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Uses of the Biographical Approach: The Construction of Youth Technobiographies

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Abstract: In this article, we report on our analysis as part of a research project conducted from 2012 to 2018, and we explore the potential of the biographical approach in studying the appropriation of digital technologies (DTs). The biographical approach (SAUTÚ, 2012) is described as a theoretical-methodological strategy to address how people, through time and space and within the framework of certain cultural and socioeconomic contexts, connect with various digital technologies and how they construct meanings, practices, and relationships.

With the analysis of a series of technobiographies (CHING & VIGDOR, 2005) of young people, we reflect on the ability of the method to capture the symbolic dimension of access to DTs, reconstruct the acquisition of digital skills and their role in educational transitions, and understand the links between biographical trajectories and broader social processes, such as those that constitute and reproduce social inequalities in contemporary societies. We show that technobiographies are a useful construct to identify repetitions, trends, and patterns of behavior, but also to pinpoint anything that is out of the ordinary in the paths of the appropriation of DTs of each particular group.

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1. Introduction[1]

What is the best way to study how people consume, understand, and use digital technologies in their daily lives? How can we account for the heterogeneity of practices with digital technologies and their transformations over time and space? What methodological strategies are necessary to reconstruct and understand the meanings that digital technologies acquire at different biographical moments? These are the questions addressed in this article which emerged from the expansion of the use of digital technologies (hereinafter, DT) in the daily lives of millions of people globally. The interest of social sciences researchers in understanding these processes has resulted in the emergence of new qualitative methodological approaches. Drawing on classical techniques and methods, researchers have sought to explore the universe of social practices situated in the

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encounter between online and offline (e.g., ARRIAZU MUÑOZ, 2007; BOYD, 2015; BURRELL, 2009; FAY, 2007; HINE, 2004; ISABELLA, 2007; LISDERO, 2017; SCRIBANO, 2017; WITTEL, 2000). It is within this universe that our work is located, and we intend to reveal the theoretical-potential of the biographical approach (BERTAUX, 1999 [1980]; FERRAROTTI, 2011; SAUTÚ, 2012) in studying the appropriation of DTs. [1]

Our guiding theoretical premise is that since appropriation does not occur in a vacuum or in isolation but rather is a context-specific process (WINOCUR, 2009) whose development is intrinsic to the course of people's lives, social research should address the access, use, and appropriation of DTs as a part of biographical trajectories. Although quantitative methodology allows the gaining of a broad understanding of the conditions of access and technological practices with a certain degree of representativeness—which is indispensable—, these approaches must be triangulated with a qualitative strategy that facilitates the establishment and understanding of the intrinsic links between life courses and the paths of DT appropriation. [2]

The biographical approach has been widely used in the study of labor, educational, and migration trajectories and to address issues of citizenship and memory (e.g., CORNEJO CANCINO, FAÚNDEZ & BESOAIN, 2017; JUHASZ, 2009; MACHADO PAIS, 2007; MORA SALAS & DE OLIVEIRA, 2014; ROSENTHAL & KÖTTIG, 2009; RUBILAR DONOSO, 2015; SANTOS SHARPE, 2020; SARAVÍ, 2009). In studies on DT appropriation, the potential of the biographical perspective and the life course approach have not yet been as widely explored, with the exception of a few groundbreaking works (CHING & VIGDOR, 2005; KENNEDY, 2003). In general, researchers have focused on in-depth interviews to understand the views of social actors regarding their ties with DTs, as well as to characterize skills and practices (e.g., SCOLARI, 2018). Survey-based strategies have also been used (e.g., KENNEDY, JUDD, CHURCHWARD, GRAY & KRAUSE, 2008) to enable the reconstruction of a general overview for broad population groups. [3]

Throughout this article, we show how we have reconstructed the paths of DT appropriation of young secondary school students in Argentina, leading to technobiographies (CHING & VIGDOR, 2005)[2] where we illustrate different and unequal forms of access and acquisition of DT skills. We thus account for changes in the appropriation of DTs tied to various biographical moments, access opportunities, interests, and the presence of other significant factors. In this analysis, we present we take into account what SANDVIG and HARGITTAI

2 "Technobiography" was first introduced in the collection entitled "Cyborg Lives? Women's Technobiographies," edited by HENWOOD, KENNEDY and MILLER in 2001. In 2003, KENNEDY described the idea behind a technobiography as a form of autobiography that is "a useful method for studying digital experiencies in general, and the relationship between online and offline lives in particular" (p.120). In 2005, CHING and VIGDOR coined the term "technobiographies" to "examine life narratives of pre-service teachers and investigate the role of technology on their personal and professional lives" (p.2). Instead of analyzing autobiographies, CHING and VIGDOR conducted interviews "focused on past life experiences with technology, current uses of technology, and anticipated future uses in the interviewee's career and personal life" (p.4).

(2015) have indicated regarding the limited amount of reflection on the research process itself in the scientific literature dealing with DTs. With the exception of journals specializing in method(ologie)s, the process of research or its implementation is not described in most papers in a way that could be useful for other studies. While in previous works (LEMUS & BENÍTEZ LARGHI, 2023)[3] we have focused on developing biographical interview scripts and on the fieldwork aimed at exploring the appropriations of DTs, here we will look in particular at the analysis of qualitative material and the reconstruction of technobiographies. [4]

In Section 2, we begin by introducing the theoretical framework we used in our research. This will be followed by an account of the methodology of the study and the data production and analysis. In the Section 3, we focus on the reconstruction of the paths of digital technology appropriation among young people from two different social backgrounds. In Section 3.1 we describe the impact of inequalities on digital technology appropriation, and in Section 3.2 we analyze how digital technologies uses take part in educational transitions. We close by highlighting our main findings regarding the heuristic potential of using the biographical approach to studying digital technologies appropriation (Section 4). [5]

2. Theoretical References and Methods

Our studies were grounded in the socio-anthropological perspective proposed by WINOCUR (2009). The use of this perspective enables us to address the ties that individuals and groups have with DTs through the concept of "appropriation" (THOMPSON, 1998 [1995]). This concept refers to the material and symbolic processes of interpretation and sense making for a given cultural artifact by a social group. Appropriation is understood as a relational process, a situated and routine activity that takes place in the context of everyday life and involves the achievement of various skills that allow individuals to use particular media, and turn its content meaningful (ibid.). In other words, appropriation of DTs is a socially, historically, and geographically constructed experience shaped by social class, gender, age, personal history, and family environment, among other factors. [6]

Researchers in the field (GALPERÍN, 2021; HELSPER, 2017; VAN DEURSEN, VAN DIJK & TEN KLOOSTER, 2015) have noted that the intersections between dimensions must be considered when analyzing the various ways in which DTs are appropriated. Such key aspects include the quality and diversity of devices and connections available, practices for teaching and learning DTs, the type of practices developed, contexts, meaningful uses, as well as the actors and knowledge available in each case (e.g., BLACK, CASTRO & LIN, 2015; BOYD, 2014; DAZA PRADO, 2019; DUGHERA, SEGURA, YANSEN & ZUKERFELD, 2012; ITO et al., 2010; LIVINGSTONE & HELSPER, 2007; SEFTON-GREEN, 2013). Furthermore, how DTs are appropriated cannot be separated from the

3 For readers interested in conducting biographical interviews, we suggest reading also LEMUS and BENÍTEZ LARGHI (2023), where we focused on the making of a biographical interview script, described the challenges regarding the study of time and space in young people's life trajectories and provided a series of strategies to use the biographical approach on research addressing use of TD along life.

universe of social representations associated with the various technological devices (HINE, 2004; WINOCUR, 2009). With these dimensions in mind, we understand the paths of DT appropriation as processes that extend through time and space, with varying and contextual starting points that are constructed within a dense web of individual, family, school and institutional times and spaces. We also see them as related to broad processes of change in social structures which take on significance through the appropriation of DTs (LEMUS, 2018). Therefore, the path of appropriation is shaped by four dimensions: access to and consumption of DTs, the development of skills to operate them, their various uses, and their representations (LEMUS, 2018). [7]

It was precisely due to its potential for studying the connections between individual agency and the constraints and possibilities that existing structures generate (MUÑIZ TERRA, 2012) that we initially considered the biographical approach attractive for studying the relationship between DT appropriation and inequalities. In this regard, we found the biographical approach relevant in that it allowed us to identify not only current conditions of access to DTs but, more importantly, to reconstruct the path of devices and connectivity within households over time, pinpointing opportunities for access based on life stages, particular socioeconomic situations, established class positions, and public policy intervention, among other factors. [8]

In the literature on the biographical approach, different authors have addressed crossroads and chance events (BIDART, 2020), turning points (HAREVEN & MASAOKA, 1988), transitions, the linearity-nonlinearity of trajectories (BIGGART, FURLONG & CARTMEL, 2008; ROBERTI, 2017; SARAVÍ, 2009) and the interaction of the spatial and temporal dimensions in the configuration of biographies (MUÑIZ TERRA, 2018), among other things. In addition to these issues, researchers have also focused on defining the unit of analysis, often through a tension between individuals and families, and on the identification of sub-stories within single life stories, aspects that we will explore further below. [9]

The analysis we present is based on data produced between 2012 and 2018 in projects where we studied the connections between social inequalities and the appropriation of DTs by young high school students of various social classes in Greater La Plata[4], Argentina. We followed a flexible design (MARRADI, ARCHENTI & PIOVANI, 2010), and this made it possible to establish a two-way flow between the theoretical and methodological definitions adopted, the hypotheses constructed, and the findings we encountered through contact with the research participants. [10]

The school sample was composed of six different high schools located in Greater La Plata (three private and three public schools). The schools were chosen using purposive sampling (ibid.). To select the schools, we gathered information from

4 Greater La Plata refers to the urban area around the city of La Plata (capital of Buenos Aires province, the most populated province in Argentina). It consists of the urban population of the district of La Plata (772,618 inhabitants) as well as those of the neighboring districts of Ensenada (64,406 inhabitants) and Berisso (101.263 inhabitants) (NATIONAL INSTITUTE OF STATISTICS AND CENSUS, 2023).

informal interviews with teachers, principals, and data analysts from the Ministry of Education of Buenos Aires Province. Also, we analyzed public data (annual surveys, school maps). Finally, the following criteria were considered to pick the six high schools: type of management (private or public), enrollment, share and percentage of state subsidy[5], type of school day, geographic location, and building infrastructure. [11]

In each school, we used three different methods in the following order: 1. a self-administered survey (MARRADI et al., 2010) of all fourth and fifth grade students; 2. semi-structured interviews (ibid.) with students; and 3. biographical interviews (MUÑIZ TERRA, 2018) with students. In total, we administered four hundred surveys, conducted sixty semi-structured interviews and eighty biographical interviews, which resulted in forty young people's technobiographies (CHING & VIGDOR, 2005). [12]

By using surveys, we could establish a socioeconomic profile of the population of each institution, thus identifying similarities between schools that enabled us to assign, in analytical terms, a predominant social class to each school. The surveys were also useful in mapping the state of access to DTs for young people and their families, identifying the age, number, and variety of devices in homes, and in determining the most common practices and skills. By including a section in the survey on the use of virtual social networks and online practices, we were able to determine the predominant uses at the time and incorporate this information into the biographical interview script. Using a survey was also helpful to gather students' opinions on DT. By doing this, we were able to identify different user profiles, and it helped us to avoid selection bias based on adults' expectations regarding youths' DT appropriation. [13]

Following the surveys, we conducted semi-structured interviews with students who were selected based on the data obtained in the survey and following purposive sampling (MARRADI et al., 2010). In this case, we were guided by criteria such as: 1. social, economic, and housing situation within a particular social class (neighborhood where the student house is located, number of people living at the same house, ownership of the house and number of rooms, parents' education and current jobs); 2. access to DTs at home (number, diversity and age of the devices; frequency and intensity of DTs uses, engagement on virtual social networks and video games); and 3. personal features (gender, hobbies and interests, consumption and lifestyle, after school projects, DTs skills). [14]

With the data gathered by the semi-structured interviews, we carried out a thematic analysis of qualitative data (DABENIGNO, 2017) to detect the cases with the greatest heuristic potential for the construction of individual life stories through biographical interviews. In our theoretical framework, we assumed that people use DT in a naturalized and ubiquitous way on a daily basis. With this in mind, we believed that it would be pointless to ask only about the instrumental use of devices and applications, as this would lead to simple answers that didn't

5 In Argentina, not only public but also many private schools usually receive a state subsidy.

delve into the meanings of DT use in everyday life. Instead, we expected the interviewees to lead us into the dense web of DT appropriation. To achieve this, we wrote an interview script that placed DT appropriation in different scenarios and situations through time and space. In doing so, we built a thematic script that addressed family composition and history, migration and moving, schooling, play and leisure, and, of course, trajectories of access to and use of different kinds of DT. In writing the biographical interview script, it was essential to include questions that led to comparisons with other relevant biographical moments and that also prompted the interviewees to give dates of certain meaningful experiences and events. Referring to macro-level processes (e.g., economic crisis) or educational shifts (e.g., transition from primary to secondary school) proved to be very useful in identifying the timeframe of certain uses of technologies. [15]

When writing the script, and also when conducting the interviews, we tried different strategies to locate the appropriation of DTs in time and space. For example, some strategies involved asking about the first memory of technologies at home, linking a particular biographical event with the school year and referencing biographical moments with widely known events (such as economic crises, political crises, etc.). Other useful resources included listing personal temporalities that the interviewee had pointed out and summarizing what the interviewee had mentioned in order to clarify facts and temporalities. [16]

We used purposive sampling to choose students to engage in the biographical interviews (MARRADI et al., 2010) as it allowed us to select cases that exhibited the most typical and frequent kinds of access, skills, uses, and representations of DTs and also to pick dichotomous cases within each school. For instance, some girls were eager to post selfies online while others in the same school were reluctant to show their images on their virtual social networks. So we decided to consider both kinds of attitudes and conducted biographical interviews with both groups of girls. We applied the same criteria to skills and access. The number of cases was determined based on the saturation criterion (VERD & LOZARES, 2016), seeking to maintain an equitable proportion between genders and institutions. In total, forty life stories of young people were generated, with a similar proportion of males and females. [17]

For the analysis[6], we adopted MUÑIZ TERRA's (2018) proposal and conducted a "socio hermeneutic analysis of the discourses obtained in the biographical interviews" (§49)[7]. This involved identifying thematic nodes in biographies, the synchronic and diachronic analysis of life stories, and the analysis of biographical events such as transitions and crossroads. Since we had a large number of interviews, we used the ATLAS.ti software to organize the analytical categories through different codes. Although we had a list of codes to use before conducting the fieldwork, the flexible nature of our research led us to incorporate codes that

6 The analysis of the biographical interviews was supported through field notes, which were useful for recovering the context in which the interactions had taken place and for recalling particular issues that had surfaced in each encounter.

7 All translations from non-English texts are ours.

emerged from the field. In our study, the meanings given by young people to DTs over the course of their lives and in their day-to-day activities were analyzed in relation to the narratives associated with a set of different significant aspects of each biography, which may be regarded as "sub-stories" (§29; see also PRIES, 1999) that could include the family narrative, the housing and migration story and the educational trajectory, among others. According to MUÑIZ TERRA (2018, §11) "[e]ach of these elements [sub-stories] can be considered as an expression of both subjective and objective factors. The significance of these factors varies depending on the particular stage of the social actor's life cycle." [18]

In analyzing the interviews, we sought to understand all young individuals' experience of DTs, their family and personal history, their tastes and interests, and to trace connections between these issues and the appropriation of DTs on a more general level, seeing these experiences as an expression of longer-term processes. We reconstructed the path of DT appropriation for each respondent and recorded this reconstruction in technobiographies (CHING & VIGDOR, 2005). The fragments of technobiographies we present below were constructed to condense the connections between accessing, learning, using and representing DTs and different dimensions of young people's daily lives at different biographical points in time. [19]

3. Reconstructing the Paths of Digital Technology Appropriation

For the analysis, we carried out successive readings of the biographical interviews in two complementary ways. First, we read them with the aim of coding the text and identifying possible emerging codes. Coding helped us to locate thematic areas in the discourse on which we then focused. The narratives produced in the interviews generally did not present a linear chronology, but rather overlapping layers of events and processes. We therefore organized them chronologically. In this chronological organization of the narratives, we placed in time and space the events that originally appeared out of order. In turn, in this retrospective reconstruction of appropriation from childhood to adolescence, we identified relevant actors, events, transitions, transformations in access, skills and uses of technologies, as well as in the meanings attributed to them. [20]

The analysis was compiled for the elaboration of young people's life stories, in which we reconstructed their trajectories of appropriation of DTs where we identified and analyzed the conditions of access and the actors involved; the development of knowledge and skills; social representations and uses over time. We also looked at the involvement of DTs in young people's practices of constructing tastes, interests and representations of the online self, identifying a set of rules that shape action in virtual space. Finally, we sought to understand the relationship between technology consumption across young people's biographies and their experiences of deprivation and privilege. [21]

Based on the narratives produced in biographical interviews, we identified three moments of the biographical trajectory for analytical purposes: 1. childhood (from birth up to age ten); 2. pre-adolescence (from age ten to thirteen), and 3. youth

(from age thirteen onwards). The interviewees associated a variety of practices, meanings, and representations of DTs to each of these moments. In the following pages, we reflect on the uses of the biographical approach in research on DTs appropriation. To illustrate the potential of the biographical approach, we reconstruct young people's technobiographies, focusing on two dimensions: access to DTs (Section 3.1) and skills development (Section 3.2). [22]

3.1 The impact of inequalities on digital technology appropriation

The possibilities of accessing DTs and the forms this access has taken have been widely studied and identified as a key element in understanding the skills and uses of technologies that people develop throughout their lives (WINOCUR, 2009). Far from being resolved at a global level, difficulties in accessing devices and the Internet continue to reflect and generate inequalities between various social groups. Thus, some social actors find themselves in favorable positions to appropriate and take advantage of DTs, while other groups must go to great lengths to remain connected. Below, we present fragments of the life stories of young people from various social classes, in which we identify and distinguish their paths towards DTs appropriation and the influence of these unequal access conditions. [23]

Valentina[8] was 17 at the time of the interview and since kindergarten, she had attended a private school in downtown La Plata with one of the highest monthly tuitions in the city. She lived with her mother, father, and younger brother in a residential area of the city center, in a large house that her parents built when she was young. Her mother studied to be a teacher but did not pursue this career and instead founded an event organization company. Her father studied business administration at the local state university and, along with his brothers, owned a chain of home appliance stores. [24]

Technology of all sorts had always been present in Valentina's home, due both to the family's affluent social position and to their family business. DTs, in particular, had been present from an early age and quickly caught Valentina's attention. She started playing with the home computer that the family bought when she was around 8 years old. Guided by her parents and exploring it alongside her brother, she developed her first skills through games:

> "I remember when we got our first computer, we didn't understand anything. My brother and I were very excited [...] I don't know why, but I have a specific memory that when the man who set it up opened a page of games for us, we didn't understand anything, so we didn't close it because we didn't know how to open it again!!! [...] It was a real novelty." [25]

That first desktop computer was in their home for several years, but they upgraded it as new options became available, such as purchasing a newer monitor. At the same time, as new DTs appeared on the market and once they

8 Names and other relevant information have been changed in order to provide anonymity to the interviewees.

became obsolete, Valentina's family's use of devices expanded and they bought new devices:

> "We had a notebook. At first, it belonged to everyone, but then my mom took it over for work [...] Then everything from Apple came out and we bought an iPad. Mom gave us back the notebook and kept the iPad. By that time, the notebook was already running very slowly." [26]

When she was 12, in 2011, her parents gave her her first cell phone. They went with Valentina to a phone company and she picked out a model of her choice. Although Valentina had already been asking for it for a few months, it was the need to stay in touch with her family during a primary school graduation trip that prompted her parents to purchase it. Valentina's desire for a cell phone had been shaped by what her schoolmates had and having a cell phone would enable her to participate in practices that were becoming fashionable:

> "Everyone had a cell phone! And I wanted one [...]. It was like everyone suddenly had a phone [and they'd say] 'Oh yeah, I was just texting ...' and I wanted to be part of that. The idea of having a cell phone was attractive." [27]

Two years later, when that first cell phone started to malfunction and became a bit outdated, they bought her a Blackberry which, at the time in Argentina (2013), was coveted by everyone, both young and old. It was the first phone that enabled the use of social networks. When we interviewed her, at age 17, she was already on her second iPhone, which she had bought on a trip abroad. The switch to this brand was also motivated by the desire to remain up-to-date and fashionable: "People started using iPhones [...]. Like everything else, people start using this and they start using that. So we go with that (she laughs). It's very consumerist [...] it's a one-way street [...] the operating system is super practical." [28]

As becomes clear from the transcripts, in Valentina's life story, modes of DT consumption have been closely related to the availability and upgrades of devices proposed by the market and generalized consumption among her peer group in the context of a social position that considers consumption a form of belonging to networks of sociability. Below, we share fragments of the life story of Rodrigo, a young man from the working class for whom DT consumption had taken on different characteristics over the course of his life. [29]

Rodrigo was 17 at the time of the interview and attended a public high school on the outskirts of Berisso, Greater La Plata. He lived with an older sister, his mother, and his father in a modest house, to which they were gradually adding floors and siding. He also had twelve older siblings that lived with their own families elsewhere. Rodrigo's mother could not read and his father completed a few years of primary school. They both worked doing odd jobs in construction, gardening, and cleaning. Since age 14, Rodrigo had worked in a sawmill on a weekly basis and also occasionally in construction work and distributing advertising flyers. [30]

Unlike Valentina, Rodrigo's first experiences with DTs began as an adolescent. His initial access to these technologies was mainly through public spaces (such as Internet cafés and schools) and, later, in his own home. His first contact with a computer was at the age of 14, in 2009, in the neighborhood Internet café, which he started frequenting with one of his brothers. The place had opened a short time earlier and Rodrigo was very excited to go: "I didn't know anything, what a mouse was, or a keyboard [...]. There had never been one [Internet café] in the neighborhood before [...] I wanted to know what a computer was like, I had never seen one." [31]

Although DTs had not been present from an early age in Rodrigo's life, that first contact at the Internet café and his subsequent visits to the place were key experiences that awakened Rodrigo's interest in DTs, both in terms of games and entertainment, as well as access to information and education:

> "My brother told me 'I'll open a game for you and you play with the mouse or the keys on the keyboard.' I only used the mouse for clicking when I was playing. I used the keyboard [...]. It was really exciting. The next day I wanted to go back. And later I started to play GTA with the mouse and I started playing other games. Then I went on the Internet. [...] I didn't know how such a small thing could have so much information." [32]

Within the biographical approach, it can be valuable to identify how different social institutions and public policies can have an impact on the life course, for example by creating, reinforcing or reducing inequalities. In doing so, they can contribute to the accumulation of advantage or disadvantage. In analyzing Rodrigo's DT appropriation trajectory, we found that in mid-2011, as part of the *Conectar Igualdad* program[9], he received a netbook from the national state, which was the first computer in his home. Although he had experience using computers in the internet café, he was a little nervous about using the netbook because it was the first time he had his own computer, so he was very cautious about using it: "I didn't dare [use it]. I was afraid of breaking it. I thought 'what if I do this and get it wrong.' I only did what I already knew how to do." [33]

The arrival of the netbook can be considered a significant event in his biography; having the netbook at home improved Rodrigo's access to DT and enabled him to use it whenever he wanted. However, the improvement was only partial, as inequalities in Internet access remained. Without Internet at home, school became a new place to connect, using his netbook. When asked what using the Internet meant to him, he commented on how it made him feel:

> "More capable, like you can look for more things, like you have everything at your disposal, all kinds of information. Whatever you need, you can look for it. It's like you can get information about everything, it's a real advantage." [34]

9 *Conectar Igualdad* program was a digital inclusion policy launched by the national administration in 2010 that provided a netbook for all secondary school students and teachers in Argentina. The program started in 2010 and finished in 2015. 7,000,000 netbooks were delivered for free all around the country.

When he turned 15, his sister gave him a cell phone that had previously been hers. Later, he had other cell phones, which he inherited from his siblings when they got newer ones. When we interviewed him in 2017, one of his brothers had recently given him his first smartphone. For Rodrigo, having a cell phone was very important; it kept him connected to his friends and social circle and allowed him to generate romantic and sexual relationships. At the same time, having his own cell phone meant the use of a socially desired and valuable good, one that went beyond the reproduction of his social position, that crossed—at that time—a symbolic boundary and made him feel more confident: "grown up, self-assured." Thus, for Rodrigo, his cell phone symbolized opportunities for doing and being: "If I had no phone I would have nothing, now I spend all day sending messages, all day, literally the entire day." [35]

These life stories, fragments of which are shared here, have enabled us to reveal the paths that young people from different social classes have followed in order to appropriate DTs, with a special focus on the issue of access. In one case, access was at home, during childhood, and involved an abundance and diversity of devices and the potential to constantly update them. In the other case, access began in adolescence, outside the home, and was characterized by the use of devices without the need to purchase them, through public access (in the Internet café and at school), handed down by family members, and through the intervention of a public policy for digital inclusion that gave Rodrigo his first computer. [36]

Through Valentina and Rodrigo's stories, we can illustrate the potential and the characteristics of the biographical approach in studying the processes of DT appropriation and how they are intertwined with the social inequalities that characterize several regions and are on the rise at the global level. In this sense, Valentina and Rodrigo's experiences reflect the conditions of access to DTs typical of two young Argentines from the upper middle and lower classes, respectively, born in the mid to late 1990s (LEMUS, 2018). Individual trajectories are relevant insofar as they allow us to understand how diverse processes at the macro and meso levels (MUÑIZ TERRA, 2012) are experienced at the micro-social level, and how phenomena of change at the structural level play a role, sometimes conditioning and sometimes enabling individual trajectories. [37]

Using the biographical approach allows us to reconstruct not only the panorama of current access to DTs but, more importantly, how this scenario has been settled along time and the conditions that enable, encourage, or hinder appropriation. At the same time, the biographical approach also serves to identify the connections between material conditions and DT practices, between structure and agency (MUÑIZ TERRA, 2012), revealing which scenarios can contribute to appropriation from an early age (for example, an abundance and variety of devices at home) as well as how actors in contexts where DTs are scarce can gain practical experience with them and develop skills, as Rodrigo described concerning what he learned in his neighborhood Internet café. To this end, one advantage to this approach is that it highlights both pronounced changes (e.g., Rodrigo receiving his first computer) and subtle transformations (e.g., the change

from one model of iPhone to a newer one, in Valentina's story) which can be significant for individuals. [38]

On the other hand, conducting a study with young people poses a series of specific issues related to social position, which is generally established by families rather than the young person individually[10]. With regard to the paths of DT appropriation, among other things this means that conditions of access are linked to family dynamics, consumption decisions, and the household's purchasing capacity. Therefore, reconstructing the life stories of young people with DTs necessarily involved retrospectively identifying the ties their family members had with various devices over time, their opportunities for access, the skills and knowledge that circulated in the household, and their interests and representations in relation to various technologies. In this regard, the biographical approach has helped us identify the participation of actors who support the appropriation process. For example, at the beginning of Valentina's journey, her father and especially her mother, who both had experience in DTs, guided her, taught her, and helped orient her regarding the purchase of devices. In Rodrigo's case, his mother and father were largely unfamiliar with DTs. So, his older siblings—who were already more economically independent—and the staff of the neighborhood Internet café guided him through his first steps using the computer and the Internet. In this way, the biographical approach facilitates the reconstruction of a kind of inheritance in terms of objectified and integrated technological capital (REYGADAS, 2008). [39]

Finally, the use of the biographical approach enables us to show the paths taken by people using DTs at various points in their lives, the material and symbolic aspects that have facilitated or hindered appropriation, and the shift, for instance, from initial fear and a lack of knowledge about how to use a device, to the development of various skills. Thus, by using this approach it is possible to capture the symbolic dimension of access to Dts, a dimension usually neglected in literature on the digital divide and on digital inclusion policies. To this end, in the next section we will analyze the paths by which young people from different social classes have learned to use DTs, identifying the actors who contributed to the learning process. [40]

10 In the case of our study, all of the young people interviewed lived with family members and although several of them were employed, their main economic support came from their parents' employment.

3.2 The appropriation of digital technologies in youth transitions

The notions of digital natives and immigrants (PRENSKY, 2001) and other related labels such as the app generation, millennials, centennials, etc. are often used to classify and differentiate generational groups. In general, the key differentiating factor is the link established by each group with DTs and, above all, the unique, specific, and distinctive digital skills of populations born, raised, and socialized in the Internet era. As such, digital natives are learning and accumulating skills in a self-referential world in which traditional institutions such as the family and the school are losing ground. In this sense, we usually speak of generational digital divides where the distance would no longer be defined by whether or not they have access to digital devices, but by the skills and abilities to use them. Therefore, the expectation for digital inclusion has shifted from guaranteeing access to digital literacy. However, this understanding tends to be conceptualized in the abstract without questioning which digital skills, how, where, and in what situations are developed and, most especially, what purposes they are used for and what social significance they hold for the actors in question. These issues are difficult to address using quantitative strategies where indicators and questions are aimed at determining the types of skills or knowledge the actors recognize, how they value them, and what benefits they derive from them. These strategies are unlikely to capture the meanings that these skills acquire in everyday life. [41]

According to the literature, the richest and most diverse processes of digital skills development take place outside educational institutions. In several studies, we can see that these types of skills are developed in non-formal settings (e.g., at Internet cafés, at home) and especially in informal learning settings (YouTube tutorials, trial-and-error processes, learning by doing and by playing, imitation, and simulation) (COWARD & SEY, 2013; MORALES, CABRERA & RODRIGUEZ, 2018; PROENZA, 2015). These are informal learning strategies (COOMBS & AHMED, 1974; MARSICK & WATKINS, 1990) that in the case of the incorporation of digital technologies lead to what SCOLARI (2018) has defined as transmedia skills. In our research, most of the students acknowledge being self-taught, relying on searches conducted on the Internet. Self-taught learning is the most common form when it comes to DTs as well is the search for solutions that has previously been shown by various researchers (ITO et al., 2010; SCOLARI, 2018). However, there is still a need to explore these processes in greater depth. To this end, the biographical approach allows us to identify actors, spaces, moments, and routines that condition and enable this mode of skills acquisition as we will see in the following examples. [42]

Damián was 18 at the time of the interview and lived with his mother and father in a house on the border between Ensenada and La Plata, Greater La Plata. His mother was a nurse and held a university degree, and his father was a painter who completed high school. When he was ten years old, in 2009, he began to go out on his own in the neighborhood and used to spend time with friends at a nearby soccer field and at the Internet café playing Counter-Strike. He remembered both spaces as meeting places for friends. He began to connect with his friends and others from the neighborhood through Facebook. It is in the

Internet café with his friends that Damián learned to play video games and chat through social networks. In 2013, when he turned 14, Damián received a smartphone as a gift and, since then, his use of the computer has decreased. This change in usage was accompanied by some degree of implicit pressure from his peer group: by then, all of his friends already had cell phones. At the same time, his interest in video games continued to grow and Damián began to wonder how they were made. According to Damián, his interest in computer technology began when he was around 15. He first started by taking apart his home computer and video game console. To do this, he performed tests and watched tutorials on YouTube but that was not enough to satisfy him. At 16, in 2017, he asked his parents if they would sign him up for a programming course and they enrolled him at a vocational training center. There he learned, in his own words, "very low-level programming," but the course served to confirm his interest in computer science. [43]

When he finished secondary school, Damián had two options: study economics (he was interested in accounting which he had studied at school) or computer science. It was the uses and skills developed both informally and formally during his childhood and adolescence that ended up influencing his decision regarding higher education:

> "Before starting computer science I had some doubts because I had studied Economics in high school and I really liked the accounting that we studied. I liked it a lot. And in my last year I wasn't sure whether to come here or to go into economics. But no, I said to myself ... 'no, I like computers much more.' My interest came more than anything from playing video games because through that I became curious about how they were made and how they were programmed. After that, I got up the courage to take apart a computer. Those were the main reasons." [44]

The narrative that results from the biographical interview is a unique construction that emerges from the encounter between the interviewer who focuses on listening, and the interviewee, who narrates his or her life. As we can see from Damián's narrative, in telling their story, all persons continue to construct their past along with their present and future (DUERO & LIMÓN ARCE, 2007; MARQUEZ, 1999). [45]

When we apply "a socio hermeneutic analysis of discourses" (MUÑIZ TERRA, 2018), we seek to understand "the universe of meanings and perceptions that actors assign to their actions in the specific context and moment in which they take place" (§49). It is interesting to note how, over the course of Damián's biography, the practice of playing video games, which began as an everyday leisure practice, took on new meanings and guided the direction of his studies. The reconstruction of technobiographies allows us to understand how appropriation is not only material and limited to a particular moment in life, but also highly symbolic, since it involves processes of resignification such as those observed in Damián's biographical trajectory. Once he began his studies in computer science, Damián entered a period of systematic learning of information technology and programming. At the same time, his participation in an institution

led to new uses of email: it went from being a mere requirement for joining social networks to Damián's main tool for communicating with his professors. In addition to what he learned during classes, he read books and watched YouTube video tutorials that he shared with his classmates via WhatsApp. Below, we introduce another DT appropriation trajectory and we show how Emilia learned to use various devices. [46]

Emilia was a student at a private secondary school in downtown La Plata. Her parents were both professionals; her father worked for a company as an engineer and her mother worked as a scientist at the local university. Ever since Emilia was a small child, her parents had been using DTs to work. So, computers have been part of her home environment since early on:

> "My dad always had a computer and it was very much related to his work. At home, there was always a computer, printer and a scanner. We had three computers. One was my dad's, one was my parents', let's say, and another was for me and my sister. And then there was the study. And there my dad had shelves full of books and the computer with all the other devices, the speakers." [47]

At age five, Emilia began using the computer to play games. She remembered that her father bought her a CD-ROM with a jungle book game. Meanwhile in her kindergarten, they used the computer to play math counting games. Initially, her reference for learning was her father.

> "Later I discovered there were pages that had video games for children. Or when I started to watch the Disney Channel, I found there was a Disney Channel web page, so you could enter and play games or download them. I remember there were pictures for coloring that we printed off with my sister." [48]

In an environment populated by DTs, Emilia developed an interest and curiosity for computers, which led her to explore and learn how to use various programs. Between the ages of eight and ten, she experienced what she called "a period of vice" with the computer: she spent long hours chatting, talking to friends on video calls, and watching makeup and cooking videos. At age 11, she created a Facebook account because all her friends were playing Pet Society. By the time she was in secondary school, her ability to explore the Internet meant that she was skillful at gaining access to information and thoughtful about the accuracy of sources, as expressed in the following passage:

> "Honestly, I really don't know that much about looking for things in books. I do it the easy way. I search for 'polymerization reaction' on the Internet, in Google, because I use Google. I open Wikipedia to have kind of a baseline and then I start to open all of the other pages that I see, that cover more of what I'm looking for. Let's say, where the title is more related. So I go from there, because Wikipedia has things that, I mean, it's easy to understand and it's great, but it's sometimes questionable and not so reliable, so I always open Wikipedia to have a base to read and then the rest to verify that it's right and everything else. I search on 'online professor,' a web page that I believe is from Chile's Ministry of Education or something like that, so they are a

> little more reliable. Then Wikipedia, I mean I use it a lot because sometimes there are things that magically appear in Wikipedia and not in any other place and you say, it seems like this could be true but you can't prove it. So sometimes I go with that, because I don't have anything else. Yahoo no ... I mean, I sometimes use it just to corroborate. If it is easy information, simple and uncomplicated, I might use it a bit. Or sometimes, for instance for chemistry, I might search for the structures of certain compounds. You can't find that anywhere and in Yahoo you have someone who asked the same thing, and they answered them. I can't find it anywhere else, so I take it from there. Because sometimes it might say 'chemistry, biochemistry professors,' whatever. I don't know if that's true but it's the only thing that comes up so I have no choice." [49]

When analyzing interviews, we can characterize people's biographies as the result of different intertwined sub-stories, according to MUÑIZ TERRA (2018). In our research, DTs were linked by young people to sub-stories (ibid., see also PRIES, 1996) at the micro level: family, school, and housing, among others. Reconstructing these sub-stories can be useful to understand how digital technologies became significant through different routines and practices. In doing so, we focus on identifying the actors involved, the times and spaces, and even the different meanings that the use of the same device or the same platform or digital content can have for individuals throughout their lives, as well as in different situations of everyday life. In Emilia's case, it is interesting to note how she developed a personal reflexivity about her use of DTs during her learning practices. This reflexivity mobilized criteria of truth and validation of the content found on Wikipedia, which were sometimes useful and sometimes insufficient. The use of the biographical approach, based on the recording of these sub-stories, allows us to understand how social representations of digital technologies are inseparably constructed from the practices and change over time and space. [50]

As seen in the two examples, the use of the biographical approach facilitates an understanding of the set of actors, spaces, and devices that enable different modes and rhythms of learning and socialization with digital technologies, despite the fact that there may be unequal starting points in terms of access and skills. In the first case, the devices and learning came about as a result of the young person's actions. In the second case, the technologies "appeared" in Emilia's home as a result of the decisions of adults. Her parents' experience with DTs played a crucial role, thus generating spontaneous socialization from early childhood. On the other hand, for Damián, the self-learning process began later and was supported in spaces outside the home. [51]

While these are processes that present the development of skills with various nuances, they are far from dichotomous situations or positions such as "knows/does not know" and "more skilled/less skilled." They, therefore, avoid succumbing to a static vision of a single moment or isolated event that rigidifies and reduces the complexity of digital inequalities. The use of the biographical approach allows us to consider the processes of digital skills development based on the idea of an ecosystem, since it enables the identification of practices, actors, and situations that contribute to self-taught learning and exploration to the

extent, in some cases, of challenging the conditions of access. It is through this reconstruction that it is possible, for instance, to understand the relevance of the social relationships established in the Internet café where young people learn collaboratively among themselves. Both stories reflect intersubjective learning that is neither intentional nor expected but nevertheless highly significant, emerging from situations that are not necessarily structured or planned for learning but that end up operating as such (SCOLARI, 2018). This confirms

> "the broad spectrum for the application of techno-social knowledge and how this informally acquired knowledge can lead to unexpected developments and tendencies, driven by a 'hunger for knowledge,' curiosity, need, and a lack of bias in combining and recombining artifacts" (PEIRONE, 2022, p.109). [52]

That is, by using the biographical approach we can identify spaces that are relevant to other practices and discover that they became significant in the development of skills. Through technobiographies, we can reveal the complexity of these trajectories, the actors involved, and the practices that enable learning which can then be applied to other practices in other spaces and for other purposes. [53]

4. Conclusion

In this article, we have highlighted the strengths of the use of the biographical approach to address the appropriation of DTs in the lives of young people based on the interaction of different dimensions over time and space. Using the biographical approach allows us to understand how people have the agency to configure their ties with DTs without losing sight of the fact that appropriation always takes place within cultural frameworks which confer meaning on the practices with DTs while conditioning, structuring, and enabling potential actions. In addition, technobiographies can be used to reconstruct how people experience different processes of change in their lives (such as moving, changes within families, forming peer groups, navigating different social contexts, etc.), in order to understand the experiences associated with institutionally prescribed transitions (such as the transition from primary to secondary school and university), and to identify how DT intersects with these pathways. The use of technobiographies could also be useful to study work trajectories, especially those involving intensive use of different technologies and machines, and to identify learning at work, other types of skill acquisition, and career changes related to technological developments. The development of technobiographies represents a tool for identifying and characterizing the most extensive pathways with DT according to social class, gender and generation, but also for locating anything that is out of the ordinary or less frequent in the pathways of the appropriation of DTs in a given group. [54]

Researchers using the biographical approach have traditionally taken into account turning points, transitions and crossroads in life trajectories. The analysis presented here shows that, because of the way in which DTs are embedded in people's daily lives, along with their use and social meaning, they take part in

different processes that gradually lead, over time, to certain biographical trajectories. For instance, the first uses of DTs could be understood as scenes where certain forms of objectified and incorporated technological capital are put into play (REYGADAS, 2008), both of young people and of the actors who participate and serve as initial supporters in this appropriation. In this sense, our observations reveal a recurring pattern in which the first uses of DTs are relevant moments of initiation in the structuring of the ties with DTs and their biographies in general, given that they enable new practices to unfold and new skills to develop, and they also model future actions concerning consumption and ties to others and to knowledge, among other things. [55]

Additionally, in our approach, we incorporate the critical view proposed by BIGGART et al. (2008), MACHADO PAIS (2007) and ROBERTI (2012) regarding the linearity of trajectories and the tendency to homogenize paths and to understand biographies as the sum of a linear sequence. Rather, it is important to account for the heterogeneity of possible trajectories and the existence of turning points, events, and processes of change that give these trajectories new directions, as well as the juxtaposition of distinct positions in various facets of biographies that escape the expected models (ROBERTI, 2012). The questioning of linearity in the trajectories does not mean that their chronological nature is lost (ibid.) but it does entail an effort to account for how the chronology is constructed in the biography of each individual and what macro, meso, and micro elements play a role in such a configuration. By doing this we can perceive not only the meaning acquired by the access, skills, uses, and practices deployed by the actors at the various stages of their lives, but also to understand the significance of the appropriation within the framework of broader social networks. [56]

In our case, through the technobiographies of young people we reveal how the appropriation of DTs fosters to an unprecedented degree the processes of the emergence of the self and the struggle for recognition in contemporary societies. Thus, by repositioning the frameworks of sociability enabled in and by DTs, we can see that the meaning of practices in social networks is closely associated with the need to separate oneself from the primary family nucleus and establish new codes and forms of belonging to broader social groups. The fact that certain practices acquire relevance at specific moments in life, then lose it, only to acquire it again but differently, as in the case of video games or social networks that come and go out of fashion, can only be interpreted if they are located in specific biographical situations and moments. In this way, we can understand that the appropriation of digital technologies, far from being a process that alienates, isolates, and individualizes young people, is, on the contrary, one of the main processes of youth socialization that enables the struggle for the recognition of the uniqueness of the self, based, paradoxically, on the incessant search for integration into groups of belonging. In turn, the reconstruction of technobiographies reveals how the mandate or imperative of connection constitutive of contemporary societies (WINOCUR, 2009) operates very effectively among young people. [57]

Finally, after reconstructing how this imperative is experienced and understanding the feelings, pressures, and fears it can cause, the use of the biographical approach allows us to compare how different people process and develop responses to this imperative. By comparing the technobiographies of the young people discussed in this article, we can observe how novel processes of material and symbolic inequality are manifested. The inscription of the paths of appropriation of DTs within broader social frameworks serves to connect the study of appropriation with the processes of existing inequalities in contemporary societies, understood through the intersection of deprivations and privileges. For example, distinct temporalities of appropriation have been shaped by inequalities in access to DTs. The abundance, in most cases, of DTs has enabled young people to become familiar with the use of devices and the Internet and, therefore, to also develop transmedia skills earlier (SCOLARI, 2018) on various devices[11]. In this regard, some young people, once they started secondary school, had more material and symbolic resources for using DTs and a broader range of skills to draw on during their time in school. At the same time, the lack of DTs at home, in some cases, required young people to make an effort to stay connected and meant that exploration and learning with DTs took longer and was more fragmented than if they had had access to DTs. [58]

Although the focus of this paper has been primarily methodological, we believe that the biographical approach has considerable potential for helping us understand, in the case of the paths of appropriation of DTs, that the series of different appropriations—both material and symbolic—represents an accumulation of advantages and disadvantages for different social groups. As we have seen from the various cases, such accumulation does not stem exclusively from the possibility of accessing and consuming devices and content, but from the amalgam of practices and representations that precede and transcend the appropriation of DTs and, at the same time, provide certain subjects—and not others—with the resources and capabilities to respond with greater or lesser success to the requirements and demands of contemporary societies and labor markets. [59]

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11 Although we have not described Valentina and Rodrigo's DT skills in depth in this paper, our research has nevertheless revealed the significant differences referred to here.

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