

RESEARCH ARTICLE

Becoming a repair entrepreneur: an ethnography of skills training in Brazil

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Abstract: Santa Efigênia in São Paulo is an important Latin American hub for buying and selling electronics. This article draws on long-term fieldwork to discuss repair training in the neighborhood. While scholars have looked at formal and informal educational spaces, this article looks at a new kind of institution that creatively combines aspects of street repair and high-end IT services. Individuals from all over Brazil seek out this popular private school with the expectation of becoming self-employed cellphone technicians. The article starts with a description of repair practices in Santa Efigênia and an analysis of the barriers to and accessibility of repair knowledge, including for the female ethnographer. It then centers on the school's training sessions, examining how students are prepared to become repair entrepreneurs through a mix of technical skills and para-technical concerns with aesthetics, logistical speed, and networking. I show that this school redraws communities of practice, bringing new actors into repair while excluding others along social divisions of race, class, and gender. Engaging with critiques of the neoliberal push for entrepreneurship in development, I consider the contradictions of this institution, concluding with a discussion of how this case offers insights into the democratization and dissemination of repair knowledge. [*Electronics repair; Entrepreneurship; Gender; Inequality; Information and communication technologies; Qualitative methods.*]

Resumo: Santa Efigênia, em São Paulo, é um importante pólo latino-americano de compra e venda de eletrônicos. Baseado em trabalho de terreno no bairro, este artigo discute as atividades

de uma escola particular que oferece cursos de reparo de celulares. Complementando a literatura sobre espaços educacionais formais e informais, este estudo analisa um novo tipo de instituição que combina o reparo de rua com serviços de tecnologia de ponta. Pessoas de todo o Brasil procuram esta escola na expectativa de se tornarem técnicos de manutenção de celulares. O artigo abre com uma descrição das práticas de reparo em Santa Efigênia e uma análise das barreiras ao acesso a estes conhecimentos, incluindo para a etnógrafa. Em seguida, descreve sessões de treino na escola, examinando como os alunos são preparados para se tornarem empreendedores na área do reparo através da aquisição de conhecimentos técnicos e para-técnicos dos quais se destacam preocupações com questões estéticas, logísticas e de estabelecimento de contatos. O artigo argumenta que a escola redesenha comunidades de prática, trazendo novos atores para a profissão e excluindo outros de acordo com divisões de gênero, classe e étnicas. Em diálogo com críticas à agenda neoliberal de promoção de desenvolvimento através do empreendedorismo, o artigo discute as contradições da instituição, concluindo com uma discussão sobre as contribuições deste estudo para a democratização e disseminação de práticas de reparo. [*desigualdade; empreendedorismo; gênero; métodos qualitativos; reparo de eletrônicos; tecnologias de informação e comunicação*]

Located in the heart of the bustling neighborhood of Santa Efigênia in São Paulo, arriving at Prime is like entering a bubble. Suddenly, you are in a neat and pristine space. The first time I visited the repair school – also known as the Cell Phone University – I remember being struck by how polished it looked. White walls, minimalist furniture, glass windows delimiting offices and classrooms. The staff dressed in a graceful combination of white, maroon, and navy blue. There are two main classrooms organized by color codes, each consisting of a screen, whiteboard, and two rows of individual workstations aligned in a long rectangle. The workstations were custom designed to methodically fit the basic equipment for cellphone repair: anti-static brush and blanket, soldering station and hot air rework station, multimeter, power supply, tools of different kinds (spatulas, screwdrivers, Kapton tape, jumpers). The contrast between Prime and the messy rush outside is blatant, as it is with the usual descriptions of repair in the global South.

I found my workstation, sat down, and caught my breath. I had no excuse to be late. All my colleagues had come from much farther away, from São Paulo's peripheries, satellite cities, and even other states. They were focused and motivated. Investing in this course would help them become self-employed cellphone repairers. The fact that the final diploma was not accredited by any government agency or Information Technology (IT) institution seemed unimportant to them. Today, we would learn to identify and diagnose common problems with components such as microphones, cameras, and charging ports, particularly in budget Android phones, where their form and location are not always obvious. Invoking all-too-familiar experiences of urban inequality in Brazil, the instructor drew a metaphor that everyone could understand: "iPhone is like a rich neighborhood where all components are organized... Android is *favelona* (slum-like), everything is thrown there."

Since the early 2000s, much faith has been put in the transformative power of micro-entrepreneurship as a motor for socio-economic development in the global South (Prahalad 2005; Roy 2010). This reflects a general economicist turn in development practices and discourses, which perceives a lively private sector as an essential requirement for and motor of national wellbeing and prosperity (Blowfield and Dolan 2014). This market-oriented logic, which sustains approaches such as microfinancing and bottom-of-the-pyramid (BoP) schemes (e.g., Dolan et al. 2012), has been criticized for recasting poverty as an opportunity, "spinning survivalism into resilience" (Dolan and Rajak, 515), and presuming the universality of the will to

become an entrepreneur. Adding technology to these development initiatives further exacerbates this optimism. Projects aiming at fomenting tech skills and entrepreneurialism have recently sprouted around the global South (e.g., Beltrán 2020; Irani 2019; Poggiali 2016), reproducing “the enduring belief that technology use and production are promising for humanity” (Avle et al. 2020, 238).

This article focuses on Prime, a popular for-profit repair school in São Paulo that provides training in skills previously imparted through self-teaching and apprenticeships. Operating within the inequalities of Brazilian society, this school offers the promise of entrepreneurship to those who can afford its courses. By delving into its operations, this article makes two main interventions. First, it deals with questions of access, examining the barriers to and accessibility of repair knowledge, including for the ethnographer. I argue that Prime reshapes the boundaries of cellphone repair communities of practice as they are organically organized (Lave and Wenger 1991), bringing in new agents to repair. By examining the obstacles and opportunities that mark the access to repair entrepreneurship by particular groups, I demonstrate that universal entrepreneurial energy is a myth and that neither tech nor the market is a seamless solution for socioeconomic development. Second, the article examines how students at Prime are trained to become repair entrepreneurs. I show that the school creatively combines aspects of street repair and high-end IT services to advance an unusual model of repair training that puts emphasis not only on technical knowledge but also on para-technical concerns with logistical speed, aesthetics, and networking.

Therefore, in addition to critical development and entrepreneurship studies, this article contributes to debates on skill. Anthropologists have long been concerned with skill in connection to traditional crafts (see Malinowski 1922). As a result, accounts of artisanal production, tacit knowledge – understood as an embodied type of knowledge that is acquired through practice and resists codification (see Polanyi 1958; Sennett 2009) – and informal apprenticeships based on master-student relationships figure prominently in the ethnographic work on skills acquisition (e.g., Grasseni 2007; Herzfeld 2004; Ingold 2000; O’Connor 2005; Prentice 2008). Although this article engages with this literature, it emphasizes a different type of skills training – fast-paced and relatively standardized. It also attends to skills acquisition as a differentiated landscape in which some are included and excluded based on factors such as

gender, class, age, and regional provenance (see also Iskander 2021). Therefore, it adds to an understanding of what Carswell and De Neve (2018) have called *the social life of skills* – or “the social processes, relationships, and ideologies that enable (or constrain) people's access to skills, and subsequently to employment, wages, satisfaction and dignity.” (ibid., 313) – and complexifies the idea of communities of practice as networks that spontaneously assemble around common interests (Lave and Wenger 1991).

Finally, this article expands the literature on repair studies. A critique of the cultural and scholarly emphasis on novelty and innovation, repair studies have called attention to the overlooked and yet essential work of maintenance that supports contemporary infrastructures and lifestyles (Jackson 2014; Vinsel and Russel 2020). With implications for the environment, electronics repair is an important part of this literature. As the last decades of climate science have taught us, the future of the planet depends on a profound revision of current patterns of electronics consumption. It is urgent to develop design practices that prioritize sustainable ethics of recycling, reuse, and repair over profit through the constant production of wasteful novelty (Crosby and Stein 2020). Despite some victories of the right-to-repair movement (see McLaren et al. 2020), pressures by multinationals to either prevent or monopolize maintenance remain high. Unsurprisingly, scholars have turned to the global South for examples of lively informal repair cultures (e.g., Jackson et al. 2012; Rifat et al. 2019). Connected to consumer patterns in the global North through global flows of e-waste (Gabrys 2011; Lepawsky 2018), places like China, Ghana, and Peru have become sites of intense electronics reuse and recycling. Some studies have also been conducted in the global North, particularly in the context of repair cafes and other sanctioned spaces (e.g., Houston et al. 2016; Rosner 2014). Only a few of these works, however, have centered on the question of skills acquisition for cellphone repair (Ahmed et al. 2015; Doron 2012; Houston 2019).

In terms of structure, the article starts with a description of the electronics neighborhood of Santa Efigênia and an analysis of repair trajectories, highlighting who typically enters the repair business and how. It follows a methodological reflection about gender, tech research, and how I ended up conducting participant observation at Prime. The article then zooms on to the repair school itself and the processes involved in learning to fix. It matters to note that this is not an assessment of Prime's efficacy in producing repair entrepreneurs but rather an analysis of who

seeks the school, how it operates, and what skills are acquired in the classroom. I conclude with a discussion of how this case offers insights into the democratization and dissemination of repair knowledge.

Santa Efigênia's Ecology of Repair

The neighborhood of Santa Efigênia¹ has a long and layered history as a major electronics market, being known to professionals, hobbyists, and average consumers as a hub for buying and selling components and devices since at least the 1960s. Located in the heart of São Paulo, Santa – as the neighborhood is also colloquially called – is part of an effervescent commercial district. Between customers and vendors selling everything from garments to pirate media, the daily crowd in this district can surpass one million people during certain holidays (Telles 2012). Santa is served by roads, railways, and the nearby Port of Santos, sitting in a nexus of commercial routes that cross regional and national borders (Freire 2014). It holds strong connections to China via Ciudad del Este in Paraguay (Rabossi 2012), as well as to many other South American cities and regions in Brazil's interior.

Presently, much of Santa's economy revolves around cellphones. According to the local Shopkeepers Association,² there are more than four hundred small stalls – popularly known as “boxes” due to their cubic form – spread across scores of shopping galleries, a good part of which sells cell phone accessories and replaceable parts such as silicon cases, headphones, charging cables, and handsfree kits. From my experience, the market of brand-new devices in these galleries is rather minimal. The market of used devices, on the other hand, is as vigorous as you can imagine. In the first trimester of 2018 alone, more than thirty-eight thousand cellphones

¹ Please note that “Efigênia” is sometimes spelled as “Ifigênia.” The inconsistency stems from the fact that the neighborhood bears the same name as its central street. Following a suggestion made by one of my interlocutors, throughout this article I will use “Efigênia” to refer to the neighborhood and “Ifigênia” to refer to the central street.

² Interview with a Chamber of Shopkeepers of Santa Ifigênia representative, April 2019.

were stolen in São Paulo (Henrique 2019). Some of these devices end up in the mazes of boxes, either whole or in parts.

Many of these boxes perform basic repair work – things like screen and battery replacement. Sociologically, they resemble many other repair spaces in the global South (e.g., Ahmed et al. 2015) as their workers are typically men from underprivileged social groups. The women tend to present themselves as sellers and receptionists at the storefront. There are exceptions, however. During fieldwork, I encountered some female repairers working in the inner bellies of shopping galleries. Perhaps the most suggestive anecdote is when I needed to fix a headset. Seeing that the task would require delicate soldering, the street vendors kept declining the job and forwarding me to a famous Priscila. Priscila was very hard to find in the labyrinths of boxes but solved my problem in five minutes. As highlighted by many scholars, there is a long history of women being deemed unfit for skilled tech work, despite their many contributions to fields such as computing and electronics (Hossfeld 2001; Hicks 2018; Rosner 2018). A mix of devaluation of their work, disregard for their intellectual abilities, and sexist appreciation of their “nimble fingers” marks views about women in electronics (Nakamura 2014) as well as other industries (see Mezzadri 2016). This effect might be exacerbated by the heavily masculine streets of Santa Efigênia, making it especially unwelcoming for women, who seem to prefer to keep their shops deep in the galleries to working side-by-side with their male counterparts outside.

In addition, it is common to see immigrants doing repair work. For instance, Ibrahim is an immigrant from Palestine who, in an interview, explained how he got from Ramallah to São Paulo in 2016. Back home, he owned a supermarket distribution company together with his brother. When, after a friend's invitation, his brother decided to move to Brazil with his family in 2014, Ibrahim was disappointed. However, seeing his brother do well as a shop boy in Santa's world of electronics made him want to come to São Paulo for a few months to see if he could also make some money. Drawing on his way with mechanics and electronics, as well as his brother's knowledge of local networks, together they rented a box and opened a repair shop. What was supposed to be a short experience became a longer adventure.

When asked how he learned to fix cellphones, Ibrahim explained that he was self-taught. Reproducing a familiar story, he explained:

“I am my own professor. But I like mechanics and electronics. At home, I would fix everything: TV, washing machine, everything. I would fix cars. If the company was without a truck, I would fix it. I enjoy doing it.”³

Descriptions of amateurs who enjoy tinkering with tech abound, making this one of the most common repair trajectories (e.g., Nova and Block 2020). Characterized by passion, attachment (Hennion 2005), and other forms of “technological intimacy” (Cross 2011), tinkering can appear in these contexts as vehicles for constructing masculinity and building community (Dunbar-Hester 2008, 2014; Gelber 1997).

Barriers and Access for the Female Ethnographer

The heavily masculine streets of Santa Efigênia were also what drew this researcher to Prime. Despite my long-term engagement with the neighborhood – which comprised countless field trips over more than five years – I always found it challenging to research repair. Between 2018 and 2019, I completed thirteen months of immersive fieldwork in the city of São Paulo, during which I conducted several semi-structured interviews with shop owners, street repairers, and other local actors, but I was chronically dissatisfied. I am a native Portuguese speaker who can sustain long conversations about electronics. However, as I circulated in the neighborhood, I was constantly reminded of my otherness by the male gaze and ordinary remarks that bordered on verbal harassment. It was hard for me to trust the space and build rapport. This changed when I heard about a new repair school that was attracting a lot of attention.

Many researchers have discussed the role of gender and other social divisions in conventional ethnographic research (e.g., Haddow 2022; Vieth 2018). Some have chosen to theorize from the limits of access (Caldeira 2021), while others have sought to develop and validate alternative research strategies (Günel et al. 2020; Pink et al. 2015). For the scholar of science and technology, the gender barrier can be particularly disconcerting, for it might seem an insurmountable limitation rooted in inexcusable sexism. While navigating these challenges,

³ Interview with Ibrahim conducted in collaboration with Dr. Carlos Freire, June 2019.

scholars often find that tech practices are much more diverse than they tend to appear. Like in the case of Priscila, this diversity may hide behind the counter, in mazes of stalls, or even have entirely parallel circuits.

I approached Prime with the intent of doing research in its premises. My academic goals were met with relative indifference, and they immediately welcomed me with a selling tour. I was offered a discounted price to complete a 40-hour Cellphone Maintenance Course during which I could conduct participant observation as a student-researcher and was granted permission to attend classes with two different cohorts to have a larger sample. One of the cohorts was following an intensive training regime, meeting eight hours a day for one week, while the other met for five hours a day during the weekends for sensibly one month. In total, I spent about fifty hours at Prime and successfully completed the Cellphone Maintenance Course for which I received a diploma in a small graduation ceremony with one of the cohorts.

In the classroom, I was always upfront about being a doctoral student studying the acquisition of repair skills and talked frequently about it with my colleagues and instructors. As a trainee doing participant observation, I paid attention to knowledge transmission – specifically what was being taught and how – my colleagues’ life trajectories and the experiences they brought to the classroom, and other aspects of practice and discourse, including their perspectives on the value of electronics repair and embodied relationship to different tools and techniques. Altogether, I spoke to twenty-four students, three instructors, two administrators, and one manager. I opted not to record our conversations so as not to disrupt the class dynamics. Instead, I collected videos and photographs with my peers’ permission, and sometimes help, and reserved a full day for notetaking after each day of fieldwork.

As it would become clear, I was not the only one who, for one reason or another – gender, class, age, regional provenance, etc. – had been barred from the organic networks of repair knowledge and was now buying my entry into it. Since this period of ethnographic immersion, I have kept in

contact with my colleagues through WhatsApp groups and other digital means. All the names in this work have been anonymized through pseudonyms.⁴

The Cellphone University

There are a few repair schools in Santa Efigênia. Most of these schools are small and completely informal, based on the apprenticeship model where one experienced technician takes two or three trainees and teaches them his trade over a long period of time. Prime introduced a different approach to repair training. Started in 2017 by a marketer named Jerson, the Cellphone University quickly became the most successful repair school in the city. Inspired by his previous job at McDonald's marketing department, and with the help of two friends – one of them with purported links to Google – Jerson developed the concept of Prime, a school that offers intense courses on cellphone repair with an entrepreneurial sensibility, all neatly organized in modules and ranked in tiers of specialization (Fig. 1). The cost of these courses varies between 750 and 2 thousand Brazilian reais (140 to 400 USD),⁵ which can be considerable sums in Brazil,⁶ and they focus on topics such as “Introduction to Android and iPhone/iPad Repair,” “Software and Operating Systems,” “Circuit Board Soldering,” and “Digital Marketing.”

Prime's courses have a structured curriculum that draws on a combination of lecture-based instruction and hands-on practice. Its classes have a small instructor/student ratio, allowing for constant consultation with instructors. Instructors are experienced technicians who work or have worked in repair. After course completion, students are provided with free access to fully equipped workstations at the repair school as well as instructor support for up to fifty repair jobs. At first glance, this training system seems entirely formal. The diplomas provided by Prime, however, are not accredited by any national body or foreign institution. In addition, the school

⁴ Ethics protocol approved by the Human Research Protection Program of The New School (#2018-1071).

⁵ Original numbers from September 2019. Conversion from May 2021.

⁶ The minimum wage in Brazil in 2021 is \$1,100 Brazilian reais.

prepares students for a sector that is ostensibly informal since most repair shops are small-scale, characterized by self-employment, and operate outside state regulations. As examined by Assa Doron (2012) apropos of cellphone repair in India, this type of training is often administered in one of two systems: either formally through big expensive institutes with connections to global IT companies (e.g., Cisco, Microsoft), or informally through small apprenticeships put together by experienced technicians. Much has been said about what defines formal and informal training and the lines between the two are fuzzy, to say the least (see Barber 2004; Gough et al. 2019). What matters here is that Prime seems to sit right in between these two models, appropriating and adapting aspects of both in a hybrid way.

For the students, acquiring repair skills represents a way of improving their livelihoods. Unlike other schooling circumstances that seem designed to reproduce class positions (Willis 1977) and training programs that recurrently fail their trainees (Dolan and Rajak 2016; Gooptu 2013), Prime seems to deliver meaningful opportunities for those who can afford its courses and would not have had access to repair skills otherwise. In doing so, it redefines the boundaries of who gets to become a cellphone repairer. Since the entry-level course does not require previous knowledge of electronics, Prime students can be very diverse. As mentioned, I took classes with two different cohorts, one on weekdays and one on weekends. On average, there were 12 students per group, 10 of whom were men and 2 women, myself included. My colleagues' ages ranged from 15 to 55 years old, and they came from all over Brazil. While the cohort that met on the weekends was mostly composed of people from the state of São Paulo, those on the intensive training course had traveled from distant states, including Pernambuco, Bahia, Rio Grande do Norte, Mato Grosso, and Acre in Amazonia. The group was racially and socioeconomically diverse, with some students coming from poor auto-constructed neighborhoods, popularly known as *favelas*. Most of these students were trying to start a new business; some (3-4 per cohort) already had their mobile shops.

Tania, for instance, had just bought an accessories shop in her neighborhood, a poor community in the northern periphery of São Paulo. She was recently married and was planning on having children. Her goal was to raise her kids while working at the shop. "That's why I wanted to have

my own business,” she explained, “so I can work and be a mother at the same time.”⁷ She had no connection to electronics whatsoever – no enthusiasts in her close circles or mentors who could take her as an apprentice. Nonetheless, since people would sometimes stop by her shop and ask if she did repair work, she decided to invest in a course at Prime, for which she paid in four monthly installments. As for most students, becoming self-employed and making a technician’s salary were key reasons for Tania to seek repair training.

Therefore, Prime can open the repair business to new actors, but it does not eliminate all barriers. In his work on crafts in China, Geoffrey Gowlland (2012) compares the advantages and disadvantages of one-to-one apprenticeships versus classroom-type teaching. He shows that the collectivized teaching of the 1950s-70s helped new groups enter the ceramics business, creating more social mobility and new forms of solidarity. The knowledge once controlled by a few families was distributed. As he points out, exclusion and secrecy are central to traditional crafts. That does not mean that collectivized teaching was all-inclusive. For one thing, it prevented rural folks from accessing training.

In Prime's case, the cost and location of the courses are the first and main barriers, especially for those without access to credit. Although access to credit by working-class people is easier in Brazil than in many other global South countries (see Sader 2013), there are many for whom this is not an option. This would be the case for the poorest of the poor and immigrants like Ibrahim. Seen through this prism, Prime deepens inequalities, creating new disparities within the lower classes. A second significant barrier is that these courses are extremely self-selective. They are sought by motivated individuals who know exactly what to expect from them. Unlike a development or educational program to promote entrepreneurship, this training is not meant to impart a transformation to a collective or develop technical skills in the population in general, but rather to enable individuals who already have a vision for what they want to do with repair skills.

Moved by the promise of making more than one thousand US dollars a month, learning to fix represents an opportunity to experience some upward social mobility through the practice of a

⁷ Fieldnotes, September 2019.

well-paid technical profession, as well as that of becoming an independent entrepreneur. Unquestionably, some students will succeed, others will not. Still, this aspirational path was so clear among my colleagues that, when I talked about my doctoral research, they would laugh and dismiss me with a “sure, you’re going to finish your studies and open a repair shop.”

Technical and Para-Technical Training

To enhance repair entrepreneurship, Prime trains its students in a combination of technical and para-technical skills, drawing on references from both street repair and high-end IT services. One of the key components of the learning process is explicit knowledge in the form of manuals and online tutorials. Prime’s manuals are self-produced by the instructors, mass photocopied, and bound with a spiral wire (Fig. 2). They consist of images and explanatory notes about cellphone components and repair tools, diagnosis flowcharts, step-by-step guides for solving common technical issues, and practical tips. Most entries are borrowed from websites like the Californian iFixit.com, which is connected to repair rights activism (see Rosner 2014), although I never witnessed any political discussions about the issue at the school. As shown by Houston (2019) in her work in Uganda, the internet plays a crucial role by enabling the formation of trans-local networks of knowledge where technicians share experiences and learn about the latest developments in cellphone technology. Throughout the training, students are taught to keep the habit of always checking these instructions in preparation for opening a device, especially when working with unfamiliar models. Just like a surgeon who must keep up with the latest science, a cellphone repairer must be updated about the ever-evolving tricks of planned obsolescence used by companies to prevent their devices’ lives from being extended. In working against these companies, cellphone repair is as much a capitalist act as it is a subversive one.

Practice is, of course, another central element in this process. After learning to diagnose common problems, students spend a good amount of time practicing how to fix them. This training consists of repeating the same operation again and again, using trial and error until one gets the gist of the movement, internalizes it, and makes it tacit (see Polanyi 1958). For instance, once we spent half an afternoon desoldering and soldering back old charging connectors, microphones, and speakers (Fig. 3). Despite its simplicity, this task can be hard to teach through instructions as

it involves constant assessment of the situation on the technician's part. This is very much in line with Ingold's (2013) notion of *correspondence*, which he uses to describe the relationship of fine attunement between person and materials that defines craftwork. Allow me to demonstrate it briefly.

First, one insulates the board and stabilizes the component before heating it with an air gun. Although there is a standard melting point for each solder, the technician must develop a feeling for how long and how close to hold the gun in order not to damage the board. With the other hand, the technician uses tweezers to gently pull the component. A tactile appraisal of the resistance of the material, aided by visual cues about the solder – which goes from a dull gray clump to a shiny silver liquid as it melts – tells you if the job is going to be difficult and whether the solder is fresh enough to be reused. Depending on these cues, to solder the component back, the technician may need to fully clean the area before applying new bonding material. Using a soldering iron and tweezers, new drops of solder are planted on the clean board and the component is reattached carefully enough to reconstruct all the circuit tracks, which sometimes requires the repetition of this entire process. All of this is done at a small scale, sometimes under a magnifying glass, so your torso, neck, and head lean in. Tactile and visual assessments of the materials' properties are thus constantly combined with actions of the two hands and an embodied sense of time and duration (Bergson 1934; Munn 1992).

A good repairer works fast but serenely, without unnecessary interruptions. Contrary to romantic images of craft as a slow process that defies capitalism (Ingold 2018; Sennett 2009), speed is vital for professional technicians. Although Prime students leave the introductory course with a fair amount of practice, some invest in advanced modules exclusively dedicated to gaining speed. In these, students spend hours repeating the same procedures, timing each other, and competing among themselves. Once on the job, the fastest hands will make more money, particularly those able to swiftly complete basic tasks such as screen and battery replacements, which comprise more than 70% of all cellphone repair jobs. Here, the popular narrative that sets up an opposition between craft and modern forms of production based on speed and repetition does not seem to hold (e.g., Langlands 2018). Scholars have discussed the shortcomings of the thesis of progressive deskilling of labor, which has roots in Marxist thought (Braverman 1974), showing that capitalism can lead to degradation of work without deskilling (Blum 2000). In the

case of repair, it seems that fast-paced capitalism and craftsmanship can go hand in hand. Speed becomes a skill that enhances repair entrepreneurship.

In our training, we were also taught to carefully consider the speed of logistics since, oftentimes, the time it takes to complete a job depends more on the availability of parts than on the procedure itself. Still, the instructors would advise against keeping large stocks of supplies. With new models coming out constantly, it would be unwise to pile up parts that can become useless, especially for those in São Paulo, who can easily have packages delivered to their doors by the swarm of *motoboys* (see Silva 2020) that orbit around Santa Efigênia. This did not apply, however, to my colleagues from the Northeast and Amazon, who made sure to go shopping before leaving the city. Although not strictly technical, this “logistical savviness” was a crucial component of speed and, therefore, of entrepreneurial success.

With increasing practice and experience, these procedures not only become organic, but the ability to improvise in the face of unexpected challenges also develops. In class, we would call these “technical readjustments,” avoiding the less reputable term *gambiarra*, a popular Brazilian word for quick-fix and workaround (see Rosas 2006). Practices of improvisation, hacking, and adaptation have been widely described in the repair literature (e.g., Houston 2013; Rifat et al. 2019). In India, the notion of *jugaad*, an analog of *gambiarra*, has even been problematically resignified by business schools as an indigenous capacity to innovate that can open new possibilities for inclusive capitalism worldwide (Kaur 2016). At Prime, however, *gambiarra* was something to joke about and conceal in favor of creating an aura of competence and professionalism.

Dealing with scores of parts and, in the case of the iPhone, with hundreds of screws of different sizes that go on top of each other, even the most methodical technicians can lose or mix up pieces. “When that happens, what do you do?” asked instructor Nando. “A technical readjustment!” Everyone laughed. Implicit in this laugh is a feeling of mischievous naughtiness, of doing something wrong but clever. “Use duct tape, a piece of rubber, a piece from an old cellphone, anything... improvise and test!” Operations like using duct tape to replace a protective piece that you have lost or feel too lazy to screw back were common. They aided swift repair (Fig. 4). And these readjustments were not specific to the repair shop. As instructors liked

to emphasize, big brands did it too. “You thought Apple didn’t do *gambiarra*? Look closer!” rejoiced Nando as he explained the differences between the iPhone 6 and iPhone 6 Plus, in which a flimsy antenna extension was used to improve signal reception after a design blunder in the first model.

Indeed, a good part of the training at Prime consisted in learning to avoid the image of informal repair shops as “*places of disorder* where the plans of global capitalist enterprises are fragmented and adapted” (Doron 2012, my emphasis). Besides being encouraged to adopt code terms like “technical readjustment,” we were taught to be carefully attentive to our self-presentation and the aesthetics of repair more generally. Keeping a tidy workbench, wearing gloves, and creating an elegant space were some of the aspects emphasized. These were so important that our manual opened with a full section on organization, which included the following instructions:

“Comfort and Well-being

Coming to work and finding the place all messy (*bagunçado*) is discouraging. Just the image of having to rummage through everything to find a component or a tool can give some people the chills. Starting the day this way is not cool (*não é legal*). Now, if you arrive in an organized environment, the feeling is different: work is encouraged, the employee feels more comfortable and even productivity improves.

Good Impression

Your customers may come to your shop looking for a service. What if they find a dirty and messy environment? That will give them a bad impression of your company, which can harm your business. After all, disorganization can also be *associated with the habits of the people* working in that environment.

Disorganization

Disorganization can be *associated with the company's mentality*. The same thing happens with organization, but in a positive way. In addition to creating *a good image*, an organized work environment helps employees find everything they need, which allows them to be more productive in their routine.

More Productivity

Organization contributes to productivity. That's because *motivated and healthy people* tend to perform better in their roles. The work environment is one of the elements that *contribute to the motivation, health, and well-being* of its employees. Investing in a clean work environment only brings benefits to the company.” (Prime [n.d.] pp.5-6, my translation, my emphasis)

Order in the workplace is thus presented as a value (see Houston et al. 2016), representing the habits and mentality of the shop owner and employees, as well as a source of health, productivity, and “a good image.”

We were advised to always wear white latex gloves. Gloves protect you from all sorts of bizarre debris that get stuck inside devices: dust, hair, tobacco, but, especially, bacteria and other residues – yes, falls in the toilet are one of the most common causes of water damage, even though most clients will not tell you it happened. But, more importantly, we learned that gloves “look classy.” They give an impression of authority and instill trust, bearing the symbolic power of expertise. Hands are central in electronics recycling, where they are constantly exposed to cuts, shocks, and toxic materials (see Rifat et al. 2019). Still, gloves were described as more of a marketing investment than a safety cost. In one of the instructor’s words:

“[Gloves] make you look like a doctor who's about to perform surgery... Clients will look at you and think, 'this guy is well-organized and competent!'... *You know, the hand draws a lot of attention...*” (Fieldnotes, September 2019, my emphasis)

Color was another recurrent aesthetic theme. Surrounded by a balanced palette of white, maroon, and navy blue, the visual experience at Prime was carefully curated. To be successful, and to distinguish ourselves from the abundance of existing boxes and street repair shops in São Paulo, we were encouraged not only to find a good location – preferably in an upper-class neighborhood and/or close to a high-end shopping mall, which will certainly be expensive – but also to follow a restrained color scheme (Fig. 5). As we were repeatedly told:

“Apple is very high-end, so they use a 90-10 color scheme of white and gray. Here, at Prime, we want to be a bit popular, so we do 60-30-10... Remember, the more colors you use, the cheaper you become!” (Fieldnotes, September 2019)

Appropriating the aesthetic protocols of multinational corporations, Prime trains students to draw on “the marks of global modernity” (Doron 2012, 570), mixing and recombining practices of formal and informal repair. The goal is simple, though not unproblematic: to appeal to customers of different social groups and, in marketing lingo, gain a competitive edge over other street repairers, possibly through debt presented as an investment.

In addition to these lessons, towards the end of the course, Prime students were provided with a most precious asset: contacts. A long spreadsheet with the numbers and addresses of electronics providers, plus access to several WhatsApp groups for mutual support, introduced students to Santa Efigênia’s opaque networks of repair. It may seem like a banal contribution, but these contacts are as essential to repair as technical skills. As famously put by Lave and Wenger (1991), becoming part of a community of practice depends not only on skillfulness but also on developing a social position compatible with the group at stake. In their work on learning to fix in Bangladesh, Ahmed et al. (2015) confirm this insight by showing that becoming a repairer depends on learning a way of being in a particular community of repairers. Since most technical operations taught at Prime can be found online, it is para-technical aspects like accessing these networks and the aesthetic concerns mentioned above that add value to its training.

Conclusion: For More and Better Repair

In the absence of viable alternatives to acquire repair skills as a working adult, Prime exploits the gap left between public vocational education and informal amateurship.⁸ It appropriates the protocols of multinational IT corporations to create a training system that promises social mobility through repair entrepreneurship. This training system is highly standardized and

⁸ Note that Brazil, and São Paulo in particular, has a strong history of public technical and vocational education and training (e.g., see Weinstein 1996), which is beyond the scope of this article.

focused on maximizing profits for new repairers, but it offers no official certification. This case adds nuance to simplistic conceptions of cellphone repair in the global South as homogeneously informal and disorderly, showing how these can be breeding grounds for a variety of novel practices and institutions.

The school introduces new paths into the cellphone technician profession, redrawing the organic boundaries of the repair community of practice. As described, repair trajectories are shaped by variables of class, gender, and ethnicity. Prime represents an opportunity for those who, for structural or personal reasons, have had no access to apprenticeships and/or were not socialized into becoming electronics enthusiasts. As I have suggested apropos of Tania and myself, these opportunities are especially important for women, as well as for people who decide to study and change careers later in life. Cost, however, can be an entry barrier, particularly for those without access to credit. Although there have been a few foreigners at Prime, there seem to be no immigrants like Ibrahim attending the school, for instance. Therefore, the school does not solve all barriers, and the consequence of this might be the reinforcement of inequalities within the lower classes. Overall, students at this school are exceptionally motivated to become self-employed repairers, which reminds us of the limitations of BoP schemes that presume the existence of a natural and universal entrepreneurial drive among the poor. It also reminds us that, even when that drive is present, proper skilling is still required.

Training at Prime draws on a combination of strategies and skills to prepare students for their ventures. It not only features technical knowledge through manuals, tutorials, and practice, but it also emphasizes para-technical skills concerning things like aesthetics, logistical savviness, and networking. For instance, students are taught to circumvent the appearance of informal street repair and draw on the symbolic power of gloves, colors, and organization as marketing tools. Improvisations, adaptations, and other common *gambiarra*s are repackaged as technical readjustments to cultivate an aura of competence and professionalism. Speedy repairs and deliveries are encouraged to increase profit and build trust.

More globally, this case prompts reflection on the dissemination and democratization of repair knowledge. Although São Paulo does not directly depend on e-waste from richer countries like many contexts in the global South (Gabrys 2011; Lepawsky 2018), the city is connected to these

global political economies of electronics through other aspects, including anti-repair regulations and designs. In a context where most people cannot afford a new phone every two or three years, repair becomes a subversive necessity. But it would be a mistake to reduce Brazilian repair to an effect of poverty. Instead, as we saw, repair can be a highly sophisticated, durable, and professionalized activity. Repairers face many challenges daily, including job precarity and exposure to toxic substances that can cause serious health problems (e.g., Sovacool 2019). Without forgetting those hardships, and the many contradictions that traverse an institution like Prime, we must ask ourselves why people keep seeking these courses and are willing to incur debt for them. As I have suggested, Prime courses offer a safe space for individuals of diverse backgrounds to acquire skills without feeling intimidated. They also provide networks of support, basic resources, access to suppliers, and practical tips, including insights into how to conduct business and organize one's work to avoid beginner mistakes. This is by no means a defense of the privatization of vocational education. I do not think of Prime as a model to be reproduced – at least not in its for-profit approach. Yet, I believe ethnographies like this help us devise better strategies for diversifying who gets to be a cellphone technician and for fostering independent, quality-driven maintenance, with the ultimate goal of making repair more inclusive and pervasive.

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Figures

Figure 1: Prime, The Cellphone University. Photograph by the author. | Alt Text: Photograph of a classroom. The instructor stands at the end of the room, pointing at a screen, while five students inspect cellphone components.

Figure 2: Self-published manuals. Photograph by the author. | Alt Text: Photograph of two manuals stacked on a colorful tablecloth.

Figure 3: Soldering practice. Photographs by the author. | Alt Text: Photographs of three students practicing component soldering on circuit boards. They wear white gloves and green aprons and look focused on the task.

Figure 4: Multimeter probe adapted with a needle for extra precision. Photograph by the author. | Alt Text: Photograph of a sewing needle soldered to a multimeter probe. The tool is being held by a white-gloved hand against a blue background.

Figure 5: A Prime's graduate new shop in Acre, next to the border with Peru. Used with permission. | Alt Text: Two photographs of a repair shop, one interior and the other exterior. The shop follows a careful and distinctive color scheme of white, yellow, and blue.