the European Union. This situation made coordination extremely difficult, considering the global nature of the issue. For that reason, the International Institute of Education Planning (IIPE-Buenos Aires) launched an information platform, making public all the educational responses for each country in the region in an organized manner. This platform, the Information System of Educational Trends in Latin America (SITEAL for the acronym in Spanish), acts as a useful source of data, but it does not provide any suggestion or guidance for countries to plan their public policies in a concise manner. Thus, the public policy trends identified in the region emerged out of each country's individual needs and assessment of the situation. Among the different responses, four of them were applied most often among Latin American countries, which highlights crucial similarities and differences in public policy trends: First, the closing of schools or suspension of face-to-face learning; second the implementation of ICT for education continuity, moving to how countries addressed inequalities and vulnerabilities to finally evaluate the course of action taken regarding curriculum and testing adaptation.

Even when the reality of the pandemic varied in each state, a systematized response could have been valuable for Latin America. Considering the similarities in many policies and the clear success of countries such as Uruguay, drawing upon knowledge transfer and cooperation could have aided to face the unprecedented crisis. However, an international meeting of education representatives from the region did not occur until December 2020, under the accommodations of the regional office of UNESCO. The goal of the meeting was to learn from the challenges countries faced during the year, discussing strategies to systematize the reopening of schools the next year. Given the success of the meeting and the well-known benefits of sharing information and coordinating efforts among countries in the region, we can presume that an educational response framework for the COVID-19

could have been an advantageous tool, had it existed.

One of the first public policies adopted almost worldwide in response to the COVID-19 pandemic was the suspension of face-to-face learning. This decision was thought to be temporary, especially with the precedent of the 2009 outbreak of the influenza H1N1 which led to a slight extension of the winter break that year after a school suspension that lasted around a month for the region. Yet, the dimensions of COVID-19 pandemic were beyond comparison and soon stakeholders realized that a prompt school reopening was out of reach. According to the report from the ECLAC, 32 out the 33 Latin American countries surveyed had, by July 2020, stopped face to face instruction as a prophylactic measure to counter COVID-19 contagion (ECLAC-UNESCO, 2020, p.2). Nicaragua was the only country keeping schools open by June 2020, and yet its education was still impacted. According to the Inter-American Dialogue, 70 percent of private schools in that country remained closed for most of the year and only 40 percent of public schools' students opted to continue attending (Inter-American Dialogue, 2020).

This public policy trend was definitely present beyond the regional level, as most of the countries in the world decided to close schools at some point. However, the duration of closing is what distinguishes the region from the rest of the world because schools in Latin America remained closed for 158 days, well beyond the global average of 95 days (UNICEF 2021). The long closing period in Latin America has raised concerns among experts in the field, especially for the disparities not only between countries in the region but compared to other regions in the world. While in Latin America closing time varied from 50 percent to 90 percent, at an average of 80 percent of the academic year, the average closing time in Europe was 45 percent, 57 percent in Africa and 61 percent in Asia (Maris Estrada, 2020). The fear of a public health system collapse motivated many countries to neglect the economic and the educational impacts, yet given the comparison with other developing regions, this is not a sufficient explanation for the prolonged closure in Latin America.

The second area of public policy application was the implementation of ICTs for the sake of education continuity. To some degree, all countries implemented ICTs during the remote learning stage, yet their pre-existing infrastructure shaped

Country	Learning Platforms	Digital Content	Physical Material or Social Networks	TV or Radio	Open Schools
Argentina	X	X	X	X	
Bolivia	X	X	X	X	
Brazil	X	X		X	
Chile	X	X	X	X	
Colombia		X		X	
Costa Rica		X	X	X	
Ecuador		X	X	X	
El Salvador		X	X		
Guatemala		X	X	X	
Honduras	X	X	X	X	
Mexico		X		X	
Nicaragua					X
Panama		X	X	X	
Paraguay			X		
Peru		X	X	X	
Uruguay	X	X	X	X	X
Venezuela		X		X	

Table 5.4.1: Educational Measures by County. Data compiled by IDB's Education Division up to May 1st, 2020, updated with information from SITEAL

and limited the extent of incorporation. As mentioned before, the region's use of technologies for teaching and learning lags behind others', so finding a solution to class suspension was not as easy as in other places. Excepting countries running federal programs to grant students access to ICT devices, such as Uruguay or Chile, policy makers had to consider the relatively low access to ICTs for students coming from low income backgrounds (Only 10-20 percent had access to a computer at home) and the lack of bandwidth coverage in rural areas (ECLAC, 2020, p. 5). For this reason, a combination of primary generation (TV, radio, newspapers, etc.) and secondary generation technologies (online platforms, learning management systems, etc.) were used not only to complement virtual learning but sometimes as the main means of instruction. According to the IDB, determining the audiences that each initiative would reach and tailor the content appropriately was a key strategy for countries (IDB, 2020, p. 24). Table **??** illustrates the scope of educational measures across countries from Latin America, showing a clear trend of preference for and availability of digital content and TV or radio.

The third area of action was the focus on inequalities and vulnerable populations. This is rather a course of action than a public policy in itself; however, analyzing how well it has been applied is a pivotal part of the evaluating pandemic response in the region. As mentioned earlier, ICT access was already unequal before the pandemic and considering the economic hardships that it brought up,

accessing devices and connectivity was even harder. Even when most of the countries attempted to ensure equal access through different means, in general there was a lack of effort to coordinate policies for equal access to educational opportunities. By July 2020, only 8 of the 33 countries provided technological devices as one of the measures adopted to implement distance learning activities (ECLAC, 2020, p.3). Most of these countries had initiated these programs before the pandemic and only two of them performed it as a response to the COVID-19 pandemic.

Nevertheless, leaving aside programs that required advanced and expensive resources such as ICT devices accessing, the region did focus on guaranteeing satisfaction of primary needs usually provided in school. In remote and low-income areas, schools usually provide students with nutritious free meals . With school closure and social distancing, many feared the loss of this state support in feeding their children. In response, the majority of Latin American countries continued to operate the feeding programs. In 13 countries the food was delivered in kits to be prepared at home, while three others continued providing already-made lunches and, to a lesser extent, cash transfers and food vouchers (ECLAC, 2020, p.2). Food insecurity was likely the biggest worry in the region, and the area where countries concentrated their efforts in terms of alleviating inequalities and vulnerabilities. Needless to say, other regions focused their equality efforts in different areas according to their needs, but in general most countries made some attempt to alleviate inequality during the pandemic.

Subsequently, the fourth action taken in the educational area was the curriculum adaptation and assessment modification. Like many of the others, this course of action was not only observed but also advised worldwide. Several countries in the region proceeded to make curricular adjustments, setting guidelines to education institutions to prioritize and guarantee a minimum of content acquisition (SITEAL, n.d.). Countries such as Argentina and Ecuador took the decision to "shrink" the curriculum to teach priority content, while in countries such as Peru and Mexico, the modification endeavored to include further content on health practices and hygiene measures to avoid contagion (SITEAL, n.d.). Curriculum adjustment is one of the areas where decisions taken during the pandemic raised social concerns, as well as the canceling and postponing of evaluations. Many

countries opted for calling off annual evaluations, such as Argentina's national assessment for schools with extended school days; Costa Rica's fifth grade national mandatory assessment (FARO tests); and the Dominican Republic's national assessment for third grade students (Evaluación Diagnóstica Nacional de Tercer Grado de Primaria) (ECLAC, 2020, p. 9). Meanwhile others opted for alternative means of evaluation, such as Uruguay, Paraguay and Chile's use of formative assessments.

Among the four trends, scrutinizing ICT incorporation for education continuity relates to the argument proposed to explain the differential levels of perceived educational resilience. However, all of them contribute to some extent to the educational response and the international perception of education continuity. In particular, focusing on equity issues around education during the pandemic significantly changes the ways that countries issue public policy responses. Given the similarities and differences in the regional trends of both ICT incorporation and pandemic response in the region, one can question the reason why some countries appeared to be more effective than others in their response limiting the pandemic's impact on education.

5.5 ICT Response to the Pandemic in Argentina and Uruguay

Uruguay and Argentina have followed the regional trends of responses previously highlighted to different extents and in different ways. With the schools closing in both countries, the ICT responses played a pivotal role in education continuity. Previous infrastructures and incorporation efforts proved beneficial for Uruguay, while Argentina had to address the profund digital divide in the education system, i.e. the gap between those with access to technology and those who did not. Thus, concerns about equity emerged differently in both countries, leading to a different course of action, as presented in this section.

On March 14, 2020 Uruguay suspended in-person education due to the outbreak of the COVID-19 pandemic. Initially, it relied on the already-established Plan Ceibal to facilitate education continuity through the use of ICT. As men-

tioned before, the plan's coverage and historical implementation facilitated the transition. Some aspects of the Plan gained more popularity during the pandemic under the initiative *Ceibal at home*. For example, the digital platform CREA served as a digital repository for teaching materials, assignments and activities for teachers as well as a teleconferencing platform similar to Zoom or Google Meet. According to the Ceibal statistics, the number of CREA users increased from 270,000 at the end of 2018, to 690,000 by June 2020 (Plan Ceibal 2020; UNICEF, 2021) Additionally, UNICEF highlighted the importance of the CREA platform in Uruguay after reviewing the systematic incorporation of the platform across the experiences described by teachers who participated in their study (UNICEF, 2021).

Another public policy response to the pandemic that engaged ICTs was related to connectivity. Prior to the pandemic, the Uruguayan government covered 1 GB of internet for each person living in households that were recipients of the assistance plan Universal Hogares. This plan benefited low income households recipients of other social benefits distributed by the state. During the pandemic, the government struck a deal with the provider Antel, to extend the benefit to a free 50 GB per household (Telemundo, 2020). Additionally, they achieved a zero cost traffic on the CREA platform as well as other education resources from the Plan Ceibal such as PAM and Matific and Biblioteca Pais (Plan Ceibal, 2020).

In terms of systematic guidance for teachers and educators, the General Direction of Initial and Primary Education (DGEIP) issued several guidelines on how to employ digital technologies for education. In the first set of documents, the goal was to guide teachers to enhance personal relationships between them and the students in spite of the distance. The second set of guidelines emphasized purposeful engagement of ICT for syllabus development, content prioritization and resources for teachers during the remote learning. In addition, over 170,000 teacher training modules were available through Ceibal at home, with a satisfaction rate of 92 percent of teachers that felt more prepared to integrate ICTs after the training (Ripani, 2020). The training emphasized the importance for teachers to actively foster communication with their students and their families as a crucial part of the education process (UNICEF, 2020).

Parallel to improving remote learning, Uruguay began to strategize the return to in-person learning to address underlying inequalities. Even though the access to ICTs in Uruguay was generally high compared to other countries in the region, socioeconomic inequalities remained at play within the country. According to the results of the 2019 Survey on the Use of ICT (EUTIC), while 95 percent of the most wealthy households had access to the internet, only 84 percent did in low income households (EUTIC, 2019, p.13). The same survey revealed that 1 every 5 households were recipients of the Plan Ceibal, but there were still 32 percent of respondent households that had no access to a digital device other than a phone. Thus, the reopening was meant to happen in three stages and as a completely voluntary process. The 22nd of April, the reopening of schools began in rural areas where the levels of access to digital technologies and connectivity were the lowest. Following the success of the initial returns, Uruguay announced the return to in-person learning for the whole country on May 21st, which was meant to happen gradually and over three stages monitored by the Ministry of Education. The IDB praised the opening plan for "leaving room for flexibility" because overall, the stages the integration and utilization of ICTs were laid out to optimize hybrid learning opportunities (Perez Alfaro, 2021).

On the other hand, the pandemic found Argentina less prepared than Uruguay to integrate ICT into the education system to facilitate remote learning. Because Argentina discontinued the initial PCI distribution of digital devices, access to ICT was more limited. The national household survey revealed that for people aged 4 to 17, only 43.7 percent had access to a computer at home, 63.7 to a mobile device and 78.8 to internet connectivity (INDEC, 2019b). With the suspension of in-person classes established on March 15th, the government had to issue a response to the unequal access to digital devices. Although they attempted to address the digital divide in May, their actions were not visible until August, over five months later. In May, the government announced the launching of the Plan Juana Manso, attempting to re-establish the initial goal of the PCI and working towards bridging the technology gap for students in the public school system. The Ministry of Education claimed to have found 147 thousand laptops in storage that would help address the digital divide. However, it was criticized for only

distributing 4,780 laptops by August (Braginski, 2020). More than a year after the initial lockdown, by May 2021, the government claimed it would distribute 633,000 laptops (Arg.Gov May, 2021).

In terms of connectivity, Argentina struck a deal with ENACOM, the public telecommunication agency, to offer free internet access to the Educ.ar platforms (CAF/ECLAC, 2020). In addition, the government released a national mandate declaring connectivity services under the "essential" category and forbidding private telecommunication providers to suspend the service on clients due to the delay or lack of payments (Argentina DNU 609/2020).It also offered different prices to the beneficiaries of the Asignación Universal por Hijo (AUH), where low-income parents receive a monthly stipend per child in school age.

For those students with ICT access, their education continued through the use of the Educ.ar platform, which originated during the first stage of the PCI. The first week of lockdown, the government uploaded multiple resources to the platform to aid teachers in planning the digital lessons (Cardini et al., 2021). At the same time, Argentina began articulating educational continuity through the plan *Seguimos Educando*—or *We keep educating*—which took advantage of the generalized access to primary generation ICT such as the TV and the radio to increase educational content (SITEAL, 2020). Although it came to be later in the pandemic response timeline, at the beginning of October, the government also launched a Whatsapp communication line to support students that relied mostly on smart phones to continue learning. The line presented students from different levels with educational activities. Figure 5.5.1 shows the conversation between the digital assistant and a student answering multiple choice questions and receiving feedback.

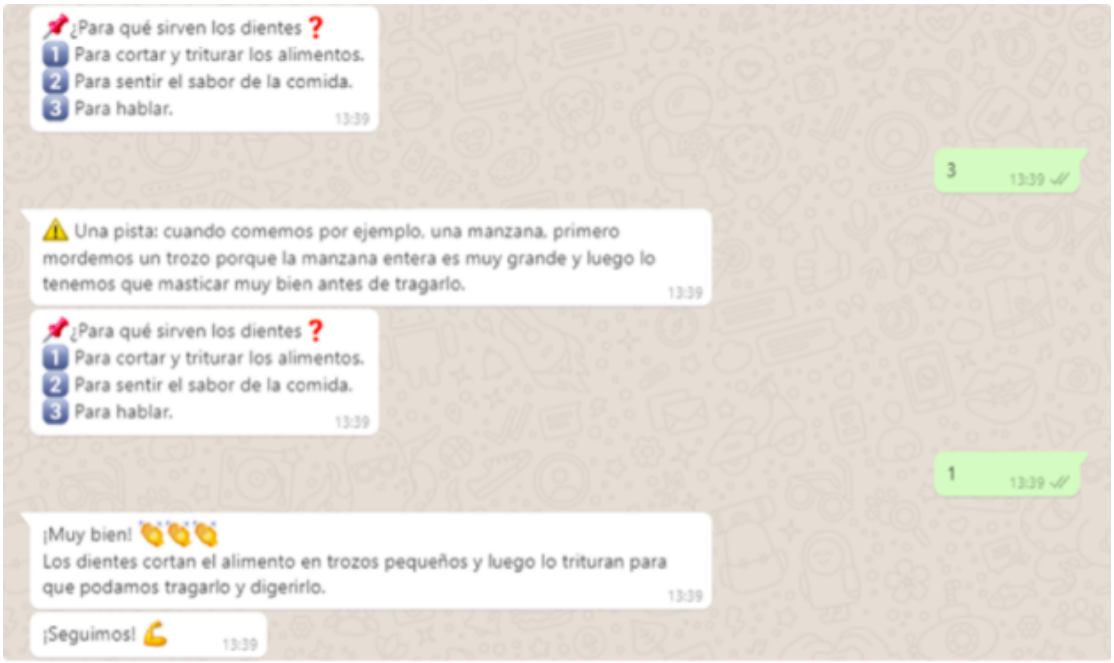

Fig. 5.5.1: Sourced from Argentina's Government Communications, October 1st, 2020 Link In the conversation held in Spanish, the digital assistant asks the student about the specific use of teeth, providing a clue after a wrong answer and the educational statement after the correct one.

Argentina provided guidance to teachers through the national digital platform for teacher education (INFoD), which was already established (SITEAL, 2020). Days after the beginning of the quarantine, Minister of Education Nicolas Trotta announced the launch of 20 new teacher trainings that aimed to strengthen teachers' confidence on incorporating ICTs for teaching (Argentina.gob.ar, 2020c). Another way the government provided support to teachers and educators was by attempting to address the lack of access to computers. By the end of July, the government set up a special loan in the National Bank that educators could take with a differential interest rate , exclusively to buy digital devices (Argentina.gob.ar, 2020d). Approximately 55,000 teachers accessed the loans, accounting for 5 percent of educators in the country, a great achievement considering that around 90 percent of teachers had access to a computer before (Cardini et al., 2021). However, the initiative still raised criticism equally from teachers who had their loans denied because they did not qualify, and from unions that believed the government should have provided free access to the devices (Braginski, 2020b).

5.6 Achieving Educational Resilience

As stated in Chapter 2, the pivotal connection between education and global competitiveness should have made educational resilience a goal for all countries. ICT incorporation and optimization during the school closing periods should have been the primary avenue for countries not only to achieve education continuity but also to display it. The next chapter attempts to explain the differential perception of educational resilience in both countries through situating the patterns of ICT incorporation explored in this chapter in contrast with the perception that International Organizations exhibit during 2020. Additionally I explore a possible alternative to the differential perceptions observed in Argentina and Uruguay.

CHAPTER 6

Explaining the Perception of Educational Resilience in the Southern Cone

Argentina and Uruguay shared similar trajectories in terms of Information Communication Technology (ICT) incorporation in the education system yet have different levels of perceived educational resilience. Chapter 4 revealed key political moments where both countries diverged in their paths, as well as the different responses each proposed to the educational crisis provoked by the pandemic. Based on the studies regarding the significance of ICT for development and education in particular for the Southern Cone, I posited that previous patterns of ICT incorporation would shape the perception of educational resilience of Argentina and Uruguay in 2020. Educational resilience encompassed a quantity aspect— number of instruction days) as well as a quality component. At the time of writing this thesis, the learning losses have not been quantified[1], which is why I engaged with the *perceived* educational resilience, illustrated by statements from international organizations.

Exploring these patterns matters due to the light they can shed on crisis management for the sake of educational continuity. International organizations employ global experts to research and recommend the best policy or course of action for countries to take in unprecedented times. When these experts choose to highlight or criticize states' endeavors, it speaks not only to their performance in the current situation but also to their global competitiveness. This is even more crucial when

[1]The amount of instruction days and other school closing parameters are available yet they do not reveal the quality of education provided during each instance.

it comes to education-related responses due to the role that human capital plays in the knowledge economy. In other words, a perception of educational resilience —or lack thereof—comprises the country's future in terms of global competitiveness.

The goal of this chapter is to review the different levels of perceived educational resilience for Argentina and Uruguay to analyze whether they seem to be motivated by the differential patterns of ICT incorporation into the education system before and during the pandemic. Section 5.1 explores this causal pathway, while Section 5.2 offers an additional layer to the explanation: the differences in perceived educational resilience could be motivated by different understandings of what the government should do to achieve it. This is illustrated with the analysis of the rhetoric each country's leader employs to highlight their educational efforts during the pandemic. Finally, Section 5.3 concludes the chapter bringing together the insights offered in the previous sections.

6.1 ICT Responses and Perceived Educational Resilience

In the midst of the pandemic, it became clear that some countries in the Latin American region were containing the effects of the pandemic more effectively than others. During the second half of 2020, Uruguay was highlighted internationally for its rapid response in testing and implementing prophylactic measures, which led the country to record only 42 deaths and 1,527 infections[2] by September 2020 (Taylor, 2020). These numbers were astonishing in the international context because at the same time Brazil and Argentina recorded almost 638.46 and 280.64 deaths per million people (Our World in Data, n.d.). The Uruguayan case was praised as "the regional hope" by health experts such as Marcos Espinal, from the Pan American Health Organization (PAHO), who also suggested that the country could offer "vital lessons for the rest of Latin America" (Taylor, 2020). Certainly, much of Uruguay's success can be explained by its relative geographic isolation

[2]I triangulated the results with 2022 data coming from the COVID-19 Data explorer from Our World in Data. By the time the article cited was published, Uruguay recorded 4.8 new cases and 0.04 deaths per million people. With an estimated population of 3,747 million people, it accounts for around 18 thousand cases and 138 deaths. It is possible that the total number of cases and deaths was unknown when the article was published.

and reduced population size (3,747 million people) which may naturally halt the spread of the virus. However, many pointed at a fast and cohesive response from the government as one of the main factors for Uruguay's international recognition. Fiona Mackie, regional director for Latin America and the Caribbean at the research firm The Economist Intelligence Unit, believed that the levels of social cohesion, the government's popularity and the effectiveness of political institutions determined Uruguay's success compared with the rest of the region (Crabtree, 2020). The lack of an official lockdown paired with high levels of social distancing exemplifies people's trust in the government's recommendations.

Uruguay's success in mitigating the effects of the pandemic influenced their education system. While countries such as Peru, Argentina, Chile and Colombia kept their schools closed for most of 2020, Uruguay resumed in-person lessons in June of that year. However, with only 29 percent attendance, many students relied on digital tools to complete their studies. Due to the previous implementation of ICT initiatives for education, such as Plan Ceibal, 77 percent of students had connectivity and devices to participate in class remotely (UNICEF Uruguay, 2020). Experts from the World Bank stated that prior experiences with distance learning had led countries to establish rapid educational responses, recognizing Uruguay for both the Ceibal-at-home initiative as well as the use of the pre-established learning management service to monitor student learning (Barron Rodriguez et al., 2021). Similarly, IDB experts praised Uruguay's ICT response calling it "the most prepared [country] for remote learning" in the region (Arias Ortiz et al., 2020).

Following the guidelines from international organizations such as UNESCO, UNICEF and the WHO, Uruguay sought to minimize learning losses by strategically planning both curriculum modifications for remote learning practices, as well as sanitary measures for in-person lessons. In order to reach out to those students without connectivity, Uruguay designed a four-stage plan for the reopening of schools that began in rural areas that were less populated and with less ICT access. These factors led to the country's educational response to be recognized as "yielding successful outcome" from international entities such as the World Bank (WB Press Comunnication N. 2021/121/LAC).

Moreover, both UNICEF and IDB experts praised the support and training system for teachers put in place. UNICEF highlighted the coordination among teacher unions and within different institutions in order to unify remote educational efforts ensuring that the amounts of work assigned to students was sufficient but not excessive or overlapping (UNICEF, 2020) The study also praised the efforts the Uruguayan teachers made to involve families in the education process, especially in primary education. These Uruguayan teacher endeavors were highlighted by IDB experts who additionally recommended other regional teacher training to focus on the pedagogical use of technology (Arias Ortiz et al., 2020)

Meanwhile, the response from countries like Argentina was criticized for its poor performance in containing the pandemic. The government imposed strict measures in March 2020, even before the virus was detected domestically, and tightened restrictions when the first cases appeared. Harsh measures included police-enforced lockdowns, border closures, cancellation of flights and long-distance buses, and the mandatory use of face masks. This is probably why the pandemic seemed contained during the first half of the year earning international praise (WHO, 2020). In June 2020, the New York Times included Argentina on its list of countries that provided the best global responses to COVID-19. Yet during the re-evaluation of the list in February 2021, the author regretted that decision because "the government did not develop a strategy beyond imposing a long and strict lockdown (...) [that] now makes it difficult for the country to reimpose it if cases begin to rise rapidly" (Bremmer, 2021). When Argentina hit its peak case load in October, the population was exhausted from the previous isolation and refused to passively obey. In fact, a survey conducted during the first weeks of lockdown revealed that 33 percent of the ten thousand participants were already exhibiting depressive symptoms (Torrente et al., 2021). At the same time, the already fragile and neglected economy could not afford another stay-at-home mandate. The rise of poverty levels to 42 percent was but one of the consequences of months of economic inactivity, especially for the informal sector that stood as 46 percent of the total population employed (Romero 2021).

With regards to education, Argentina's performance has been deplorable. Argentina's schools were closed for 185 days, which exceeds the regional average

(Levy Yeyati, 2021). First, Resolution 103/2020 from the Ministry of Education established that upon detecting a positive COVID-19 case among faculty, staff and students, education establishments should close and suspend classes for 14 days. Then Resolution 108/2020 took a definitive decision, making the home-stay order mandatory. This granted the public health system time to prepare for the sanitary crisis while forcing the education system into an almost immediate transition into virtuality. President Alberto Fernández kept extending the quarantine mandate with announcements scheduled approximately every 14 days. Neither he nor his team addressed the educational crisis in public and a reopening plan for schools was not even discussed until the end of the school year. This situation presented a particular challenge to the most vulnerable student sector of the population due to the lack of access to digital devices, reliable connectivity or both.

The sudden transition to remote learning put around 1.5 million students at risk of dropping out due to their exclusion from active remote learning. Those numbers are deeply concerning, considering that Argentina already presented one of the highest high school dropout rates of the region, with only 48 percent of students completing their education (ACDI, 2020). The challenging digital divide forced the government to quickly address the issue. On one hand, Argentina's effort to incorporate educational TV programs to reach out to students without internet or digital device access was praised by World Bank experts, as a complementary response that addressed the digital divide (Munoz-Najar et al., 2020). On the other hand, Fernández offered to distribute 663,000 laptops across the country, focusing on the areas where the attendance had most sharply decreased (Alcoba, 2021). Yet, this project took months to deploy and even the full number of expected recipients represented approximately a third of students in need of ICT access. In fact, IDB experts stated that "the range of emergency digital responses in the country was insufficient" during the pandemic (Cardini et al., 2021). Indeed, Argentina's and Uruguay's efforts brought forth a divergent set of perceptions and opinions coming from international organizations. These institutional observations helped to construct the differential perceptions of educational resilience for both countries, and therefore their global competitiveness during moments of crisis. Although it is possible that the experts aforementioned

may have personal subjectivities, the institutional backing of their claims makes them extremely relevant to the overall shaping of any state's identity. In general, Uruguay's pre-pandemic infrastructure and public policies seem to have given it the upper hand. Due to neglecting the PCI in the last years, Argentina faced more challenges implementing remote learning strategies, which diminished its educational resilience.

Needless to say, other factors such as the economic situation, divided public opinion of the government and weakness of the health system contributed to the difficulties. Yet, ICT incorporation and adaptation strategies seem to have been a crucial parameter in the way educational resilience has been understood. But to what extent? Chapter 4 revealed that once the pandemic hit, Argentina and Uruguay implemented strategies that were similar in nature. Although the timing and the efficacy of these responses differed for both countries, both provided teacher training, a sovereign digital platform to coordinate public education efforts, subsidized connectivity, etc. The main difference between them was the way in which they addressed educational resilience. With the digital divide being the main obstacle for education in both countries, Fenrandez' government implemented measures to make ICT available for both teachers and students. Argentina understood educational resilience as the success of remote learning. Uruguay instead, dealt with their digital divide by quickly formulating a re-opening strategy. President Lacalle Pou's government understood educational resilience as the implementation of a hybrid strategy that accommodated most of the needs. How were these different perspectives on educational resilience further visible? How did Argentina and Uruguay's own perception of educational resilience affect their identity as well as their perceived global competitiveness?

6.2 Discourse as an additional layer of analysis

In order to further explore the different perceptions of education resilience between Argentina and Uruguay during the pandemic, I present an additional layer to the analysis, rooted in the perspective that the leaders of both countries displayed regarding education. In particular, the way the presidents advanced educational

responses with their discourse and rhetoric may illuminate their understanding of educational resilience and the international perception of educational resilience of the country as a whole. Juxtaposing the leader's rhetoric with the generalized international perspective may shed light on another factor that might have influenced the perception of education resilience for both countries: school reopening plans and hybrid teaching.

During 2020 and at the beginning of 2021, a central point of tension globally was the strategy for reopening schools, and Latin America was no exception. Leaving aside the case of Nicaragua, the only state that never enforced a lockdown or a closing of schools, all the countries in the region opted for interrupting face-to-face instruction at some point during the pandemic. Thus, planning for an efficient re-opening became a priority for the governments in the region. However, it also raised many questions about how, when and where to re-open given the pervasive and relentless nature of the pandemic. School closures were one of the most contested public policies given the negative impacts that the interruption imposed not only for students and teachers but for households. In fact, it is not an exaggeration to affirm that this particular decision affected society as a whole directly or indirectly. For that reason, it is only logical that contrasting views would arise for such a policy. Even when they have not been clearly established as such, one could identify the following three contrasting views:

First, we can find what I have denominated the Health Prioritizing perspective. Those who align with such a perspective believe that prioritizing health implies reducing contagion opportunities to the maximum. For such a reason, schools should close and remain closed until the pandemic is contained and overcome. Government officials that align with said point of view usually would favor lockdowns and other prophylactic measures regardless of their economic impact. Such is the case of Argentina's and Paraguay's president Alberto Fernandez and Mario Abdo Benitez who not only kept the schools closed during the full academic year of 2020, but also opted to close schools in April 2021 after only a couple of weeks of face-to-face instruction. Another reason to align with this perspective lies in the inadequacy of school conditions to maintain student safety. In fact, many parents believe that sending their children to school would be exposing them to

greater risks of contagion due to the lack of prevention infrastructure and prefer to remain on virtual learning modalities. This is not inaccurate considering that in Latin America and the Caribbean, 1 out of 6 schools (16 percent) do not have water services at all and 1 out of 5 schools (almost 20 percent) do not have any hand-washing facilities (Uribe Aasen, 2021).

While dealing with the second wave of the pandemic, the concern of a fragile healthcare system and an unprepared school infrastructure were completely valid reasons to keep school closed for both leaders and citizens in the region. However, the perspective was contested by many international organizations because in reality schools have little to do with the rise in COVID-19 cases. According to the World Health Organization (WHO), kids and adolescents that are less than 18 years old only represent 8 percent of the global COVID-19 cases during 2020, even while constituting 29 percent of the world's population. (Castillo, 2021). UNESCO, UNICEF and other recognized organizations actively advocated for the return to in person classes. Without scientific support, the health prioritizing perspective seems to lack foundational evidence, and yet it does not diminish the social traction it acquired in 2020 rooted in fears and anxieties.

Second, we can identify a perspective driven by the psycho-social impact concern. Many experts remain concerned about the psychological effects that the lockdown, the isolation, and the economic situation during the pandemic has caused in almost all individuals, especially those who are more emotionally vulnerable like children and adolescents. In fact, UNICEF recently called upon national health authorities after it reported results obtained after surveying participants aging from 13 to 29 from nine countries in the region that an alarming 73 percent of the subjects have felt the need to ask for help concerning their physical and mental well-being but only 40 percent actually did it. Furthermore, extended quarantines in overcrowded conditions have been found conducive to intensifying domestic violence and abuse that affect children physically and/or socio-emotionally. (The Inter American Dialogue, 2020). Increased levels of anxiety, stress and depression among youth is not only a parental concern,but is also correlated with an increase in damaging behavior such as drugs and alcohol consumption or even involvement in criminal activities. One of the main representatives of this perspective is Clau-

dia Uribe, director general of the Regional Office for Education in Latin America and the Caribbean from UNESCO, who has pronounced several statements favoring the reopening of schools with arguments rooted in psycho-social concerns (Uribe, 2020).

Third, is the perspective of those concerned with the exacerbation of inequality occasioned by the closing of schools and the transition to remote learning. Considering that less than 30 percent of the most vulnerable high school students in Latin America have access to a home computer to do their homework, it is not a surprise that virtual education measures do not reach everyone (IDB 2020). The Inter-American Dialogue goes beyond, by phrasing this concern in terms of other basic needs satisfied by the school such as feeding programs, basic nutrition plans and reproductive health, that were interrupted under the circumstances (The Inter American Dialogue, 2020). However, the concern encompasses not only the current situation, but also the future progress and educational attainment compromised by the pandemic at both the individual and state level. In fact, the World Bank presented a report warning against the prolonged closing of schools given that the estimated loss in human capital and economic productivity would result in excessive economic costs: "Learning losses may translate into an aggregate economic cost of foregone earnings of US$1.7 trillion lost (at 2017 PPP) for a ten-month duration of school closures" (World Bank, 2021, p.9). Of course, such losses will correspond to the diminished expected social mobility for educated students coming from low-income backgrounds, who will see their opportunities reduced compared to those of their wealthier peers who were able to continue studying remotely.

Although three perspectives have been delimited, the perspectives on school closing can be understood as a spectrum that helps identify what guided the actions of leaders and institutions during the pandemic. Although the Argentine president, Alberto Fernandez seems to align more with the health prioritizing perspective, it is harder to determine the perspective of Uruguayan president, Luis Lacalle Pou. During 2020, he seemed to align more with the second and the third perspectives that encouraged open schools but it was not as clear cut as that of Fernandez'. Contrasting these leaders' political ideologies with the way

they spoke about the educational situation in 2020 presents interesting patterns. While Fernandez perpetuates the kirchnerista political ideology, Lacalle Pou is identified on a center-right political spectrum. According to the historical public policy trends in Latin American, leftist governments tended to pay more attention to public education, yet this does not seem to be the case in either Argentina or Uruguay. Using social media research engines, I retrieved comments that both leaders published in their accounts during 2020 that exemplified their rhetoric with regards to education during the pandemic. Additionally, looking at the published speeches that both leaders gave either directly addressing the education crisis or completely neglecting it during key moments, one can also gain insight on their perspective through the narrative they presented. A summary of the key findings can be observed in table 6.2.1. In comparison, Fernández had more of his public statements available both in social media and speech records compared to Lacalle Pou, but 5 communications were selected for each leader.

Date	Luis Lacalle Pou	Date	Alberto Fernandez
May 21	Announces the return to in-person classes strategy. The return was meant to be undertaken voluntarily and in three stages by the month of June. "We are taking this decision because we are convinced that the risk is minimal. We wouldn't be doing it otherwise"(Infobae, 2020)	April 25	Announcement of the extension of the lockdown. The president did not make explicit mention of the school closing but thanked "the little ones" for staying at home, protecting the health of the elder. "Keep trying to *train* yourselves at home (...)" he recommended to the youth. The specific word choice of *train* as opposed to *educate,* seems to hint at an awareness of the diminished educational processes during the lockdown. (Casa Rosada, 2020a)
June 25	Press conference speech. He qualified the lockdown as "the easy response" and pointed that it was "against his beliefs of individual freedom". He highlighted the success of returning to in-person learning, especially for rural schools where the digital divide was a great concern. He denounced the "false dichotomy between health and the economy" expressing his concern for "mental health" and the increase in mental issues during the quarantine period. (CED Uruguay, 2020)	June 20	Speech during Argentina's Flag Day. On this holiday, 4th grade students across the country pledge allegiance to the flag. The speech does not address the school closing situation, the learning crisis or a possible return. (Casa Rosada, 2020b)
July 12	Lacalle Pou justified the enactment of the Urgent Consideration Law by explaining the positive changes it would bring to education among other factors he presented in a Twitter thread. He promotes the enactment of the law because it will "strengthen educational establishments' ', legally back up the Teacher Education Council, and create a system of national scholarships for universities. The law received huge backlashes from the popular sectors, criticized as "neoliberal". (Lacalle Pou, 2020a)	July 18	Press conference along with Buenos Aires' governor and the Autonomous City of Buenos Aires' mayor. Fernandez speaks about the "new normalcy", praises the lockdown, comparing Argentina's situation with the crisis in the Basque Countries. He makes no mention about the education system. (Casa Rosada, 2020c)
July 22	Press conference about the increase of COVID-19 cases in different infection focuses. He claimed that even though the contagion was increasing the re-opening guarantees achieved until then, were not going to change. (Lacalle Pou, 2020b)	July 31	Speech directed to the argentinean youth asking them to avoid social interactions. He based his request on the "solidarity" they should display to the elder that have a greater fatality rate from COVID-19. He "summoned" all argentinians to "avoid spreading the virus as well as getting infected with the virus" He expressed that it was not a matter of "civic liberty" but rather of solidarity. (Casa Rosada, 2020d)
September 22	Speech for the General Assembly in the UN. "Our country's answer to the pandemic (...) was based on our citizens' use of their liberty with responsibility, solidarity and generosity, which in addition to a robust and resilient health system has allowed us to return to work, educational and cultural activities." (Lacalle Pou, 2020c)	August 28	Announcement of the extension of the quarantine restrictions. "It has been almost 100 days of quarantine, I know it is tough (...) for those of us who cannot send their children to school and the kids that stay at home, it is hard for all. Yet I am convinced that the quarantine avoided a sanitary collapse like happened in many countries and cities around the world" . (Casa Rosada, 2020e)

Fig. 6.2.1: Table comparing speeches and public communications from the presidents of Argentina and Uruguay

Some consistent patterns that can be perceived in the Fernández discourse is the international comparison he brings up regarding the pandemic management. This could be because during the initial stages of the pandemic, Argentina's lockdown was internationally praised for prioritizing health as opposed to the economy.

Headlines such as *Argentina Is Showing the World What a Humane COVID-19 Response Looks Like* and the inclusion of the country among those with best responses to the pandemic in the first edition of the Times' publication may have incentivized the use of international comparison in Fernandez' discourse (Sugarman, 2020; Bremmer, 2021). However, the initial praise rapidly turned into critique when the strict lockdown proved to be an inefficient strategy to deal with the impact of the virus, damaging the economy senselessly. Similarly, the fact that the president did not address the school closing or announce a reopening plan during key moments further confirms that he upheld a health prioritization mindset. The consequential neglect of education in his communications, although justified, is consistent with the low levels of educational resilience observed for Argentina.

On the other hand, Lacalle Pou's speeches kept highlighting "individual liberty" and responsibility as a factor determinant of Uruguay's success. This particular pattern aligns with his political ideology, even though the president explicitly stated that his response to the pandemic was "independent from his political ideology" in his June 25th speech (Fundación Libertad, 2020). Additionally, the fact that the return to in-person classes was strategic and voluntary came up in many of his communications. His June 25th speech particularly aligns with the second perspective presented, which shows concern for the mental health repercussions of lockdowns, but this pattern cannot be identified in the wider range of his speeches. The mention of the successful response to education is consistent with the perception of education resilience previously observed. Naturally, the health prioritization perspective opposes the other two mentioned and such conflict spreads social unrest among wide sectors of the population. Interestingly, after a whole year of pandemic management, both leaders achieved an abysmal difference in public support levels. On February 1st, only 38 percent of Argentines approved Fernandez' management against the coronavirus while 75 percent of Uruguayan citizens qualified the government's actions during the pandemic as "good" or "very good" (Ospina-Valencia, 2021; Cifra, 2021).

The rising tension was visible during the April 2021 protests that took place in Argentina. Although they happened outside the scope of this study, it is worth mentioning them because they illuminate the social tensions created by the con-

trast of both perspectives. The protest occurred across the country in response to a sudden contingency mandate that President Fernandez attempted to enact at the beginning of April 2021. After the COVID-19 cases nearly tripled from March to April in Buenos Aires (where around 40 percent of Argentina's population live), the president ordered the suspension of face-to-face instruction (among other restrictions) until the 30th of April, facing wide backlash across the media, the opposition and civil society. The Federal Justice and the opposition mayor of the City of Buenos Aires (CABA), Rodriguez Larreta, rejected the measures, taking the case to the Supreme Court of Justice which granted the reopening of schools. However, the resolution was adopted unequally across the districts, while the rest of the province of Buenos Aires saw in-person classes suspended for almost two weeks. Meanwhile the president vocalized its rejection of the legal determination, calling Argentinean Justice a "mamarracho", i.e. a mess or a disarray. Given the political and social repercussions brought up by the situation, it is important to understand the perspectives we have identified before to clearly see the motivations and fears of the actors in situations such as the Argentinean case.

Meanwhile, Uruguay also faced public backlash to some of the education responses taken by the government but they were not related to school reopening. The proposal and following approval of the Urgent Consideration Law (LUC) sparked social discontent around many of the educational measures proposed. With the approval of the law, the month of August saw an increase in protests coming from teacher unions that went on strike (TeleSur, August 2020). The protesters were particularly concerned with the modification of the concept of national education, erasing the word public from the LGE, which signaled the "desire for privatization" according to the protesters (Peoples Dispatch, 2020). Then, although some education responses were challenged, the school reopening decision of the Lacalle Pou administration was overall approved, mainly due to its voluntary nature.

Hence, although both governments faced different degrees of public backlash regarding particular education policies, the Argentinean case speaks of challenges specifically brought up by the pandemic, while in Uruguay, the social manifestations were rooted in traditional political ideology discordance. The government's

rhetoric in both countries add another lens to the analysis of educational responses as well as the perceived educational resilience.

6.3 Wrap-Up

The previous sections highlighted key differences in the ways educational resilience was perceived both externally and internally. On one hand, Section 6.1 revealed the high standing of Uruguay by international organizations (IOs) compared to Argentina in terms of perceived educational resilience. On the other hand, Section 6.2 added a different lens on the way educational resilience was perceived, by looking at the government discourse on education and their responses to the crisis. All in all, **the analysis reveals that the perceived educational resilience during the pandemic was somewhat determined by the ICT response of the countries, but it is also consistent with the government attempts to re-establish in-person teaching**.

All the policy recommendation documents coming from international organizations reviewed for this thesis highlighted the importance of developing a sustainable integration of ICT in the education system. Yet, they also pointed at the importance of human interaction for learning processes. Similarly, they emphasized the importance of upholding education as a universal human right that the state had to guarantee to all their citizens, raising concerns about differential access to ICT. For example, UNICEF highlighted the importance of guaranteeing equal access to ICT because they represented equal access to education during the pandemic. Back in May 2020, UNICEF Argentina released a press statement concerned about metrics that revealed the digital divide in different socio-economic sectors: among recipients of the AUH, 28 percent studied without internet access and 53 percent without a computer (UNICEF, 2020). The return to in-person classes was favored by the organization, claiming that other countries had begun the formal reopening process or were finalizing their strategic planning with that aim. Although Uruguay was not mentioned explicitly, the experts were certainly referencing it as a regional pioneer. Similarly the World Bank recommendations issued during 2020 proposed three phases to deal with the pandemic's impact on

education (Munoz-Najar et al., 2020). Phase two stands for *Managing continuity*, where the authors recommend countries to ensure that schools reopen safely, minimizing drop-outs and recovering the learning opportunities lost during 2020.

Clearly, ICT availability was crucial during the pandemic and yet not sufficient to guarantee effective remote learning. Whereas Argentina focused their efforts on minimizing the possibility of contagions with policies that improved remote learning, Uruguay took a step further, strategizing the gradual return to in-person learning. This approach aligned with the one IOs advocated for countries to pursue when countering the detrimental effects of the pandemic on education. The presidential public communications show whether their administration purposefully pursued educational resilience in an integrated way or otherwise. Thus, the differential approaches and actions may explain where the differential levels of perceived educational resilience of Argentina and Uruguay come from.

CHAPTER 7

Conclusion and Future Work

Decades ago, a novel tool introduced as the *Internet* first allowed people around the world to communicate information quickly and effectively, regardless of distance. During 2020, it proved vital when the COVID-19 pandemic disrupted the lives of virtually every person on Earth, exacerbating the need to access and understand Information Communication Technologies (ICT). The global health crisis also led to an educational one, forcing countries to respond through public policies that sought educational resilience for their national systems. Succeeding in this endeavor could guarantee the preservation of human capital, a key aspect of global competitiveness in the years to come. The review of scholarly literature on the way global competitiveness is understood within the knowledge economy, and the benefits that ICT provides to those ends, especially for Latin America and the developing world, led to the conception of this study. This thesis aimed to understand the role that ICT took in the international perception of educational resilience, looking particularly at the Southern Cone. Although I hypothesized that pre-pandemic ICT incorporation policies would determine each country's educational resilience, the relationship between ICT and resilience proved to be much more complex.

For the purpose of this thesis, I used a combination of regression analysis and process tracing in the form of case study comparison to address the limitations each used presented. My efforts to combine both sought to present results as accurately as possible on a salient topic with huge societal consequences. First, I based the statistical analysis after previous studies measuring ICT impact on education, as well as complementary mechanisms unique to the pandemic situation. I compiled cutting-edge data sets coming from recognized international sources and

used them to calculate estimates on ICT incorporation levels, COVID-19 impact and educational resilience for 50 countries. However, the regression models yielded unsatisfactory results. Although the univariate regression observed a positive and statistically significant correlation, the more complex models presented a negative correlation between the dependent and independent variable that led me to question the internal validity of the results. In general, these findings demonstrated the centrality of economic development when measuring the relationship between ICT incorporation and perceived education resilience. Future research could take advantage of the estimation strategy proposed, but incorporate higher quality, more insightful data that was not available at the time of writing. Moreover, disaggregated data that allows us to measure the impact of ICT on educational resilience at the school or individual level could add confidence to the study.

Second, I tested my hypothesis specifically for two countries in the Southern Cone that had presented clearly differentiated levels of perceived educational resilience during the pandemic. Informed by my experience living in Argentina in 2020, I compared the country with Uruguay in terms of ICT incorporation patterns previous to the pandemic, as well as ICT responses in the midst of it. I also highlighted regional trends to situate their policies in the Latin American context. In doing so, I put together the political history of a particular ICT incorporation policy that shared many features across countries: the One Laptop per Child initiative, that would become Plan Conectar Igualdad (PCI) in Argentina and Ceibal Plan in Uruguay. The ICT responses employed for education during the pandemic were highly associated with the degree of maturity of these programs in the national context. However, ICT maturity alone did not explain the differential levels of perceived educational resilience for these countries.

Taking into account the rhetoric present on the administrations of Argentina and Uruguay, an analysis of both presidents' discourses revealed divergent understandings on how the state was responsible for pursuing educational resilience. Had I had more time, I would have used quantitative methods[1] instead of close textual analysis on the public communication available for both leaders, which is something that future investigations could employ. While Argentina pursued

[1]The tidytext package on R could facilitate a quantitative analysis of the sentiment and tone of the different speeches.

ineffective actions towards improving remote learning, Uruguay focused on strategizing the return to in-person teaching. This approach resonated with the recommendations presented by international organizations, favoring human interaction and the pedagogical use of technology. In other words, Uruguay was perceived to have achieved a higher rate of success than Argentina at guaranteeing educational resilience because their approach aligned with the one offered by the international community of experts in education. Ideally, these conclusions would apply to the educational responses employed by other countries, which creates the opportunity for cross-validation of the findings in future studies. However, the limitations of this methodology includes the uncertainty of replication due to the highly contextual nature of the analysis. In terms of limitations, I acknowledge the difficulty of analyzing recent events such as the education disruption during the pandemic. The uncertain nature of current times make prediction extremely difficult as events and situations are rapidly changing, sometimes for the best and sometimes for the worst. The consequences of decisions taken by heads of states and leaders during the pandemic will be identifiable in the long term, and attempting to evaluate them in the present seems counterintuitive. Yet, conducting this study seemed pertinent due to the potential insights that could help understand the effects of the pandemic in a much clearer way. When I began my research in 2020, studying educational resilience seemed of utmost importance for the Latin American region.

This thesis contributes not only to the literature studying the effects and uses of ICT in the developing world, but also to the global efforts on diminishing the negative impacts of the COVID-19 pandemic in education. It expands the academic conversation on educational resilience, applying it to a new arena outside of conflict or natural disasters. Lastly, it provides evidence on the global importance of ICT incorporation for pedagogical uses. Further policy efforts to remediate the pandemic-caused learning losses may benefit from rethinking the value of a comprehensive approach to the use of ICT in education. Considering the advantages that robust ICT incorporation initiatives provided to countries during the lockdowns, decision makers and stakeholders may want to contemplate further investing in technological development. Technologies need to serve humanity in the search for more equal and sustainable access to knowledge.

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A Appendix 1

Questions used for the ICT index, extracted form the PISA School questionnaire 2019:

To what extent do you agree with the following statements about your school's capacity to enhance learning and teaching using digital devices?

(Please select one response in each row.) (Please think of different kinds of digital devices such as for example desktop computers, portable laptops, tablet computers or interactive whiteboards)

		Strongly disagree	*Disagree*	*Agree*	*Strongly agree*
SC155Q01HA	The number of digital devices connected to the Internet is sufficient	☐ 01	☐ 02	☐ 03	☐ 04
SC155Q02HA	The school's Internet bandwidth or speed is sufficient	☐ 01	☐ 02	☐ 03	☐ 04
SC155Q03HA	The number of digital devices for instruction is sufficient	☐ 01	☐ 02	☐ 03	☐ 04
SC155Q04HA	Digital devices at the school are sufficiently powerful in terms of computing capacity	☐ 01	☐ 02	☐ 03	☐ 04
SC155Q05HA	The availability of adequate software is sufficient	☐ 01	☐ 02	☐ 03	☐ 04
SC155Q06HA	Teachers have the necessary technical and pedagogical skills to integrate digital devices in instruction	☐ 01	☐ 02	☐ 03	☐ 04
SC155Q07HA	Teachers have sufficient time to prepare lessons integrating digital devices	☐ 01	☐ 02	☐ 03	☐ 04
SC155Q08HA	Effective professional resources for teachers to learn how to use digital devices are available	☐ 01	☐ 02	☐ 03	☐ 04
SC155Q09HA	An effective online learning support platform is available	☐ 01	☐ 02	☐ 03	☐ 04
SC155Q10HA	Teachers are provided with incentives to integrate digital devices in their teaching	☐ 01	☐ 02	☐ 03	☐ 04
SC155Q11HA	The school has sufficient qualified technical assistant staff	☐ 01	☐ 02	☐ 03	☐ 04

Does your school have any of the following?

(Please select one response in each row.)

		Yes	*No*
SC156Q01HA	Its own written statement about the use of digital devices	☐01	☐02
SC156Q02HA	Its own written statement specifically about the use of digital devices for pedagogical purposes	☐01	☐02
SC156Q03HA	A programme to use digital devices for teaching and learning in specific subjects	☐01	☐02
SC156Q04HA	Regular discussions with teaching staff about the use of digital devices for pedagogical purposes	☐01	☐02
SC156Q05HA	A specific programme to prepare students for responsible internet behaviour	☐01	☐02
SC156Q06HA	A specific policy about using social networks (<Facebook>, etc.) in teaching and learning	☐01	☐02
SC156Q07HA	A specific programme to promote collaboration on the use of digital devices among teachers	☐01	☐02
SC156Q08HA	Scheduled time for teachers to meet to share, evaluate or develop instructional materials and approaches that employ digital devices	☐01	☐02

B Appendix 2

The main independent variable follows a normal distribution, as it can be seen in the histograms pertaining Figure 1 and fig. 2. In the case of ICT incorporation, the index distribution for countries shows the count of countries that achieved certain scores, with the majority obtaining approximate values between 16-21 in the scale fig.1. The histogram presenting the distribution of the ICT index disaggregated by school shows a more insightful description of the index distribution, which is also normal, where one can see that most of the schools in the sample lie between obtaining a value of 10-20 [see fig. 2. The histogram for the dependent variable, educational resilience, poses a uniform distribution, which makes interpretation of the data a harder task to accomplish. Because of the random pattern of modes, the distribution does not reveal insights about the system [see fig. 3]. The rest of the control variables follow a normal distribution, except for GDP per capita, which was initially left skewed before I transformed it to the logarithmic scale see fig 4. Although the distribution of the literacy rate variable is also skewed I did not perform a log transformation because it is already interpreted as a percentage.

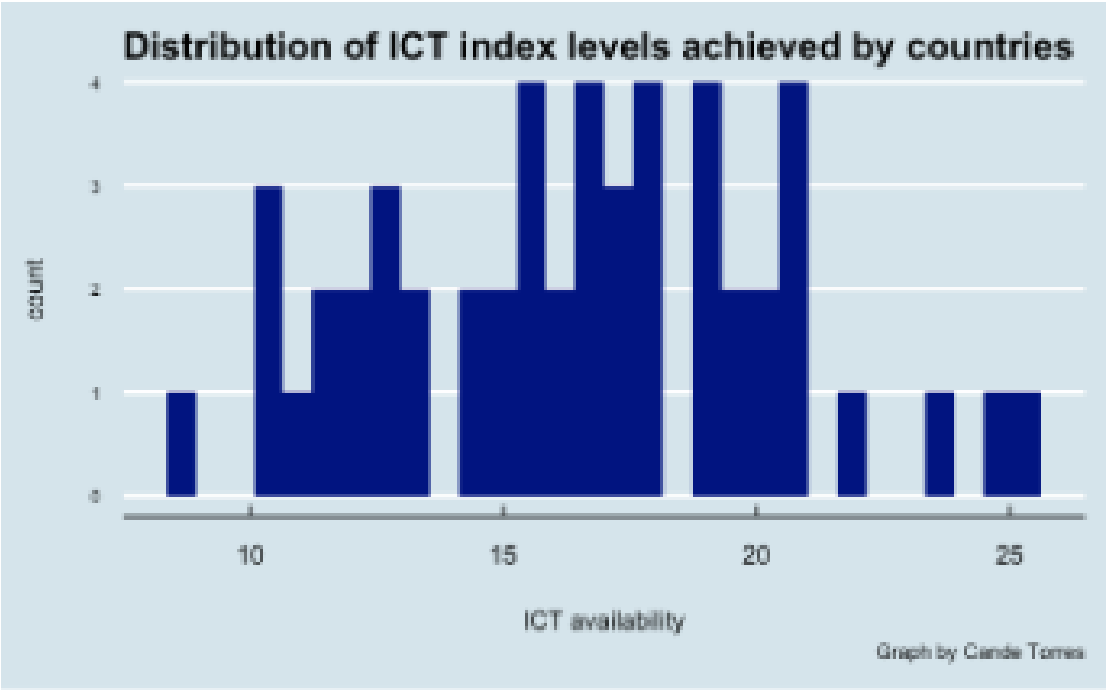

Figure 1: Distribution of IV (aggregated by country

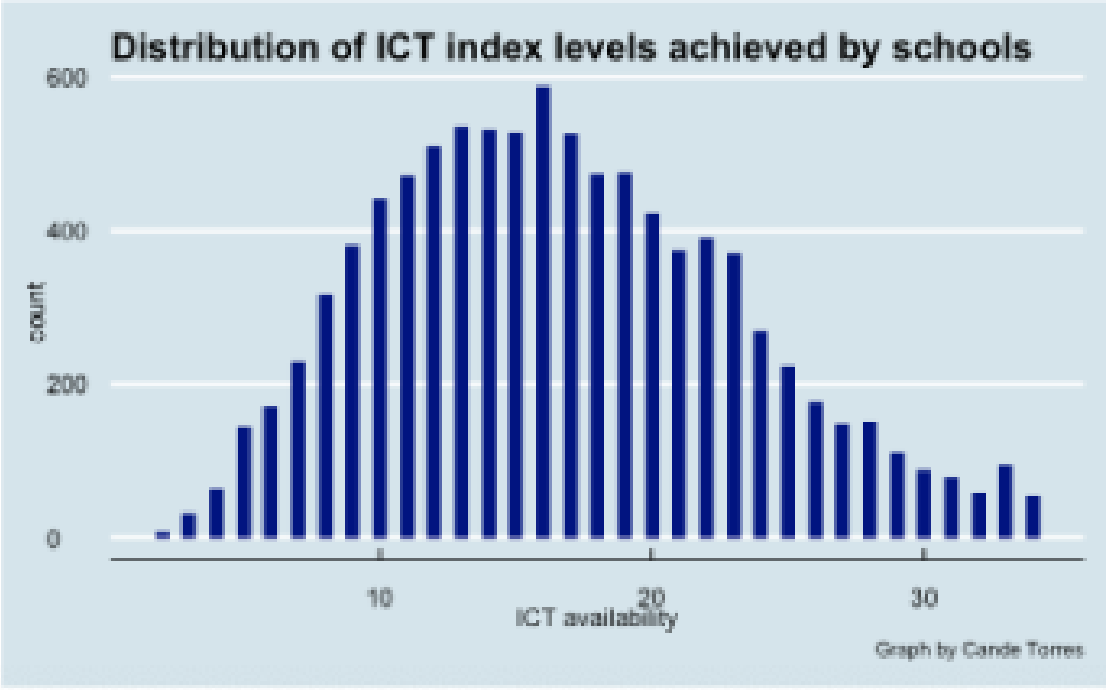

Figure 2: Distribution IV (dis-aggregated by school

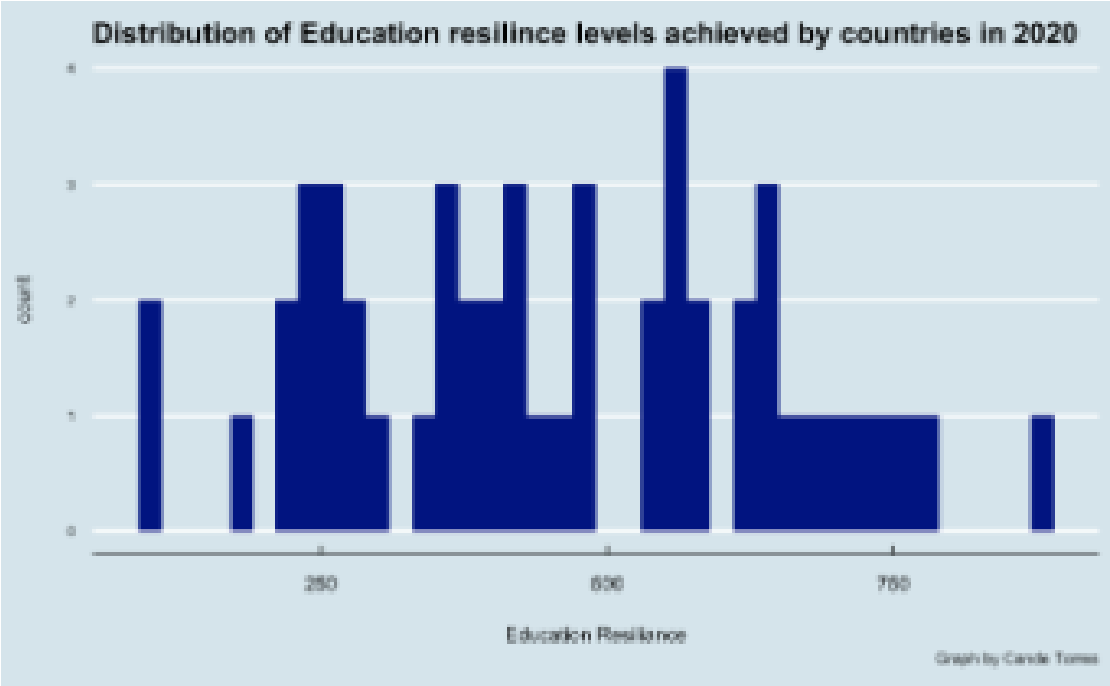

Figure 3: Distribution of Educational Resilience

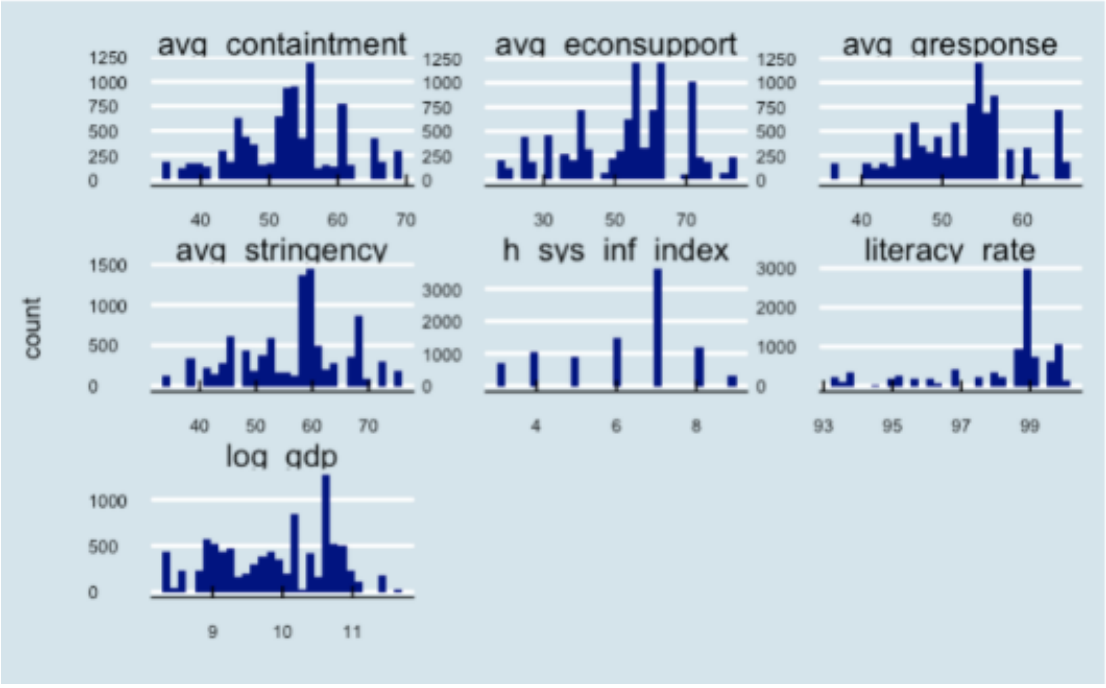

Figure 4: Distribution for Control Variables