

**Fostering youth agency in a datafied world: Unraveling cartographies of possibility with speculative education and youth participatory action research in the Nayah-Irú curriculum**

by

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## **DEDICATION**

This dissertation is dedicated to the two most important people in my life. Cecilia, you believed in me even when I doubted myself. You pushed me to go beyond my limits whenever I thought I had nothing more to give. I am eternally grateful for the love we share.

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**ABSTRACT**

Building on the need for developing educational responses to the impact of data practices in our everyday lives, a new curriculum called Nayah-Irú was designed and implemented in the context of five alternative schools in Uruguay. Nayah-Irú aimed at fostering Critical Data Literacy (CDL) using speculative civic literacies, helping youth and educators envision possible futures for the use of data in their lives while challenging oppressive practices in digital platforms. By engaging in YPAR and Speculative Education, this curriculum aimed to facilitate the development of alternative perspectives to understand how data influences our lives while disrupting the normalization of datafication. The implementation of the curriculum involved artifact documentation and a youth research conference, followed by interviews with educators. This dissertation research explores how youth develop critical data literacy through the Nayah-Irú curriculum. It also examines how youth research projects serve as examples of civic participation and how educators facilitate the development of critical data literacy. Following the multiple-case study design, 7 interviews with educators and over 60 artifacts were analyzed that were collected over 10 weeks. The cross-case qualitative analysis revealed four overarching themes: (a) speculative storytelling and real-life experiences, (b) overcoming discursive loops through civic participation, (c) guided discovery as an approach to engage in CDL and (d) remapping challenges into opportunities. Based on these themes, the study proposes the Cartographies of Possibility framework to support CDL through a place-based approach that intersects speculative play and YPAR, aiming to overcome discursive closures in relationships with data. The research holds significance for educators, researchers, and stakeholders interested in fostering critical data literacy among youth from a sociocultural perspective, positioning data

literacy as a liberatory practice that cultivates awareness of systemic injustices and inspires youth to imagine more equitable futures.

## CHAPTER 1. INTRODUCTION

### Problem Statement

Data plays a significant role in the lived experiences of youth due to the increasing reliance on technologies for various aspects of life, such as education, entertainment, business, and social interactions. All aspects of human life can be transformed into data that can be used to track, monitor and predict human behavior without the users' awareness in a process known as datafication (Livingstone, 2019). Despite the growing interest in the role data plays in designing educational futures, the analysis is often culture-devoid (Siles, 2023), prioritizing instead the analysis of how data can be used to make education more efficient over the lived experiences and perspectives of the students subject to their influence.

As educational organizations become more dependent on data, youth and educators find themselves subject to its power without having much influence over the design and implementation of these systems. Living in a datafied culture means youth have been creating data traces since birth (Van Dijck, 2014). This data is collected from users to sort, track and police their behaviors (Eubanks, 2018), potentially impacting the educational experiences available to them. The proliferation of data-driven technologies has created a literacy gap, particularly among youth, who are growing up in a datafied world where data is increasingly pervasive. However, youth and educators rarely have a voice in how these systems are implemented and structured.

The lack of data literacy among youth can have potentially harmful consequences making them vulnerable to exploitation by those who control the data structures that shape our lives (Tygel & Kirsch, 2016). Datafication, the process of quantifying social behavior through the collection of extensive digital data for algorithmic decision-making and services (Eubanks, 2018;

Noble, 2018; O’Neil, 2016; Raffaghelli, 2023) is essential for these structures to exist. Despite the risks involved, the social, political, and ethical consequences of datafication in education often go unnoticed.

In education, the consequences of datafication have three specific implications (Pangrazio et al., 2022). The first implication is reductionism, where digital platforms reduce human behavior to quantifiable data. For instance, schools may use attendance and test performance data to determine learning outcomes (Selwyn et al., 2021), leading educators to prioritize behaviors that impact the data in their teaching practice. The second implication is abstraction, which involves extracting information from its context to be processed (Abrams, 2014) and later used to make inferences. However, the challenge with abstractions is that data extracted without its context often reflects the normative values of dominant structures (Benjamin, 2019). For example, mobile applications in education may reinforce certain desirable behaviors without considering the omissions and biases involved in their development (Ecclestone, 2016; Williamson, 2017). Finally, the third implication is individualization, which focuses on monitoring and evaluating individuals. Since data can be linked to specific individuals, it is possible to personalize educational content to meet their needs and interests. However, this personalization process relies on variables that may not always be accurate or appropriate, limiting opportunities for collective reflection and collaboration.

In addition to the implications discussed earlier, it is important to acknowledge the ethical implications inherent in the datafication process within education. Data can be collected to serve specific interests, and algorithms can be applied to vast amounts of data to categorize and predict people’s behaviors, leading to extensive data extraction and surveillance through commercial platforms (Buolamwini & Gebru, 2018; O’Neill, 2016; Perrotta et al., 2020). The rapid



expansion of educational solutions that profit from users' data raises ethical concerns regarding the operation of datafication in the lives of teachers and learners (Williamson, 2017; Zuboff, 2019). Consequently, not only does datafication have the potential to impact the learning process, but it can also exacerbate economic inequality as well as perpetuate racial and gender discrimination. Therefore, it is essential to engage educators and youth in incorporating literacies that allow them to critically examine how datafication operates in their everyday lives.

There are multiple approaches to engaging youth in data literacy and providing them with strategies to promote their safety and manage data (Pangrazio & Selwyn, 2018). However, given the performative nature of data circulation in our lives (Beer & Burrows, 2013), it is crucial to complement those efforts with learning experiences that capture the performative aspects of data (Nichols et al., 2021). Instead of solely focusing on educating youth about the technical structures that support digital platforms, it is essential to analyze their experiences with data from a sociocultural perspective. This approach to data literacy centers on how youth make meaning of their lived experiences in digital platforms and engage in civic participation. In understanding how datafication can become oppressive for youth, data cannot be conceived as a static unit of analysis but as textual practices that are constantly co-constructed (Kennedy, 2018). This perspective allows exploration of how youth can resist or challenge oppressive digital structures (Fotopoulou, 2019; Pangrazio & Selwyn, 2019), opening possibilities to engage in critical data literacies (CDL).

With the aim of addressing the limitations of traditional data literacy, critical data literacies (Hautea et al., 2017) emphasize foregrounding the lived experiences of youth and questioning oppressive structures. In the absence of a critical lens to data literacy, youth may perceive data as objective and independent (Kitchin, 2014) and believe information online is not

subject to reinterpretation (Pangrazio & Selwyn, 2018). Engaging with CDL is essential to reframe youth perceptions about themselves as data agents and to recognize data as personally relevant and connected to their lived experiences. Therefore, CDL encompasses three interconnected perspectives of data literacy within sociocultural frameworks: data literacy as comprehension, enabling learners to recognize how data is constructed; data literacy as critique, allowing learners to explore ways in which data perpetuates injustice; and data literacy as participation, empowering youth to view themselves as agents in the transformation, interpretation, and representation of data (Irgens et al., 2020). A sociocultural perspective of data literacy allows opportunities to develop educational responses to datafication that center on youth's lived experiences, supporting the connection between data and their lives.

By adopting a CDL approach, it becomes essential to extend this perspective to educators as well. Critical literacy studies identify educators as change agents (Morrell, 2017); however, they are often unprepared to engage in CDL education. The impact of COVID-19 on teaching and learning has led educators to prioritize digital literacy efforts in digital teaching and learning and technology use in education, with a focus on developing technical skills, while other domains like data literacy are frequently overlooked (Gouseti et al., 2023). This is further amplified by the “knowledge economy,” which places a heightened emphasis on digital literacy as relevant for employment and entrepreneurship (UNESCO, 2018). Additionally, the black-boxed nature of datafied platforms obscures the potential biases of data, making it challenging for educators to understand how data is defined, constructed, collected, shared, and commodified (Pangrazio et al., 2022), thus limiting their possibilities to engage in critical dialogues about data in their classrooms. Exploring how youth cultures navigate digital spaces is crucial for defining educational responses to datafication; however, this will not be possible without incorporating

educators in critically examining their data practices and the structures that surround them, not only from a technical perspective but also from a political and ethical dimension.

Although programs exist to introduce data literacy to support learners at schools, everyday data practices tend to occur elsewhere (Pangrazio & Sefton-Green, 2022). This realization underscores the need to develop educational responses that center the lived experiences of both youth and educators in relation to datafication. A promising approach in this regard is a place-based approach to data literacy, which enables youth and educators to make sense of their everyday understanding of data and critically examine their own practices within their contexts. By spatializing data literacy, educators can address local challenges and develop culturally responsive practices that recognize and value the diverse ways of knowing, being, and doing within their communities (Comber, 2015). This approach allows for a meaningful connection between disciplinary knowledge and the lived experiences of youth in the private sphere, fostering a deeper understanding of data and empowering youth to actively engage in civic participation regarding their use in their lives.

### **Context**

Within this study, youth in five communities in Uruguay engaged with CDL as a means of civic participation during the implementation of a curriculum to support youth development of CDL. Given the intricacies involved in developing CDL, a learning design approach was adopted that centered on youth and their existing knowledge about data. This design was collaboratively developed in partnership with a community of educators from an alternative schooling institution affiliated within the network of Centros Educativos de Capacitación y Producción (CECAP), which serves youth aged 14-20 years old who have disengaged from the formal schooling system without completing a middle school education.

The CECAP community, which experienced the repercussions of the COVID-19 pandemic, faced unique challenges due to the prolonged separation between educators and students. Notably, the community's access to technology was limited, as CECAP students were not included in the government's "one laptop per child" (OLPC) program, resulting in many students either lacking a personal device or having to share devices with family members. Furthermore, even if students managed to get access to a mobile device, a report by the Ministry of Education and Culture in Uruguay described that 35% of the families lacked internet access at home or had restricted monthly data usage (Dambrauskas et al., 2021). Within this context, educators found that many students encountered difficulties incorporating digital literacy practices into their learning activities, including tasks such as sending e-mails, utilizing video conference tools, managing accounts and passwords, and using learning platforms (Dambrauskas et al., 2021). Despite the technical limitations, educators from this community were concerned about other dimensions of youth engagement with digital platforms.

The educators actively engaged in conversations with both parents and youth during the pandemic identifying pressing concerns regarding the digital practices of the youth. These concerns encompassed a range of issues, including online gambling, grooming, social media addiction, and gaming addiction, among others. It was within this context that I became involved with the community, having received an invitation from the center coordinator, who expressed a desire to create something exciting and meaningful for the youth upon their return to school. Collaboratively, we embarked on a co-design journey to develop a curriculum that could address relevant issues surrounding datafication in their lives.

To engage learners in recontextualizing their relationships with digital spaces, we co-designed and implemented "Nayah-Irú," an alternate reality game. Within this game, a narrative

unfolds, introducing a 16-year-old female character from a future iteration of what was once known as Uruguay. Nayah-Irú resides in a society where all digital spaces have been prohibited, yet she defies the ban, driven by her curiosity about the history of digital spaces in the 21st century. Through mediums like email, social media, and virtual worlds, Nayah-Irú establishes communication with the students, seeking to uncover the reasons behind the ban and determine whether it is necessary to reconstruct the digital platforms. Ultimately, students are tasked with defining their stance - whether to provide Nayah-Irú with a grim portrayal of digital spaces which could justify the ban or to incorporate a rich myriad of perspectives to support her decision to resist. This speculative fiction leverages storytelling as an alternative to resist systemic inequities (maree brown, 2017; Mirra & Garcia, 2022) and provides opportunities to deconstruct and reimagine normative paradigms.

Nayah-Irú also integrates speculation with Youth Participatory Action Research (YPAR) (Camarota, 2008; Torre & Ayala, 2009) to deconstruct and reimagine normative approaches to data literacy and civic participation, fostering an educational intervention aimed at supporting youth and educators to challenge oppressive structures. Through their interactions with Nayah-Irú, youth embark on a journey of social dreaming by interpreting their world through the lens of Nayah-Irú's harrowing future. The outcomes of the youth research projects are disseminated using different data-informed artifacts to advise Nayah-Irú about the decision she needs to make. Thus, their research artifacts are framed as narratives, enabling youth to re-story their relationship with digital platforms and redefine their civic roles by questioning them and engaging in different forms of social action.

The implementation of the Nayah-Irú curriculum began with a single CECAP center in 2021 which expanded to encompass five diverse CECAP communities in 2022. This study

focused on investigating the second iteration of this curriculum. Educators implemented the curriculum during a 12-week process, interacting with Nayah-Irú, and conducting their research projects. Furthermore, the participating youth had the opportunity to showcase their stories and research findings during a research conference, where they engaged in knowledge sharing with fellow peers and educators from other centers and the wider community.

### **Purpose and Research Questions**

The purpose of this research was to investigate how youth engage with CDL as a means of civic participation in the context of five CECAP communities in Uruguay. This research is based on the premise that youth already possess knowledge based on their own lived experiences with data and algorithms. By understanding their lived experiences with data, youth can recognize how algorithmic and datafied practices may be harmful and engage in civic participation to resist them. This research design centers on youth and their existing knowledge about data and algorithms through the development of a participatory and action-oriented curriculum that allows youth to explore their data stories.

The guiding research questions are:

1. In what ways do youth develop their critical data literacy through their participation in the Nayah-Irú curriculum?
  - 1.1 How are youth understandings and critiques of data demonstrated during the implementation of the curriculum?
  - 1.2 How do youth research projects demonstrate examples of civic participation?
2. How do educators implement the Nayah-Irú curriculum to facilitate the youth development of critical data literacy?
  - 2.1 What specific strategies do educators use to facilitate the curriculum implementation with youth?

2.2 In what ways do educators interpret the challenges and opportunities identified during the implementation of the curriculum?

### **Significance and Rationale**

Amidst the growing concerns about the impact of datafication on youth, this study aims to contribute to the field of critical data literacy by providing insights into empowering youth to perceive the sociocultural implications of datafication. Additionally, it seeks to explore how they can challenge oppressive structures through the development of place-based responses to datafication.

Critical theories on place-based pedagogies (Gruenewald, 2003; Theobald, 2018) extend beyond the notion of space and engage in theories of place as a multidisciplinary construct. These theories emphasize the significance of incorporating students' lived experiences into pedagogical approaches. To understand how youth navigate digital spaces, it is crucial to comprehend how they integrate their literacy practices and identities across diverse places (Moje, 2004). Instead of reproducing disembodied literacy practices such as worksheets, study guides, and disciplinary knowledge about cybersecurity, it is crucial to construct student-centered conversational spaces that honor and center students' sociocultural knowledge (Souto-Manning & Martell, 2016). Adopting a place-based perspective on data literacies can assist educators in comprehending youth literacy practices as they navigate different spaces, contexts and communities. This study introduces an innovative approach employing place-based methodologies to investigate CDL practices.

Digital technologies have made it possible to reimagine ways to transcend privileged adult perspectives on what youth civic agency means. For youth to reclaim their literacy practices through place-based practices, one approach is to focus on literacy instruction as a

reflection toward social action (Martinez, 2020). Place-based action research leads students to investigate their local surroundings, introducing different dimensions of place by utilizing research methods and engaging in the political process of place-making (Gruenewald, 2003). Youth Participatory Action Research (YPAR) is a form of participatory action research (PAR) that aims to center youth voices by investigating how injustice is produced and how it can be ultimately challenged and changed (Camarota & Fine, 2008)

A salient characteristic of YPAR is that it centers youth as a historically contingent and socially produced category, meaning they are affected by the material conditions set by the discourses and social structures that surround them. Therefore, YPAR seeks to move away from deficitarian perspectives of youth and emphasize their engagement and ability to impact the world (Petroni et al., 2021). One way that YPAR honors the perspectives of youth is by amplifying their expressions of knowledge within the dominant research community (Mirra et al., 2016). This also means that youth are encouraged to creatively develop and produce new forms of text to represent their knowledge (Goodman, 2018), and express what they have learned in different forms (Mirra et al., 2016). Participation is at the heart of any strategy that may seek to enable positive changes in how we use data in society, and the use of YPAR in the design of this curriculum supports the development of data-informed conversations within and across communities.

Developing a critical approach to data literacy education poses a tension due to the oppressive nature of the digital spaces youth navigate. Although youth often feel they have no control over their data being collected by social media companies without their consent, they also feel supported by social media and find it challenging to give up using it (Vogels & Gelles-Watnick, 2023). Therefore, attempting to engage learners in critiquing these platforms can lead



to issues of vulnerability and agency that are often complex to navigate (Pangrazio & Selwyn, 2021). On the one hand, students need to be aware of the implications of datafication in their lives, but it is also important to center educational responses that honor students' voices rather than instilling the educators' perspectives of data.

In his work, *Pedagogy of the Oppressed*, first published in 1968, Paulo Freire (1970) emphasizes the importance of engaging learners in praxis that supports them in developing a critical consciousness. Freire suggests that educators should connect the personal experiences of learners to broader knowledge domains through dialogues. Although educators may have more knowledge about the underlying impacts of datafication in a student's life, learners are the ones who decide which areas to focus on, how to explore them, and which genre and medium to use to express their reflections. Thus, this study suggests avenues to create the adequate conditions to engage youth in critical discussion about data.

The Nayah-Irú curriculum uses the speculative civic literacies framework developed by Mirra and Garcia (2022) as a conceptual scaffold to overcome the limitations of incorporating a critical lens to data literacy education. Through an ethos of inquiry and innovation, this framework encourages envisioning and designing more equitable futures (Mirra & Garcia, 2017). Speculative civic literacies center on the notion of re-storying our lives (Thomas & Stornaiuolo, 2016) by fostering participatory approaches that encourage agentic resistance and public dreaming (Mirra & Garcia, 2020). This approach prioritizes youth making meaning of their experiences to understand the implications of a datafied world before exploring how the systems operate. It advocates for a practice-based approach to democratic learning, where youth actively practice citizenship and employ literacy to critically analyze and challenge oppressive structures, ultimately striving for civic freedom (Duncan-Andrade & Morrell, 2008) and

engaging in sociopolitical learning beyond the knowledge-based perspectives of civic education (Gutierrez, 2008). One of the defining features of speculative civic literacies, present in the Nayah-Irú curriculum, is the engagement in joyful social dreaming amidst the uncertainty or indifference youth may feel about digital platforms. The Nayah-Irú curriculum invites youth to imagine a dystopian future and encourages them to actively participate in resisting the oppressive structures present in that realm.

The narrative in Nayah-Irú creates a situation of cognitive dissonance, which allows youth to perceive the discrepancies and contradictions in the narratives of dominant structures (Mirra & Garcia, 2022). Instead of engaging in an abstract theoretical framework or technical exercises, educators can use this curriculum to prompt cognitive dissonance allowing students to speculate and develop alternative rhetorics (Coleman, 2021) to disrupt the normalization of datafication. By allowing critical perspectives to emerge through social dreaming and dialectic tensions, educators can foreground the vulnerability and marginalization youth experience every day, while minimizing feelings of alienation.

Participatory research that utilizes speculative approaches to data literacy is relatively uncommon in the existing literature. Educators willing to address datafication through a cultural lens in their classrooms often encounter difficulties in finding curricula that resonate with the lived experiences of their youth. This study presents a place-based curriculum tailored for and co-designed with educators who want to engage youth in exploring their data literacies. By leveraging a methodology that centers local knowledge youth already possess about datafication, it encourages them to re-shape their relationships with such structures through re-storying. This approach positions data literacy as a liberatory practice, enabling youth to raise awareness about

the systemic injustices they face amidst the pervasive presence of datafied structures in our daily lives.

This dissertation explored the engagement of youth in Uruguay with Critical Data Literacies (CDL) as a means of civic participation. The Nayah-Irú curriculum, which converges speculative civic literacies, YPAR, and place-based pedagogies, aims to facilitate youth understanding of how data is collected, used, and manipulated; identify the ways in which data can be used to perpetuate injustice; develop strategies for resisting oppressive structures; and imagine more equitable futures. The findings of this study hold implications for educators, policymakers, and other stakeholders who are interested in promoting CDL among youth from a sociocultural perspective.

## CHAPTER 2. THEORETICAL FRAMEWORK AND LITERATURE REVIEW

In this chapter, I examine the literature and research that serve as the foundation of this investigation into the lived experiences with data of youth and educators. I explore the use of youth participatory action research (YPAR) (Cammarota, 2008; Torre & Ayala, 2009) and speculative fiction (Mirra & Garcia, 2022) as tools for fostering critical data literacy development and civic engagement. The primary focus of this work is to empower youth and educators in cultivating a critical understanding of the oppressive nature of a datafied culture and providing them with tools to engage in acts of resistance that pursue social justice. This study aligns with the tradition of critical theory, which guides the examination of critical media literacy in conjunction with critical pedagogy. Additionally, I explore how place-based approaches to critical pedagogy can provide alternative pathways to support youth and educators in examining their personal relationships with data.

To begin, I discuss the influence of critical pedagogy on the study of critical media literacy. I also explore how incorporating place-based approaches to critical pedagogy can offer valuable avenues for youth and educators to critically examine their connection to data. I explore case studies that offer insights on how to engage youth in critical place-based pedagogy, facilitating resistance against oppression through dialogue and praxis.

Next, I address the role of critical media literacies countering dehumanization. I highlight the importance of speculative play and the significance of centering youth culture and encouraging social action through YPAR. To bridge critical media literacy with Critical Data Literacy (CDL), I note empirical data demonstrating the impact of datafication in education. This serves to illustrate how a culture-devoid understanding of data can lead to harmful and dehumanizing practices. Drawing from this literature, I explore both the challenges and

opportunities of engaging in data tactics as transformational resistance. Finally, I draw from existing research on speculative civic literacies and theories of resistance to provide insights into how students and educators can make sense of community issues related to data literacy.

### **Critical Pedagogy and Literacy Education**

This section examines the theoretical foundations that underpin this research, with a focus on critical pedagogy and its connection to critical media literacy. Critical pedagogy emerges from a Marxist critique of capitalism, suggesting the importance of engaging in actions that transform both self and society (Allman, 2007). It is also connected to Gramsci's (1971) notion of "social hegemony", which refers to the means through which dominant groups establish consent to maintain their position in society. Media and curricula are among the tools that dominant groups can use to create such consent. Therefore, critical educators play a crucial role in engaging individuals in questioning and redefining cultural practice in collaboration with students (Duncan-Andrade & Morrell, 2008). Given the broad scope of critical pedagogy, this section will focus on its philosophical principles to gain an understanding of its epistemological roots and identify potential connections within CDL education.

The field of critical pedagogy emerged as a response to the imposition of dominant narratives in society. At a time when schools are often viewed as institutions that prepare students for a world of subordinated labor or as an instrument of workforce development, critical pedagogy centers education as a preparation for three primary goals: 1) self-reflection, understanding the world in which we live; 2) self-managed life, becoming aware of the forces that impact and shape our lives; and 3) critical agency, developing the conditions to transform both nature and ourselves (Aronowitz, 2015; Giroux, 2011). Consequently, the co-creation of knowledge between educators and students assumes a central role in critical pedagogy.

Critical pedagogy challenges youth to transition from a state of frustration about inequity towards more agentic roles. This shift arises from praxis, “reflection and action upon the world in order to transform it” (Freire, 1970, p.51). Praxis requires the integration of theory and practice to gain an understanding of the world and engage in a process of dialogue and conscientization (Darder, 2017). Through dialogues and questions, educators can facilitate authentic learning experiences that raise awareness of societal issues and empower students to change them.

The work of Freire in Brazil, addressing the literacy gap among adult people in Pernambuco in the 1960s (Tygel & Kirsch, 2016), conceives literacy education as both a technical process of learning to read and write and an emancipatory process of developing “*conscientização*” or critical consciousness. He was responding to traditional literacy methods that introduced reading and writing in a decontextualized manner, encouraging adult learners to memorize, rather than using language as a means of self-expression. Rather than focusing solely on teaching people how to read and write, Freire understood literacy education as an emancipatory process that enables individuals to engage in understanding and expressing themselves in the world (Freire & Macedo, 1987).

Freire’s approach to literacy can be summarized in four stages (Tygel & Kirsch, 2016). The first stage is the investigation stage, where learners analyze reality and reflect on the social inequities they experience in their everyday lives. Educators engage in dialogues about specific aspects of the students’ lives and promote the expression of extreme situations (Corazza, 2003). An extreme situation or *situação-limite* (Freire, 1974) refers to a situation that leads to human acts that transform one’s reality. These extreme situations are not seen as the end of the road for enacting possible changes, but rather as boundaries beyond what initially seems impossible

(Gomes Moreira & Souza Lobo Guzzo, 2013). Through research and inquiry, educators can support learners in generating themes for literacy education.

Once learners can discuss these extreme situations, they enter the second stage, thematization, which involves analyzing the problems and identifying themes based on learners' lived experiences. Learners engage in coding reality through various forms of representations, such as symbols, language, drawings, or images, and decoding these representations to generate new information (Freire, 2005), often employing more abstract coding methods (Tygel & Kirsch, 2016).

In the third stage, the problematization stage, the discussions elaborated in the previous phases lead to dialogues about social and political aspects of learners' lives, specifically exploring how learners can become catalysts in transforming these aspects (Freire, 1974). Finally, in the systematization stage, students organize, interpret, and disseminate their ideas to inspire change in other communities (Tygel & Kirsch, 2016) by developing alternative perspectives of the lived world (Ghiso, 2011). In summary, the process of critical consciousness in literacy education involves a process of critical inquiry that supports knowledge production based on local experiences and participatory democracy practices (Adams & Streck, 2010).

Many scholars have employed critical literacy toward social action (Martinez, 2020) in the classroom, creating spaces for students to learn and embrace their identities as intellectuals (Garcia & Morrell, 2022). For example, The Council of Youth Research, as described by Mirra et al. (2013), is a program that engages students and teachers in dialogues about civic literacy and democratic practices. The Council aims to counteract the neoliberal agenda of schooling spaces, which often prioritize certain dominant perspectives and create oppressive spaces through standardized curricula, gifted programs, and the elimination of bilingual programs. In

this program, knowledge production is a form of counterhegemony, where students produce documentary films that challenge the conditions of their school, incorporating interviews that reflect stories of inequality and hope, and engaging in online communities to share blog postings about their projects around the country.

The Youth Writing Collective, as described by Flores (2018), is a summer creative writing program that aims to amplify the voices of linguistically diverse youth living on the U.S.-Mexico border. Flores explores how these youth struggle to make sense of their personal identities while navigating restrictive language and literacy curricula. The collective revolves around three questions: Why am I here? Where am I from? and What does community mean to me? Participants are invited to write, draw, or use other modes in their free writing, and pláticas are used to engage in conversations with community members to learn about their career pathways and experiences navigating college. Through their writing and sharing of their experiences, the students' voices transform silence into a powerful tool and offer insights into how classrooms can be reimaged as spaces for deconstructing systems of oppression.

In "Ask Anansi," as described by Garcia (2013), students are engaged in critical literacy instruction using participatory media practices in both digital and non-digital spaces. The curriculum involves a scavenger hunt game where students critically interpret their experiences in and around schools, eventually transforming into the roles of creators of new clues in the scavenger hunt. The game revolves around Anansi, a trickster spider god from Caribbean folklore who uses tricks and riddles to answer questions. In the culmination of the game, students design a story for Anansi in the form of a scavenger hunt, tasked with empowering a counter-narrative about their community and challenging dominant stereotypes. This experience allows students to engage in research practices that are similar to those of an indigenous anthropologist,



as they seek to make sense of the complex relationship between time, space, and literacies, ultimately participating in a form of worldbuilding.

The three examples presented above demonstrate how literacy education can be approached through investigation of community problems, development of themes, and engagement in different forms of action. However, while Freire's critical approach to literacy emphasizes critical inquiry with community issues, datafication as a challenge presents specific nuances.

Data literacy is built on the premise that it can only be developed effectively if there is a deep understanding of the contexts within which datafication is taking place. However, such contexts are difficult to visualize as youth navigate a multiplicity of digital spaces every day, which also influence the material world in different ways. Thus, there is a need to incorporate place-based approaches to critical literacy and pedagogy to provide avenues for educators and learners to develop both skills and critical awareness to comprehend how data is constructed, critique how data is framed in our lives, and how we can be empowered within the places in which we live (Irgens et al., 2020).

### **Place-Based Approach to Critical Data Literacy**

Given critical pedagogy's goal of challenging social reproduction, it is necessary to redress how structures are constituted to permit some people more advantage over others, thus perpetuating inequality (Garcia & Morrell, 2022). Consequently, it is important to examine what is happening beyond the four walls of the classrooms. Human beings, and learners, exist in a cultural context. By reflecting upon their own "situationality," they can challenge such contexts and take action (Freire, 1970). However, in order to change the world, it is necessary for students to learn how to understand it (Freire, 1970; 1998). Freire's understanding of literacy placed special emphasis on knowing how to read the world and understanding our role in changing the

world as central to critical consciousness. When learners and educators interpret their lived experiences in place (reading the world) as texts, they can engage in praxis – reflection and action - to change the world (writing the world) (Gruenewald, 2013; McLaren, 2003). In essence, critical pedagogy and place-based education share the goal of centering pedagogical practice in transforming the oppressive elements of reality (Gruenewald, 2013). Place-based education emphasizes the need to engage in practices that support our understanding of how to read and write the world. This is particularly relevant for data literacy given the complexity of digital platforms. To support youth in reading the world on digital platforms, researchers and educators need to look into literacies that focus on making sense of complex spaces.

Emergent literacies incorporate socio-spatial, socio-material, and sensory dimensions (Howes, 2015), which expand the understanding of diverse ways of doing and knowing about the world. The role of space in literacy practices requires unpacking the trajectories of spatial theories since modern conceptions of space. Modern theories conceived space as empty, neutral, and available to be filled up (Leander and Sheehy, 2004). Postmodern perspectives on space (De Certeau, 1984; Foucault, 1972; Lefebvre, 1991; Massey, 2005) began to expand this notion by introducing multiple dimensions: geographic, demographic, sociological, ecological, political, national, global, among many others (Soja, 1989).

The work of Doreen Massey has been fundamental in reconceptualizing how we understand space and place and can be important in understanding how we navigate digital spaces. Massey (2005) makes three propositions for space. The first is that space is a product of interrelations: space is a “simultaneity of stories so far” (Massey (2005, p.9), meaning that our understanding of space is constructed through multiple spatialities embedded in our practices (Massey, 2006). For example, youth playing online games may engage with other online players,

spend time with friends sharing experiences with the game at school, create illustrations about their favorite characters, and save money from a part-time job to buy game currency. All these different spatial experiences shape their understanding of that gaming space.

The second proposition introduced by Massey (2005) is that space needs to be imagined as a sphere of possibility that allows for the existence of multiplicity and heterogeneity. When youth engage in playing an online game, they share time and space with other players around the world. For a few minutes, two different trajectories, heterogeneous in nature, coexist. Imagining space as a sphere of possibility implies recognizing that an episode cannot be told from a single perspective (Massey, 2005). For example, the narrative of the youth who plays online games may depict a very different narrative than the perspective of an educator who has never participated in an online gaming session or a parent who is concerned about their children's amount of screen time. All these narratives simultaneously coexist with other narratives with their own trajectories, with distinct characteristics and potentially different futures. Understanding space as a sphere of possibility is also a way to push back against global narratives that do not recognize the coexistence of other histories (Massey, 2005).

Finally, Massey proposes that space is always in process and always becoming, which creates opportunities for possible futures (Skelton, 2009). The openness of space allows opportunities to also imagine the openness of the future, thus escaping the inexorability of the grand narratives. Returning to the example of the youth playing games, one may feel tempted to believe that this youth is subject to a system that collects data about his gaming preferences to tailor offers that will keep them engaged and willing to spend more money in an endless loop as if he were living in a grand and uncontestable narrative. Massey (2005) instead rejects this type

of formulation and argues for a radical openness of the future: “Only if the future is open is there any ground for a politics which can make a difference” (p. 11).

In summary, the term “space” does not refer to possessions or fenced-off areas, but to the dynamic relations between different spatialities. This is where the concept of place becomes important. To Massey (2005), while space can be understood as a simultaneity of stories-so-far, “places are collections of those stories” (p.130), representations of how space operates in our lives. Literacy practices in datafied platforms cannot be confined to technical descriptions; instead, they need to be perceived as a sphere of possibility where multiple spatialities converge and which can be transformed. However, to make sense of such space, it is also necessary to focus on the place, the subjective and emotional attachments we build across the spaces we navigate.

New perspectives of space and place have been incorporated into literacy studies leading to the development of a new field of socio-spatial literacies (Mills & Comber, 2013). Seeking to understand data literacy from a place-based perspective requires incorporating three acknowledgments from sociospatial literacies: a) textual practices are sociogeographically distributed; b) space and literacy practices are socially constructed; and c) power is imbued in all literacy spaces.

The first acknowledgment of socio-spatial literacies is that textual practices are socio-geographically distributed and manifest in distinct forms (Mills & Comber, 2015). The phenomenon of globalization, including the presence of international corporations, the improvements in transportation and communication, have led to a time-space compression (Harvey, 1990), allowing for a new understanding of place as more complex and hybrid (Massey, 1995). Similarly, our literacy practices, especially those of children and youth, are

adapting to globality. Mapping where and when youth engage in knowledge learning, sharing, and building has become increasingly challenging as the time they spend online may surpass the time they spend at school.

Despite the challenges of navigating multiple spaces, youth can adapt their local realities to the global movements present in digital platforms. Massey (1998) explains that local specificity is constantly being reinvented while global, international influences continue to be incorporated as people import, adopt and adapt cultural objects. This implies that youth navigating digital spaces are not passively subject to datafied practices. Instead, they are constantly negotiating the relations and interconnections of data in their lives, from the local to the global.

The second acknowledgment of socio-spatial literacy is that both space and literacy practices are socially constructed. Literacy practices are always configured in social spaces; space shapes literacy practices, and the practices can also organize the space itself (Leander & Sheehy, 2004). Therefore, socio-spatial literacy focuses on the materiality of space and how it connects to literacy practices instead of focusing on the socio-cultural context alone (Mills & Comber, 2013). Sociospatial approaches to literacy can help educators and researchers to make sense of how discursive practices are produced within spaces, including the space in the interpretation of those discourses, rather than considering it to be in the background. This implication is crucial for data literacy education as it demonstrates the relevance of considering how space has been constructed by educators and learners and how they use the tools available in that space to enact their literacy practices.

Finally, the third acknowledgment in socio-spatial literacies is that literacy practices cannot be interpreted without their larger social contexts and power relations. While the

construction of space occurs in multiple ways through social interaction, power structures lead to the fixation of spaces that attempt to homogenize certain values and practices (Luke & Freebody, 1997; Street, 2006). Thus, acknowledging how power manifests in our relations with space and literacy can help us visualize the patterns of marginalization that are socially and geographically constructed (Soja, 1996). Capitalism has always required the displacement of certain groups to allow for the accumulation of others (Harvey, 2003). The colonial naming and mapping practices that have dispossessed indigenous people of their lands serve as a salient example of such practices Brooks, 2008; McKittrick, 2006). Foucault (1975) theorized that the increase of prisons in nineteenth-century Europe was compliant with the notion of capitalist accumulation, illustrating the relationship between power and the use of social space. McKittrick (2006) also uses prisons to describe how historically human beings have been placed in forms of nonexistence, places where they can only be charted as static. These two examples show examples of displacement, the process by which certain narratives about space and place are reinforced to erase alternative forms of place-making (McKittrick, 2006).

Lipsitz (2011) exemplifies the spatial dimensions of power asymmetries by pointing out that explaining disparities between white people and people of color based solely on race can lead to racist arguments that blame people of color for their inability to use their freedom. It is necessary to incorporate space into the analysis of race to describe how whiteness has operated as a spatialized advantage. To understand racial inequity, it is also necessary to examine other forms of segregation, such as housing disparity manifested through redlining practices and unequal access to mortgage opportunities, forced assimilation (i.e., loss of language, culture, history, society), often experienced by indigenous people, and taxation and transportation, among others as these elements can explain how space and race are co-constructed (Lipsitz,

1998). Examining the roots of racism (space) alone is not enough; it is necessary to understand how the routes of racism (place) have led to the construction of injustice (Massey, 2005).

Similarly, attempting to understand how datafication has the potential to harm youth and educators by examining how these platforms are technically constructed is not sufficient if we do not consider how datafication is experienced in their everyday lives.

These three implications of sociospatial literacies require educators and researchers in data literacy education to consider that: 1) data literacy practices are not dictated by platforms or dominant practices, but they are constantly re-negotiated by users in space; 2) we need to understand how data literacy practices have been socially constructed by users during their interactions rather than attempting to assume all literacy practices are enacted in the same way; 3) seeking to understand how inequity manifests in digital platforms can only be possible if we examine the routes youth navigate that may lead to the construction of such injustice.

### **Imagining Space: Critical Literacies in Place**

Current research in education has shifted its attention to understanding the implications of the lived experiences of learners beyond the walls of a classroom (Baldrige et al., 2011), which has also involved looking into out-of-school learning approaches that may inform formal education. This shift has led to a significant body of literature that focuses on multicultural theory (Banks, 2013), culturally relevant (Ladson-Billings, 2014) and culturally sustaining pedagogy (Paris, 2012) to make sense of the lived experiences of youth out-of-school in order to imagine new pedagogical approaches. Paris's approach to culturally relevant pedagogy (CRP) seeks to overcome dominant language, literacies, and cultural ways of knowing, sustaining, and extending youth cultures rather than focusing on creating curricula that may only focus on being relevant or responsive (Paris, 2012; Dyke et al. 2020). The work of Ladson-Billings (2006) and Valenzuela (2005) have demonstrated the benefits of introducing youth cultures and histories as

ways of knowing. Still, the voices of marginalized youth are largely underrepresented in the design of learning experiences due to racial, linguistic, cultural, and gendered hierarchies encoded into merit-based, colorblind policies (Dyke et al. 2020).

One essential framework in incorporating cultural perspectives to pedagogical practice has been LatCrit theory, a branch of Critical Race Theory. This framework theorizes and examines ways in which race and racism impact people of color, specifically Latinas/os Theory (Solorzano & Yosso, 2001) placing special emphasis on the issues “often ignored by critical race theorists such as language, immigration, ethnicity, culture, identity, phenotype, and sexuality (Solorzano & Yosso, 2001, p. 311). In exploring educational issues, LatCrit theory emphasizes the need to acknowledge how educational structures and discourses operate in ways that oppress and marginalize students (Delgado Bernal, 2002).

One approach in LatCrit has been the use of counterstories and testimonios to legitimize youth voices and identify the oppressive structures present in different spaces. counterstories utilize various analytical methods such as cultural intuition, community-based knowledge systems, and multidisciplinary approaches such as critical historical investigation, autoethnography, and collective memory work. These approaches aim to challenge and disrupt racial and cultural hierarchies while generating knowledge that supports acts of resistance (Delgado Bernal, 2013; Yosso, 2005). Therefore, counterstorytelling is not a means to validate one specific story about lived experiences, but a means to complicate the understanding of the truth in digital spaces (Gachago & Cronje, 2015).

Somerville (2007) engaged in counter-stories with Australian indigenous and nonindigenous communities to understand the relationships between dominant and alternative meanings of water. The study builds on three principles that are central in understanding how



place and learning interact. (1) Place-learning is always embodied and local. Stories around natural elements in indigenous cultures are often blended with everyday accounts from communities who interact with such elements; (2) Place is frequently represented through storytelling and material artifacts; (3) The stories told about places are often contested with other stories (Somerville, 2007).

Students learn about space through their local and embodied experiences, and they can make sense of these experiences through stories. For example, Latinx students in the US may experience high school as a space where their identities as people of color affect their relationships with teachers (Mills and Comber, 2015). This youth will make sense of this experience through stories that they will tell friends, family, or even school authorities. However, school leadership may have built their own account of the place, endowing it with notions of justice and diversity which may contest the stories of other students. Critical pedagogies of place need teachers to guide students in analyzing the material conditions of the places they inhabit and engaging in literacy practices that allow them to re-construct those places (Mills and Comber, 2015).

Supporting educators in developing place-based responses to data literacy that honor youth's ways of knowing in digital platforms is particularly challenging in data literacy education. Digital platforms operationalize in ways that foster a sense of discursive closure, thus limiting the potential for storytelling. This discursive closure reinforces narratives of inevitability and powerlessness (Markham, 2020), further perpetuating deficit discourses connected to educators, youth and schooling in media and academic texts. These "texts of terror" (Rappaport, 2000) often place blame on marginalized communities for their economic conditions and

complicate youth and educators' possibilities to engage in counterstorying their lived experiences.

To counteract this, it becomes necessary to contest dominant cultural narratives and instead emphasize the agency and positive contributions of marginalized communities as positive agents. By enacting pedagogical approaches that envision other alternatives we can embrace “a vision through pedagogy that creates... a transformed set of relationships and possibilities for social futures; a vision that is lived in schools” (Cope & Kalantzis, 2000, p. 19). To engage in this type of vision, it is necessary to find alternative trajectories for possible futures. An imaginary is what emerges as someone speculates about something they do not know, casts into the future or the past, and thinks about what the world may be like, was like or could be like in another time or space (Markham, 2020). Humans are capable of making sense of complex spaces through narratives (Myerhoff, 1978) and this opens opportunities for youth to engage in using counter-stories to support the assembly of complex literacy repertoires (Comber, 2015).

School spaces have become meeting places for people to negotiate ways of being, acting, and knowing. For Massey (2005), space can be seen as “an ever-shifting constellation of trajectories” (p. 151). Educators mediate these trajectories every day, standing in front of groups that are the unique result of a multiplicity of distinct, though related, histories that merge into one space. In this context, literacy teaching and learning needs to acknowledge the political nature of the diverse trajectories students bring to school (Comber, 2015) and provide youth with opportunities to navigate spaces strategically and tactically (Lankshear & Knobel, 2002) to create cartographies that allow them to imagine other spaces.

### **Cartographies Centering Youth Voices**

The history of maps in human society can provide insights into how power is operationalized in digital platforms. The act of mapping or cartography is a dual construct (Corner, 1999). On the one hand, maps are analog representations of space, but they are also abstractions which represent the perspectives of those people who make the maps to produce memories in space that can perpetuate certain memories over others (Harvey, 1996). Maps first acted as advertisements, seeking to encourage settlers to move to vast and fictitiously empty landscapes; maps were also used to abstract and simplify how imperialism operated (Scott, 1999; Dyke et al. 2020). However, despite being artifacts used by states to disseminate ideas about hegemony, maps have also been used by communities to tell stories that go beyond state-driven narratives. For decolonial theorist Mignolo (2011), the act of telling stories that overcome the abstraction and simplification of dominant ways of knowing is an act of decolonial thinking or deterritorialization.

The use of social media as a form of activism is an example of deterritorialization and reterritorialization of digital spaces; youth are capable of reclaiming decentered literacy practices of marginalized cultures as valid in the literacy practices of the dominant, white, middle classes (Mills, 2011; Mills & Comber, 2015). Deterritorialization involves challenging current, dominant representations of space, and engaging in representing the world using a new type of cartography that allows youth and educators to re-territorialize and re-imagine the spaces they inhabit. Mohanty (2003) introduced the concept of cartographies of struggle to emphasize the need to create maps that look into the intersecting lines of simultaneous oppression. Cartography is more than making maps; it refers to the act of making and remaking maps to recognize marginality and sovereignty (Smith, 2013).

The act of Cartography has the potential to engage in critical place-based pedagogy by allowing learners to make and remake existing territories as they navigate processes of inclusion and exclusion. Mapping makes conflicting cartographies visible and provides opportunities to create new spatial possibilities as counterspaces. Counterspaces are spatial projects which can be produced through the political imagination and practice of social movement representing an alternative to dominant spaces which operate in the systems we navigate (Magaña, 2020).

Counter-mapping is a mapping practice where marginalized communities resist conventional representations of space to address oppressive relations in space allowing for the creation of multiple textual, visual, auditory, and spatial artifacts that engage mapmakers in critical reflection and understanding of lived experiences (Gutierrez-Ujaque & Jeyasingham, 2021). Gutierrez-Ujaque and Jeyasingham (2021) found that using counter-mapping in examining public spaces with higher-education students allowed them to examine their social and material practices. The students also engaged in exploring complex systems of marginalization leading to deeper exchanges with people and spaces. Also, counter-mapping allowed youth to become more aware of the particular experiences of exclusion. Finally, the counter-mapping experience also led to the generation of new knowledge.

The construction of counterspaces is an approach to pedagogy, research and methodology that challenges oppressive structures by pluralizing our conceptions of place (Frith & Richter, 2021), thus allowing marginalized communities to tap into cultural intuition, community knowledge traditions, and collective memory (Dyke et al., 2020). Counterspaces as cartography can provide insights into culturally informed knowledge of place that considers multiple perspectives of the lived experiences of educators and students and educators enacting different forms of (re)mapping (Goeman, 2013) which can be defined as:

the labor Native authors and the communities they write within and about undertake in the simultaneously metaphoric and material capacities of map making, to generate new possibilities (p.3).

Cartography provides affordances for youth to (re)map space through the explorations of the different places they have socially constructed, thus engaging with space not as a neutral vacuum but as spheres of possibility and space. “A simultaneity of stories so far” (Massey, 2005, p.9).

### **Youth Voices: Contributions from Critical Media Literacy**

To develop agency in a data saturated infrastructure, it is imperative to gain new understandings of literacies “on-the-move” (Leander et al., 2010; Stornaiuolo et al. 2017). The field of critical media literacy provides effective avenues to explore how data literacy efforts can be incorporated. Critical media literacy has focused on supporting youth to raise awareness of the role that media plays in shaping their thoughts (Baker-Bell et al., 2017). Critical media literacy educators engage youth in learning from media in order to resist media manipulation and use media constructively (Kellner & Share, 2007), thus examining technology as a site of struggle in which online and offline structure can collide (Kersch & Lesley, 2019). This approach requires emphasizing the context in which the literacy practices take place through meaningful pedagogies rather than solely addressing the way in which data operates in our lives from a technical perspective.

Engaging in critical media literacy requires looking at ways in which youth are influenced by media but also exploring how youth are influencing the world around them through media participation. To engage in critical media pedagogy, it is necessary to center youth cultures by engaging them in classrooms. Garcia and Morrell (2022) identify six actions educators can take to engage in centering youth voices: 1) students at the center; 2) authenticity

as a standard; 3) get in touch with students' digital lives; 4) keep it playful; 5) centering action; and 6) put it all together.

### **Authenticity and Community Connections**

Polman (2012) identifies three kinds of authenticity that educators often need to achieve: personal agency, authentic community connections, and externally authentic cultural tools.

Authenticity is often perceived as valuable by educators and learners as it can lead to increased excitement and connection. A study by Polman et al. (2018) in which teachers and researchers co-designed a course to make English Language Arts more engaging for students. The study showed that the activities supported self-reflection and allowed students to choose topics, groups, class time, etc. (personal agency). This agency, however, was not perceived as such by students because of the opportunity to select topics or means of expression but because they were given the chance to determine how they would spend their time on this project. The study also showed that youth showed higher levels of engagement when they started considering their audiences for their final products, thus demonstrating the relevance of engaging in building authentic connections with community members. Also, youth found it relevant to create products that mirror those found in the real world and make use of technical and research tools professionals use.

### **Connecting with Students' Digital Lives through Analog Pedagogies**

An approach to media literacy requires engaging in discussions and reflections about the media students consume but also produce. This practice can be complex as students may not want their teachers to learn of their online practices (Garcia & Morrell, 2022). Thus, centering youth voices regarding their digital practices may require engaging in critical discussion about our digital lives within the analog spaces we use as our classrooms.

An ethnographic study by Antero Garcia (2020) engaged in observing role-playing games at two gaming cafes to explore issues of identity, play and power in gaming literacies. Garcia identified that gaming literacies were developed and sustained in multiple spaces: at the gaming table, in the game, and beyond the table and connected this phenomenon to Steinkuehler's (2007) description of a constellation of literacy practices identified in online video games. Each space within this activity presented different domains of literacy. The in-game literacies focused on constructing a world through mediated activity while the at-the-table practices focused on teaching new players, strategizing, engaging in dialogues, scheduling, among others. Finally, Garcia found that some literacies were enacted beyond the table such as painting miniatures, attending conventions, posting in online forums, among others. This study is an example of how digital literacies are not constrained by digital platforms. Instead, these spaces are continually redeveloped and shaped by cultural practices.

### **Speculation and Play**

Games and play can create opportunities to engage youth in issues of social justice. In times when youth are victims of increased surveillance, criminalization and discrimination, they seldom have the freedom to engage in exploration and imagination (Garcia & Morrell, 2022). For example, Lafontaine et al. (2020) describe a Participatory Action Research project where youth were involved in developing an escape-room game, Sandra's Keys, about older adult mistreatment. The authors engaged in the work of Augusto Boal (1979), Theatre of the Oppressed, who developed a series of participatory actions, exercises and games to facilitate conversations about the process of conscientization (Freire, 1970). Using forum theatre and escape room design, youth engaged in a social justice game where they connected activism to their gaming literacies. The authors argue that this experience allowed them to challenge

dominant frames by countering social expectations related to abuse and age through an activity that had a significant cultural meaning among youth in the community.

In a study to engage children in reflecting on the use of self-tracking devices, Agesilaou and Kyza (2021) utilized a gamified approach in which youth were presented with a mission; a director of a company that collects data from children using data trackers is asking them for help to reply to different user requests such as a sports company requesting personal data from children to send them promotional emails, a health insurance company asking for a girl's medical data to evaluate her medical coverage and a children's gym owner who wishes to post their activity data on a website for a monthly competition. The authors found that this speculative playful scenario offered opportunities to discuss the scenarios by developing different evidence-based arguments.

There are other forms of playful texts that can be taken into consideration. While most literacy practices at schools focus on informational texts for disciplinary purposes, literature and storytelling. Imaginative texts can introduce youth to visions of the world which contest what counts as possible and impossible in developing future worlds and societies (Garcia & Morrell, 2022). Toliver (2020) used speculative fiction to engage a group of Black middle school girls in the southeast United States in storytelling to critique social injustice. The author found how youth weaved their personal experiences into fantastic narratives to inspire readers to act. One of the students created a narrative about a police state in which torture and silence are used to enforce citizens into submission. The author described how the youth connected the history of police violence and murder of Black people to a narrative about a group of protestors in a civil rights movement. Jordan et al. (2021) used speculative fiction to challenge pessimistic visions of the future in environmental education.



The use of speculative fiction present in literature and games is not just an optional element to motivate students. Play and speculation can support youth in re-creating futures and spaces, thus engaging in social dreaming to make sense of and build worlds centering play as a leading activity in changing the world (Arada et al., 2022; Espinoza, 2008; Gutierrez et al. 2017; Mitchell & Chaudhury, 2020).

### **Action and Participation: Youth Participatory Action Research**

In addressing action and participation in the classroom, Garcia and Morrell (2022) describe the importance of making intentional decisions about how these two actions will be enacted in the classroom. An active classroom will require different roles for students, leadership shifts, different classroom arrangements, and, most importantly, a common understanding about the projected outcomes of the student's actions. The authors recommend a “Goldilocks-like” approach where educators may find balance between undertaking a project so large that students will find inconsequential or a topic so minuscule that students’ actions feel unimportant.

One way in which youth can do this is by engaging in Youth Participatory Action Research (YPAR) as a praxis approach to empower youth in developing a critical consciousness (Cammarota, 2017). YPAR can provide youth with opportunities to reclaim their right to use the knowledge they already hold about the world, thus reclaiming space. YPAR is a form of participatory action research (PAR) whose main goal is youth empowerment by teaching youth how injustice is produced and examining how it can be ultimately challenged and changed (Cammarota and Fine, 2008).

YPAR initiatives with students can support literacy educators and researchers to develop culturally sustaining learning spaces that foster pluralism as part of a democratic perspective of schooling (Paris & Alim, 2014). In YPAR, students get the opportunity to center and critique their personal experiences with data by examining research questions that are connected to their

lived experiences across multiple spaces (Fine & Torre, 2004). YPAR supports youth critical inquiry processes by introducing them to different research methods, developing research questions, implementing data collection tools, collecting data, analyzing the data and developing research findings with multiple audiences (Marciano & Beymer, 2022; Mirra et al., 2016). While students are introduced to research methods, the approach to research is not guided by neoliberal approaches which often de-legitimize local knowledge (Cockburn, 2005), focusing instead on capacity building and community responsiveness to the needs of the community. In engaging with envisioning new possibilities to datafication that dismantle determinism, trajectorism and inevitability, it is necessary to engage in models that unearth alternatives from youth-driven perspectives.

For example, Garcia (2020b) engaged students in a research project about the absence of love and the perpetuation of stereotypes in South Central Los Angeles. He created a fictional character who interacted with characters thus blurring the lines between research and play. In this YPAR project, Garcia was guided by three principles: the collective investigation of the problem, the reliance on local, indigenous knowledge, and the desire to take action (McIntyre, 2000). The project was organized into three stages: 1) inform, where students gathered and analyzed information to produce their work; 2) perform, where students used the knowledge they acquired to produce new work; and 3) transform, where students extended the game experience to a curated public exhibit to impact the public's reading and interpretation of the South Central community.

In a series of case studies combining YPAR with the use of a participatory application, Streetwyze, to collect community-based data about public health tagging photos, audio, video while also sharing stories about important themes, Shah (2020) found that youth expressed how

their participation helped them develop their confidence, connections with others, a sense of responsibility for others, a sense of agency. Additionally, Shah (2020) found that youth felt they were more aware of the inequitable systems that disproportionately affected their communities. For example, youth used the technology to identify how targeted tobacco advertising did not follow state guidelines regarding proximity to school-sites and that the number of tobacco outlets in their neighborhoods were higher than what the official county data reported, indicating a gap that could have health implications for the community. These two examples of YPAR exemplify how this approach can incorporate the use of technology to have youth investigate their lived experiences while centering their local knowledge.

### **Putting It All Together: An Epistemology of Youth Knowledge**

The actions described in this section to centralize youth lived experiences can allow educators to build and interpret new and relevant knowledge in classrooms. By shifting from assumptions of adult expertise, these actions build on the interests of students, engage them in imagining possible worlds, and connect the school literacies to the world that exists around them beyond the walls of the classroom.

### **The Need for Critical Data Literacy**

Although conversations about datafication in education are relatively new, conversations about data literacy and the need to develop date a much longer time (Rubin, 2020). The idea behind earlier notions of data literacy was that all adults should be able to interpret and critically evaluate information drawn from data (Gal, 2002). However, the wide availability of open data, our growing presence in digital platforms, and the amount of data traces we can generate require educators to refine their understanding of data literacy (Louie, 2022).

Bargagliotti et al. (2020) identified four cyclical steps in the process of data inquiry: 1) asking questions that could be answered with data; 2) collecting data that could answer those questions; 3) using statistics to analyze the data; and 4) interpreting results to answer the questions. However, given the complexity of today's data, D'Ignazio and Bhargava (2015) recommend adding new abilities to data literacy regarding the identification of when and where data is being collected; what algorithms are and how they draw conclusions about individuals; and the ability to evaluate the ethical impacts of data-driven decisions for individuals and for society.

D'Ignazio and Bhargava's (2015) recommendations reflect the concerns about the way in which data may affect our lives. Power can be used to maintain power hierarchies (Bhargava et al., 2015; D'Ignazio & Klein, 2017) through the collection of vast amounts of data without the users' consent thus leading to a loss of personal autonomy (Pangrazio & Selwyn, 2019). Not understanding how data operates in our lives can risk exploitation by those actors who control the structures (Tygel & Kirsch, 2016). Data can be collected to serve specific interests (Bhargava et al., 2015), algorithms can be used on large-scale data to categorize and predict people's behaviors thus provoking economic inequality (O'Neill, 2016) or racial and gender discrimination (Buolamwini & Selwyn, 2018; Noble, 2018).

The proliferation of this platform logics requires datafication to be possible - transforming social activity into quantifiable data (Sadowski, 2019). Reducing social behavior to numbers that can be subject to prediction and tracking. Social media relies on datafication to determine what advertisements or contents may be accessible to certain users (Butcher, 2012). There are also ethical concerns about the way in which platforms can sell user-data to third parties in order to engage users in behaviors that lead to profitable outcomes (Zuboff, 2019).

Thus, the promises of platforms and datafication need to be contrasted with their potential risks to impact users' privacy, and expand mechanisms for surveillance (Benjamin, 2019).

These tensions also have implications for education, especially in the integration of educational technologies and their promises of digital transformation (Selwyn et al. 2017) and the rise of personalized learning. Applications like ClassDojo allow educators to collect data regarding student behavior. While there have been studies demonstrating ClassDojo's effectiveness to support student engagement, there are scholars who show a different perspective. Williamson (2017) described how tools like ClassDojo may be able to collect data for measuring behaviors, but it is also a technology of psycho-compulsion and behavior modification that promotes teachers awarding positive feedback to behaviors deemed appropriate. This notion strongly aligns with the industry values of competition, disruption, individualization, quantification and speed (Robinson & Milbourne, 2019) making social emotional learning functional through a datafied tool.

Current datafied platforms reflect how configurations of power circulate; the platformization of education extends the regimes of standardization to more invasive and refined scales such as biometrics (eye-movements, facial expressions) (Williamson, 2018) that seek to rank and control students in return for promising adaptive and student-centered outcomes. Thus, it is essential to engage in literacies that incorporate the ethical considerations of whether and how data should be used and collected (Baumer, 2022), including the critique of the power structures that may use data in ways that can harm others.

### **Current Approaches to Address Datafication**

Within the context of datafication, there exist several potential approaches for society to respond to its harmful effects: regulatory and technical responses, data safety practices, data science, data hacking and media literacy (Pangrazio & Selwyn, 2019).

The implementation of regulatory responses designed to mitigate power imbalances (terms and conditions) is often complemented by the utilization of technical resources as counter tactics to prevent unwanted data collection (ad blockers, VPNs, etc.). However, the lack of understanding of digital rights among younger members of society may prevent them from being able to effectively assert those rights, and technical measures can be circumvented by tech companies, rendering them ineffective (Pangrazio & Sefton-Green, 2022).

Data safety practices are strongly connected with notions of cybersafety focusing on the development of skills to manage and control personal data. One limitation with this approach is that it tends to focus on personal data that users often volunteer consciously. This is a popular approach in schools as it consists of normative strategies that can be transmitted to students such as adjusting settings or reading terms and conditions (Pangrazio & Selwyn, 2018).

Data science involves a systematic analysis of the organization, properties and analysis of data (Dhar, 2013) and are often directed towards people who have no prior experience in computer science, but who are interested in using data to maximize their value to the public (Pangrazio & Selwyn, 2018). The fact that this approach often uses large sets of data collected from organizations, makes it more relevant to broad societal issues, rather than local contexts (Pangrazio & Selwyn, 2018).

Data hacking is a form of literacy which focuses on understanding how systems operate and how they can be repurposed (Pangrazio and Selwyn, 2018). This approach is popular in programming communities with the technical skills necessary to engage in this practice.

Finally, media literacy approaches to datafication have focused on supporting individuals in understanding the world around them through data with emphasis on data education, data visualization, data modeling and data participation (Deahl, 2014). Different studies explore how

youth use media to explore social reproduction and transformation using mobile devices in political protests (Smith et al., 2018), engaging in civic action (Jocson, 2015) or critiquing representations in popular media (Baker-Bell et al., 2017).

Despite the significance of these approaches in addressing the use of data, there are limitations in their ability to involve the growing relevance of personal data and the way in which data can affect individuals and communities. Data safety approaches may provide students with effective strategies to promote data safety or manage large data sets (Pangrazio & Selwyn, 2018), however, we know little about the performativity of the circulation of data in our social lives (Beer & Burrows, 2013) making the scope of this approach very limited. Data science, data literacy and data hacking approaches may provide some critical frameworks to critique current digital structures, but they are ultimately limited in addressing how users can engage in managing their personal data, especially when data is generated and used in ways that are unknown to them (Pangrazio & Selwyn, 2018).

An analysis of the limitations of educational responses to datafication cannot be complete without acknowledging that digital platforms operationalize in ways that present very specific challenges for educators and youth creating conditions that limit the development of alternative, critical voices to contest hegemonic narratives about datafication. This becomes a form of discursive closure (Deetz, 2007; Habermas, 1970, 1984) that closes off alternatives to critical data literacies.

### **Discursive Closure**

The limitations of educational responses to datafication are affected by other dimensions of the nature of data-saturated places such as the positionality of youth and educators in the digital economy which leads to disqualification (Nichols et al. 2021), the perceived inevitability and trajectorism of datafication in our lives which serves as a form of discursive closure, the

sense of a technological determinism, disqualification, and the notion of the “false dilemmas” in resisting digital technologies (Markham, 2020). These are four structural conditions of datafication that may lead users to believe there is no way to (re)map digital spaces.

### **Agency and Disqualification**

The level of agency users may have in terms of their personal data depending on their positionality within the digital economy. For example, the devices youth can use to engage in a political protest are linked to the policies and practices of governance of cell-service providers and third-party applications. Thus, the information extracted from personal and geolocation data can be used in the training of algorithms that dismantle future protests (Nichols et al. 2021). This is closely related to disqualification, a form of discursive closure that can be built into imaginaries about expertise (Markham, 2020). This notion leads users to believe that the fact that they lack the professional qualifications or specialization in a specific field, disqualifies them from being able to question them (Deetz, 1990). In a study, Markham (2020) found that users tend to dismiss their own ideas about the way in which future technologies may be shaped, thus reinforcing the black-box nature of data practices in our lives.

### **Inevitability and Trajectorism**

Another pressing challenge when attempting to (re)map digital space is the capacity for imagining possible alternatives to data structures in our lives since the available material for such imaginative acts varies greatly depending on prior imaginations (Markham, 2020). When the available knowledge about a subject is too large or long standing, it is natural that new imaginaries and narratives become partially formed by the models that we already have (Beckert & Bronk, 2018). In data literacy, the ability to imagine differently about the future is affected by two forces. The first one is the invisibility of boundaries which makes it challenging to grapple with the multiplicity of identity and the simultaneity of local and global movements when users



interact with digital platforms (Markham, 2016). The second force at play is trajectorism; the sense that human beings live in a predetermined narrative. People often experience difficulties imagining futures that do not reproduce current ideological trends. This form of technological determinism leads users to believe that technology development is pushing through on a trajectory that cannot be stopped. Individuals, unable to understand how black boxed datafied systems work, feel disqualified from analyzing them critically (Markham, 2020). This feeling is exacerbated by the fact users often feel they would encounter huge problems if they did not have those technologies.

According to a Pew Research Center survey to teenagers between 13 to 17 about their experiences with social media shows that 54% of the youth say it would be hard or very hard to give up their uses of social media even though 32% of teens say social media has had a negative impact on people their age and % express they have little to no control over their data being collected by social media companies (Vogels & Gelles-Watnick, 2023), which can be understood as a form of trajectorism. This shows that despite understanding the potential negative issues present in data-saturated environments, youth may find it inevitable to continue using social media as it also provides them with positive experiences such as connecting to friends, finding self-expression opportunities, building support networks, or being accepted by others (Vogels & Gelles-Watnick, 2023). This is consistent with the work of Gerrard and Gillespie (2019) who describe how recommendation systems, which have been designed to keep people interacting with platforms, will feed users with content they may enjoy regardless of whether the content may lead to self-harm, misinformation, conspiracies, etc.

These contradictions show how the feelings of inevitability and powerlessness reinforce the perception that youth have no agency over datafied structures, making it necessary to give up control.

### **Technological Determinism**

Technological determinism is a way in which human beings make sense of their futures in which technology has the upper hand in determining future pathways (Markham, 2020). This determinism may be expressed by users in two ways: utopian perspectives that perceive the world can only get better with the aid of technology or dystopian views that anticipate grim futures in the face of technological progress. These deterministic views, however, are often used to discuss the future vaguely or at a macro level (Dafoe, 2015), which is why an approach that focuses on the micro-level details of digital experiences, could allow users to acknowledge how technologies can be socially shaped (Markham, 2020). Thus, interventions to respond to datafication need to push against the limits of public imagination and engage in speculative approaches that promote the development of alternative views about the future.

### **The False Dilemma**

A fourth way in which digital platforms operate which affect the development of educational responses is the notion that in the face of a problem, only two alternatives are possible. These alternatives often simplify the problem situation by failing to recognize all the possible solutions (Damer, 2008; Markham, 2020). One example of a false dilemma is the debate between privacy versus security; youth find themselves willing to accept higher surveillance practices by accepting that having school districts monitor their social media practices or implementing higher policing practices from the government and social media companies (Vogel & Gelles Watnick, 2023). In the case of educational technology, most applications are not open-sourced meaning they are not publicly available to be audited and educational organizations are

not able to know what the platforms do, how they store, process and analyze data, instead, they are forced to trust developers blindly. Not accepting these terms may leave schools and educators without access to the necessary tools to engage with students digitally. However, this dilemma of accepting the terms or being left out could be overcome if technologists adhered to ethical principles such as transparency and expiration, giving up data control to schools, and prioritizing local solutions to reduce data transfer, among others (Amo et al., 2021).

Thus, educational responses to datafication need to incorporate the notion of multiple alternatives to problems related to digital platforms, overcoming the “either or” logic and engaging in (re)mapping other possible futures.

### **Engaging with the Critical in Critical Data Literacy**

The limitations presented earlier make it necessary to engage youth and educators in critically exploring the complex nature of data and its multiple dimensions and capturing the performativity of data in our lives; both the “processes of being acted on and the conditions and possibilities for acting” (Butler, 2015, p. 63) in regard to data. In this relationship, the educator may know more about the underlying impacts of datafication in a student’s life, but learners are the ones who decide which areas to focus on, how to explore them and which genre and medium to use to express their reflections in (Markham, 2019). This requires engaging in data literacies that center the development of solidarity among students to mediate discussions around race, power and data (Vakil et al. 2019); repurpose data to tell personal stories (Wilkerson & Laina, 2018) and address social justice issues (Gutierrez et al., 2019), among others.

Engaging in critical data literacy makes it necessary to provide more pedagogical support to help educators take up data as a tool to address issues of injustice (Stornaiuolo, 2020). This requires unpacking three sociocultural perspectives of critical data literacies: 1) data literacy as comprehension, recognizing why and how data are politically, socially and materially

constructed; 2) data literacy as critique, engaging in discourses around the usage of data and the ways in which data can reproduce injustice; and 3) data literacy as participation, engage youth in seeing themselves as civic participants in the way data is generated, transformed, interpreted and represented (Irgens et al., 2020). The first two views understand data not only as the ability to comprehend the complexity of relationships in the production of data, but also how data is socially, racially and politically constructed. Data literacy as participation focuses on the active engagement of youth in turning data into knowledge that can transform their communities (Hardy et al., 2020; Irgens et al., 2020; Noushad et al., 2022).

### **The Role of Educators**

While the role of educators in the systemic analysis of literacies engages them as change agents (Morrell, 2017), creating the conditions for the constructions of data literacies presents several challenges. In assessing which educational technologies they may want to incorporate into their learning design, they may be exacerbating already-existing injustices. For example, an educator choosing to use a platform for a classroom project will be subject to the often-obscure structures of free learning platforms (Nichols et al. 2021). Thus, educators need to engage in self-examination of their current educational practices and evaluate how certain platforms may incorporate predictive logics and commercial interests into learning spaces. This foregrounds questions about the ethics behind the co-authorship of data in digital platforms which may have implications beyond the four walls of the classroom (Amoore, 2020).

Existing literature about critical data literacy tends to focus on the youth experiences in various learning designs, however there is a gap in the literature regarding the roles of educators in navigating the complex boundaries of studying platforms and datafication. One example of studies identifying pedagogical approaches to datafication is the work of Markham (2019) who has focused on generating data about the lived experiences of learners through participatory

research. The author makes recommendations for those educators willing to engage in critical data literacy: 1) engage in critical theory, without the terminology; 2) acknowledge big data as relevant; 3) nurture the value of non-quantifiable ways of knowing. Rather than resisting critical approaches, Markham (2019) suggests broaching topics gradually through examples and experiments. One way in which this can be done is by creating a situation of cognitive dissonance where students could engage in more critical perspectives of an issue. Rather than engaging in an abstract theoretical framework, critical theory can be approached by watching or experiencing situations created by the educator. Allowing critical perspectives to emerge through dialectic tensions can forefront the vulnerability and marginalization they experience every day, while minimizing feelings of alienation.

The acknowledgement of big data as relevant focuses on the notion that data is not an object, but an ideology (Markham, 2019). Thus, the focus of analysis should not be defining whether big data is a good or a bad thing (Baym, 2013), but helping learners analyze how their lived experiences are tracked and collected as data in ways they are unaware of. Discarding concepts as big data for being too detached from the realities of learners would prevent them from reflecting on what constitutes data and how meaning is being made based on that data. Nurturing non-quantifiable ways of knowing focuses on how users often engage in reflexive interpretive methods to make sense of their lived experiences. Markham (2019) argues that by centering these experiences in the analytical process can foreground the way in which data operates in users' lives and that they solely hold the knowledge to answer many of the questions. Allowing qualitative research to delve into everyday matters serves as a counterbalance to quantification, datafication and computations. Additionally, it provides opportunities to engage in sensemaking about our lived experiences in the places we navigate.

As it has been described during this chapter, the ultimate goal of a critical approach to data literacy is supporting youth and educators in finding alternative possibilities to resist technological determinism, feelings of inevitability and powerlessness, false dual dilemmas and disqualification (Markham, 2020; Nichols et al., 2021). This requires unpacking what type of participation and action can be expected from youth and educators in countering oppressive data structures. The personal data literacies domain of data tactics (Pangrazio and Selwyn, 2018) can explain why it is necessary to engage youth in repurposing and resisting data structures.

### **The Personal Data Literacies Framework**

Conceiving personal data literacies as textual practices allows us to see data as a manageable entity rather than as pure information. An approach that follows a textual approach to the analysis of personal data practices can foreground personal data as a social practice and a tool for action (Pangrazio and Selwyn, 2018). The contributions from New Literacy studies lead to the emphasis of context in the analysis of texts. So, unlike traditional approaches in data science and data safety where there is a focus on general strategies to analyze data, a critical data literacy approach will incorporate the generative and emergent meanings that individuals bring to the production and analysis of data (Pangrazio and Selwyn, 2018). Thus, understanding the implications of place and learning becomes very relevant to engage in critical data literacy.

Youth's lives in digital spaces are often unacknowledged by families, educators, and even peers. To challenge the binary between adults and youth, it is essential to develop student-centered conversational spaces that honor students' sociocultural knowledge (Souto-Manning & Martell, 2016). Rather than providing youth with prescriptive guides to inhabit digital spaces based on our adult's perspectives of what is safe and what is not, we need to center the learning experience in youth's literacy practices from their perspective honoring their lived experiences and creating a learning space where all learners are valued.

Luke (2000) identified three components related to the critical engagement with texts. The first component is the metaknowledge understood as the meaning systems and the contexts in which they are produced. The second component includes the technical skills to negotiate such systems. Finally, the last component is the user's ability to understand how these systems interact with power. To understand how these components align with the needs of data literacy educators, Pangrazio and Selwyn (2019) developed a framework of personal data literacies to guide educational and academic efforts. The framework also presents three main components which involve (1) technical skills to manage data and be safe in digital spaces, (2) knowledge of the social nature of data, and (3) an ethical dimension which requires critical reflexivity regarding data profiling and recirculation. In the exploration of these components, individuals should be able to pursue context-specific lines of inquiry regarding their data. The personal data literacies framework is organized into five domains: a) Data Identification; b) Data Understandings; c) Data Reflexivity; d) Data Uses; and e) Data Tactics. The different domains are all critical in nature, but they represent varying degrees of critique which may not be enacted in a linear and sequential manner.

### **(A) Data Identification**

Data Identification, the first domain in this framework, involves recognizing the different ways in which data can be generated either provided by the user, extracted from them without their knowledge, or processed and feedback to a user. Being able to identify how personal data can be inadvertently extracted from users or how analytics and dashboards are produced from particular forms of data while excluding others are forms of critical acts (Pangrazio & Selwyn, 2019).

**(B) Data Understandings**

Once users can identify data, it is possible to engage in questions about how and where data is generated. This second domain, data understandings, also involves analyzing how data may be used in the future. Thus, this area of the framework involves the users' capacity to make informed speculations about the possible re-uses of one's data (Pangrazio & Selwyn, 2019).

**(C) Data Reflexivity**

This third domain in the framework is where individuals can analyze the implications of processing and reusing their personal data. For example, youth may be able to recognize that their interactions with the TikTok platform will impact on the type of content they will see more often while creating new kinds of data on the platform. This can lead to critical conversations about the implications of their actions and collective negotiations of which standards may be the most appropriate for users (Pangrazio & Selwyn, 2019).

**(D) Data Uses**

The last two domains in this framework are closely aligned with civic action (Selwyn and Pangrazio, 2018). Data Uses involves using specific strategies to manage personal data in different ways, from adjusting privacy settings to examining the terms and conditions in a platform. In some cases, users are less inclined to work within the boundaries of official structures, and resort to alternative ways of knowing.

**(E) Data Tactics**

This notion can be associated to a more oppositional behavior where the users engage in different forms of data disobedience (Brunton & Nissenbaum, 2015), mitigating, evading, and sabotaging oppressive structures of data reuse and recirculation. Users may engage in this domain in multiple ways; from deliberately entering false personal information to disrupt the connection between personal data and generated data to technical approaches such as setting up



applications to protect their privacy (Pangrazio & Selwyn, 2018). These tactics may also include creative appropriations of personal data such as experimenting with machine learning applications to create alternative algorithms or creating visualizations and representations of data for particular purposes.

Taking a more critical approach, the personal data literacies framework (Pangrazio & Selwyn 2018) seeks to raise awareness of datafication processes and provide individuals with strategies to control their personal data. These are: data Identification (what data are); data understandings (how and where data are generated and processed, as well as interpreting the information presented in processed data); data reflexivity (analyzing and evaluating data profiling and prediction, as well as its implications); data uses (how is data used by others and how can the individual use data better); and data tactics (resisting datafication and/or repurposing data). While the framework does try to capture increasingly advanced levels of data critique, it does not prescribe a sequential developmental pedagogy. Furthermore, it is not intended as a normative ideal for personal data practices (Mathieu, 2016). Instead, it aims to support greater understanding of personal data – primarily to support individuals make informed decisions about their data practices.

This framework attempts to raise awareness of datafication and provide strategies to support users in controlling their personal data. Understanding the multiple strategies they can use to control their personal data can support educators and designers in the development of curricula that seeks to support learners in incorporating these strategies. There are two important implications about the last domain of this framework, data literacy, which need to be addressed. The first one is that despite the framework addresses “personal” data literacies, the focus is to build knowledge about datafication (Domains 1-3) to engage learners in “collective”

understandings of data as they explore the challenges to privacy in a connected context and develop ways in which they can resist or repurpose data structures (Pangrazio & Selwyn, 2018). This collective understanding can be possible through everyday conversations that yield individual and collective imaginaries that present alternatives against hegemonic forces (Markham, 2020). The second implication is that the framework does not seek to present these domains as a sequential developmental pedagogy (Sefton-Green and Pangrazio, 2020). Therefore, users are not expected to engage in these domains in any order.

### **Transformational Resistance in Digital Platforms**

Youth engagement in resisting oppressive data practices is a challenging endeavor due to the discursive closure present in digital platforms (Markham, 2020). A study by Selwyn and Pangrazio (2018) with youth in a co-design workshop where they were invited to explore how personal data is generated through using text, image and geolocation data. The authors found that the youth did not engage in data tactics practices as they were expecting which could be explained due to different factors: youth not perceiving datafication as a problem and the time-consuming nature of counter-practices. This study is an example of the need to engage critical literacy development through a social justice lens.

As mentioned throughout this chapter the goal of a critical approach to data literacy is to engage youth in contesting or resisting data practices. To support this goal, it is necessary to engage youth in both a critique of the social structures that create oppressive conditions and a motivation towards social justice (Solórzano & Delgado Bernal, 2001). These two elements are the foundations of the transformational resistance framework developed by Solórzano and Delgado Bernal (2001). Transformational resistance is when youth are able to engage in

critiquing the systems and structures which oppress them and to engage in transforming them. The work of Solórzano and Delgado Bernal (2001) identified four behaviors that described oppositional behavior: a) reactionary behavior; b) self-defeating resistance; c) conformist resistance; and d) transformational resistance.

Reactionary behavior is a type of oppositional behavior where youth lack both a critique of the conditions that lead to their oppression and a motivation towards social justice. A self-defeating resistance represents the traditional notion of school resistance. These are behaviors of students who may be able to critique social conditions but are not necessarily motivated by an interest in social justice. Conformist resistance refers to oppositional behaviors that are motivated by social justice, but which hold no critique of the oppressive systems. This often leads to practices that do not challenge oppressive systems. Finally, transformational resistance is a form of student behavior that both critiques oppression and engages in a desire for social justice (Solórzano & Delgado Bernal, 2001).

One tension of this framework is that it has been mis-utilized to judge youth approaches to survival regardless of the circumstances they had to navigate. Additionally, there have been interpretations of this framework that fail to visualize how self-defeating or reactionary behaviors may still hold potential for transformation (Hannegan-Martinez et al., 2022). Rather than seeing the framework as a tool to label youth, it is meant to be used as an analytical tool to inform pedagogical decisions that could help educators guide youth's reflections and behaviors towards collective transformation. Resistance is not fixed, nor lineal, but it manifests itself through transformative ruptures such as interactions, experiences and moments where a pervasive systemic inequity is disrupted (Delgado Bernal & Alemán, 2017). Thus,

transformational resistance also needs pedagogical ruptures, curriculum, instruction and mentorship that create the space for transformative ruptures to emerge.

Transformational resistance does not only manifest itself in classrooms and schools, but it can be enacted in multiple contexts. This is particularly relevant for this study as it is important to evaluate how transformational resistance can be enacted in digital platforms. In understanding counter-stories (or counter-mapping) as a liberatory tool to challenge deficit narratives that impact schools, society, and media (Garcia, 2017; Solórzano & Delgado Bernal, 2001), scholars are beginning to identify digital forms of counterstories such as the use of politicized hashtags and memes in social media (Carney, 2016). Tanksley (2022) found that Black undergraduate women from 11 universities in the US and Canada engaged in social media use to navigate and survive oppressive campus climates, offering alternative counter-spaces for visibility and community. The women also found that they could also see the material power of digital resistance through the creation of Go Fund Me pages for victims of racial violence. Engaging in transformational resistance online, however, also had some downsides. Women found they had been exposed to racially traumatizing social media content that had manifestations in their educational experiences and their mental health.

As described earlier, digital platforms have the capacity to engage in different forms of algorithmic oppression where they augment and distort different views of the world regardless of the attitudes and values present in that content. This may lead Black students to be exposed to white supremacy advocates which are algorithmically augmented while their perspectives are invisibilized, thus reinforcing a racialized status quo (Tanksley, 2022).

It is necessary to complement the potential benefits of digital platforms to engage in counter-mapping with an analysis of the way in which these technologies may commodify, alter,

or silence their productions (Noble, 2016). This makes the analysis of how algorithms engage in systems of power and subjugation, by deciding which data is shown and which one is not, especially relevant when supporting youth in engaging in transformational resistance in digital platforms.

### **The Need for Speculation in Critical Data Literacy**

Supporting youth in understanding how digital platforms can be both a counter space and a place that is affected by algorithmic and datafied structures that perpetuate injustice is difficult to unpack given the complex nature of such platforms. Simply identifying and declaring that digital platforms are socially constructed and mediated with power is not the ultimate goal. Rather, it is necessary to engage in pedagogies guided by justice that broaden our understanding of the horizons of learning environments (Garcia & Mirra, 2023). Inspired by afro-indigenous and queer futurisms, Garcia and Mirra (2023) call for a speculative approach in education focused on teaching and learning beyond the current social, economic, and cultural arrangements that represent different forms of oppression. A speculative civics literacy approach in critical data literacy will decenter the power structures and the study of present conditions of harm related to datafication to emphasize the ethical relations needed for civic trust, collaboration and worldbuilding.

Speculating about the future is not about engaging in wildly imaginative tales about the future, but it is an intentional design where educators develop methodological innovations to explore how alternative worlds can be brought into existence (Montfort, 2017). Speculation is not bound to a specific time and space, and in this deterritorialized state, we can re-map schooling as a place for imagination and social dreaming. In (re-)mapping spaces (Goeman, 2013) learners engage in creating forms of meaning making and communication that reorient the nature of their democratic lives towards equity, empathy, and justice (Mirra & Garcia, 2020).

Speculative fiction within this paradigm offers ways of making connections between concepts that normally do not go together, yielding opportunities for thinking otherwise (Markham, 2020) by inhabiting other worlds and identities. The reason why this study focuses on cartography as a representation of possibility is that human beings often tend to think of alternatives as straight-line trajectories or loop traps, thus fostering the idea that we are determined to follow certain trajectories or repeat the same actions over and over. Thus, more than an act of storytelling, engaging in speculative civic literacies and participatory research as a cartography, allows youth and educators to engage in a process of world-making where they can interpret the relations between human beings and technology paying attention to multiplicities, relations between and stories-so-far (Massey, 2005). The type of cartography presented in this study does the opposite of presenting hegemonic views of the world to tame confusion and complexity. On the contrary, cartographies mediated by speculation and participatory knowledge construction focus on representing space, not as a structure, but as an “arena of possibility” (Massey, 2005, p. 109) which becomes both a map and a space which affords opportunities for envisioning new possibilities and futures.

### **Summary**

When educators dare to see themselves as “social, historical, thinking, communicating, transformative, creative persons; dreamers of possible utopias, capable of being angry because of a capacity to love” (Freire, 1998, p. 45), they can engage in critical pedagogy as love and dialogical hope. Dialogical hope recognizes the future has the potential to be better than today, and that growth is possible (Silverman, 2022). This hope also needs dialogical humility, where

teachers can open up to new ways of understanding, and dialogical solidarity, where educators and learners work together towards better life conditions (Miller, Brown, and Hopson, 2011).

This review of the literature and theoretical framework has described how centering youth voices in recognizing oppressive structures in digital platforms to engage in critically transforming them is a complex path. The review of the literature revealed that the obscurity of digital platforms lead youth to feel powerless in the face of technological progress which hinders their possibilities of engaging in social justice (Markham, 2020). Thus, place-based perspectives are needed to engage in designing counterspaces that disrupt the democratic space and visualize new alternative worlds, and pathways to engage in change.

In this study, cartography or (re)mapping (Goeman, 2013) can be seen as a means through which youth can read and write the world to create new maps through which can represent the complexity of their lived experiences in digital platforms. Rather than mapping the world only through cartographies of struggle where they could provide an account of the multiple ways in which data structures oppress them, students can also attempt to map their lived experiences in place and (re)map their positions through speculative literacies grounded in sociospatiality. Mapping our personal geographies is not an easy task, let alone teaching someone how to do it. But there is hope in engaging in this task:

How we are at the small scale is how we are at the large scale. The patterns of the universe repeat at scale. There is a structural echo that suggests two things: one, that there are shapes and patterns fundamental to our universe, and two, that what we practice at a small scale can reverberate to the largest scale (Adrienne Maree Brown, 2017, p.52).

The worlds of Brown (2017) inspire us to reimagine and hope that changing oppressive structures is possible by grounding our work in the local: our classroom, our students'

neighborhoods. We need to make sense of our most personal geographies as each of us has important pieces of the whole. Addressing global issues without understanding how our personal geographies are constructed through complex interactions with one another and space can only lead us to monocultural utopias which will have no impact on the dominant structures. (Re)mapping (Goeman, 2013) invites students and educators to re-imagine their geographies by conceiving possible futures, where their position in the map shifts from marginality to centrality.

Place-based perspectives of knowledge can disrupt dominant narratives about datafication and provide opportunities for these narratives to be re-written, opening discourses, and engaging in envisioning possible alternatives. Is it enough to create maps to reclaim our geographies? To answer this question, I will conclude this chapter with Freire's (1998) words in *Pedagogy of Freedom* to show that, as space, our future is mutually constructed and relies on the idea of hope; the hope that a better future for our learners is possible:

"...hope is something shared between teachers and students. The hope that we can learn together, teach together, be curiously impatient together, produce something together, and resist together the obstacles that prevent the flowering of our joy" (p. 69).



### CHAPTER 3. THE NAYAH-IRÚ CURRICULUM

Nayah-Irú integrates speculative civic literacies within a sociospatial framework to critically examine the relationship between youth and digital platforms, employing the personal data literacies framework (Pangrazio & Selwyn, 2019). A game-based curriculum forms the core of Nayah-Irú, connecting youth with a fictional character to facilitate discussions on datafication and platforms, ultimately engaging them in a YPAR project.

This chapter presents a historical account of my involvement in the design process of this curriculum within the CECAP communities in Uruguay. Additionally, the theoretical framework underpinning the curriculum design is presented, along with an outline of the curricular goals. These elements shed light on the rationale behind the content taught and highlight the necessity of the different components included.

Furthermore, a brief overview of alternate-reality games is provided to illustrate how game-based elements in this design further enhance the intersection between YPAR and Speculative Education, ultimately supporting Critical Data Literacy education (CDL). Lastly, the structure and sequence of activities for teacher development workshops and curriculum implementation are described in detail.

#### **History**

To provide a comprehensive understanding of the development of this curriculum, it is important to delve into the historical context and the relationships that influenced this study. The implementation of this study took place within an alternative education network called CECAP (Centro Educativo de Capacitación y Producción) in provincial Uruguay. CECAP aims to support young individuals who have dropped out of the formal schooling system (more details about the network and the Uruguayan educational system are included in the next chapter).

Prior to the implementation of this curriculum, in March 2021, Uruguay was facing its highest peak in COVID-19 infection rates. Shortly after, CECAP educators learned that the school year would not commence until after the winter break in July. It was during this period that a teacher from one of the alternative schools in a small town in western Uruguay who had attended one of my game-based learning classes approached me for assistance in designing a game-based project for the second semester.

At that time, I was deeply struck by the unique challenges faced by the youth in this community, and I accepted the invitation. Upon arriving, I was quickly exposed to the multitude of inequalities and obstacles that the CECAP youth had to confront. These challenges included a lack of access to laptops and Zoom during the pandemic restrictions, and some of the youth did not even own a personal mobile device. The only means of communication between teachers and students was through a text messaging application, WhatsApp, which was used by teachers to share readings, activities, and information. This limited access to technology made it exceedingly difficult for the youth to continue their studies, leading many of them to take on jobs that further diminished their chances of returning to school. Additionally, some of the youth had to assume additional responsibilities at home, taking care of their siblings, while others were even becoming parents themselves.

The initial meetings with this community played a crucial role in comprehending the issues they faced and establishing a connection with the educators. Over the following four months, I collaborated closely with the educators to brainstorm various themes they wished to address in that unconventional school year. The educators expressed concerns about the concepts of "health" and "well-being" as they felt ill-equipped to address the diverse challenges

experienced by the youth, including mental health, sexual health, and food literacy, among others.

Through our discussions, we endeavored to narrow down the focus for designing a curriculum that effectively tackled one of these issues. One of the educators shared a conversation with a parent of a youth who mentioned their child spending a significant amount of time in bed, mindlessly scrolling through social media videos. This led to other conversations about the fact that despite not having personal devices, youth often managed to borrow or “rent” devices from friends to stay connected. Rather than avoiding discussions about the youth's private lives, the educators acknowledged the need to address the potential issues arising from such behaviors. Initially, our conversations centered around self-care and cybersecurity concerns, but over time, our focus shifted to the oppressive structures that impacted the youth. Topics such as privacy, online gambling, surveillance, and digital literacy emerged as central themes in our discussions, prompting us to explore ways of utilizing technologies more thoughtfully. As a result, in collaboration with the educators, a game-based curriculum was developed named *Nayah-Irú*. Following a pilot implementation in 2021, this curriculum was revised and implemented by four more communities in 2022.

The revisions for the second iteration of *Nayah-Irú* included the design of comic-book style vignettes to support youth whose reading ability did not allow them to access long texts, enhancing accessibility features for youth including audio recordings of the texts, simplify complex texts, and provide images and diagrams to accompany texts. Additionally, the youth from Puertas had found it necessary to create an event at the end of the implementation to disseminate their findings. Therefore, the curriculum implementation also included a specific date for a local conference where youth could share their findings with other peers.

While I took the lead in developing the activities and Nayah-Irú curriculum, as described later in this section, the design process encompassed elements of co-teaching as a form of co-design practice (Nicholson et al., 2022). This approach provided opportunities to shift teachers from passive adoption of a pre-determined curriculum to active participation in its design and integration. Thus, my role as a co-teacher became a design practice aimed at facilitating curriculum innovation and implementation (Penuel, 2019). Research has shown the positive impact of co-teaching as a co-design approach, leading to the adoption of designed technologies and/or curricula (Durrall et al., 2019) while enabling educators to establish tangible connections between the actual design and their classrooms.

### **Design Method**

This design process draws inspiration from the method Social Design-Based Experiments (SDBEs) (Gutierrez et al., 2020). SDBEs are rooted in the learning sciences and combine design-based research traditions (Design-Based Research Collective, 2003) with democratizing forms of inquiry, such as Participatory Design and Youth Participatory Action Research. Social design research incorporates sociocultural approaches to design (Engestrom, 2011) and embraces the context-sensitive and iterative nature of design research (Brown, 1992). One distinguishing characteristic of SDBEs is their engagement in envisioning and designing utopian ideals, methodologies, and outcomes as "moving horizons of possibility" (Gutierrez et al., 2020, p. 331). This utopian element of SDBEs seeks to transcend deterministic perspectives of education and instead fosters learning designs that imagine and model new social futures (Gutierrez, 2016).

Central to this design process is the collaboration with individuals who confront systemic injustice, aiming to comprehend and address their experiences. Consequently, the design principles underlying this methodology strive to be sensitive to the historicity of communities as embodied in their lived experiences, the sustainability of the designs, and the resilience

demonstrated by individuals through their resourcefulness in navigating complex circumstances (Gutierrez et al., 2020).

Based on the work of Gutierrez et al. (2020), the design of Nayah-Irú was guided by the following principles:

- **Historical Context:** The curriculum considers the unique historical contexts of each community, recognizing their specific knowledge systems and addressing the evolving forms of oppression experienced by youth and educators.
- **Sustainability:** The design of Nayah-Irú aims to create opportunities for educators and youth to explore alternative pathways and lines of inquiry, fostering long-term engagement and growth.
- **Community Resilience:** The curriculum acknowledges the existing resilience demonstrated by educators and youth in navigating data-driven structures. It provides opportunities for these adaptive strategies to be further developed and expanded upon.

By incorporating these principles, the design of Nayah-Irú strives to create a curriculum that is responsive to the historical context, sustainable in its impact, and supportive of the resilience of educators and youth in their engagement with data-driven environments.

### **Theoretical Tenets of the Nayah-Irú Curriculum**

The Nayah-Irú curriculum embodies the intersection of two essential frameworks: the guiding principles of Participatory Action Research (PAR) epistemology (Ayala et al., 2018) and Speculative Civic Literacies (Mirra & Garcia, 2022). This intersection serves as a foundation for the development of Critical Literacy (Freire & Macedo, 2005), empowering youth to further enhance their personal data literacies (Pangrazio & Selwyn, 2019).

Engaging in research and sharing findings can be a transformative experience for youth as it nurtures their critical consciousness and encourages transformative resistance (Cammarota

& Fine, 2018). YPAR goes beyond being a mere methodology; it is an epistemological approach that places the creation of knowledge by youth at the center, providing a liberatory opportunity (Martinez, 2020).

Table 3-1: Guiding Principles and Design Implications

<b>Guiding Principles</b>	<b>Description</b>	<b>Design Implications</b>
<b>Participation</b>	Practitioners and stakeholders work together in all steps of the research process.	Need for teachers to reflect upon their own practices and engage in giving up control.  Development of skills needed for the research process.
<b>Critical Inquiry</b>	Grounded in critical-race and decolonizing theories, examining the contexts and conditions of our lives.	Narrative needs to reflect episodes that engage in reflections about deterritorialization and reterritorialization.
<b>Knowledge Co-Construction</b>	Knowledge produced collectively can be richer and hold more depth from contributions.	Design of open-ended collaborative tasks.  Introduce research methods that favor collaboration from the community.
<b>Power with(in)</b>	Need to be mindful of recognizing power within the group and engaging in self-inquiry.	Create opportunities for developing relationships of mutuality.
<b>Indigenous Cosmologies</b>	Reclaim and reimagine indigenous ways of knowing. YPAR as a healing process.	Center opportunities that allow youth to share their lived experiences as ways of knowing, including stories of struggle and healing.
<b>Creative Praxes</b>	Data collection and dissemination needs to resemble the cultural and creative productions of the local community, including music, poetry, dance, etc.	Introduce experimental and arts-based research methods.  Support opportunities to create multiple types of compositions for data dissemination.
<b>Transformational Action</b>	Commitment to conscious action and social change.	Provide opportunities within the curriculum to discuss ways in which they can engage in action through research design or dissemination.
<b>Concientización para la Colectiva.</b>	YPAR as a movement and not as isolated actions. Movement's goals are critical consciousness, social justice, and emancipation.	Develop cross-center productions.  Provide a venue for a meet-up of youth at the end of the implementation.

While there are arguments supporting the need to involve a diverse range of actors in dialogues about data (D'Ignazio & Klein, 2019), incorporating participatory methods (Eynon, 2022), this study is the first of its kind to situate data literacy within YPAR epistemologies and methods. Informed by the eight guiding principles of PAR *EntreMundos*, an extension of PAR that emphasizes Latinx theorizing on the use and practice of PAR (Martinez, 2020; Torre & Ayala, 2009), this study adheres to a set of principles that are described and enacted within the curriculum, as outlined in Table 3-1. These principles serve as a framework for the curriculum's design and implementation, reflecting a commitment to inclusivity and equity.

Normative practices of literacy and civic engagement are often insufficient in the creation of liberatory social futures (Mirra & Garcia, 2020), and this becomes even more problematic in digital platforms due to the obscurity of their practices, which often leads to a discursive closure (Markham, 2020). Drawing from notions of “restorying” (Thomas & Stornaiuolo, 2016), the speculative civic literacies framework by Mirra and Garcia (2020) is grounded in three principles: 1) centering informal collective affiliations and relations as a driving force of democratic education; 2) implementing an iterative and practice-based approach to democratic learning focusing on doing citizenship rather than adhering to narrow funds of knowledge deemed as civic education (Gutierrez, 2008); 3) engaging in joyful social dreaming; thinking beyond existing structures, and creatively constructing radical visions of public life. This last principle calls for the use of speculative fiction built on traditions of Afro- and Indigenous futurism, which embody the notion that storytelling can represent a form of resistance and agency in the face of systemic oppression.

The speculative civic literacies framework (Mirra & Garcia, 2020) and YPAR (Ayala et al., 2018) share this need to simultaneously deconstruct and reimagine normative paradigms of

learning and democratic life. In deconstructing linear narratives about the growing presence of datafied structures in our life, Nayah-Irú engages youth in speculative thinking and imagining alternative histories with the purpose of offering ways of making different connections that may lead to new forms of thinking about data.

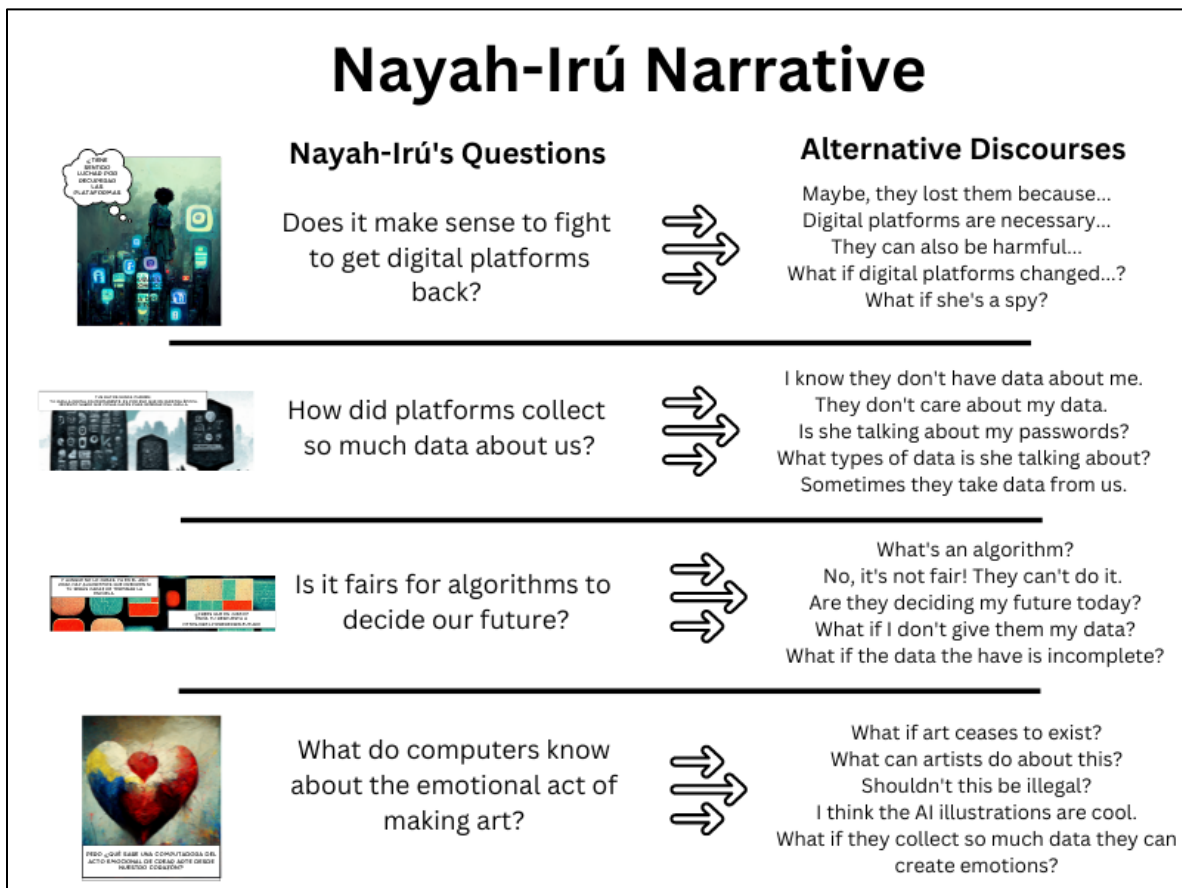


Figure 3-1 Questions present in the Nayah-Irú narrative leading to alternative discourses.

A crucial understanding of the Nayah-Irú curriculum is that the speculative narrative present in the curriculum needs to avoid being trapped in loops that may close off alternative discourses (Markham, 2020). Therefore, the fictional character Nayah-Irú does not present a dystopian arc that traps youth in a narrative loop on how datafication will eventually ruin the future. Instead, Nayah-Irú presents a youth who is forced to re-construct the past of civilization (our present) through old accounts and engages with youth in getting their responses to some of



the data she has collected, thus engaging them in alternative discourses. Figure 3-1 describes how Nayah-Irú connects the narrative in ways that favor alternative discourses. Each question in the narrative prompts youth to imagine possible alternatives and explanations to understand this gap in Nayah-Irú's world.

To ensure that the critical inquiry process in Nayah-Irú effectively promotes critical data literacy, the curriculum is structured around the five domains of personal data literacy identified by Pangrazio and Selwyn (2018): data identification and understanding, data reflexivity, and data uses and tactics. The initial three domains focus on developing knowledge about data practices and engaging in a critical analysis of digital platforms. The remaining two domains provide avenues for collective action and transformative resistance. It is important to note that these domains are not presented in a linear manner within the curriculum. Instead, their activation depends on the individual experiences of the youth and the strategies employed by the educators. To clarify the presence of these domains within the curriculum, these were integrated with the quadrant graph of data practices and literacies developed by Raffaghelli (2022) (see Figure 3-2). Each quadrant serves to characterize different forms of data literacy as youth navigate various practices. The quadrants are defined by two tensions: the nature of the accessed data (public and private) and the expected attitude of the youth towards data practices (reactive and proactive). The curriculum is designed to move recursively across all four quadrants, allowing for reflection and comprehension that exemplify the diversity of data practices and literacies.

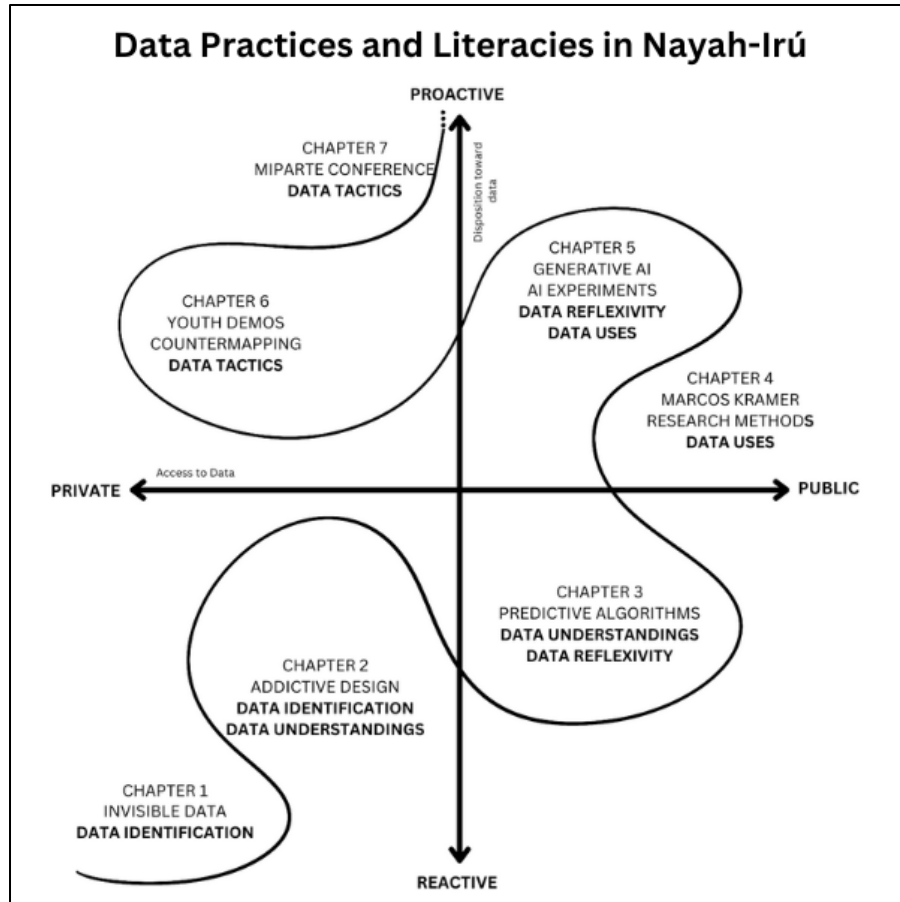


Figure 3-2 . Data Practices and Literacies in Nayah-Irú

### Nayah-Irú: Alternate Reality Games

This section examines the incorporation of game-based features into the curriculum to establish a connection between the speculative narrative and the structure of Youth Participatory Action Research. Nayah-Irú introduces an alternate reality game (ARG) featuring a 16-year-old female character from a future version of Uruguay (Jagoda et al., 2015). ARGs create a semi-fictional and immersive play environment, employing various forms of games, such as digital and analog formats. One key aspect of ARGs is that while game challenges are designed by the game developer, the players actively shape their experience through collaborative actions (Jagoda et al., 2015).

Transmedia storytelling (Jenkins, 2006) plays a crucial role in ARGs, utilizing multiple communication modes. In the case of ARGs, this multimodal communication involves incorporating real-world components as a storytelling platform, where players can access clues, puzzles, narrative revelations, and opportunities for play (Jagoda et al., 2015). For example, Nayah-Irú initiates the game by sending students a physical letter containing an encrypted message and a token.

The decision to create Nayah-Irú as an alternate reality game stems from the genre's pervasive nature. ARGs transcend time, place, and social boundaries, allowing players to perceive the shared experience as an extension of their own reality rather than a purely fictional endeavor (McGonigal, 2003). Throughout the game, Nayah-Irú reveals that she inhabits a future where all digital spaces have been banned. Despite this prohibition, she manages to communicate with students using real-world applications like email, social media, and virtual worlds, seeking to uncover the reasons behind the ban.

The narrative framework of Nayah-Irú offers several benefits for the curriculum. Firstly, it enables educators to maintain the realism of the datafication topic even within the context of a fictional and speculative future. Secondly, the puzzles provide opportunities to introduce various lessons that explain different aspects of data and datafication. Thirdly, the narrative promotes interaction between Nayah-Irú and the students, encouraging collaboration among the students themselves to overcome challenges.

The decision to set the game in Uruguay and create a protagonist with a Guaraní name aims to establish a culturally specific narrative that resonates with the youth. The theme of the digital ban seeks to provoke cognitive dissonance among the youth, prompting reflection on the implications of personal device restrictions. Although this dystopian future may seem

implausible, it offers an opportunity for youth to consider the reasons behind such bans or identify instances where their identities might be constrained on digital platforms. The narrative does not warn youth against a post-apocalyptic future, but only describes the lack of access to digital platforms without providing further details about the impact of such ban in their lives. This decision sought to overcome loop narratives where youth are forced to interpret deterministic perspectives of the future. Even though Nayah-Irú comes from the future, the information she provides only focuses on fragmented narratives of her past for youth to reflect upon their current circumstances.

Despite Nayah-Irú being a game with rules and goals, players have the freedom to engage with the storytelling in multiple ways. Rather than providing puzzles with predetermined solutions, the game encourages youth to participate in creative productions that promote a more interest-driven investment in the experience (Jagoda et al., 2015). Additionally, educators intentionally avoid explicitly addressing the real or fictional nature of Nayah-Irú, fostering open speculation about her world and the students' own future. Consequently, Nayah-Irú does not offer a standardized experience, but rather accommodates diverse contributions and interest-driven pathways thus supporting the development of alternative discourses. Some youth may choose to engage in storytelling, while others may focus on designing research projects to provide substantial evidence in response to Nayah-Irú's inquiries.

In addition to introducing youth to datafication themes, the narrative framework also acquaints them with a wide range of action research methods, encouraging discussions on ethical implications, data quality, and how the collected data serves the purpose of responding to Nayah-Irú. This process involves the introduction of a second character, Marcos Kramer, who shares his research skills with students and emphasizes that Nayah-Irú requires more than a mere

recommendation. Once students gather data to address their questions, they are encouraged to design physical and digital objects, presenting them at the CREAJOVEN research conference—an event for youth participatory action research co-organized by the researcher. In their research artifacts, the youth are tasked with deciding whether to present Nayah-Irú with a pessimistic view of digital spaces, potentially justifying the digital ban, or incorporating a multitude of perspectives that support her decision to resist.

### **Curricular goals**

After analyzing the first iteration of Nayah-Irú, the curriculum has been refined with the following goals:

- 1. Engage youth in civic participation:** The curriculum aims to guide students through a process of problem discovery, empowering them to expand their knowledge-construction process beyond the school. It provides avenues for participation, including developing artifacts, organizing events to disseminate findings, conducting demos to support community members, and exploring various forms of organizing.
- 2. Amplify student voices:** Recognizing that youth already utilize data in different ways, the curriculum seeks to amplify their voices by creating outlets for sharing experiences and understandings. It includes opportunities, such as conferences, where youth can showcase their findings and insights.
- 3. Experiment with data:** The curriculum encourages youth to explore their capabilities in authoring diverse types of texts. It introduces new tools and avenues for creative expression, enabling youth to engage with data and algorithms in playful and innovative ways.

- 4. Participate in a game experience focused on socio-technical aspects of data:** By integrating game-based components, including role-playing by educators, the curriculum engages youth in issues related to data creation, circulation, and data safety. The game serves as a model for play, facilitating the transmission of essential information about cybersecurity and data privacy.
- 5. Investigate the multiple and diverse trajectories of data in space:** The curriculum provides opportunities for youth and educators to recontextualize their personal experiences with data within a collaborative learning environment. Through sharing expertise and leveraging their unique perspectives, participants collectively examine the multifaceted nature of data.
- 6. Afford opportunities for alternative discourses on datafication:** The curriculum offers a series of speculative scenarios, encouraging youth and educators to imagine "what if" situations that explore possible futures with data. This approach challenges deterministic narratives and opens up possibilities for diverse perspectives, moving away from discursive closure loops.

In summary, the overarching goals of the curriculum are to engage youth in civic participation, amplify their voices, foster experimentation with data, promote awareness of socio-technical aspects of data through game-based experiences, investigate the various trajectories of data, and create opportunities for alternative discourses on datafication. By pursuing these goals, the curriculum aims to empower youth, nurture critical thinking skills, and encourage active engagement with data in meaningful ways.

## Educators Development Workshops

The teacher development workshops aimed to collaboratively explore the implications of data discourses and practices within the lived experiences of educators. Additionally, these workshops aimed to co-discover the potential of Youth Participatory Action Research (YPAR) as a methodological framework for meaningful engagement with students. The workshops spanned over a period of three months, with weekly meetings, and encouraged educators to participate in joint sessions with colleagues from other participating centers.

Rather than simply instructing educators on a predetermined set of participatory research methods, the sessions went beyond that. They included activities that focused on situating educators' existing knowledge about data and research, while also creating spaces for designing educational interventions. The workshop design draws inspiration from Raffaghelli's (2022) hermeneutic-pedagogical approach and is further detailed in Table 3-2.

Table 3-2 Design of Teacher Development Workshop

<b>Conceptual tools</b>	<b>Description</b>	<b>Activities</b>
<b>Initial Information</b>	Generate a sense of curiosity	Scavenger hunt in a virtual world, finding concept definitions.
<b>Self-diagnosis</b>	Capture insights and develop self-awareness.	Visual collage defining key terms.
<b>Technical instruments</b>	Methods, technologies, practices, and knowledge within professional communities.	YPAR toolkit activity introducing research epistemology and methods.
<b>Self-exploration</b>	Connect with participants' lived experiences.	Educator shared their literacy practices when they were younger through narratives.
<b>Reflection</b>	Explore how they can connect the youth's lived experiences to their professional roles as educators	Collaborative storyboarding activity representing challenges and how they can be addressed. Remixing visual collage.

To begin the workshop, educators engaged in an online meeting using the avatar-based videoconference system, Gather. During this session, they actively participated in a Scavenger Hunt, which involved exploring various tools for fostering youth engagement in multimodal composition and participatory research. As a subsequent activity, educators were tasked with

creating a visual collage on a collaborative board using Padlet. This collaborative board served as a platform for educators to use images or drawings to visually represent important concepts such as youth, data, community, research, and teaching (refer to Figure 3-3 for an example).



Figure 3-3 Visual collage defining key concepts for CDL.

During the following two synchronous sessions, educators were introduced to YPAR epistemologies and engaged in various activities to deepen their understanding of research methods. In one activity, educators created a mind map to explore the ways different research methods can support youth research processes (refer to Figure 3-4 for an example). Additionally, educators delved into the concept of autoethnography through a narrative-sharing activity on Padlet. They were prompted to reflect on their own literacy experiences during their time in secondary school and how they participated in their communities (refer to Figure 3-5 for examples). The narratives shared by the educators were analyzed to identify and describe various types of literacy practices. This activity served as an opportunity for educators to reflect on the evolution of literacy practices since their own teenage years.



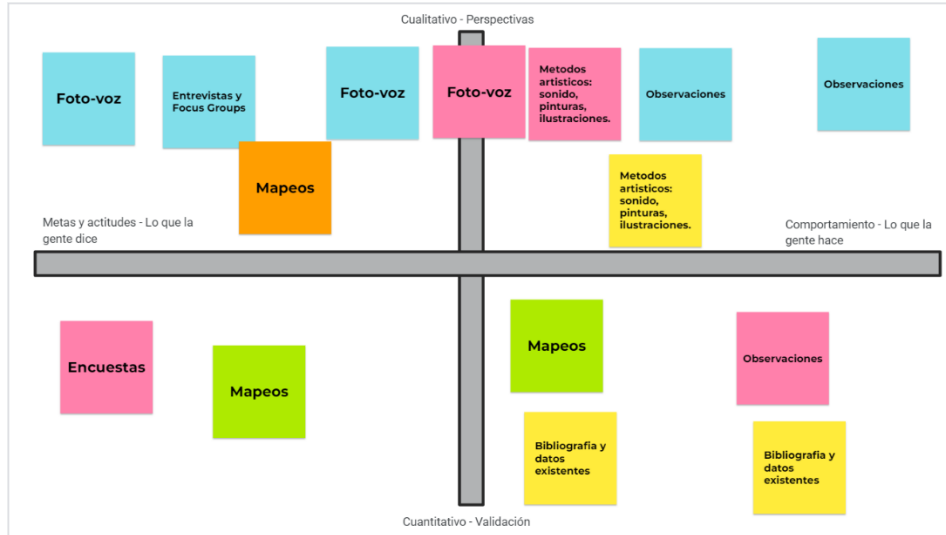


Figure 3-4 Collaborative exercise on Jamboard

Figure 3-5 Teacher Narratives

In the final meeting, educators gathered for an in-person workshop that involved two activities. In the first activity, educators were provided with cutouts of the images used in their digital visual collages. They were tasked with redefining the key concepts by arranging these images into a new visual collage. This activity aimed to encourage educators to explore new perspectives and interpretations of the concepts.

The second activity focused on strategic planning through narrative exercises. Educators were required to represent a challenge present in their communities, envision the future of that community, and describe the steps they planned to take to address the challenge and achieve their vision of the future (see Figure 3-6 for an example). For instance, educators from the Central center described challenges related to communication codes among youth from different neighborhoods, which resulted in instances of violence that were later shared on digital platforms (depicted in the left image). To address this, the educators proposed empowering youth with tools to engage in constructive dialogue and reconnect with their classmates (depicted in the center image). Lastly, they envisioned a YPAR project where youth would analyze and create a glossary of communication practices, exploring how they are interpreted by youth from different neighborhoods.



Figure 3-6 Strategic Planning Exercise - Central Teachers

### Implementation of Nayah-Irú

Nayah-Irú was designed to be implemented over a ten-week period, with each week featuring activities that aligned with the Personal Data Literacies Framework (Pangrazio &

Selwyn, 2019) and connected to different stages of the YPAR Structure adapted from Martinez's work (2020), specifically selected for this project. Moreover, the weekly activities aimed to incorporate principles from the Speculative Civic Literacies Framework (Mirra & Garcia, 2020).

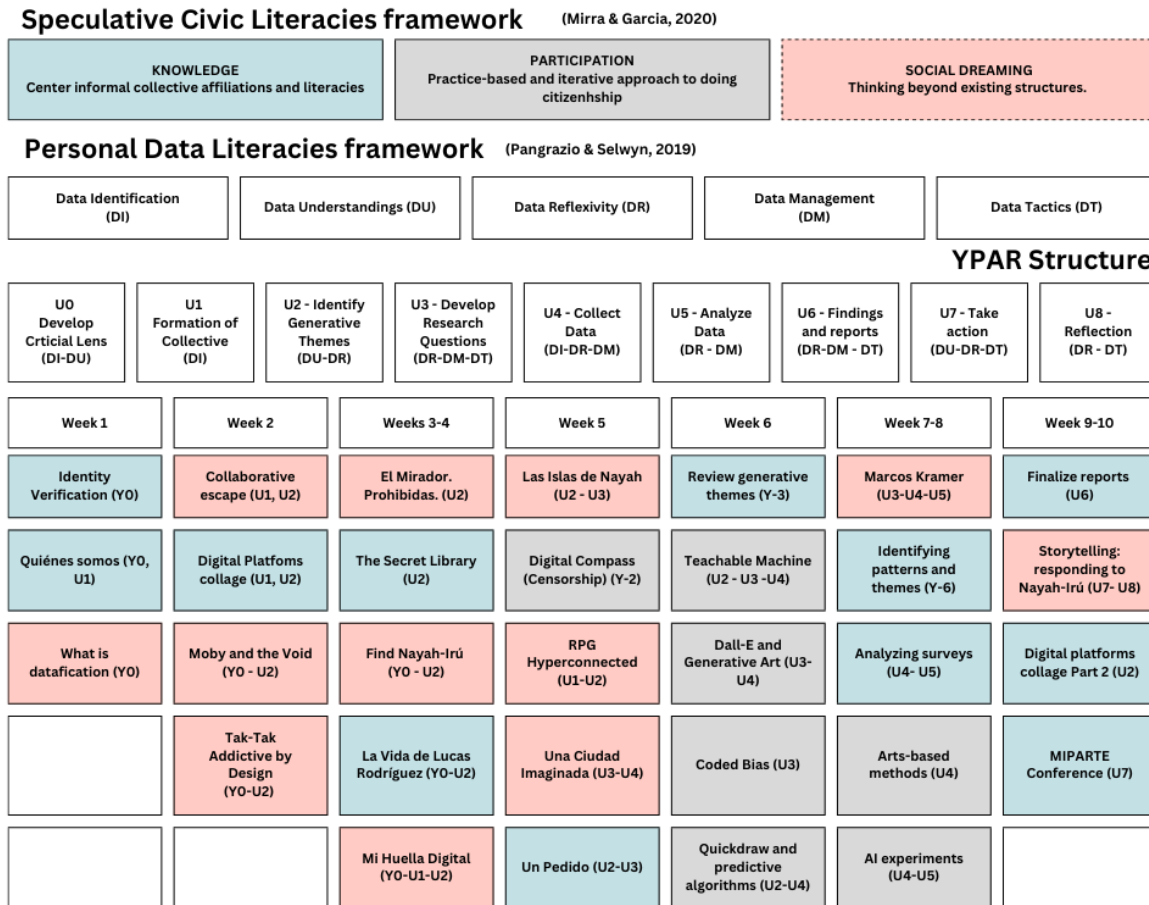


Figure 3-7 Epistemological Framework of Nayah-Irú

To illustrate, activities that provided youth with disciplinary knowledge essential for their critical inquiry and research process were categorized as "Participation," offering practice-based approaches to citizenship. Activities that encouraged youth to explore their lived experiences with data or collaboratively generate new knowledge were labeled as "Knowledge." Lastly, activities that invited youth to engage in speculation and imagine alternative discourses, contemplating Nayah-Irú's fate and their own, were categorized as "Social Dreaming." Figure 3-

7 provides an overview of how each activity developed for this curriculum aligned with the YPAR structure and the epistemological frameworks underpinning this study.

In the initial stages of the curriculum, youth interact with Nayah-Irú through Gather, an avatar-based video conference software that serves as the central platform for content delivery and collaborative activities. For instance, in Level 1, youth discover Nayah-Irú's office, where they find instructions to create their own avatars. The office space features tutorial videos, animated instructions, and a collaborative board for sharing their avatars (Fig. 3). Moreover, youth receive communication via email, Facebook Messenger, and Telegram messages. Some conversations are facilitated by educators, while others are automated through a bot or presented in comic book vignettes.

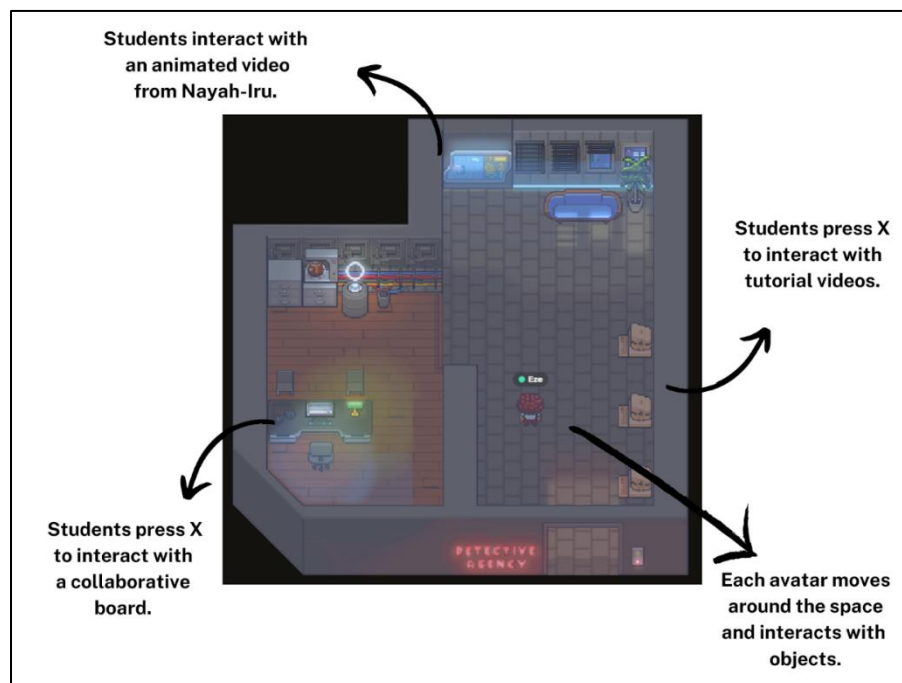


Figure 3-8 Interactive space for Week 1

The game plays two roles in this process based on the literacy components identified by Luke (2000). First, students are introduced to socio-technical skills to be safe in digital spaces and learn about the social nature of data. As the game progresses, students take agency over the

narrative of the game and engage in critical reflexivity regarding data practices. In this study, stories are used as an artifact to engage in the exploration of the digital space in order to develop maps that allow learners to explore their personal data literacies, identify tensions, and engage in telling stories to the community that contributes to critically resisting oppressive digital spaces.

### Game Chapter 1 - Invisible Data

Week 1: Understanding data and datafication.

1. Youth receive a letter at home or at school. The letter leads them to a virtual world in the Gather platform where they are asked to prove they belong to the 21st Century by providing some information about their culture. The interactions occurred through e-mail after contacting Nayah-Irú in a Gather virtual world.

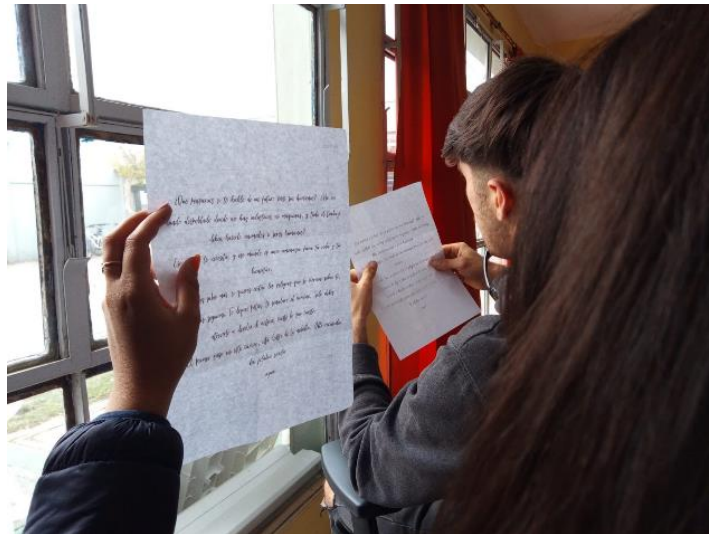


Figure 3-9 Youth from Puertas receive the first letter

2. Nayah-Irú requests them to create a secret code name which will be their avatar during the game. By using Padlet, youth were able to select an image that would represent their identity in the game and create their character features. This activity allowed youth to interact with Nayah-Irú using an avatar rather than their own identity.

3. What is datafication? A comic book vignette that describes how datafied platforms can get to know users and shape their behavior is followed by a reflection about the implications of datafication in their lives. The vignette describes Nayah-Irú's world and her warnings about the possibility the youth may be generating data.



Figure 3-10 Vignette introducing the ban of digital platforms in the future.

## Game Chapter 2 - Addictive Design

Week 2: Developing a critical lens of datafication and design.

1. The collaborative escape activity allows youth to find new ways to communicate with Nayah-Irú. In this case, they find out Nayah-Irú has a Telegram account, moderated by a bot, which can reply to some of their questions (see Figure 3-11).



Figure 3-11 Interactive features between Telegram and Gather

2. Using an edited version of the music video, youth reflect upon the addictive nature of mobile technologies and their implications for themselves and the people around them. Youth were asked to discuss why companies would attempt to keep users engaged with their products.
3. Youth imagine an innovative and disruptive product that they need to sell to other people their age. They imagine how they would attract their attention and what type of personal data they would need to accomplish their goals.

### Game Chapter 3 - Predictive Algorithms

Weeks 3-4: Understanding how data can be used to predict future behavior.

1. Youth first learn the motives of Nayah-Irú to contact them by sharing a newspaper from future Uruguay describing the moment when digital platforms were banned worldwide.

Youth discuss the implication of banning such platforms in the future and speculate about potential reasons for doing so.

2. Youth also discover Nayah-Irú has a presence in different social media accounts where she posts information about datafication that may be useful for their projects.
3. They also read a speculative comic book story about Lucas Rodriguez, a youth from one of the communities, who was deemed dangerous by an algorithm based on his social media behavior as a teenager (see Figure 3-12). The story, developed by the researcher, seeks to engage youth in critical conversations about the implications of our digital presence in the material world. Thus, this activity begins to draw lines between the speculative world and the worlds they inhabit, but also between the digital and physical worlds in their lived experiences.



Figure 3-12 Lucas Rodriguez Narrative

## Game Chapter 4 - Who is Marcos Kramer?

Week 5. Developing a critical lens and reflecting on the generative themes.

1. Youth first discuss the implications of datafication and in which ways they can be countered by exploring ways in which they give up data without knowing.



- Youth play a dice-based RPG game, created by the researcher, where they create storylines of a youth attempting to avoid the harms of datafication.
- Youth receive a request from Nayah-Irú. She explains she needs more information to reach a decision on whether to stand up against the government that is banning digital technologies. She requires them to think about which data they can send her to help her decide and invites them to find ways to contact someone named Marcos Kramer.

## Game Chapter 5 - Generative Algorithms

Week 6. Developing research questions and research training.

- Youth use a problem-framing tool developed in Padlet to narrow down the generated themes into research questions (see Figure X). They were encouraged to think about the following questions: “Who are the key stakeholders in this problem?”, “Who holds knowledge about this problem?”, and “Is the answer already available, or do we need to find it?”

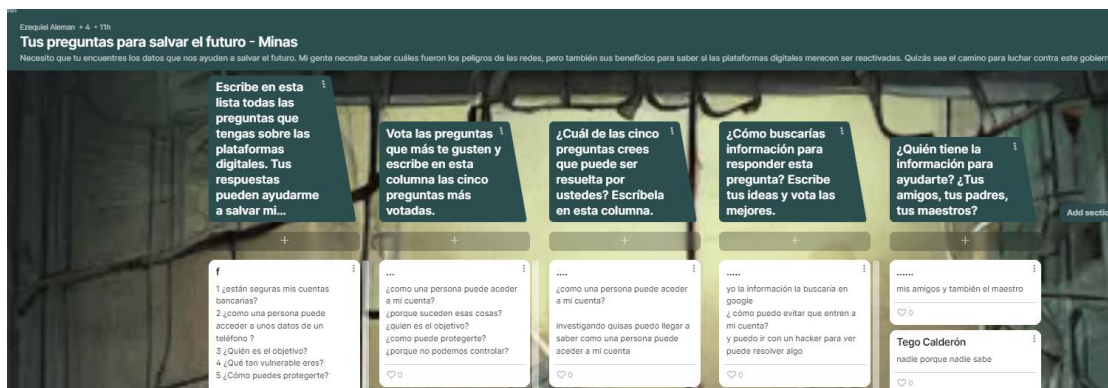


Figure 3-13 Problem-framing tool

- Research tools. Youth are introduced to different platforms where they can experiment with data and algorithms: Google Teachable Machine, Dall-E, Quickdraw AI, Stable Diffusion, Midjourney, Writesonic, Google Forms, Google Spreadsheets, among

others. Figure X shows a teacher who helped the youth 3D print a piece for a project that involved using Google Teachable Machine to classify different types of beans with their laptop webcams in order to discuss racial bias in face detection tools.



Figure 3-14 3D print for an AI experiment in Melchor

## **Game Chapter 6. Countermapping**

Week 7-8. Research methods training, data collection and analysis.

1. Youth receive training to research digital platforms using surveys, experiments, interviews and fieldnotes.
2. Youth learn about Marcos Kramer, another fictional character that provides them with information about Nayah-Irú's world and introduces them to the research conference (see figure 3-15). Marcos also provides them with different types of output their research can implement for Nayah-Irú to get the data.



Figure 3-15 The vignette of Marcos Kramer

### Game Chapter 7. CREAJOVEN Research Conference.

Weeks 9-10. Creating data stories and presenting at the CREAJOVEN research conference.

1. Youth are invited to create a story where they represent three moments of their research project: the struggle, where they identify a problem in their community; the possibility, where they imagine alternative discourses to that challenge; and resistance, where they describe their research process (see Figure 3-16).



Figure 3-16 Pinares Youth Narrative

2. Youth complete a new digital platforms collage to explore how their attitudes towards digital platforms shifted over the ten weeks of the program.
3. Youth participate in the CREAJOVEN research conference presenting their work to peers, educators, and authorities. Figure 3-17 shows one of the Melchor students introducing their Machine Learning experiment to the President of the Technological University of Uruguay.



Figure 3-17 Melchor youth introducing ML experiment to stakeholders (Source: UTEC)

### **Summary**

The design process of Nayah-Irú, a curriculum, is influenced by Social Design-Based Experiments (SDBEs) methodology which emphasizes envisioning utopian ideals and addresses systemic injustice by collaborating with individuals experiencing oppression. The design principles focus on the historical context of the CECAP communities in relation to digital platforms, the development of a sustainable curriculum, and the acknowledgment that the CECAP communities have knowledge, values, and attitudes that need to be centered. The Nayah-Irú curriculum integrates Youth Participatory Action Research (YPAR) epistemology and Speculative Civic Literacies, empowering youth in critical literacy and personal data literacies. The curriculum follows the guiding principles of PAR EntreMundos, emphasizing inclusivity

and equity. It also employs speculative thinking and storytelling to deconstruct and reimagine normative paradigms of learning and democratic life. Nayah-Irú prompts alternative discourses and engages youth in bridging the knowledge gap between their personal lived experiences and the disciplinary knowledge about the nature of data in our lives. The curriculum incorporates the five domains of personal data literacy and moves recursively across different data practices and literacies.

## CHAPTER 4. METHODS

This study utilizes a multiple-case design (Creswell, 2013; Stake, 2006) within a qualitative research paradigm. According to Creswell (2007) and Stake (2013), multiple case studies involve examining a single issue through the analysis of multiple cases. In this research, each case represents an observational examination (Bogdan & Biklen, 2007) of a specific setting where the Nayah-Irú curriculum was implemented. Each case is individually examined, focusing on its unique contexts and situations to gain insights into how local experiences shape the activities, the experiences, and the interpretations of the curriculum (Stake, 2013).

A multiple-case design allows for the exploration of real-life bounded systems through detailed data collection from various sources (Creswell, 2013). It is important to note that multiple case studies shift the research focus from central organizational matters to the local operations of each case (Stake, 2013). This approach aligns with place-based methodologies that aim to elevate the voices of marginalized communities. In this research, each case is analyzed and reported individually, enabling the drawing of cross-case conclusions and conducting a cross-case analysis (Stake, 2013) that emphasizes the personal lived experiences of each community.

The study received approval from the Institutional Review Board (IRB) at Iowa State University and was granted exemption from most requirements of the human subjects protection regulations (see Appendix B). The exemption was granted because the study was conducted within established educational settings involving normal educational practices that were unlikely to negatively impact students' learning opportunities. Additionally, all interactions with participants were limited to the research context, without posing any reasonable risk to the subjects. Participants were fully informed about the study's scope and their rights to withdraw

their participation at any time without facing negative consequences. To protect the identity of the collaborating communities, all names of students, educators, and towns have been changed. The chosen names adhere to gender conventions, ensuring female students are given female names.

### **Description of Context**

This section presents an overview of Uruguay's educational system and emphasizes the importance of alternative schooling options, specifically CECAP. In 2002, Uruguay experienced a severe financial crisis that resulted in persistently high levels of poverty, despite efforts to revive the economy. The concentration of disadvantaged youth in impoverished neighborhoods has led to increased educational segregation, as their residential areas often determine the schools they attend. Furthermore, there has been a shift of middle and upper-class students from public schools to private institutions (Filardo, 2018).

While access to education in Uruguay is generally satisfactory, attendance and dropout rates, particularly in secondary education, continue to rise. In 2018, 15% of young people aged 15-17 were not enrolled in school, with a higher rate among low-income families. Additionally, 51% of 23-year-olds in 2018 had discontinued their education (INEEd, 2019). Concerns have also been raised about academic performance in subjects such as mathematics, science, and reading, as measured by PISA standardized tests, especially among youth from lower socioeconomic backgrounds (ANEP, 2019). In response to these challenges, Uruguay has implemented alternative schooling placements to provide opportunities for young people.

This study focuses on five CECAP schools situated in different provinces of Uruguay. These schools are part of the CECAP network, an initiative by the Ministry of Education and Culture that supports youth who have dropped out of secondary education, are unemployed, and

face vulnerable social circumstances (PNET, 2013). The program aims to deliver comprehensive education, foster social inclusion and civic participation, encourage the continuation of secondary education, and prepare students for the workforce by integrating knowledge, skills, and attitudes (PNET, 2013). The CECAP centers are adaptable and collaborate with formal educational institutions to offer dual programs, allowing students to take secondary school classes alongside the alternative program (Carbajal, 2021).

Youth attending CECAP centers have a positive perception of the program, considering it as a pathway to future employment. Internship programs have been established to encourage ongoing education, and scholarships are provided to cover transportation and meals, contingent upon regular school attendance. It is recognized that disengaging from the CECAP center significantly reduces the likelihood of youth completing their formal education (Carbajal, 2021). The CECAP curriculum encompasses educational references, fundamental knowledge (literacy, mathematics, critical thinking), vocational training workshops, arts, physical education, and information technology, with an emphasis on social inclusion in the digital society.

### **Recruitment**

The cases selected for this study were purposefully chosen, allowing each CECAP center to determine the relevance of the curriculum to their specific learning goals (Merriam, 2002). The Ministry of Education and Culture informed all CECAP schools about a workshop titled "Investigación Participativa y Mundos Virtuales" [Participatory Research and Virtual Worlds] in February 2022, and educators from ten centers attended this workshop. These educators were then invited to participate in a longer YPAR training program, of which eight schools decided to take part.

In July 2022, educators from the eight participating centers came together for an in-person event where they shared their experiences with YPAR through the creation of a collective



collage. In August 2022, the Ministry of Education and Culture provided an overview of the Nayah-Irú curriculum to all centers that applied to participate. Initially, six CECAP centers applied, but one had to withdraw from the project due to unresolved scheduling issues.

Each CECAP center had the autonomy to select the students who would participate in the project, without any specific requirements regarding the number of youth involved.

Demographic information was not collected from the participants in this study. The weekly meetings between educators and students took place in school buildings, either in information technology labs or during educational reference hours, depending on the decision of each center. While technology availability in the classrooms varied, all centers had internet access, a large screen, and at least one laptop for every 2-3 students. Due to open enrollment, some students joined or left the program during its implementation, and these transitions were discussed and supported during the weekly meetings with educators. Table 4-1 presents the characteristics of each center.

Table 4-1 Characteristics of each CECAP center

<b>Center</b>	<b>Weekly hours</b>	<b>Number of students</b>	<b>Number of facilitators</b>	<b>Educators</b>	<b>Subject/class</b>
<b>Miguelete</b>	One 2-hour meeting.	7	1	Beatriz	Information technology
<b>Melchor</b>	Two 1-hour meetings.	15	2	Lucía and Matías	Educational Reference
<b>Central</b>	One 2-hour meeting	20	2	Liliana and Carlos	Basic Knowledge
<b>Puertas</b>	One 2-hour meeting and one 1-hour meeting.	20	1	Gerardo	Educational Reference
<b>Pinares</b>	One 2-hour meeting.	15	1	Paula	Educational Reference

## Participants

The participants in this research consisted of 77 youth, aged 14-18 years old, who were enrolled in CECAP programs, and 7 educators who implemented the curriculum as part of their classroom activities.

Educators within the CECAP network play a crucial role in guiding youth through their personalized educational journeys. Among them, educational reference teachers take on significant responsibilities, such as welcoming students, devising pedagogical strategies, designing workshops, providing emotional support, and facilitating group processes. Their role is integral to the pedagogical approach of CECAP (Reallini et al., 2011). However, CECAP educators face challenges in finding suitable mentoring methods for each student, as many require support in navigating social spaces. It is important to note that each center lacks assigned psychologists or social workers, which further adds to the challenges they face (Sordi, 2016).

The youth in CECAP centers confront high rates of absence and dropouts, especially during the first semester. These students often exhibit traits such as impulsiveness, aggression, low self-esteem, feelings of hopelessness, apathy, and disconnection between their desires, decisions, and future outcomes. Additionally, language difficulties contribute to their sense of exclusion and well-being challenges (Achard, 2014). However, within the CECAP network, these youth find protection, acknowledgment, and support from their peers and educators. They perceive CECAP as a community where their voices are heard and valued, emphasizing the importance of community and group support in fostering their continued engagement. CECAP provides them with opportunities to develop a positive self-perception, cultivate their own voices, and envision hopeful futures (Achard, 2014).

### **Data Collection**

Due to the complex nature of multiple case studies, Stake (2013) suggests an ethnographic approach that focuses on primary sources of data to foreground thick descriptions, experiential understanding, and multiple realities. Thus, it is necessary to collect data from each case employing different lenses, thus using different types of data. Additionally, the observations and interpretations of the researcher and teachers were triangulated with the primary data. The following research questions guide this inquiry:

The guiding questions for this research are:

1. In what ways do youth develop their critical data literacy through their participation in the Nayah-Irú curriculum?
  1. How do youth understandings and critiques of data are demonstrated during the implementation of the curriculum?
  2. How do youth research projects demonstrate examples of civic participation?
2. How do educators implement the Nayah-Irú curriculum to facilitate the youth development of critical data literacy?
  1. What specific strategies do educators use to facilitate the curriculum implementation with youth?
  2. In what ways do educators interpret the challenges and opportunities identified during the implementation of the curriculum?

Data sources for this research included: (1) youth artifacts, (2) interviews, and (3) reflective memos. The data was collected after the five sites had fully implemented the curriculum and participated in the MIPARTE research conference. Educators provided access to the artifacts the youth had designed and participated in the interviews. The self-reflective memos were collected during the implementation of the project after the weekly planning sessions with

educators. Figure 4-1 describes the different types of data and how they align with the research questions.

Data	Description	Research Questions			
		1A	1B	2A	2B
Interviews	Two interviews with educators from each school, including a member checking interview.	■	■	■	■
Focus Group	A semi-structured interview exploring the outcomes of the curriculum implementation with all the educators.	■	■	□	□
Teaching memos	Ever week, teachers and I wrote memos reflecting on the previous lesson and making plans for the upcoming week.	□	■	■	■
Youth Artifacts					
Visual collages	Visual representation of datafication concepts. Completed at the beginning and end of the implementation.	■	□	□	□
Youth narratives	Storyboards describing research process.	□	■	□	□
Youth reflections	Youth reflections submitted during the activities.	■	■	□	□
Collaborative boards	Step-by-step visual guide to design research questions.	■	■	□	■
Research Posters	Youth presented research posters sharing their findings.	■	■	□	■
Additional Artifacts	Extension activities introduced by the educators.	□	□	■	□

Figure 4-1 Data Sources and Research Questions Alignment

**Interviews**

To gain insights into how educators implemented the curriculum, the study conducted three stages of interviews: (1) Focus groups, (2) individual semi-structured interviews, and (3) member-checking interviews.

The focus group involved all educators (7) who implemented the curriculum. This 90-minute in-person interview took place during the MIPARTE research conference on December 8, 2022, in Montevideo, Uruguay, a research meeting where youth presented their research projects. During this session, a preliminary exploration was conducted to delve into the lived

experiences of the educators while engaging in their research projects with youth. In the interviews with educators, they were asked to identify events or moments from the design of the artifacts that warranted closer examination. Teachers' suggestions could involve looking into specific artifacts, collages, identifying themes, or more specific nuances in their implementation of Nayah-Irú.

Subsequently, five 90-minute interviews were conducted with the seven educators from each center (3 individual interviews and 2 interviews with 2 educators each) to analyze how local experiences shaped the curriculum, the strategies they implemented, and their understanding of the outcomes of their YPAR projects. All the interviews were conducted virtually using videoconferencing software (Zoom) in December 2022, the week following the MIPARTE conference. Given the complexity of the data collected in this study, member checking (Tracy, 2010) played a crucial role in ensuring qualitative rigor.

In the member-checking interviews with educators conducted in March 2023, the preliminary codes and artifacts developed in the data analysis were shared to seek their perspectives on areas that may have been underrepresented or unacknowledged in the study. This interview allowed educators to read the narratives of their projects adding new accounts or removing those statements that may have been inaccurate according to their perspectives. Code rectification and analysis checks were performed to ensure that the findings accurately represented the voices of the teachers by providing them with a list of quotes sorted into different themes to evaluate how the different cases aligned with cross-case themes. The interviews were audio-recorded and transcribed for later analysis.

### **Artifacts**

In this study, artifacts refer to the various creations generated by the youth throughout the implementation of the curriculum. These artifacts take on diverse formats, such as illustrations,

videos, paper storyboards, visual presentations, and narratives. The decision to select these artifacts for subsequent analysis is rooted in the recognition that multimodality accentuates the role of situated action, thereby placing the social context at the center (Sakr et al., 2016).

The table below provides a list of the artifacts developed by the youth as outcomes of the suggested activities within the curriculum. It is important to note that the youth also produced additional artifacts during their research process, which were identified as independent productions.

Table 4-2 List of Youth Artifacts

Activity	Artifact	Number of artifacts/entries
<b>Week 1.</b> <b>¿Quiénes somos?</b>	Youth depictions of their alternate persona for the game. Youth were allowed to share their persona with other students.	28 artifacts
<b>Week 2 and Week 10.</b> <b>Digital platform collage.</b>	Youth used Padlet to respond to questions using a visual collage. This collage was implemented twice, at the beginning and at the end of the project.	315 entries (Week 2)
<b>Week 2.</b> <b>TakTak Addictive by Design</b>	Youth create a personalized ad for a product based on data collected from their classmates.	9 artifacts
<b>Week 5.</b> <b>Hyperconnected</b>	Hyperconnected. Youth play a dice RPG game and create multiple narratives describing the role of digital platforms in their lives.	8 artifacts
<b>Week 6.</b> <b>Quickdraw and predictive algorithms.</b>	Youth play with Quickdraw, an AI tool that predicts intent and participate in a collaborative board.	67 entries
<b>Week 7 - Review generative themes.</b>	Problem-framing tool to design research questions	5 artifacts
<b>Weeks 7-8 Experiments with data.</b>	Arts-based methods. Youth create visualizations describing their experiences using a generative AI tool as inspiration.	4 artifacts
<b>Weeks 9-10 CREAJOVEN</b>	Youth research posters	6 artifacts
<b>Weeks 9-10 CREAJOVEN</b>	Youth narratives of their research process.	5 artifacts
<b>Weeks 9-10 CREAJOVEN</b>	Other artifacts developed by the youth for the MIPARTE conference. .	4 artifacts (brochure, two videos, and one 3D maquette of Nayah-Irú's world.

**Reflective memos**

Throughout the implementation of the curriculum, researcher reflective memos were maintained to capture a wide range of thoughts, emotions, and experiences encountered during the research process. Recognizing the intricate nature of qualitative research, it was crucial for the researcher to acknowledge their own biases and influences on data collection and interpretation (Primeau, 2003). These memos played a vital role in fostering a heightened sensitivity to the nuanced meanings embedded within the collected data, allowing for a more meaningful engagement with the participants (Birks et al., 2008).

In total, 38 audio recordings were prepared as a result of the weekly meetings conducted over the ten-week period of curriculum implementation with the educators. Additionally, all the self-reflective memos were transcribed to facilitate further analysis and exploration of the data.

**Data Analysis**

In this multiple-case study, the data analysis was conducted at both the individual case level and the cross-case level to gain valuable insights into the issue of critical data literacy. To streamline the coding and analysis process, Dedoose software was employed. This tool proved instrumental in effectively managing codes across multiple cases, thereby enhancing the efficiency of the analysis and facilitating comparisons between cases.

The analysis process followed a systematic sequence of steps, progressing from the examination of each individual case to the cross-case analysis involving all five cases. The outcomes of this process are illustrated in Figure 4-2, which showcases the various reports generated as a result of the analysis: narrative and analysis reports of each case, list of individual assertions, theme commonalities report, list of assertions, and case comparison.

### **Case Analysis**

The unit of analysis for each case in this study consisted of the educators and youth from the five CECAP centers. To gain a comprehensive understanding, each case was examined in its entirety, with a particular emphasis on identifying issues and common themes using constant comparative analysis (Cresswell, 2013).

In order to maintain the distinctiveness of each case (Stake, 2013), it was decided not to merge the individual cases into the main research questions of the overall multiple case study prematurely. Instead, careful attention was given to each case before integrating them. To facilitate this approach, a sample plan was developed for each individual case, as depicted in Figure 4-3. This plan encompassed contextual elements, areas of focus (such as Nayah-Irú interactions, YPAR process, local events, and past experiences), data sources, specific challenges, and key research questions.

For each CECAP center, the analysis focused on three main areas: 1) how the youth engaged with the Nayah-Irú curriculum, 2) the strategies implemented by educators during the implementation, and 3) any local events or experiences that might have influenced the outcomes. To organize the data, mini-cases were created, capturing specific research outcomes or activities organized by the educators. Data sources included interviews with educators, student artifacts, and a focus group that connected participants from different centers. Additionally, notes were taken regarding economic conditions, organizational structure, and youth access to digital devices. After completing each analysis, a summary table was created to organize the themes, data sources, and evidence identified during the case analysis.



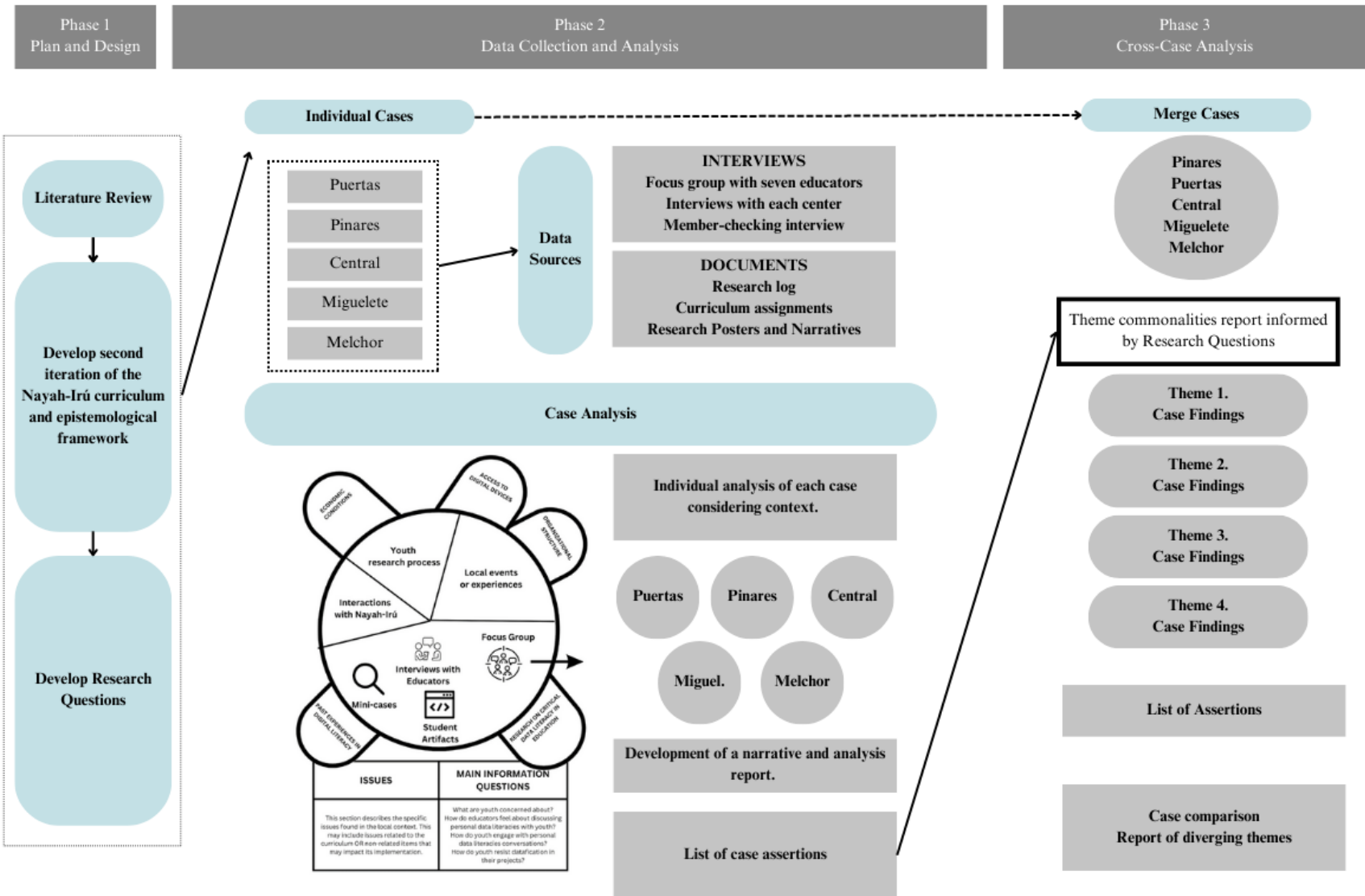


Figure 4-2 - Multiple Case Study Process (adapted from Stake, 2006)

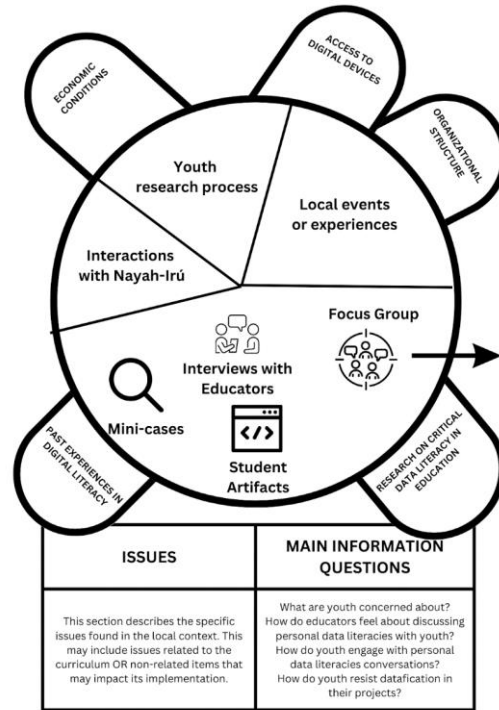


Figure 4-3 Sample Plan for Individual Case Studies based on Stake (2013)

The data analysis aimed to understand how youth and educators interpreted and engaged with data in relation to concepts of agency, equity, and resistance. Specifically, the examination focused on how educators and youth discussed their relationships with Nayah-Irú and provided examples of how they identified, understood, used, and reflected upon their data practices. Thematic analysis (Braun & Clarke, 2006) was employed to structure the coding process, consisting of six phases: familiarization with the data, generating initial codes, searching for themes, reviewing themes, defining and naming themes, and writing. Figure 4-4 shows the initial organization of codes individually separated per case, followed by the development of themes, while keeping the organization by case. Finally, the figure shows how the data was organized into four grand themes with a combination of codes from all the cases.

During the initial stages, the interview transcripts and memos were cleaned and anonymized, and an inductive analysis was conducted. Coding was used to explore how youth navigated the curriculum implementation, described their lived experiences with data, and

utilized data in their research. The coding process involved the use of descriptive codes, summarizing the main topic of each passage in a word or short phrase, as well as in-vivo codes to maintain a connection to the participants' language. Analytic voice memos were recorded to capture in-the-moment sense-making. Simultaneous coding (Saldana, 2021), involving overlapping descriptive and in vivo codes, was occasionally employed. Through successive rounds of axial coding (Charmaz, 2014), the original codes were further categorized into parent codes. This ensured that all codes were relevant and facilitated the creation of individual case reports, as well as the holistic analysis of data for cross-case comparisons.

After completing the individual analysis of the cases, a narrative was prepared for each one of the cases in this study. During the member-checking stage, the narrative was shared with the educators to assess the representativeness of the stories in relation to their lived experiences with the youth.

### **Cross-case Analysis**

To ensure traceability, the data in this study was organized into descriptors, enabling each code to be linked back to its respective center. Cross-case analysis plays a crucial role in mobilizing knowledge derived from individual case studies and assessing the significance of each research question within those cases. Stake (2013) suggests a method for analysis that involves drawing generalizations about the group of cases by exploring commonalities while also considering their unique aspects. These generalizations encompass broad findings shared by the cases included in the study. By synthesizing the findings of each individual case, convergent themes were identified, allowing for the construction of a comprehensive summary of assertions that contributed to the understanding of the cases (Stake, 2006). Additionally, the data was coded looking for other themes such as the presence of personal data literacies domains (Pangrazio & Selwyn, 2019) to evaluate which strategies had been implemented by the youth during the

project. The analysis also incorporates areas where findings could not be fully converged, providing additional insights in the report of these findings.

### **Researcher Positionality**

I acknowledge that for many of the educators in this community, the fact that I was introduced to the center by a school authority clearly evidenced the power asymmetry teachers are often exposed to in educational research. This could have been further exacerbated by my introduction as a researcher visiting from a United States institution. Thus, I assume educators may have had little to no opportunities to stand back or refuse my presence. I attempted to fill this gap by decentering myself from the project development and recentering the educators as the specialists in this project.

The fact that my relationship with Puertas began almost two years prior to the beginning of this study allowed me to understand the complexities of this learning community and to build a relationship based on trust and care. This experience also allowed the rest of the communities to see how the curriculum had been tailored to their needs. The professional development workshops, including my trip to Uruguay in 2022, were important moments for me to connect with the five communities. During the professional development and planning activities, I focused on listening to educators' challenges rather than enforcing a strict agenda for our conversations.



While exploring the characteristics of platformization, datafication, or algorithmic oppression may be useful, there is a clear tension in this study between my understanding of these phenomena and the local practices, tactics, and interventions. I see this tension as an opportunity to engage in humanizing research in digital literacies where the focus on the lived experiences of youth regarding their digital lives will interrogate the conditions of social injustice through theory and commitment to social action (Fine, 2008). Still, my knowledge and interest in the topic may have permeated this study by reinforcing certain issues over others during my conversations with educators.

This humanizing approach to research also seeks to resist traditional notions of objectivity in science. My role as a participant-observer has led me to define my epistemological views about knowledge as situational, partial, incomplete, and influenced by temporal, spatial, and social contexts. This epistemological approach to knowledge is favored in place-based research as it decenters the researcher as the sole provider of knowledge (Tuck & McKenzie, 2015). In this study, I do not seek to measure how much knowledge students have learned but how the knowledge they have situationally created speaks of larger structures of understanding and acting upon oppressive structures. From an axiological point of view, this also means that knowledge in this study is subjective and clearly affected by the values each community holds. From the point of view of ontology, this study focuses on local knowledge about data literacies in these communities seeking to flesh out the lived experiences of the youth and educators rather than focusing on grand narratives (Yilmaz, 2013).

Another personal limitation in conducting research around data literacy is that every single finding, referenced text from the literature, or quote from a participant is also speaking of my personal data literacies. As a researcher, I can also be paralyzed by grand narratives, false

dilemmas, and technological determinism. I am also affected by discourses of technological determinism and feel the need to accept the terms and conditions in digital platforms.

Finally, even when Nayah-Irú was designed as a transformative experience, I assume that knowledge is mediated by power relations and control (Tuck & McKenzie, 2015), and as such, my own design is affected by these dimensions. For example, the digital objects students create are subject to some of the oppressive structures of the mainstream digital spaces they used to create them. Being aware of my biases and limitations allowed me to engage in thoughtful discussions with educators to make sense of the youth experiences during the implementation of this curriculum.

### **Trustworthiness**

Given the complexity of the multiple realities youth experience in digital platforms, this study needs to be conducted in a holistic manner, where the interrelationship between different pieces of reality is explored as they mutually influence each other. As a result, seeking context-free truth statements is not viable for this study. However, in order to establish trust with the readers and present a trustworthy research activity, the focus has been on describing the steps taken to ensure the trustworthiness of the research, drawing upon the four general criteria proposed by Lincoln and Guba (1985).

The first criterion, credibility, emphasizes the congruence of findings with reality. Credibility is achieved using data triangulation, incorporating various sources of information such as artifacts, interviews, and memos to support the established findings. Validating these findings through triangulation entails comparing the new perspectives from each case study with existing knowledge of other cases and themes (Stake, 2006). Additionally, during the cross-analysis stage, educators are involved in verifying interpretations through member checking. This process allows for the revision of codes, creation of new ones, and revisiting previously

overlooked data sources. The credibility of this study is further strengthened by the extended engagement over the course of one semester, working exclusively with the educators, and another semester where the curriculum is co-implemented, while guiding the youth's research process. This prolonged engagement facilitates reflexive self-analysis through the creation of descriptive memos containing rich and contextual data.

The second criterion identified by Lincoln and Guba (1985) is transferability, which acknowledges that qualitative studies are context-specific but can yield transferable designs applicable to educators in other settings. To ensure transferability, a comprehensive description of the study context, the researcher's positionality, the implementation process, data collection methods, and time frames is provided. This detailed information allows for a thorough understanding of the circumstances surrounding the study, thereby enhancing the potential for transferability.

Dependability, the third criterion, pertains to establishing the researcher's trustworthiness. Dependability is supported by clearly distinguishing the researcher's observations from interpretive comments about the data. However, it is important to acknowledge that this separation does not guarantee complete freedom from bias. Therefore, reflexive auditing is employed, wherein the researcher's involvement in decision-making processes is described to maintain dependability.

The final criterion, confirmability, as outlined by Lincoln and Guba (1985), aims to achieve a degree of objectivity in the research. However, it is worth noting that only certain qualitative research approaches, such as emergent design positivism, can fully attain the desired levels of objectivity (Bogdan & Biklen, 2003). Given the nature of this study, it is unlikely to claim complete objectivity, as the researcher acknowledges active participation in developing the



game narrative, training educators in using YPAR as a framework, and collaborating in decision-making processes regarding data collection, analysis, and dissemination based on the resources and conditions of the environment. This recognition of potential involvement and contamination resulting from the researcher's presence is an essential aspect of addressing confirmability.

In conclusion, by adhering to the criteria for trustworthiness established by Lincoln and Guba (1985), this study endeavors to establish credibility through data triangulation, member checking, and prolonged engagement. It strives to enhance transferability through comprehensive descriptions of the study context and process. Moreover, it supports dependability by separating observations from interpretive comments and engaging in reflexive auditing. While complete objectivity is challenging, efforts have been made to address confirmability within the limitations of this study.

## CHAPTER 5. FINDINGS

This chapter begins with a narrative account of the implementation of each case based on the interviews with the teachers and exploring the preliminary themes identified during data analysis. The main reason behind the decision to present each case separately is to allow the reader a qualitative understanding of the experiencing of the case as it occurred in each context and its particular situations (Stake, 2006) A total of 5 cases are presented:

- Puertas: a story of access and belonging in digital platforms.
- Pinares: a story of digital privacy
- Central: a story of datafication and personalization
- Miguelete: a story of data tracking and digital well-being
- Melchor: a story of machine learning and generative AI

To further illustrate the points made by the educators in their interviews, reference to posters, youth narratives and other artifacts are provided (see Chapter 4 for List of Artifacts). Then, a cross-case analysis is presented that explores four grand themes including the development of critical data literacy through speculative storytelling and real-world stories, their engagement in acts of civic participation to overcome discursive closure, an analysis of the strategies implemented by the educators and how they reframed the different challenges they encountered.

### Case Narratives

Each case narrative below is organized with four main parts: 1) background, 2) youth experiences, 3) YPAR process, and 4) educator strategies to illustrate the emergent themes derived from the analysis of each case.

All the names and centers mentioned in this chapter are pseudonyms. The names do respect gendered conventions for names meaning that traditionally female names were assigned to female participants. Also, the quotations that included potentially identifying details about the participants were redacted. The name of the research conference has also been replaced with an identifier, CREAJOVEN, which stands for Congreso de Investigación y Creatividad Juvenil para la Participación y Transformación Comunitaria [Congress of Youth Research and Creativity for Community Participation and Transformation]. The quotations from the participants which illustrate the findings and discussions in this study have been translated from Spanish to English by the researcher. To facilitate the reading process in English, only the translated texts are provided while the original texts have been added to appendix B.

### **Puertas: A Story of Access and Belonging in Digital Platforms**

Puertas is a small province in the western Uruguay. Due to its proximity to a port, the town has historically been utilized as a trading point for local and international companies. This CECAP serves the entire city, but it is located in a marginalized area. Despite the relatively small size of this community, the educators expressed that many youth were unfamiliar with the downtown area or the coastal areas.

Puertas was the first center that implemented the Nayah-Irú curriculum in 2021 (see Chapter 3). Gerardo, who was part of that initial implementation, is a physical education teacher, and he is convinced his background has allowed him to thrive as an educator at CECAP. He teaches them about discipline and self-control, but he can also engage them in activities where they can be playful and imaginative. Gerardo teaches the reference group periods, which means he gets to spend time with the youth every day to discuss issues they are concerned about.

## Youth Experiences

During the first weeks, Gerardo found the youth were puzzled by the interactions with Nayah-Irú. When they first received the letter, many of them asked Gerardo for answers. One key moment during the implementation was the Mi Huella Digital [My Digital Footprint] activity, where the youth watched a video about a person being followed by different tracking and surveillance technologies while she was organizing a trip. Students first argued that the video was interesting but that it was fictitious.

After finding that the youth showed little concern about the issues presented in the curriculum at the beginning, a pivotal situation occurred during the first weeks of the implementation when one grandparent had been scammed online, and the news appeared on the local news. Gerardo was able to connect this episode to the materiality of data in digital platforms, which was a good start to begin a rich discussion about personal data. During the focus group interview, Gerardo shared that this episode led to more conversations about the nature of algorithms. Gerardo was surprised when he found one of his students was capable of clearly defining algorithms using examples from his lived experiences, such as Netflix or Spotify recommendations. One student described how her playlists on Spotify often started playing random songs in between her favorite songs and that most of the time, she did like the songs that had been suggested by the algorithm. This also allowed Gerardo to realize that some of his students already understood the nature of algorithms in their lives and how his reactions made him stay “quietito” [very still and quiet] listening to their interactions:

*He explained it like that, and I stayed quiet as if to say, "Keep talking because it's interesting." He explained what algorithms were well, and then other kids said, "Ah, that's why this happens to me." And that's when the exchange started. I remember that moment clearly, like I paused and let them exchange their thoughts, and they started*

*saying, "This happens to me, and it might be because of this or that." And that's when I thought, "Okay, this is real, it's not just a game."*

For the 2022 school year, the Puertas CECAP decided to focus its efforts on accessibility as its yearly theme. This decision may have been influenced by the organization of a national hackathon that sought to encourage youth to design solutions to improve urban accessibility. However, the Puertas Center was also impacted by a car accident that left a student with a permanent disability. This traumatizing experience for the community strongly influenced the perspectives of the youth. Students also realized that elders were particularly vulnerable regarding the use of digital platforms as they were more prone to be affected by fraud.

The Puertas relationship with digital accessibility can also be linked to the characteristics of the student populations, as several youth in the group presented learning and physical disabilities which prevented them from accessing written texts, handwriting or using a mobile phone. Therefore, the youth had to help each other to access the different activities. During the interview Gerardo was asked whether these circumstances had impacted the curriculum, Gerardo replied,

*Right? Because actually, it affected all of us. We started specializing, learning, and having conversations, mainly about how to handle things... Maybe it empowered us to improve as a team, and everyone was concerned about trying to improve in that aspect (accessibility). But we were already moving towards that and wanted to shift the focus away from just wheelchairs and ramps.... And thinking about digital accessibility helped us grow.*

### **YPAR Project**

The youth in Puertas developed over thirty research questions on week 5. Gerardo describes that getting to selecting the right questions for the research was a highly complex task

as most questions focused on data safety issues, such as creating strong passwords, protecting their social media accounts from hackers, or data hacking issues, such as accessing someone else's account. Therefore, it was necessary for Gerardo to facilitate the curriculum in ways that would allow the development of what he described as *preguntas enredaditas* ["twisted questions"]. The Padlet used for this activity allowed youth to vote for the most relevant questions. After that, they had to collaboratively reflect on which questions could be answered by just browsing through the internet and which questions would require more research.

Gerardo also described the question-framing process as very important in the implementation of the curriculum as it allowed them to finally understand the actual purpose of Nayah-Irú in this narrative and that their voices had to be heard in the future to save her world. The final question selected by the Puertas youth for their research project was: *How do people with visual impairments access social media?* As the youth began learning about digital accessibility, they reframed the question to discuss: How do influencers on Twitter use alternative text? Alternative text is an accessibility feature that allows users with visual impairments to listen to audio descriptions of each image. Gerardo was surprised with the youth framing of the question and had to do his own research to support the youth.

The youth first found a list of the most followed Uruguayan accounts and created a list on a collaborative board. They realized most of the accounts belonged to organizations, athletes, journalists, and community leaders, so they decided to build a second list of influencers they followed on social media regardless of the number of followers. They looked at the last ten media posts from each account to determine whether they had recently used alternative text. They found that of all the popular organizations and influencers, 29% of them did use alternative

text in at least one of their last ten posts. However, when they looked into other influencers, people they admired, they noticed none of them were using that feature. Gerardo described,

*They were shocked by the very low percentage of people who used it, mainly because we did it with a person they follow. It's not like I introduced them to Lacalle Pou [the president of Uruguay] or the president of Russia or people they have no idea about... and they were somewhat disappointed with those individuals.*

The youth in Puertas were surprised to find that even prestigious organizations such as the local government and the President of the country did not use these features. As a response to this, the youth planned an awareness campaign that involved communicating with local influencers to teach them about alternative texts. The youth presented their research findings at the CREAJOVEN research conference, where they showcased a video describing their findings.



Figure 5-1 Research Poster - Puertas

In their research poster (Figure 5-1), the youth decided to communicate directly with Nayah-Irú, describing how despite the progress of technology, digital platforms continue to be inaccessible for people with disabilities. The poster is accompanied by two graphs that describe the outcomes of their analysis and the future steps they are going to take. The youth also included a narrative video where they present a sequence in which a person with a visual impairment asks for help to see a publication from the popular Argentinian footballer Lionel Messi (Figure 5-2). Since there was no alternative text available, the other person had to describe the image in detail. The person with the visual impairment explains that alternative texts could do the same thing if users took the time to add a description before posting their photos. In their conclusion, presented in the poster, youth argued that, ultimately, social media developers had to take responsibility for the lack of accessibility in digital platforms and that they should force users to write alternative text prior to posting a publication.

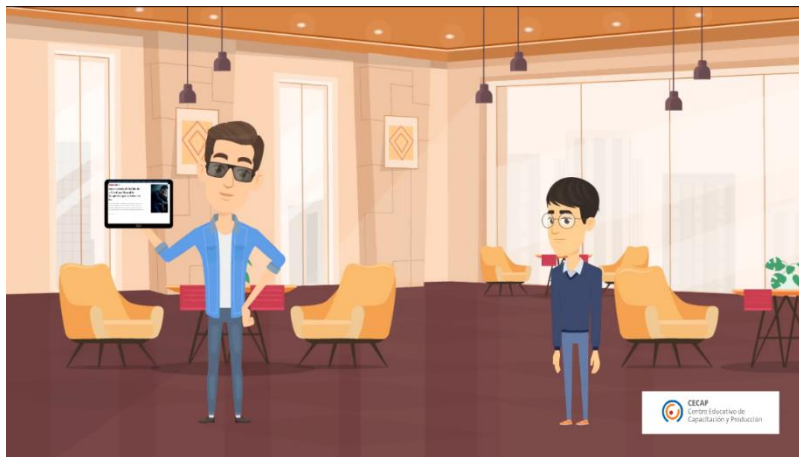


Figure 5-2 Narrative describing a conversation about alternative texts.

While the youth were preparing their poster, they found out that some applications like Microsoft Word are already automating alternative text using artificial intelligence to make up for users' lack of engagement with this feature. This led to some conversations about the



potential of AI to support accessibility in the future. Gerardo argued this could be a future direction for their research project.

### **Educator strategies**

As the implementation began, Gerardo found that it was necessary to actively participate in the speculative fiction presented in the curriculum. During the first sessions, youth would repeatedly ask Gerardo: *“What is happening? Do you know her? What does she want?”* His answer was always the same: *“I don’t know. I was sent this and now we need to figure it out”*. His goal was to create some sense of uncertainty, and he would even push other students who would unravel some of the plot mysteries before the rest, not to spoil the process for others. Gerardo found that the speculative nature of the game served as a motivation, but also to overcome an obstacle. He claims that the narrative allowed him to engage them in difficult conversations which allowed them to share their knowledge.

Gerardo described his participation in the facilitation of Nayah-Irú as a process of guided discovery which he defined as: *“It’s like a methodology, right? You throw them small ideas so they can discover something... But you don’t tell them the final objective. You just give them an objective that will lead them to achieve another one”*. In the context of the game, Gerardo felt he was a mediator between the game experience and the youth, hinting at what to do little by little without introducing the entire plot from the beginning. Gerardo compared his role to that of a questgiver, a non-playing character in a game that supports the player in understanding the plot or learning new abilities but leaves the final decisions to the players.

### **List of Assertions**

The following is a list of the assertions for this case:

1. Gerardo's Background and Teaching Approach at CECAP:

Gerardo's experience as a Physical Education teacher allowed him to effectively teach discipline and self-control while engaging the youth in guided, playful, and imaginative activities.

2. Engagement and Discussion on Data Materiality based on a Real Case:

Connecting a local scam incident to the materiality of data in digital platforms sparked a rich discussion among the youth, generating interest and engagement with the curriculum.

3. Youth's Understanding of Algorithms:

Some youth surprised Gerardo by displaying a clear understanding of algorithms, using examples from their own experiences like Netflix or Spotify recommendations, deepening their engagement with the curriculum.

4. Impact of Traumatic Experience on Perspectives:

Traumatic experiences, including a community member's online scam and a student's disability caused by a car accident, shaped the youth's perspective on digital platform misuse and accessibility, motivating them to address these issues in their research project.

5. Limitations in Reading, Writing, and Use of Digital Platforms:

Challenges related to learning and physical disabilities within the student population affected their access to written texts, handwriting, and using mobile phones.

6. Importance of Question-Framing Process:

The question-framing process allowed the youth to connect the curriculum to their lived experiences.

7. Disappointment with Community Influencers:

Disappointment with the low percentage of youth influencers using accessibility features like alternative text on Twitter but showed little concern regarding local organizations and national leaders not using it.

## 8. Guided Discovery:

Gerardo's guided discovery approach, acting as a mediator in speculative fiction, motivated the youth to share their knowledge and engage in difficult conversations.

### **Pinares: A Story of Data Privacy**

Pinares is a small town located near the capital city of Uruguay, Montevideo. Due to its proximity, many workers often commute to Montevideo daily. Paula joined the professional development programs in February 2022, and she remained in the community of educators until the implementation. Despite having participated in these workshops with other colleagues, she ended up implementing the project on her own. She claimed she had been chosen to implement the curriculum because she was younger and liked social media. Originally, she was going to collaborate with the Information Technology teacher, but due to scheduling issues, Nayah-Irú was only implemented during her group time.

The Pinares CECAP has a dual program which allows youth to attend CECAP activities in the afternoons and attend a program called “Redescubrir” [re-discover] in the mornings in which they can complete the formal education curriculum. In cases of youth with special education needs, they start by attending the CECAP workshops only, and the team determines when they can join the program. Paula describes that while students are required to know how to read and write to be part of the program, many of the youth can only use their phones to write but cannot handwrite.

### **Youth Experiences**

Initially, Paula began the Nayah-Irú implementation once a week for 90 minutes, but by the end of the project, she used every opportunity during the week to continue with the program. Paula showed great enthusiasm for the program, and she would send voice memos with her ideas about the curriculum and how it could be improved after every session.

One salient characteristic of Pinares is that only two students in the classroom had access to phones. Paula describes how they would lend (or rent) their phones to other students who wanted to check their social media or play Free Fire, a multiplayer game. Despite these limitations, the fact that youth can use the laptops when they arrive to school and use the free Wi-Fi connection makes the center a welcoming place. Due to these circumstances, many of the elements of the game had to be re-evaluated, such as QR codes, collaborative online activities, GPS-related content, among others.

Prior to beginning the program, Paula shared that one of her most important concerns was the violence the center was experiencing. Some students had been involved in fights, and there was a specific episode between two students that led to one student having to leave the institution. During my interactions with Paula, as she was implementing the program, she was often interrupted as she had to deal with many emergent issues related to youth behavior. Paula believes digital platforms played a key role in the rise of violence among students as they would often share these fights on Instagram and TikTok.

The narrative of Pinares is strongly influenced by these stories of violence and harassment, but it was also influenced by extensive knowledge sharing among the youth. The implementation of Nayah-Irú began with many questions: why is this happening to Nayah-Irú? Is she real? She described how the encrypted letter that arrived at their homes caused great enthusiasm. At some point, when the youth were sharing the letters at school, one of them realized they could read the letter if they turned the page and looked at it through the window light (see figure 5-3). Paula described this episode:

*"They were looking at it strangely. "In what language is this?" they asked me. Who is it? Because everything seemed even stranger there, and one of them started to notice*

*something and looked through the light without realizing the message. Another one realized later and stood by the window, and they all got it. Oh well, it speaks Spanish! That was really cool. Yes, and they started to get hooked on it.”*



Figure 5-3 A youth from Pinares reading Nayah-Irú’s letter through a window.

Paula found that the messages from Nayah-Irú allowed the youth to engage with the curriculum. For example, at some point, Nayah-Irú told them they had to be careful because her government was monitoring digital platforms to prevent communications between her reality and ours. The youth were alarmed by this situation and asked: *“But, why are the platforms being monitored? What does that mean?”*

The Pinares youth enjoyed visiting the virtual spaces designed for this curriculum. For example, one of the sessions involved exploring a 3D scan of a classroom (see figure 5-4). She found the youth were excited about visiting this new place and discovering its mysteries. They would zoom in on every single detail and wondered what it would be like to live in a place like that: *“¿Esto es real?”* [“is this real?”] Paula confessed she often struggled to complete the puzzles herself but was relieved to find that youth were constantly helping each other to

overcome any challenges. Paula found this approach effective, because the narrative allowed her to decenter the conversation from more traditional approaches to data literacy she had developed before which mostly consisted of telling students what to do and what not to do online.



Figure 5-4 3D scan of a classroom youth explored looking for clues.

Activities that involved any type of reading were a challenge for this community. There were several students who had considerable difficulty reading written texts, and even when Paula volunteered to read the text aloud for everybody, some students would eventually stop attending. She describes how difficult it is to engage youth in critical reflection projects when they struggle to read and write, especially when they have a background of rejection from the formal schooling system. One of the youth in the program had been described by the local middle school as a troublemaker. The CECAP teacher found the student was attending classes every day and was willing to get additional tutoring classes from the teacher. However, whenever the project required him to read or write, he would just leave the room.

Another issue of vulnerability arose when youth discussed the nature of data privacy. The youth shared with Paula that police officers would enter their homes or stop them in the street and would get their phones to check for incriminating evidence. During the implementation of the curriculum, they identified the duality of their circumstances. On the one hand, Nayah-Irú

insisted about the importance of data safety, but on the other hand, anyone can come and access that data. Paula shared,

*When the topic came up... about one of the girls saying that the police can enter your house and search everything without permission. And yes, it happens. This violation of someone else's rights is terrible, and well, they grab your phone, search it, and nothing happens. So there's this duality where, well, I protect my data, but then someone else comes and searches it and nothing happens.*

When the Nayah-Irú curriculum introduced predictive algorithms, Paula found the students were not able to make the necessary connections. Until one of the activities introduced the concept of automated moderation of social media which led to a series of conversations about whether it is possible to post photos containing nudity. Paula used this opportunity to engage in conversations about algorithmic decision-making. She argued that the speculative nature of the curriculum allowed the youth to engage in delicate conversations about their lived experiences on social media. As Paula described:

*The debate arose very spontaneously among them, as if trust was generated within the group, and they started talking about boobs. I mean, I don't know if a class allows a student to say, like, 'because so-and-so posts pictures of boobs like this and I was like... mozzarella (quiet). Of course, questions arose, and they felt comfortable expressing themselves.*

The good rapport between Paula and her students can also be explained due to her ability to listen to the youth. The teacher explained how youth from different groups come to talk to her about things they like or challenges they are facing.

## YPAR Project

As the youth began developing their research questions, they were still engaged in conversations about privacy. During this process, one student shared an experience where she had been groomed by an older adult which led them to debate the nature of online anonymity. This episode sparked a heated debate among the youth. Boys felt that providing personal information to social media was not necessary as they did not want to be tracked by their schools, families, or the police. The girls, on the other hand, strongly argued in favor of collecting people's personal data: *“the girls defended their position to the death, saying that we should provide personal data because it would be great to have more security.”* In the final narrative of their research, the girls even introduced a vignette describing the importance of online safety for women (see figure 5-5). In their storyboard, a girl, Ayelen, is shown sharing her personal data online (name, address, phone number). In the background, an older man has a description saying: *“this old man looks at Ayelen’s profile every day and goes to her school to spy on her.”*



Figure 5-5 Narrative - Pinares youth



The question selected by the youth for their research study was: What would happen if we were forced to identify ourselves with our personal data on social networks? The youth created a survey asking questions to other peers in the school. They found the data was very divisive. Only 17.6% of the participants were concerned about having to share their personal data with social media companies, and, most importantly, 59% of them said they would not care. The participants who replied that giving up personal data was a positive thing argued that being able to make users accountable in social media would make online environments safer (see Figure 5-6).



Figure 5-6 Pinares Research Poster

As a result of the youth participation in the CREAJOVEN research conference, Paula returned home with many takeaways. First, she shared how she had invited other teachers from the Pinares CECAP to attend the conference with her. Paula described how one of the teachers

who had failed one of the youth researchers, was surprised to see the student in a different context:

*To see them from another perspective. In the electricity class, for example, Carla doesn't have a good relationship with the teacher because she doesn't like the class. And Mariana, the teacher, was surprised by how she stood up and started talking and presenting. And I said to her, "Oh, Mariana, give her a higher grade."*

Paula also found that Mariana, the Electricity workshop teacher, was amazed at the way in which youth were sharing their knowledge about data and algorithms. The teacher was surprised to find that a group of youth from Melchor had been training an algorithm and were adding data to the model to adjust it to the conference participants' facial features. This experience led Paula to reflect upon the need to engage youth in more events where they can share their voices and experiences with others. She found that the youth were very anxious and nervous at the beginning of the event, and some of them did not take anything from the catering because they thought it was not for them. According to Paula, the lack of opportunities to connect with other communities and people creates a lot of tension for them. However, once they started to feel more confident about themselves, she saw a very positive change in their ability to communicate their experiences.

### **Teacher Strategies**

As Paula began introducing the curriculum to the youth, she found that the boundaries between what was real and what was fiction began to blur. Paula described how she provided opportunities for youth to question themselves about the narrative, taking a role as someone who was also seeking to unveil the mysteries of Nayah-Irú. Paula discussed: *"You see, with this future*

*thing and I don't know what, the kids asked me: Is Nayah-Irú going to be at the event? Okay, are we going to meet Nayah? Or they would look at me and say, are you Nayah?"*

Paula also discussed the open-ended nature of the curriculum: *"That is when I asked myself, where is this going to end?"*. The different videos and activities prompted different discussions and Paula allowed all these conversations to flow naturally. This was reflected in the problem-framing exercise where they had to think of questions for their research, and she realized each question led to new ones. In fact, Paula says that by the time the youth were halfway through the design of the poster and the narrative, they realized they could ask many more questions. Paula also described how she realized that some of the situations they were discussing were not necessarily related to the research questions. For example, she wanted them to focus on narratives about the implications of the speculative scenario of having to verify their social media accounts with their personal information, but the youth insisted they wanted the story about a girl being stalked by an older man online.

During the activities describing datafication, Paula noticed that the curriculum often presented situations that were too distant from the lived experiences of the youth, such as making purchases online, using a credit card, or driving a car. Paula found that drawing connections between their experiences and her personal life was helpful. For example, one of the youth, during an activity that was not related to the curriculum, argued that Netflix was mainly a platform for watching South Korean TV shows. Paula was surprised to hear that until she realized the youth was getting different recommendations from the platform based on her interests. Paula decided to show the student her personal Netflix account and how her recommendations were different. Paula immediately made the connection to the Nayah-Irú curriculum: *"Remember what I told you about algorithms?"*

Paula also realized that she could have done more to engage the youth in taking more action. When she saw them present at the conference, she wondered how much impact they would make if they had shared their findings with their peers at the school, amplifying the youth voices to create a wider impact: “Because *something really great was generated within the group. We're almost 15, but what about the others? Those who were supposed to do the survey asked, "What is this for?" We should have told them more.*”

### **List of Assertions**

The following is a list of assertions based on the Pinares case:

1. Paula's Enthusiasm and Commitment:

Paula's increased engagement in the program, utilizing every opportunity during the week and regularly sharing ideas for curriculum improvement through voice memos, showcased her enthusiasm and commitment.

2. Limited Access to Technology:

Only two students had phones for social media and gaming purposes. The availability of Wi-Fi at school encouraged the youth to spend time at school.

3. Violence and Social Media:

Paula's was concerned about the violent episodes in the area and raised questions about the influence of social media on student violence.

4. Engagement Through Storytelling:

The youth's engagement with the Nayah-Irú curriculum was enhanced through storytelling, with encrypted letters and virtual exploration capturing their interest.

5. Challenges with Reading and Writing:

Reading activities posed difficulties for the community, particularly for students with a history of rejection from the formal schooling system, impacting critical reflection projects.

#### 6. Privacy Concerns and Dualities:

Youth expressed concerns about data privacy due to experiences with phone checks by the police, leading to a duality where they understood the importance of data safety but also experienced violations of their rights.

#### 7. Delicate Conversations about Algorithms:

Conversations about algorithmic decision-making arose from the introduction of automated moderation on social media regarding nudity.

#### 8. Gendered Perspectives on Online Safety:

The girls advocated for collecting personal data to enhance online security, while the boys expressed concerns about being tracked by schools, families, or the police.

#### 9. Positive Impact of Youth Participation:

Participation in the research conference showcased students' capabilities and engagement to teachers from other subjects.

#### 10. Teacher Strategies

Paula employed various strategies, including blurring fiction and reality, open-ended discussions, and adapting to student interests and concerns, to effectively engage the youth in the program.

### **Central: A Story of Datafication and Personalization**

Central, the urban CECAP center in this study, stands out as it attracts students from diverse neighborhoods and offers services to learners enrolled in other programs. The facility provides access to vocational training spaces like gastronomy, carpentry, and hairstyling. Carlos and Liliana, experienced educators, have been integral to the CECAP program for years, with Liliana serving as the center coordinator and Carlos leading group discussions on various topics. During the initial weeks of implementation, Liliana expressed concern about community

violence, with a survey revealing that 15% of students had experienced violence or abuse on digital platforms. Carlos, despite his limited knowledge of social media and digital platforms, took the lead in implementing the curriculum. Initially uncertain, he engaged in discussions with students, acknowledging the potential of a participatory methodology to co-discover aspects of digital platform operations that were unfamiliar to him.

### **Youth Experiences**

Carlos felt the Nayah-Irú narrative was very compelling as it provided a hint of the unknown, something they did not know and that had to be uncovered. The game experience helped him weave different conversations and topics in ways he had not been able to do before. Liliana, who did not participate in every session with the youth, noticed that after a few weeks the youth had built a relationship with the Nayah-Irú character. Carlos shared that at times he just could not figure out the different puzzles in the escape rooms because the youth would solve them very quickly, and he would just sit back and observe the youth navigating the rooms at such speed that he felt in awe.

For Carlos, the curriculum allowed him to play with the fact that nothing was ever given to them. Nayah-Irú did not answer the questions, she only shared fragmented accounts of stories she found in old computers. That led to interesting conversations about the origin of those stories, how old they were, or whether they were real. Carlos added that the curriculum often led them to find that not only some things were not given, but some things needed to be created; it was the knowledge that they had to create.

When the project began, Liliana noticed the reaction of the youth when they read the first vignette from Nayah-Irú. It was a vignette that showed a junkyard full of computers with a text that reads: *"The computers in the future live in the garbage dumps. You don't know everything I had to do to get the computer from which I'm writing to you."* (See Figure 5-7). Liliana argued

that youth have become so familiar with digital technologies that they just could not wrap their minds around this dystopian future.



Figure 5-7 First frame of the Nayah-Irú vignette

In the conversations among the youth, Liliana noticed how they started “*Finding each other through their coincidences*”. It was during one of these conversations that they started discussing the implication of digital platforms selling data to third party companies. The youth in this community recorded several conversations and posted them on their research log. One of the recordings had three students sharing this conversation:

**Ana:** *We started thinking about how these companies knew so much about us. Our data, where we lived.*

**Pedro:** *Yes. We began to notice that these companies take our data.*

**Ana:** *And they use the data to recommend things to us. So, when we see an ad in social media, we shouldn't trust that.*

**Lucía:** *Yes, it's like they use our data against us.*

These conversations were the starting point of the problem-framing process for the Central community as youth began to wonder how they could learn more about the way in which companies use their data to personalize ads. This was a significant outcome for Carlos and Eduardo, who were first surprised when the youth claimed the videos about personalization in

digital platforms were not real or that they were doing enough protecting their data by just keeping their passwords private.

### **YPAR Project**

The problem-framing tool was not very utilized in this community as they only came up with three questions and had problems refining them. They developed three initial questions related to the topic:

- a. How can I know if my data is being sold or exploited by people with evil intentions?
- b. How do “they” know about me and my preferences?
- c. How risky is it to share access to personal data with social media applications?

Carlos felt they needed a different approach, so they decided to start brainstorming ideas for their research project by discussing different methods. They thought about creating a survey, but Carlos found that they struggled with writing the questions due to the existing reading and writing difficulties the group had. That is when Carlos suggested using a different type of method. He said he wanted them to complete a self-ethnography where they could explore how the social media they use suggested specific content, products, or services. However, the youth were reluctant to open their social media accounts to be used as research data.

After this initial block, the youth came up with the idea of conducting what Carlos identified as an ethnographic experiment. Rather than observing their own lived experiences, they would create new experiences by inventing TikTok profiles. The youth decided to create a fictitious profile of a Lionel Messi fan, a worldwide famous footballer. For two weeks, all the students logged in to the new account and interacted with “likes” to any Lionel Messi content ignoring anything unrelated to the player. The youth kept track of the content that appeared on their feed by writing down the type of content they would see each time they logged in.



The youth noted how the platform started to show content about Messi and other Argentinian footballers. Then, they found many videos of influencers and even the footballers themselves promoting sporting gear. The youth even noticed that some brands like Pepsi started showing up very often. At first, they thought it was unrelated content, but then one of them found out that Lio Messi had a sponsorship deal with the company. Finally, the youth also kept track of unrelated content and argued that while they did not interact with the content, they felt it could be attractive to men, which they thought was probably the main audience for Lionel Messi. They concluded social media can track data from their online behavior to create profiles that would allow them to personalize ads. Additionally, they argued that the platforms also suggested other types of content to increase their engagement with the platform (see Figure 5-8).

**Un fan de Messi en Tik Tok**

**Autores**  
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CONFERENCIA DE INVESTIGACIÓN PARTICIPATIVA JUVENIL - MI PARTE

**Introducción**  
Las redes sociales pueden condicionar e influir en tu comportamiento, a partir del relevamiento de tus datos, gustos, preferencias. Puede llevarte a decisiones no pensadas

**Objetivo**  
Decidimos saber cómo actúa una red (en este caso Tiktok) y cómo usa los datos de tu perfil. Para ello hicimos un experimento práctico.

**Metodología**  
El experimento consistió en crear un perfil ficticio en Tik Tok de un fanático de Messi. Interactuar durante varios días, con "likes" a todo lo directamente relacionado, e ignorar los demás aspectos. Registrar en una planilla los tipos de video que se nos sugerían.

Las redes sociales utilizan nuestros datos para crear perfiles que les permitan enviarnos publicidades personalizadas. Pero, también busca que generemos nuevos intereses.



**Análisis**  
Videos de otros futbolistas: (Emiliano Martínez, Rodrigo De Paul, Cristian Tello).  
Publicidad: ropa deportiva (Tiendamia), comida rápida (Subway), refrescos asociados a competencias y deportistas (Pepsi)

**Resultados**  
Aparecían videos relacionados con el perfil. Luego, comenzaron a aparecer videos no relacionados directamente, aunque le podrían interesar al perfil. Así como también publicidad de productos que podría imaginarse que dicho perfil desearía acceder.

**Conclusión**  
La publicidad cambia según lo que haces en las redes sociales. Busca conseguir nuevos consumidores para otros productos y que nosotros como usuarios nos intereseemos en nuevos productos o contenidos para que pasemos más tiempo en esa red social.

Figure 5-8 Central Research Poster

Carlos and Liliana were surprised by the level of engagement and participation of the youth during the conference. They were expecting all projects to focus on similar things; however, they found that each community had approached the curriculum differently. As in the

Pinares case, Carlos was amazed by the machine learning team from Melchor, and he felt he had been able to grasp how machine learning worked from listening to the student demonstration. Additionally, they argued that the research conference favored collaboration among the youth during one of the visual collage activities. Carlos was pleased to see his youth working alongside students from other centers in re-telling the Nayah-Irú narrative. In particular, he enjoyed seeing one of the posters where the youth used images from the predictive algorithms chapter to make a statement: “*We decide our own future!*” (See Figure 5-9).



Figure 5-9 Collaborative collage during research conference

### Teacher Strategies

As described earlier, Carlos was very interested in the project, but he felt he lacked the necessary technical skills to support the youth. As Liliana and Carlos were traveling to attend the interview, they described how their minds started to travel, thinking about how they could implement the project the following year, which semesters (groups) should be participating, how to incorporate educators from the digital technology workshops, and how to introduce youth to new research methods. Liliana explained how the early professional development workshops

started to make much more sense after they had witnessed the youth participating in a YPAR project. Carlos also shared that he felt the professional development had been helpful, but it was too theoretical.

When the youth watched the Moby video clip about addictive designs, they argued they had liked the video, but that it was not real. Liliana and Carlos had to engage in a long-term process to let them visualize how the future Nayah-Irú is describing shares some resemblance to their own realities. This experience led Carlos and Liliana to reflect upon the oppressive nature of digital platforms in their own lived experiences. Carlos showed concern about the dehumanizing nature of datafied platforms: *"The first feeling I get is that we are hardly talking about a human being anymore, but rather about a set of data on which decisions are made, and it's not clear who makes them... It's almost a process of dehumanization, especially at such young ages."* Liliana shares these concerns and makes reference to the use of predictive algorithms that was being discussed in the news.

The newspaper article described Liliana had been published in August 2022, when the implementation of the curriculum was just starting and was titled: "Artificial intelligence: with algorithms, they predict which high school students may drop out or repeat grades and will create lists." Liliana argued that while this information could be helpful, she could not help wondering what the role of educators is in the design of those technologies. A list of students who could drop out or repeat grades is potentially a list of students who will eventually join a CECAP program. She argued that these designs were being developed without insights from educators who work with the students who will eventually appear on those lists. Liliana felt her students may have their futures severely affected by these algorithms:

*"You're going to be a little lab bug and you are going to be marked. Because if you're not in the yellow or in the green, then you are in the red and you won't be able to do certain things or you will be able to do them. That gets a little complicated."*

When describing their roles in the process, Liliana argued that their main goal is to develop critical subjects who can read but who can also know. Therefore, she explains that with the rise of generative AI tools like ChatGPT it is necessary to show them how the algorithms work, and experiment with them as they did with their research project.

Carlos added that this process of experimentation required him to work on subjects he was not familiar with. He would often read the action plans and felt he did not know exactly how they would play out in the classroom. At some point during the first weeks, Carlos told the youth: *"Look. We are exploring this together. There are things I don't know. I haven't done this before; I don't have an answer for everything"*. When Carlos was asked how the youth reacted to this statement, he said they may have been disappointed but that he felt the curriculum allowed him to enjoy himself during the implementation. He felt the same surprise when Nayah-Irú contacted them over the phone or when the youth found a new vignette. It was a collaborative discovery and the fact he did not have the answers for everything forced them to rely on each other. As Liliana described:

*"We don't have to feel insecure. No, you have the certainty that you are working with something new, which will be investigated and understood by both parties. So, if you approach it from the perspective of learning together, well, there it is; it also enables participation while respecting the different roles but attending to the horizontal dynamics in the classroom. I think that aspect of Nayah-Irú is really enriching."*

### **List of Assertions**

The following is a list of assertions based on the analysis of the implementation of the Central case:

1. **Knowledge Creation:**

The youth demonstrated high engagement and ownership in the Nayah-Irú curriculum, fostering a relationship with the character, navigating escape rooms confidently, and engaging in conversations about knowledge creation and shared experiences.

2. **Awareness of Data Exploitation:**

Discussions prompted by the curriculum raised the youth's awareness of how their personal data is sold and exploited by digital platforms, leading to conversations about data usage by companies, distrust in personalized ads, and the potential for data to be used against them.

3. **Design of an Ethnographic Experiment:**

The community faced challenges in problem-framing and creating a survey, but successfully developed questions related to data exploitation. They opted for an ethnographic experiment, creating a fictitious TikTok profile to observe platform personalization based on their interactions.

4. **Youth Framing of Predictive Algorithms:**

Through their research project, the youth learned about algorithms' role in tailoring content and predicting user behavior. They discovered that social media platforms track their online behavior, use data to personalize ads, and suggest content to increase engagement.

5. **Educators' Framing of Predictive Algorithms:**

Carlos and Liliana reflected on the dehumanizing nature of digital platforms and the potential impact of predictive algorithms on students' futures, emphasizing the importance of critical data literacy for both youth and educators.

6. Collaboration and Reflection:

The CECAP program fostered collaboration among students from different centers during the research conference, enabling shared learning and reflection.

7. Narrative Cases Imagining Social Action:

The youth visualized themselves sharing their research findings, discussing the role of algorithms, and teaching others, envisioning social action based on their understanding.

8. Teachers Co-discovering the Curriculum:

Initially feeling a lack of technical skills, Carlos engaged in a co-discovery process with the youth, actively seeking and creating knowledge together.

9. Professional Development Limitations:

Liliana highlighted the importance of practical professional development workshops, realizing their relevance during the curriculum implementation but emphasizing the need for a more practical approach in the future.

### **Miguelete: A Story of Data Tracking and Digital Wellbeing**

Miguelete, situated in central Uruguay, is a town known for its agricultural activities and mineral extraction. The CECAP center, located near the downtown area, is relatively distant from the more marginalized parts of the town. In a meeting with educators, it was revealed that many young people rarely venture across the river that divides the town into eastern and western sections.

The implementation of Nayah-Irú in Miguelete differed from other communities. While three educators attended professional development workshops between February and July 2022, the center coordinator chose Beatriz, a teacher who had not participated in the workshops, to lead the process. As a first year CECAP educator, Beatriz had to adapt to the community's needs,

which presented numerous challenges while introducing a completely new curriculum and methodology.

Unlike other educators who had part-time or full-time positions, Beatriz had limited hours at the CECAP center, making it challenging to conduct additional sessions during the week. Furthermore, high levels of absenteeism made it difficult for Beatriz to engage with students who had been absent in previous weeks. As a result, Beatriz often allowed these students to work on other projects they found interesting, such as a Minecraft challenge. This deviation from the intended curriculum activities may have impacted the outcomes of the implementation.

### **Youth Experiences**

In the first week, the youth from Miguelete displayed great enthusiasm for the Nayah-Irú narrative. It was enjoyable for Beatriz to witness their attempts to uncover the hidden messages and secrets within the virtual spaces. However, engagement with the narrative faced a limitation in the second week. The high rate of absenteeism made it challenging for students who had missed the initial class to grasp the storyline. To address this, Beatriz dedicated time each week to review what they had learned and created a collaborative board in the room to keep track of various events.

As the weeks progressed, Beatriz observed that several students had dropped out of the program. Being her first time working at CECAP, she struggled with the uncertainty of not knowing which students would continue attending classes the following week. Despite Beatriz's efforts, some students exhibited high absenteeism and would show up in class only to request something unrelated to the curriculum. For instance, the school was organizing a Minecraft project during the implementation, and some youth chose to do that during Beatriz's class. Another challenge was that Beatriz could not attend school for two weeks due to illness which

impacted her possibilities to work on curriculum areas like predictive algorithms and generative tools.

Beatriz found that the playful nature of the curriculum was ideal for engaging the youth. She admitted to facing difficulties in motivating them and acknowledged their reluctance to read anything for her class. The curriculum provided a way to involve them in academic activities without their awareness.

The youth from CECAP Miguelete initially showed little concern for the issues presented in the curriculum, which sometimes led Beatriz to question whether they were taking it seriously. First, she found that the youth were spamming the collaborative board with fake profiles using memes and funny (sometimes inappropriate) names.

Beatriz noted that the youth showed little interest in the first two vignettes of Nayah-Irú which introduced the plot. However, they displayed significant interest when they watched the video that addressed the issue of mobile phone addiction. They were taken aback by the portrayal of individuals in the video as mindless addicts and questioned how people could behave in such a manner. The video in question was a music video for the song "Are You Lost in the World Like Me" from the album *These Systems are Falling* by Moby & The Void Pacific Choir. The animated cartoon depicted a boy attempting to establish a connection with others while everyone else remained fixated on their screens. Beatriz realized that, at the time, the youth did not grasp that the video was a critique of the current use of digital platforms. This realization prompted her to initiate more discussions on the topic.

During one of these conversations, Beatriz discovered that the youth had been grappling with the consequences of a fight that had taken place at the CECAP center, which had been livestreamed on social media. One of the students involved in the fight had to leave the center,



while the other remained. They linked this incident to their problematic use of mobile devices and acknowledged that even though their posts vanish quickly from their feeds, the data is never truly lost.

The youth also engaged in discussions about the way in which digital platforms operate to create such levels of engagement. In one of their research logs, the youth posted the following comment to the question How do social media platforms keep you interested?

*Looking at the users' interests, comments, ratings, etc., if an application or game is popular, you can be sure that it will be updated all the time. This is because it listens to the interests or simply thinks that it knows what is best and includes it in an update.*

### **YPAR Project**

During the problem-framing stage, the youth faced challenges in generating original ideas for their research project. Most questions in their problem-framing tool centered around data safety concerns, such as creating secure passwords or determining if someone had viewed their Instagram profile. This prompted Beatriz to encourage the youth to adopt a more proactive approach. In a planning session with the researcher, she familiarized herself with various research methods introduced during the professional development workshop. Inspired by this, Beatriz proposed that the youth observe their own practices related to digital wellbeing.

Embracing the challenge, the youth began brainstorming ideas. They initially considered surveying their peers about the number of hours they spent on their mobile phones each day. However, they believed that most individuals would provide inaccurate information, as nobody wants to admit to being addicted to social media or video games. This led them to discover the digital wellbeing dashboard on their phones, which allowed them to track their daily phone usage hours and identify their most frequently used applications (see Figure 5-10). Intrigued by their own data, they decided to replicate the experiment with other youth in their CECAP community.

They taught them how to access the data and requested that they record the information for the study.

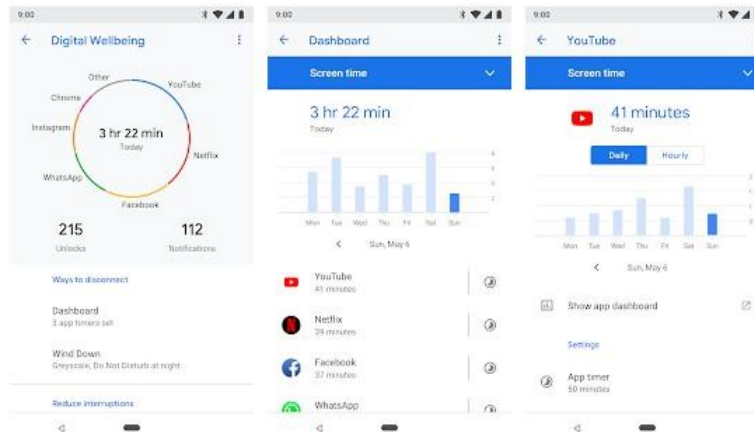


Figure 5-10 Google Digital Wellbeing Dashboard

Their research goal was to explore the activities that students engage in most frequently online and guide them in using the digital well-being dashboard to monitor their screen time. The youth included instructions on accessing the digital well-being dashboard on Android devices and discovered that games, WhatsApp, and Instagram were the most common applications used by the students. They also gathered participants' perspectives on their mobile phone usage, as they shared in their research poster: "They also told us that sometimes they lose track of time in online games. This consumption creates a vicious cycle that encourages you to keep consuming through incentives and rewards" (see Figure 5-11).

Before the CREAJOVEN research conference, Beatriz believed that the youth required additional preparation due to the complexity of the implementation process. However, her perception changed when they arrived at the conference venue, and she was pleasantly surprised by how confident and at ease they were in explaining their work and conducting the demonstration:

*I saw that they were very comfortable with what they were saying, and it was truly them. They didn't have a rehearsed script or anything, and they explained things as they came to them, as they agreed upon. In that process, I'm truly pleasantly surprised by them. Not that I expected any less, right? But how they were in class, I mean, I saw them as completely different students.*



Figure 5-11 Miguelete Research Poster

Beatriz further mentioned that there was one student who had a history of non-participation and frequent absences, but surprisingly, he decided to join the project and took full ownership, leading the entire research team. Initially, Beatriz had doubts about his ability to sustain the project for several weeks, as teachers often form preconceived notions about students. However, this experience taught her that students often defy educators' expectations.

This realization prompted Beatriz to challenge some of the established practices at the CECAP center. She observed that certain students were consistently chosen to attend events or participate in special field trips simply because they adhered to the institution's norms.

Recognizing the need for change, Beatriz decided to disrupt this pattern and create opportunities for other students to be involved.

### **Teacher Strategies**

Beatriz asserts that her lack of background in digital literacy or technologies transformed her role from a teacher to a collaborator in the research process. Throughout the implementation of the curriculum, Beatriz managed to grasp certain concepts related to data and algorithms. She also reflected on her changed perspective regarding her phone usage and her decision to limit access to certain data, such as location or microphone usage by applications.

However, Beatriz encountered challenges due to the low engagement of some students. She observed that some students were accustomed to leaving the classroom at their own discretion, which led to conflicts when she decided not to tolerate such behavior. Nevertheless, she effectively navigated these situations by creating alternative activities for students who chose not to participate in the project. Initially, she felt a sense of failure for not motivating everyone to engage, but she eventually accepted that it was impossible to compel unwilling students to participate in a collaborative process.

As mentioned earlier, Beatriz did not attend the teacher development workshops and had limited familiarity with the project prior to its implementation. Initially, she felt discomfort due to the lack of specific guidelines and a predefined template for the expected project outcomes. However, towards the end, she recognized the value of the open-ended nature of the curriculum as new themes began to emerge. For example, during the research project's development, Beatriz observed a significant increase in the youth's engagement as they began exploring the settings of their phones. One student made a startling discovery that a marketplace app they frequently used had access to their microphone, while another student was shocked to find that Google Maps had a detailed record of all her trips in the town. They shared their findings with each other, realizing

how their phones were collecting and storing such data. Beatriz adeptly facilitated these emerging interests and provided opportunities for the youth to showcase their discoveries at the conference, even though they didn't have a traditional poster or formal research findings. Instead, they designed a brochure to educate their peers on how to disable geolocation features on their phones.

### **List of Assertions**

The following is a list of assertions based on the Miguelete case:

1. **Limited Engagement and High Absenteeism:**

Initially enthusiastic, the youth in Miguelete showed decreased engagement and high absenteeism, with some students only attending class for unrelated activities, posing challenges to curriculum implementation.

2. **Playful Nature of the Curriculum:**

The curriculum's playful approach effectively engaged the youth, who were otherwise reluctant to participate in academic activities, providing a way to involve them without their awareness and facilitating academic discussions and activities.

3. **Identity Representation:**

The youth's choice to identify as video game characters associated with negative traits raised questions about their respect for the curriculum or attention-seeking behavior, but these characters' complex backgrounds may have resonated with their lived experiences.

4. **Interest in Mobile Phone Addiction:**

Exposing the youth to a video on mobile phone addiction sparked significant interest, leading to discussions on the impact of digital platforms on behavior and questioning the portrayal of individuals as mindless addicts.

5. **Consequences of Livestreaming and Data Retention:**

Connecting their discussion to a livestreamed fight, the youth recognized the permanent nature of data despite posts disappearing quickly, initiating conversations about privacy and data safety.

6. Understanding Social Media Engagement:

The youth demonstrated an understanding of social media platforms' engagement strategies, such as personalized content, user interactions, incentives, and rewards, recognizing the cycle of continuous consumption.

7. Research Project Focus on Digital Wellbeing Leading to Action:

Initially facing challenges in generating research ideas, the youth observed their own practices related to digital well-being, tracked screen time, identified commonly used applications, and developed demonstrations to support peers in disabling intrusive features.

8. Teachers Remapping Expectations about Youth:

Despite initial doubts, the youth took ownership of the research project, displaying confidence and enthusiasm during the research conference, challenging Beatriz's assumptions about CECAP students.

9. Challenging Established Practices:

Beatriz recognized the need to disrupt patterns of favoring certain students for events or field trips based on institutional norms, creating opportunities for other students to be involved and challenging established practices at the CECAP center.

10. Transformation of Teacher's Role:

Beatriz's lack of background in digital literacy or technologies transformed her role from a teacher to a collaborator in the research process, embracing new perspectives and reflecting on her own phone usage habits and data privacy.

## **Melchor: A Story of Machine Learning and Generative AI**

Melchor, located in the northern part of Uruguay near Brazil, has a population distribution that shows more people between the ages of 15 and 29 compared to those between 0 and 14, indicating a potential trend of youth migration from Melchor to other areas. Most of the population resides in urban areas, with Melchor being the largest urban settlement in the province, accounting for over half of the population. This pattern can be attributed to the development of agricultural activities that require fewer workers in large areas of land, such as oilseed crops and forestation. Migration from rural to urban areas has been particularly pronounced in this province.

Before joining the Nayah-Irú project, the CECAP in Melchor faced leadership challenges, resulting in the absence of an official center coordinator. Despite the uncertainty, Lucía and Matías, both educators and artists with backgrounds in education, took charge of implementing the curriculum after attending professional development workshops. Their roles at CECAP encompass various responsibilities, including conducting group sessions, facilitating discussions, and organizing activities, not limited to visual arts.

While Lucía actively participated in the professional development sessions, Matías joined the implementation process later and initially struggled to find a personal connection to technology-related topics. However, as the students delved into generative art, Matías discovered his ability to actively engage in the process.

The educators' artistic backgrounds played a significant role in this implementation, as the focus was primarily on the analysis of generative AI tools. Nevertheless, critical conversations about data and algorithms were still possible, showcasing how Melchor exemplifies the support for critical data and algorithmic literacy from multiple perspectives.

### **Youth Experiences**

In the initial weeks, Lucía aimed to have the youth explore cultural aspects within their communities and collaborated with local artists to help them discover their cultural assets for their annual theme project. For that project, she engaged with the youth in discussions about the role of Instagram in defining attractiveness. Slowly, she began to recognize that their annual project about arts and culture could also be linked to the curriculum. Therefore, the Melchor youth engaged in two different research projects aligning Nayah-Irú with rich conversations about the role of artists in the future.

Regarding the curriculum, Matías and Lucía shared their personal fascination with the Nayah-Irú narrative. The educators argued that without the speculative fiction of Nayah-Irú the project would not have had the same level of impact. They argue that while it is true the research projects could have been designed anyway, they would have probably focused on things they already know. According to Matías, Nayah-Irú introduced a new series of challenges that the youth could choose to address. He also added that the speculative narrative provided opportunities to create emotional connections with the topic. When describing the emotional states of the youth during the curriculum, Matías described the first day they implemented the curriculum. One of the youth was really concerned about the letter they had received. She would leave the room and come back after a few minutes with some hypothesis to explain the strange message and the educators played along by creating even more suspense. During the interview, Matías and Lucía shared how they enjoyed the narrative and found it relevant for the curriculum:



*Matías: It's like I'm fascinated with the story, and more than that, I feel like a kid. I have expectations. I want to know what else, what else happens, how it's going, how we're going to defeat the government, and how it all works.*

*Lucía: The other day we were talking about that with some friends.*

*Matías: I talked about it with a group of friends at a barbecue, right?*

*Lucía: Exactly, we are more "Gurises" (kids) than the kids in that sense. Because we get just as excited as they do.*

*Matías: I basically told them the story of a 17-year-old girl, 2300 in Uruguay. Yeah, that part blew their minds.*

*Lucía: It was interesting to project ourselves into that idea of thinking about the future instead of the current reality. It made me think a lot more.*

### **YPAR Project**

A pivotal moment in the curriculum, according to Lucía, was the Lucas Rodriguez vignette which introduced the topic of predictive algorithms. This was a comic book story which introduced a youth that had been profiled by and eventually sent to prison for hateful comments. She felt the students were shocked by the narrative. The day they read the narrative, a group of students from another class was staying with them and even when they were not familiar with the Nayah-Irú narrative, they were also compelled to participate and resist the discourse present in that narrative. After a heated debate, Lucía and Matías decided to add more content related to algorithms, including a viewing of Coded Bias, a documentary by Shalini Kantayya that describes the limitations of algorithms used for facial recognition. This debate would eventually lead to one of the research projects in this community.

The youth decided they wanted to ask questions about predictive algorithms and their impact. But they also noticed that they could not fully grasp what they meant. Therefore, they started experimenting with Teachable Machine to understand how algorithms work. They thoroughly enjoyed playing a game where they trained a model with their webcam using their own faces. The idea was to evaluate whether the system would detect males and females and they laughed whenever the system misgendered one of them.

They decided to experiment with this idea of a gender detection tool in a study they named: *“Los Algoritmos Predictivos Excluyendo Realidades”* [Predictive Algorithms Excluding Realities] and found that: *“Algorithms sometimes generate an inaccurate definition of people. This directly impacts their future”* (Figure 5-11).

**Los algoritmos predictivos excluyendo realidades**

“Transitando el universo de Nayah - Irú, lo que más nos impactó y nos hace reflexionar es imaginar un futuro donde seamos clasificados por un algoritmo predictivo.”

**OBJETIVO**  
REFLEXIONAR EN BASE A NUESTRAS REALIDADES, HASTA QUÉ PUNTO PUEDEN (LOS ALGORITMOS) INCIDIR EN NUESTRAS DECISIONES Y PENSAMIENTOS.

**Metodología:**  
Experimentación.

- Los modelos que no están bien entrenados tienden a tener limitaciones y provocar conflictos éticos y discriminatorios, como en el documental “Prejuicio cifrado”.
- Hay personas y empresas que se benefician con el sistema de algoritmos (Industrias, comerciales, etc)

**Nayah:**  
¿Qué criterios utilizan las personas que configuran los algoritmos predictivos para la toma de decisiones?

Los algoritmos a veces generan una definición no real de las personas. Eso afecta directamente en el futuro de cada unx.

Las “cadenas” que genera el flujo de datos en las redes y la poca privacidad que tenemos son dos factores que preocupan la integridad de nuestras juventudes.

¿Por qué personas que trabajan en las industrias comerciales se benefician del sistema de algoritmos?

Figure 5-12 Melchor Research Poster - Predictive Algorithms

The other research project was a result of the work Lucía and Matías were doing with the youth for their annual theme. At the beginning of the year, and prior to joining the professional development workshops, they had decided they wanted youth to explore and appreciate the local

artists in their communities. The educators implemented activities which aimed at developing technical skills regarding the use of algorithms. Some of these tools were image generation tools like Midjourney, Dall-E and Stable Diffusion. Therefore, they first invited the youth to take ten words from the Trending Topics in TikTok and use those words as prompts for a painting. The youth used the words and created an original painting. Later, they were invited to see what the application Dall-E had generated using the same words. They were surprised to see how Dall-E could also create extensions of their own paintings. Lucía and Matías engaged in some conversations about the way in which these algorithms are trained and how the rights of many artists may not have been respected. Therefore, the youth decided to contact two local artists they had met at a previous school event and ask if they could do the same out-of-painting generation with their work. After getting the paintings and generating the new extended works of art, they visited the artists and showed them what the AI had done.

The youth developed three questions for the interview: a) What were you thinking about when you made your painting? b) What do you think about the AI creation? and c) Can AI create art? One of the local artists was surprised to see how the AI had imitated her style, which was very original. But, argued that the new extended version of her work did not capture the duality she was trying to represent with her painting. The other artists shared the same feelings as she had sought to represent female emotions, and the AI added men to the extended frames. However, she claimed that in some way, what the AI is doing resembles the work of artists who often get inspiration from other works of art (see Figure 5-13).



Figure 5-13 Melchor Research Poster - Generative AI

During the CREAJOVEN research conference, the youth in the Machine Learning project found that the model they had created had not been saved. Consequently, they had to start re-training the model with the faces of all their friends. As attendants began stopping by their booth, the students invited them to check if the model would detect their gender. If the model did not, they offered to train the model with their face and explained how the actual images were not saved in the model. One of the most relevant moments for the youth was finding that a woman of color who was attending the conference stopped to see their project. When they tried the model, the system failed to recognize her gender. This brought the youth memories of the Coded Bias documentary they had watched in class and Carla, one of the students, saw this moment as an opportunity to refine her model.

Both Lucía and Matías were excited about the outcomes of the research conference. They noticed how all the youth participating in the conference had been able to tell the narrative of their research process, the nature of their findings, and explain what they had enjoyed the most. As teachers with several years of experience in CECAP, they know this is only possible because

the youth were committed to the learning experience. Lucía said they could share their knowledge because it had been clearly connected to their lived experiences. Matías added that the framing of the conference as a formal, academic event was a positive outcome of the conference. For the CECAP youth, it was something unique to be able to present at a large venue, with resources, catering, and seeing peers but also educators and authorities listening to them.

### **Teacher Strategies**

Matías shared that one of the most difficult challenges during the implementation was the perceptions of other adults about the CECAP youth: *“They underestimate them. I’m sorry, but they just underestimate what they are capable of doing.”* This was reflected in what they described as a lack of interest from community stakeholders who did not show much enthusiasm in the work the youth were doing. They found that the best approach to overcome these challenges was to continue disrupting the institutional norms and pushing the boundaries of what the youth can do. This often means engaging in activities with the youth after class or even during weekends. For example, during the member-checking interview, Lucía was meeting with two of the youth at her place as they were preparing their research project to be submitted to the CREAJOVEN journal.

Lucía found that the youth made significant progress during the implementation of the curriculum. She argued that their progress may not be visible to people who are not familiar with the reality of a CECAP center, but seeing Carla, one of her students, raise her hand and speak in front of everybody to describe the project during the CREAJOVEN research conference was something extraordinary for her. Matías added that it took them several days to convince Carla’s mum to allow her to travel to the capital for the conference. They had to insist because Carla had never left her town without her parents, but the teachers did not want her to miss the experience

given all the work she had put into the project. Lucía also confessed that seeing Carla present at the conference and give interviews to the local press moved her to tears:

*So, she left school because she was being bullied, because she was overweight. So, for someone with all that background, I mean, with episodes that you see, that sometimes she can't handle life and gets depressed and needs... to see her, overcome and face it. I mean, I almost cried, you know? I mean, I actually cried. What they have been working on with Nayah, they have empowered themselves with that knowledge, they have gained depth on the subject to the point where they were able to stand up and transmit that knowledge. That's amazing.*

One way in which Lucía and Matías supported the speculative nature of the curriculum was by incorporating other elements to create the conditions for the youth to believe Nayah-Irú was real. For example, when the first letter arrived, they prepared an envelope with a seal to make the experience feel more authentic and Matías shared that someone had given it to him on the street. The youth could not believe Matías had not asked this person what he wanted and one of the students was curious about the outfit of this person to figure out if it was an alien or a time-traveler. During the introduction to Marcos Kramer in the narrative, the educators had received a QR code with the face of the main character. The educators decided to print several copies and place them in different parts of the town along the path they usually followed to get to school (Figure 5-14). This approach supported the playful nature of the curriculum and invited the youth to engage in other speculative activities.



Figure 5-14 A sign with a QR code in the streets of Melchor.

At the beginning of the implementation, the educators found that the youth showed little concern over the use of their personal data. Matías, concerned about their indifference, asked them whether it was ok for anyone to use a photo or data collected from their online interactions and do things that may affect their decisions. Matías shared this interaction with the youth:

*And then, there, they would tell me, "I don't care about the truth, I don't care about what they do with my data, it doesn't matter to me because I'm fed up. It's all the same to me. Don't you understand?" I asked them. And that's where it became a matter of, "Well, what if someone they know does that?" Because we had previously discussed all of this, and it was like it didn't bother them if the person was someone they didn't know, someone from another country. It bothered them when people they knew invaded their privacy.*

This led Matías and Lucía to question themselves regarding the way in which they were implementing the curriculum. They noticed the duality of the youth perceptions; on the one hand, they claimed they could not produce so much data, because they were careful, but on the other, they would see the youth interactions online and all the data they could be generating on multiple platforms. They argued that the only way to get out of that loop was to create a roleplaying

game. Matías pretended to be an advanced artificial intelligence that could use data to determine which careers the youth would follow in the future. One at a time, the youth interacted with the AI, and they would get very disappointing news. Matías used his familiarity with the youth to his advantage using information about their behavior in digital platforms to determine what careers they would have to follow. The youth were furious about the arbitrary decisions Matías was making. Then, he added data about their past such as the fact that many of them had repeated courses in elementary school to claim that they should aim for low-paid jobs. This created an uproar among the youth, who questioned the nature of this AI. Matías' use of roleplaying and speculation proved useful in allowing the youth to overcome the discursive closure they were experiencing.

Lucía used other strategies to make the curriculum more relevant for the youth. For example, when they were discussing how digital platforms can personalize content based on their behavior, the youth struggled to understand the idea. She found that the video included in the curriculum was difficult for the youth to understand as it depicted a person that was very different from them (white, rich woman preparing a summer vacation in a different country). Therefore, she decided to share her own narrative. Lucía discussed how she loved sewing and one day her sewing machine started to fail. Frustrated, she decided to browse for a new machine. Days after this episode, she noticed she was seeing ads for other sewing machines, which led her to buy a new one, including lots of new accessories. When she got her sewing machine, she found out that the old sewing machine only had a small mechanical problem. Lucía shared that she felt embarrassed about sharing her story of mispending money, but it was useful for the youth to visualize how the same process depicted in the video could also happen at a smaller



scale. This strategy allowed Lucía to create conversations about the way in which digital platforms influence youth behaviors.

When discussing the implications of YPAR in the Nayah-Irú curriculum, Lucía shared: *"Participatory research is like a big mystery, right? And it's difficult to get involved in something when you don't really know what it is."* The teacher was describing the limitations of the teacher development workshops, because even though they had seen the outcomes of the first iteration of the curriculum at the Puertas CECAP, their experience was going to be completely different. This led Matías to reflect that YPAR is not just a recipe or a series of steps, but a knowledge creation process, which is often iterative. He shared that during the youth experimentation with Dall-E, an AI image generation tool, he could see how the youth iterated different prompts and approaches: *"That is also a process. They have to experience it; I can't plan it for them"*.

The educators described that the experience of doing YPAR about data practices led them to reflect about their personal data literacies. Lucía described how she began to question her own practices as a citizen regarding data and digital platforms. The knowledge she gained allowed her to acknowledge the limitations of users in relation to digital platforms. Similarly, Matías confessed he felt frustrated due to the feelings that there was nothing you can do to change: "It feels like we will continue to choose doing this. We will continue accepting their terms." Despite the frustration, they were inspired by the fact their youth did not bother to fall into discourses of hopelessness or frustration once they had started preparing their projects.

### **List of Assertions**

The following is a list of findings based on the Melchor case:

1. Impact of Speculative Fiction in Generating Challenges and Opportunities:

The speculative fiction narrative of Nayah-Irú had a substantial impact on the project, fostering emotional connections, purpose, and empowerment among the youth. Emotional engagement enhanced motivation and encouraged creative problem-solving.

2. Predictive Algorithms and Debates:

The introduction of predictive algorithms sparked debates among students, promoting critical thinking and ethical discussions based on real stories and roleplaying games.

3. Intersection of Technology and Creativity through Generative AI:

The curriculum explored the intersection of technology and creativity, particularly in generative AI. Engaging with local artists and investigating AI's role in art prompted critical reflections on technology's impact on artists and the future of art.

4. Challenges and Resilience during the CREAJOVEN Research Conference:

Youth encountered setbacks during the research conference but demonstrated resilience and adaptability by overcoming obstacles and refining their projects.

5. Effective Communication of Research Findings:

The youth successfully communicated their research process and findings, effectively showcasing their knowledge and experiences to a diverse audience.

6. Challenging Perceptions and Pushing Boundaries:

Educators overcame initial doubts about the capacity of CECAP youth by pushing boundaries and engaging in activities beyond regular class hours.

7. Authenticity and Playfulness in the Curriculum:

The incorporation of authenticity and playfulness within the curriculum created an immersive and enjoyable learning environment. Infusing playfulness fostered curiosity, creativity, and experimentation among the youth.

### Summary of Individual Cases Analysis

After analyzing the data from each separate case, the following summaries were prepared discussing the main implications of each case:

Table 5-1 Summary of Individual Cases

	<b>Puertas</b>	<b>Pinares</b>	<b>Central</b>	<b>Miguelete</b>	<b>Melchor</b>
<b>Youth experiences</b>	Youth shared understanding of datafication drawing examples from digital platforms.	Youth showed concerns about data privacy, especially related to real situations of having their phones inspected by the police.	Youth demonstrated awareness of data tracking and personalization in social media platforms.	Youth were interested in mobile phone addiction and focused their efforts on digital wellbeing. In this process, they found out about data tracking features in their phones.	Youth were shocked about predictive algorithms which also led them to investigate other applications of artificial intelligence.
<b>Teacher strategies</b>	Guided discovery approach as a mystery-filled mediator facilitating engagement.	Teacher connected her personal stories with that of the youth to see digital platforms from different perspectives.	Educators felt they developed their own literacy practices by engaging in a process of co-discovery and co-construction of knowledge.	Teacher felt she had transformed her role due to not being knowledgeable in the area becoming a collaborator in the process and reflecting on her own data practices.	Educators engaged in different forms of playfulness including roleplaying difficult scenarios and creating an atmosphere of suspense and mystery.
<b>YPAR Process</b>	Real-world situations impacted the youth's decision to research digital accessibility.	A situation of online harassment led to a study about data privacy.	The research project engaged the youth in an ethnographic experiment where they spent a week using a fake profile in TikTok.	The youth conducted a study to learn about peers' use of mobile devices, but also engaged in creating a workshop to show them how to disable data tracking features.	Youth conducted a project exploring local artists' perceptions of generative AI and developed a workshop demonstrating how ML models are trained.

### **Cross-case analysis**

The analysis of narrative reports for each case is followed by a cross-case analysis that revealed four themes organized under: 1) Youth Development of Critical Data Literacy and 2) Educators' Facilitation of Youth Critical Data Literacy. The first two themes are 1) Speculative storytelling and real-life experiences and 2) Overcoming Discursive Loops through Civic Participation. While the second two themes, associated with the educators, are 1) Guided Discovery as an Approach to Engage in Critical Data Literacy and 2) Teachers Remapping Challenges as Opportunities.

#### **Youth Development of Critical Data Literacy**

After analyzing the narratives, two themes emerged from the theme commonalities report that aligned with the research questions about data literacy development among youth. The analysis of the first theme "Speculative Storytelling and Real-World Problems" describes how youth develop their critical data literacy by drawing connections between the speculative narrative and real-world situations. This theme responds to the first research questions in this study: how do youth understandings and critiques of data are demonstrated during the implementation of the curriculum? The second theme in this section describes how the YPAR projects allowed the youth to create alternative discourses to address critical data literacy issues. This theme responds to the second research question in this study: how do youth research projects demonstrate examples of civic participation?

Table 5-2 Theme Commonalities Report

Theme	Description	Assertions from Single Cases
<b>Youth Development of Critical Data Literacy</b>		
<b>THEME 1. Speculative storytelling and real-life experiences</b>	Youth develop critical data literacy through engagement with real-life experiences, but speculative storytelling allows educators to engage youth in developing their critical data literacies.	Impact of Speculative Fiction in Generating Challenges and Opportunities (Melchor) Impact of Traumatic Experiences on Perspectives (Puertas) Engagement through storytelling (Pinares) Narrative cases imagining social action (Central) Playful nature of the curriculum (Miguelete)
<b>THEME 2. Overcoming discursive loops through civic participation.</b>	Youth research projects creating alternative discourses to address data literacy issues.	Disappointment with community influencers (Puertas) Awareness of data exploitation (Central) Privacy concerns and dualities (Pinares) Challenges and Resilience during the CREAJOVEN research conference (Melchor) Research project focus on digital wellbeing leading to action (Miguelete)
<b>Educators' facilitation of youth Critical Data Literacy</b>		
<b>THEME 3 Guided discovery as an Approach to engage in CDL</b>	Educators found themselves interacting with the youth as guides who created the conditions for speculative storytelling, wonder and critical inquiry.	Guided discovery (Puertas) Blurring the boundaries between fiction and reality (Pinares) Teachers co-discovering the curriculum (Central) Transformation of teacher's role. (Miguelete) Authenticity and playfulness in the curriculum (Melchor)
<b>THEME 4 Educators remapping challenges into opportunities</b>	Teachers' pedagogical responses to deficitarian views of youth and contextual limitations.	Importance of question-framing process. (Puertas) Delicate Conversations (Pinares) Design of an ethnographic experiment (Central) Research Project Focus on Digital Wellbeing Leading to Action (Miguelete) Challenging perceptions and pushing boundaries (Melchor).

## **Theme 1. The Role of Speculative Storytelling and Real-Life Experiences in Developing Critical Data Literacies**

### **Yo Soy Fan de Nayah [“I Am a Fan of Nayah”]**

The quote for this section corresponds to Matías, from Melchor, who shared his excitement with the Nayah-Irú narrative. The educators first acknowledged that Nayah-Irú was essential in the development of a YPAR project because she created opportunities for youth to develop an emotional bond with the plot. Matías from Melchor shared: *"And for me, Nayah's story creates a connection. It's not about me as a teacher, but about there being a person who needs you. The purpose of researching data is not for the school. It's for Nayah. She is asking me for it."*

In the case of Puertas, the speculative fiction nature of the curriculum provided affordances for the co-construction of knowledge about data. Gerardo would often tell the students he did not know who Nayah-Irú was and that they had to work together to figure it out. Similarly, Carlos and Liliana were overwhelmed by how the youth could connect emotionally with the main character; as Liliana shared: *"It's like they took ownership of the character"*. For Beatriz in Miguelete, the narrative allowed her to create an excuse for the youth to engage in a reading activity. She considered that the speculative fiction and playful nature of the curriculum were “necessary evils” in the design of learning experiences. She also found that not knowing how the story would play out allowed her to shift her role and become a part of the game experience. Ultimately, the speculative fiction elements of the curriculum proved to be invaluable tools for fostering collaborative knowledge construction, emotional connection, and active engagement, leading the educators to embrace the playful narratives and unpredictability of the curriculum.

Not only did the speculative nature of the curriculum impact the level of engagement and emotional connection with the curriculum, but it also led to critical inquiry and speculative problem framing. For example, the youth from Central were surprised about the Nayah-Irú vignette showing computers in a junkyard and led them to ask questions about the reasons why technologies may be banned in the future. Matías highlighted that the emotional states generated by the curriculum also afforded opportunities for youth to speculate about possible explanations to Nayah-Irú's experiences. The youth from Melchor engaged in a roleplaying activity with their teachers where they expressed their frustration regarding the nature of predictive algorithms. Paula shared how the youth were so involved in the speculative fiction that they wondered if Nayah-Irú was going to show up at the CREAJOVEN research conference.

The curriculum also afforded opportunities to ground their inquiry process in real situations the community had experienced. At first, educators found that the youth claimed the videos and narratives present in the curriculum were unrealistic. However, as they moved across the different curriculum activities, they started making connections between their lived experiences and issues related to digital platforms that were mentioned in the Nayah-Irú narratives.

In the case of Puertas, they focused on the experience of the grandmother who had her financial information stolen from her to discuss the material implications of data. Paula, from Pinares, discussed the duality of having youth protect their personal data while the police officers in the area regularly inspect their telephones without permission looking for incriminating evidence. In Central, Carlos and Liliana used the youth's knowledge about football and the world cup to discuss how the content about Lionel Messi, the Argentinean footballer, could be impacted by the advertising deals the player had signed. Both Beatriz and Paula also discussed

with their youth the implications of recording fights at school or in the neighborhood leading to questions about the permanence of data in digital platforms. Finally, in the case of Melchor, Lucía shared how a series of targeted ads led her to purchase a sewing machine she did not even need in the first place, leading to conversations about algorithms impacting their decision-making process.

Through the incorporation of real-life experiences into the curriculum, the educators witnessed a transformative shift as the youth began to bridge the gap between their personal encounters and the digital platform issues explored in the Nayah-Irú narratives, enabling insightful discussions on data implications, privacy, advertising, decision-making, and the enduring nature of information in the digital realm. Figure 5-15 summarizes how educators blended both the speculative and playful nature of the curriculum with real-life experiences.

	1) PUERTAS	2) PINARES	3) CENTRAL	4) MIGUELETE	5) MELCHOR
Speculative Fiction	"I don't know. I was sent this and now we need to figure it out" (Gerardo)	"But, why are the platforms being monitored? What does that mean?" (Paula describing the questions of the youth)	"When they saw the computers in that junkyard. That moved them". (Liliana)	"Any activity that does not require youth to be forced to read" (Beatriz)	"The narrative creates a dynamic of mystery and surprise that blends everything together." (Lucia)
Real-world cases	"she didn't recover the money. Right? And the kids looked at him with big eyes because it was a real case. I mean. And it was about data." (Gerardo)	"When the topic came up about one of the girls saying that the police can enter your house and search everything without permission. And yes, it happens." (Paula)	"Of course. A fan of Messi would probably also be interested in other footballers and clothes." (Extract from Central youth narrative)	"A fight was recorded... and that triggered the topic of how data can be reproduced and it is there permanently." (Beatriz)	"Well, look, your teacher is an idiot because she bought a sewing machine when she already had one that worked" (Lucia)
Playfulness	"We need to adapt to the fact that youth play games and live with games" (Gerardo)	"Sometimes there were games within the games where they enjoyed themselves just playing with the virtual worlds."(Paula)	"The game provided the curriculum with a hint of mystery, the unknown" (Carlos).	"Any activity that does not force youth to read is a positive thing for me" (Beatriz)	"I felt I was playing the game with them... No, we were part of the game. (Lucia)

Figure 5-15 Educators' Perceptions of Speculation, Real-World Cases and Playfulness

The youth also engaged in storytelling when they had to imagine the outcomes of their research projects. In their narrative, the youth imagined themselves teaching other youth about their findings. In one of the frames, the youth are asked by the participants how social media can



tailor content. One of the participants is shown saying: “Are there people in TikTok watching what you are doing?”. The youth answer: “In fact, there are no real people because it would be impossible to see everything there is on TikTok or other media”. A second youth in the frame says: “It is automated. They use programs, something called algorithms”. In another frame, the youth describe how algorithms can predict the potential interests and behaviors of the users and seek to influence their decision-making process. The narrative ends showing their peers surprised about their findings and congratulating them for their work (see both frames in Figure 5-16). The youth's engagement in storytelling not only allowed them to envision the impact of their research projects but also allowed them to elaborate different discourses where they sought to explain complex concepts or engage in experiments and other technical activities.

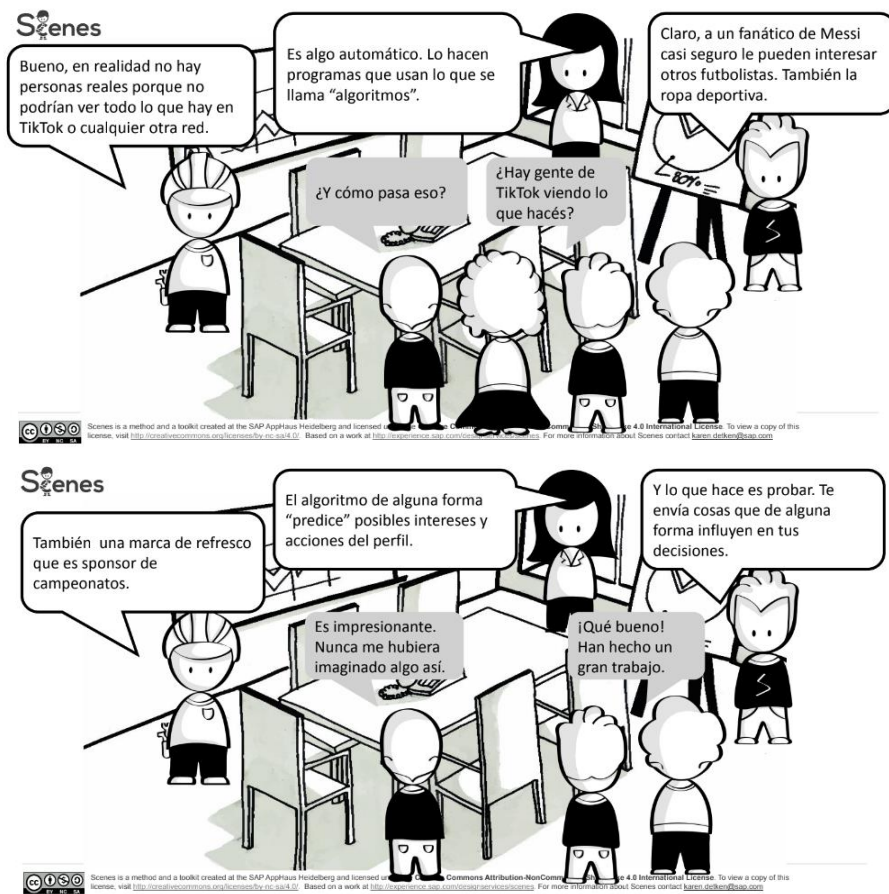


Figure 5-16 Central CECAP Narrative

The youth from Puertas addressed their research poster to Nayah-Irú, by saying "Hello Nayah-Irú, these days we are facing a major issue regarding accessibility on social media." They also created a video where they imagined a scenario where a man with a visual impairment asks a youth to help him read an article about Lionel Messi. The man then explains to him why the lack of accessibility prevented him from accessing many texts online. These narratives connecting their actions to the curriculum reflect the development of their CDL grounded in personal experiences.

### **Demonstration of Understandings and Critiques of Data**

The youth develop their critical data literacy through the Nayah-Irú curriculum in several ways. Firstly, the incorporation of a speculative fiction narrative engages the youth emotionally and empowers them to propose creative solutions to data literacy challenges. This emotional connection enhances their motivation to learn and develop a sense of purpose. Additionally, the curriculum prompts discussions about real-world applications of data and algorithms, sparking critical thinking and ethical debates among the youth. The intersection of technology and creativity, particularly through activities involving generative AI and interviews with local artists, encourages the youth to think critically about the implications of technology in the creative domain. These experiences foster a deeper understanding of data literacy and its broader implications.

The youth's understanding and critiques of data are demonstrated throughout the curriculum implementation. In Miguelete, they become aware of data exploitation and its impact on individuals, recognizing how their personal data is sold and exploited by digital platforms. The Melchor youth explore predictive algorithms, recognizing the role of algorithms in tailoring content and predicting user behavior. The youth from Central demonstrate a nuanced understanding of the ways social media platforms track their online behavior and use data to

personalize ads and suggest content. The Pinares youth engage in discussions about privacy concerns, data retention, and the potential consequences of livestreaming. And the Puertas youth describe that digital platforms are still limited for some users due to accessibility features.

The research process conducted by the educators and the youth was not a simple one. They first found how the youth experienced difficulties to stay away from deficitarian discourses due to cultural and contextual factors. Their experiences, beliefs and societal norms shaped their perspectives on data, and engaged them in a situation of hopelessness where their major concerns were related to issues of data privacy. For example, an analysis of the first visual collage the youth developed during the second week of the implementation shows that when students were asked about their concerns regarding data and digital platforms, out of 53 replies, 10 students said they had no concerns, 12 of them were concerned about hackers or online scams, 6 students argued they were concerned about the use of their time and 3 of them showed concern about bullying. Two posts could demonstrate a form of critique regarding the black-boxed nature of digital platforms, which are stock images of a blindfolded man (see Figure 5-17). Finally, 4 posts refer to fake news. The other 17 students posted photos that were unrelated to the question and were not considered for this analysis. This finding shows that youth had little awareness regarding the identification and use of data in digital platforms. Instead, they are mostly focused on issues related to data safety which led them to feel curious about ways in which they can protect themselves, but not about the ways in which digital platforms operate to create other forms of oppression. This finding points to the discursive closure presented by digital platforms, and it is further illustrated in Theme 2 of this chapter.

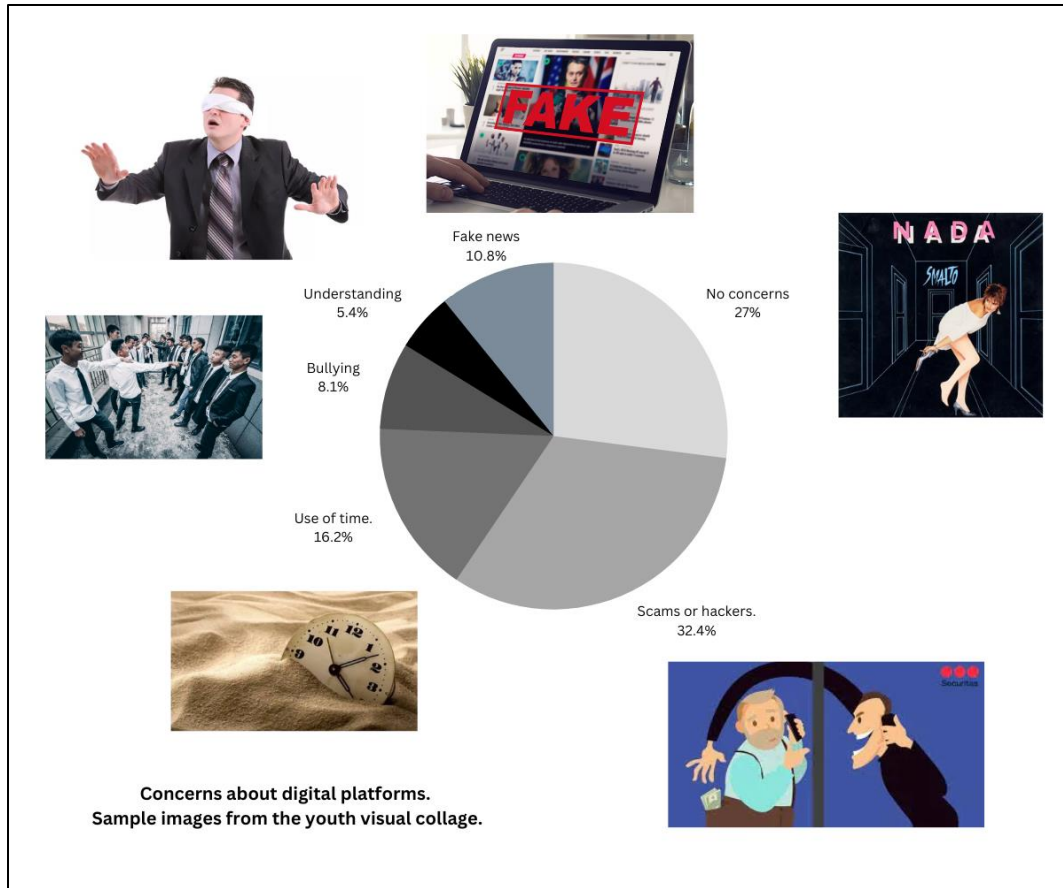


Figure 5-17 Youth Concerns about Digital Platforms at the beginning of the program

For the second collage, the youth were required to answer the same questions using only images. However, most of the answers were presented in text which could indicate that students felt they had more to share this time and that an image would be too restrictive (see table 5-3). The number of answers is also lower (9), but there were no posts with unrelated content. Also, this could be explained by the lower number of students due to dropouts during the school year and the fact that youth were already working in teams for their research projects which may have led them to write answers collaboratively.

The youth's comments highlight various concerns and considerations regarding data literacy practices in digital platforms. They express caution about the need for vigilance to avoid negative consequences, such as unauthorized use of personal data and invasive advertising. They

also raise apprehensions about the potential risks of meeting strangers, sharing sensitive images, and disclosing personal information that could be exploited or misused. The youth emphasize the prevalence of scams, data sales to third parties, and the lack of respect and accountability on social networks (data identification and data understandings). They stress the importance of taking necessary precautions, such as avoiding excessive disclosure of personal information and critically evaluating the purpose and intentions behind using social networks (data reflexivity and data uses).

Table 5-3 Youth entries in the Collage and alignment with personal data literacies

	<b>Youth entries</b>	<b>Personal Data Literacies Domain</b>
<b>1</b>	Nothing, if you're cautious, you have nothing to fear.	Data reflexivity.
<b>2</b>	More and more, they invade you with many ads and force you to buy a subscription to avoid seeing those ads, damn rats.	Data identification Data understandings
<b>3</b>	They use our data illegally.	Data reflexivity
<b>4</b>	The way people talk to strangers to meet up without knowing if it's really that person or someone pretending to be them, and they expose their bodies on public accounts, so anyone can see those photos and do something inappropriate or upload them elsewhere and that won't ever be deleted.	Data identification. Data reflexivity.
<b>5</b>	There is increasing insecurity with personal data, which is distributed among companies to bombard you with invasive ads. Additionally, you can meet people from other places, but you don't know if those people have good intentions. Just a simple mistake like pasting someone's address in the wrong place can ruin your life.	Data identification Data reflexivity
<b>6</b>	To join a social network, you have to register information, which can be made public. Another problem is the malicious intentions of immoral people who often use you to acquire money through scams or steal something. The sale of your data is very common, based on selling your information to third parties. If you don't take the necessary measures, you become just another victim. And the last problem is... the lack of respect and the existence of negative opinions. The reality is that social networks provide more "freedom" and people feel safer, so they take advantage of that to post things like false information and demand respect when they don't respect anyone.	Data identification Data understanding Data reflexivity
<b>7</b>	Talking to strangers, uploading photos with your public account because someone can impersonate you with your photos, and revealing your location because anyone can track your movements.	Data identification Data understandings
<b>8</b>	Avoid discussing personal data or giving too much real information because that causes you getting more offers online.	Data identification Data understandings Data reflexivity
<b>9</b>	Ask yourself why you want to use those social networks, for what purpose? And after thinking about it, take appropriate measures.	Data reflexivity

The youth's new interpretation of the question demonstrates examples of critique and understanding of data literacy which could be linked to the domains of personal data literacies (Pangrazio and Selwyn, 2019). Youth's answers 1 and 2-8 all demonstrate some understanding of the materialization of data in their personal lives, data identification, such as the use of tracking applications (7) and the pervasive nature of personalized ads (2, 5, 8). They also show evidence of identifying how personal data is generated, data understandings. For example, how using digital platforms forces users to give up data voluntarily (6, 7, 8), the way in which data can be sold to third parties (6). Youth also demonstrate evidence of data reflexivity, the analysis and evaluation of the implications of managing, controlling and critiquing personal data (Pangrazio & Selwyn, 2019). They identify the way in which data can be permanently stored in digital platforms (4, 5), the need to engage in self-reflection about our personal data practices (1, 9), and the potential legal implications of digital platforms collecting data from users (3). The collage suggests that the youth were able to engage in the understanding and critique of digital platforms. The visual collage does not provide insights into the data tactics domain of the Personal Data Literacies framework. The analysis of youth engagement with civic participation activities will be explored in the next theme.

The presence of all domains of the personal data literacies framework is a significant finding in this study. The data collected in this study provides insights into how youth engaged with different domains of personal data literacies at various stages of the process. To analyze the data from teacher interviews, codes were assigned to each personal data literacies domain in the framework. This approach allowed for the creation of a visual data literacy learning pathways organizer representing personal data literacies for each case (Figure 5-18). The X-axis represents the ten-week program, while the Y-axis represents each center. Color codes were used to

represent different personal data literacies domains. Blank spaces indicate either a lack of codes associated with activities during those weeks or the inability to map codes to specific personal data literacies domains. It is important to note that in some weeks, multiple domains were present in the codes, but the visual pathway map only displays the codes with the highest frequencies.

Although data identification may appear underrepresented in the figure, it was often combined with other codes in many cases. However, it is interesting to point out that most of the codes focus on youth making sense of what counts as data emerged from activities related to other domains, such as data reflexivity. For instance, in Central, youth developed an understanding of how data is generated through their interactions with TikTok after designing a study and engaging in discussions about datafication and personalized content. In Melchor, the youth identified how algorithms utilize different types of data after discussing the implications of algorithmic bias. Puertas' understanding of data was influenced by personal stories shared among the youth, like a grandmother's story about scamming and the realization that Spotify suggested songs based on their playlist favorites. Lastly, in Miguelete, the youth conceptualized data towards the end of the program when they recognized that the same technology used to monitor their digital well-being could also track their location. These examples demonstrate that, although data identification may not be prominently featured in the figure, it was addressed through activities related to other domains, enabling the youth to develop an understanding of what constitutes data in various contexts.

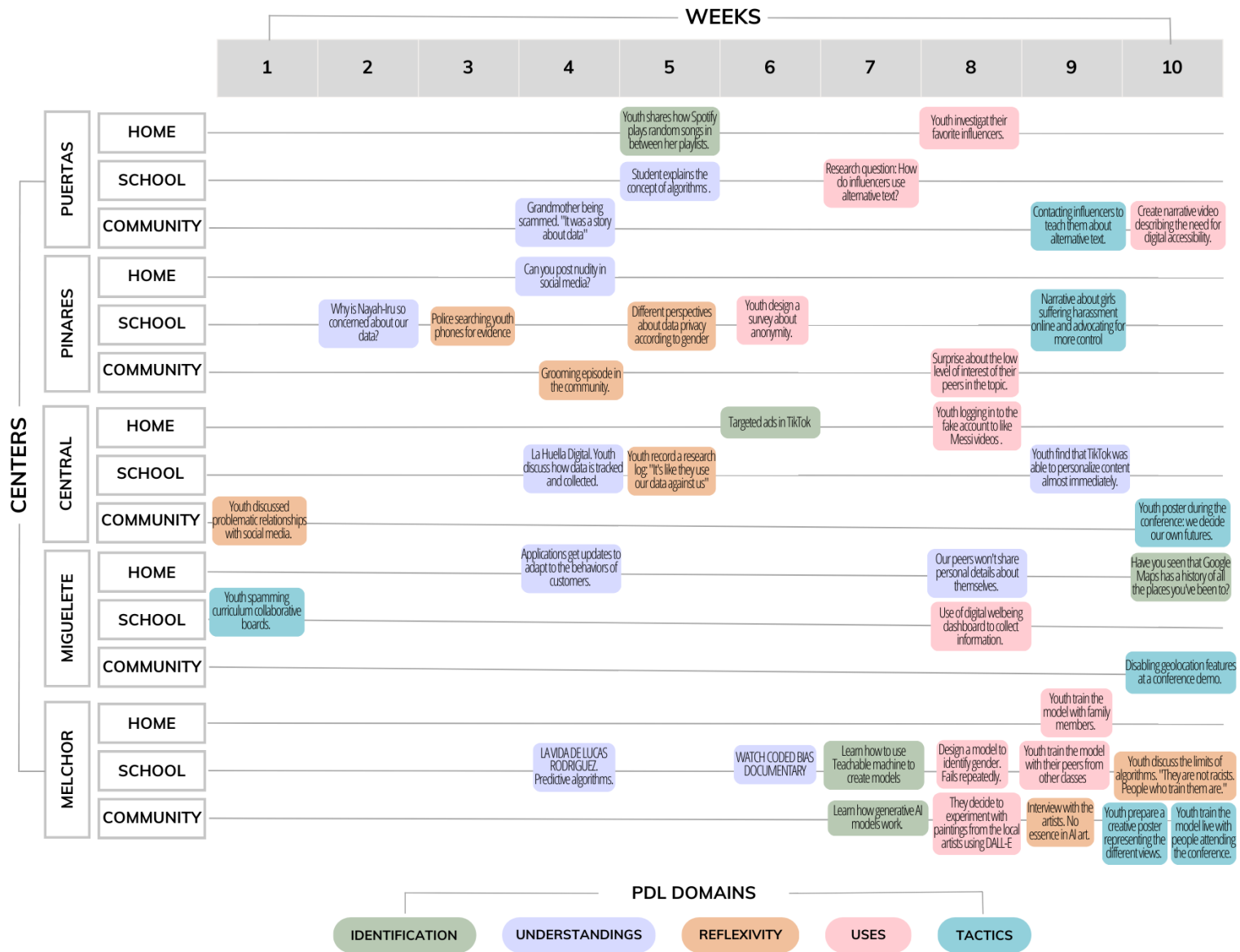


Figure 5-18 PDL Domains during the Implementation



### **Data Tactics**

The concentration of data understanding and reflexivity in weeks 4-5 aligns with the curriculum structure, where the youth were introduced to more complex vignettes like "La Vida de Lucas Rodríguez", "Your Digital Footprint", and "Are You Alone in the World like Me?" These resources allowed youth to engage in discussions about data tracking and personalization features which supported dialogic relationships between the educators and the youth.

Similarly, the evidence of data uses is concentrated in week 8, which follows the completion of the problem-framing tool. Data uses, the fourth domain in the Personal Data Literacies framework, which refers to applying and managing data, and building technical skills and interpretive competencies, appears represented during the activities related to the YPAR project. Youth from Puertas and Pinares collected data from social media and their communities and shared their findings, while youth from Miguelete, Melchor and Central developed technical and interpretive competencies by designing experiments.

In all cases, evidence of data tactics was observed, reflecting the youth's criticality towards digital platforms. Figure 5-18 illustrates that the Miguelete youth exhibited greater engagement with data tactics at the beginning of the implementation. For example, they used tactics such as spamming the collaborative board with unrelated images to obfuscate the tools from the curriculum. In the rest of the cases, data tactics appear between weeks 9 and 10, which coincides with the development of the YPAR projects and their presentation at the CREAJOVEN research conference.

### **Theme Summary**

In summary, the findings identified in this theme answer the question about youth critiques and understandings of data literacy by confirming that youth demonstrated a more nuanced understanding of the nature of data, moving from stages of discursive closure to

elaborating alternative discourses and discuss the critical implications of the study. Additionally, the interviews with the teachers confirmed that the speculative approach to YPAR facilitated opportunities to engage with data literacy from a different place.

For the educators, the speculative fiction in the curriculum afforded several advantages in creating the conditions for critical data literacy development:

- a. Developing an emotional connection with the curriculum.
- b. Eliciting frustrated responses from the youth which led to critical conversations.
- c. Create a greater sense of purpose for the research study.

Additionally, the findings show that tapping into the lived experiences of youth was crucial in framing the research themes for their projects.

Finally, the findings showed that the youth were able to transition from different forms of discursive closure to enact data tactics either repurposing or resisting data practices. However, analyzing how these actions contributed to critical data literacy development requires a more nuanced understanding of the civic participation process which is described in the next theme.

## **Theme 2. Overcoming Discursive Loops through Civic Participation.**

### **Examples of Discursive closure in the Nayah-Irú Implementation**

In their interviews, educators described how the first few weeks of the implementation required them to take steps to get youth to think more critically about data. This situation manifested itself in different ways. In Puertas, youth refused to believe the Digital Footprint activity, which involves a video depicting a person being followed by different technologies to offer her better deals for a trip. The youth had no issue with the vignettes from Nayah-Irú as they perceived it as fiction, this video, on the other hand led them to deny the possibility that technologies could have such a significant impact in their lives.

In the case of Pinares, the lack of access to phones led to a different type of discursive closure. Youth not being able to use mobile technologies, were forced to borrow or “rent” devices from other peers. Paula described this situation made her feel anxious as they would often not even log out of their accounts after using someone else’s phone. But, most importantly, it forced them to only engage in critical conversations about data without being able to explore most of the technologies they were discussing. This resonates with a comment from Lucía who argued: *“How are you going to take action if you don’t understand the technology you should be angry with?”* The material conditions of youth in the CECAP community also impacted their ability to develop alternative approaches to respond to pressing challenges related to datafication.

The youth from Central, Miguelete and Pinares also questioned the narrative of the curriculum, arguing that the story was too far-fetched. As Liliana attempted to open this discussion to have the youth to compare, they found themselves in a loop where Liliana and Carlos were arguing that the story was inspired by their realities, while the youth rejected that argument, as Liliana described: *“now this doesn’t happen, and we said, of course it does”*. Youth in Miguelete, while watching the video about addictive behaviors, argued that the video was exaggerating the situation as most people do not have problematic relationships with their devices.

Finally, in the case of Melchor we see a different type of discursive closure. During the unit about algorithms, the educators decided to do a roleplay where one of them would play the role of a “mean AI” that could determine their futures, youth reacted against this AI in the roleplay scenario. As Matías shared, when they were told by the “AI” teacher what type of career they should aim for, the youth said: *“oh, but it doesn't work like that.”*

For the educators, the speculative nature of the curriculum allowed them to disrupt some of their loops as Paula shared:

*The fictional world makes it more comfortable to tell what they investigate. Because the doubt that remained for me was whether a story that is very real, that talks too much about "us" and "us" and "us" for no apparent reason, loses a bit of meaning for teenagers.*

Paula's concerns describe that grounding stories in their lived experiences from the very beginning could further exacerbate the discursive closure. Carlos adds that despite datafication being something so real, the youth first found the topic trivial, but eventually, the activities in the curriculum allowed them to understand why it matters to them as he shared:

*It seems to me that, in our case, at least, it was like a topic that wasn't too present when we started with this, right? I mean, it wasn't something that lacked some element of reality, but it's as if they had never stopped to think a little about the subject... until we started doing a series of things in this project. It was then that it began to click.*

Matías added that the frictions in the Nayah-Irú narrative allowed the youth to show more interest in the topic due to the emotions that the curriculum brought that created a sense of urgency and criticality:

*The issue that moved them the most was the issue of the algorithm, for example, that defined people's futures. When we reached that part, it was like, "Oh, no, no. Okay, it matters, it matters, it matters where I'm going, how I do it, where I take my selfie.*

Speculative scenarios rather than deviating the youth and educators from the real-world issues sparked emotional reactions and provided a safe space where they could reflect upon the themes they had been discussing.

### **Preguntas Enredaditas: Educators Framing Research Questions**

Educators argued that framing the research questions to engage youth in more critical forms of data was the most challenging moment during the implementation of the curriculum. The problem-framing tool suggested in this curriculum allowed youth to share different research questions anonymously. Later, those questions were refined by having youth vote questions based on different criteria: Do we already know the answer to this question? Are we capable of answering this question ourselves? The major limitation in this process is that, despite the progress the students were making in the conversations, most of the youth chose questions that reflected the discursive closure described earlier.

The research questions suggested by the youth were coded to determine how they were grounded (See Table 5-4). Out of seventy research questions developed by the youth from the five centers, 65.7% focus on data safety issues. These questions focused on technical aspects of data safety such as how to protect a password, how to lock a social media account or what to do if their debit card is stolen. One positive outcome of the framing process is that 21.4% of the youth questions focused on issues that demonstrated a sense of data reflexivity (see Table 5-5).

Table 5-4 Analysis of the youth research questions

Category	Puertas	Pinares	Central	Miguelete	Melchor	Total
<b>Data Safety</b>	<b>24</b>	<b>8</b>	<b>3</b>	<b>6</b>	<b>5</b>	<b>46</b>
<b>Data Surveillance</b>	<b>0</b>	<b>0</b>	<b>1</b>	<b>0</b>	<b>0</b>	<b>1</b>
<b>Data Tracking</b>	<b>0</b>	<b>1</b>	<b>2</b>	<b>0</b>	<b>1</b>	<b>4</b>
<b>Algorithms</b>	<b>1</b>	<b>0</b>	<b>0</b>	<b>0</b>	<b>3</b>	<b>4</b>
<b>Sociocultural Implications (Data Reflexivity)</b>	<b>6</b>	<b>6</b>	<b>0</b>	<b>1</b>	<b>2</b>	<b>15</b>
<b>Total</b>	<b>31</b>	<b>15</b>	<b>6</b>	<b>7</b>	<b>11</b>	<b>70</b>

Carlos shared that the process of asking the questions, despite being very challenging, was an opportunity to: *“rethink certain things. In that sense, we started taking a different perspective about data, about what data means and what is happening around them”*. Gerardo discussed the need to engage the youth with “preguntas enredaditas” [wicked questions] by

having them discuss the need to vote for questions they did not have an answer for. He was surprised when he found out that he had no idea how the question could be answered. He said to himself: “I don’t know how to answer this question”.

Table 5-5 Examples of Data Reflexivity Questions

Center	Data Reflexivity Questions
<b>Puertas</b>	Will my data be stored forever online? Will social network cease to exist due to government control? What is the impact of not knowing how to read and write in your online experience? How do people with visual impairments access the internet?
<b>Pinares</b>	Do we use our social media problematically? What do teens feel about social media?
<b>Central</b>	What are the consequences of having your data sold to companies?
<b>Miguelete</b>	How vulnerable are we in digital platforms?
<b>Melchor</b>	How effective is online moderation? How can we prevent our data from being used by companies?

### Examples of Civic Participation and Resistance

Youth research projects demonstrate examples of civic participation by addressing relevant societal issues during the implementation of the curriculum and seeking to create positive change through their research projects and demonstrations. The youth actively participated in discussions prompted by the curriculum, such as discussions on personal data, algorithms, data exploitation, and online safety. They shared their perspectives and experiences with their teachers and engaged in refining their reflections over time.

The curriculum also afforded opportunities for the youth to engage in civic participation from different data practices and literacies. Based on the four quadrants of data practices and literacies in Nayah-Irú, it is possible to classify the youth research projects and demos into four categories. First, three cases focused on a more reactive disposition to private data practices denouncing issues of data privacy, personalization in social media and the implications of generative AI. The youth in these three cases identified a challenge, but their lack of

understanding of how the platforms operated led them to explore the social implications of the problem (Pinares and Melchor) and/or experiment with the technology (Central and Melchor). The cases of Melchor and Central demonstrate examples of youth building technical skills and interpretive competencies which constitute examples of data uses, the fourth domain the personal data literacies framework (Pangrazio and Selwyn, 2019), while the case of Pinares shows youth applying information represented by processed data from the insights of their peers to make sense of their lived experience, which is another example of the Data Uses domain.

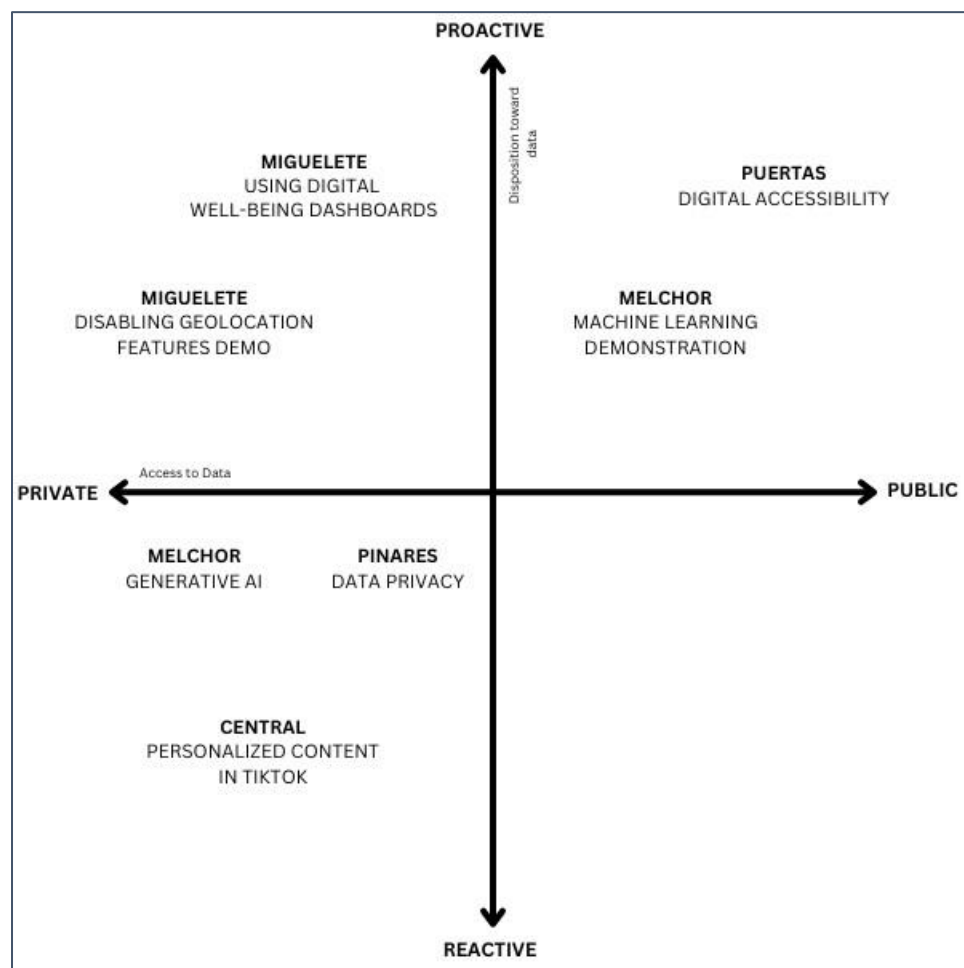


Figure 5-19 Classification of youth projects

Other examples of studies based on private data, but with a more reactive approach, are the two demonstrations conducted by the Miguelete youth. The youth encouraged their peers to disable their location features, thus resisting or obfuscating the way in which devices operate, which constitutes an example of data tactics. The case of Puertas is an example of youth developing a shared language about accessibility and applying information from publicly available data to describe how digital accessibility is not being accounted for by leaders and influencers, thus constituting an example of data uses. Finally, the case of Melchor and their machine learning demonstration is an example of a creative repurposing of public data to raise awareness of the limitations of machine learning, thus representing a case of data tactics. The analysis shows that none of the projects engaged in using public data with a reactive disposition. This could be due to the lack of activities engaging students in using publicly available datasets for exploration and analysis. Nevertheless, the youth were successful at using public data for more proactive purposes. Figure 5-19 describes how each case corresponds to different quadrants in the Nayah-Irú curriculum.

Finally, the findings from this implementation demonstrate that youth could shift the analysis of their personal data literacies from individual accounts shared through stories to civic participation efforts that connected to the needs of the community. An analysis of the research posters shows how the youth's actions had an intended audience outside the limits of the team which worked on the project. Figure 5-20 summarizes how the youth objectives and actions eventually addressed specific audiences in their schools and wider community.

### **Theme Summary**

The analysis of the findings related to this theme provides opportunities to answer the second research question in this study, how do youth research projects demonstrate examples of civic participation?



	Youth Objectives	Youth Actions	Target Audience
PUERTAS	Evaluate whether influential social media accounts use accessible texts.	Contact the influencers to inform them of alternative text functions.	Public audience. Community stakeholders.
PINARES	Evaluate peer perspectives about online anonymity.	Survey their peers and create a narrative to describe female experiences.	Peers who may be concerned (or not) about the implications of privacy in women's lives.
CENTRAL	Identify how TikTok algorithms use data from your behavior to personalize content.	Ethnographic experiment creating an AI platform.	Peers who are struggling with social media addiction.
MIGUELETE	Discover how their peers use mobile data.	Teach peers how to use digital well-being platforms to track their screen time.	Peers who are struggling with screen time on their phones.
MELCHOR (1)	Understand how algorithms work and evaluate their limitations.	Youth train a machine learning model with their peers' data.	Peers who do not know about algorithms.
MELCHOR (2)	Understand the impact of generative AI in local artists.	Use generative AI to extend the frames of local artists' paintings.	Local artists and people interested in the impact of AI.

Figure 5-20 Analysis of Research Posters

The youth faced various challenges, including limited access to technology, reading and writing difficulties, and learning disabilities. However, they supported each other to overcome these barriers, helping those students who could not read, staying at school after hours to complete their projects, and even navigating the challenges of not being allowed to travel to the research conference. Their resilience and support for one another are also demonstrations of civic participation in this curriculum.

The youth undertook research projects related to data literacy from different perspectives based on the local challenges and conversations they had maintained over time. They framed research questions, conducted different types of research methods, and gathered data to explore

topics such as data privacy, data tracking, digital well-being, algorithmic bias, generative AI and personalized ads. By conducting research and presenting their findings at the conference, they contributed locally grounded knowledge relevant for the data literacy field and shifted from an individual analysis of their personal data literacies to community-centered civic participation. They recognized the importance of spreading awareness and empowering others with the knowledge they had gained, demonstrating a sense of responsibility toward their communities. During the conference, besides presenting their findings, they also engaged in teaching others about algorithmic bias, data exploitation, and online safety, and developed demonstrations to support their peers in disabling intrusive features and promoting online safety for women.

In summary, the youth in these cases engaged in civic participation and acts of resistance by actively participating in discussions opening new alternative discourses to address oppression in digital platforms, conducted research challenging established practices, and demonstrated a commitment to raising awareness, sharing knowledge and empowering themselves and others within their communities.

### **Educators' Facilitation of Youth Critical Data Literacy**

The next two themes explore two research questions connected to the role of educators in the implementation of the curriculum. The first theme, Guided Discovery as an Approach to engage in CDL describes the ways in which educators framed the implementation of the curriculum to answer the following question: What specific strategies do educators use to facilitate the curriculum implementation with youth? The second theme, Educators Remapping Challenges into Opportunities, describes how the educators identified challenges in the implementation of the curriculum and engaged in different actions that supported the development of alternative discourses. This theme findings provide avenues for answering the

last question in this study: In what ways do educators interpret the challenges and opportunities identified during the implementation of the curriculum.

### **Theme 3. Guided Discovery as an Approach to Engage in CDL**

*Era como un descubrimiento guiado* [It was like a guided discovery]

The analysis of the interviews revealed specific strategies educators used to a) blend speculative fiction with authentic stories and b) promote knowledge co-creation in YPAR by acknowledging limitations and engaging them in a process of co-discovery.

#### **Educators Blend Speculative Fiction with Authentic Stories.**

Educators implement the Nayah-Irú curriculum in various ways to facilitate the development of critical data literacy among the youth. They blend elements of authenticity and playfulness to create an immersive and enjoyable learning environment. By infusing playfulness into the curriculum, educators foster a positive atmosphere that motivates the youth to explore and experiment with complex data-related topics. For example, Matías told his youth that he had received Nayah-Irú letter from a strange man. The youth, puzzled by this revelation, engaged in a discussion with Matías, as he shared:

*When they asked me who brought the letter, I said: I mean, no, I don't know. He was a kid on a bicycle. And the kids asked me: "and he was dressed like from the future?" "But how do I know how people dress in the future?", I replied. "You should have paid attention to the clothes.*

While the educators engaged in the playful nature of the curriculum by creating this mystery-filled environment, they also engaged in connecting the speculative narrative to real events in their communities. For example, Gerardo, from Puertas, helped the youth connect the activity about digital footprints with the episode of the grandmother who had been scammed.

Gerardo described how connecting real-life experiences with the curriculum was a successful approach to engage youth.

*Did you see how kids feel like they can do anything and are immortal, huh? But it was good because it was like coming back down to earth and saying, "oh, yeah." And one of them said, for example, it happened to my grandmother, I don't remember exactly what situation had happened. It wasn't about the bank, it was another situation, but it was about data, like a card or something, and they went through a lot of complaints, complaints, and in the end, she didn't recover the money. Right? And the kids looked at him with big eyes because it was a real case. I mean. And it was about data. About personal data that had been stolen.*

Educators served as collaborators and mediators in the inquiry process, facilitating open-ended discussions. Their approach, in a speculative scenario, involved hinting at youth what to do without revealing the entire plot, allowing them to share their knowledge and engage in difficult conversation.

### **Enable Knowledge Co-Construction in The YPAR Process.**

During the first minutes of the interview with Gerardo from Puertas, he described his teaching approach: *"Because it's like guided discovery that I used. They were discovering, finding ways to overcome those obstacles."* When prompted what he meant by guided discovery, he compared it to the work he usually does when trying to teach youth how to do a somersault in his P.E. class:

*If it's a somersault, for example, I don't tell the person, "You have to look at your belly button, hide your head, take a little jump, try not to land on your head." Instead, I say, "Let's see how we could do this somersault." And then we start brainstorming. Maybe we must look downwards. Okay, yes, but what else besides looking downwards? I explain it*

*as if I'm helping them, but I don't give them direct commands, like "You have to do this and say that."*

Gerardo described how to engage in knowledge co-construction by creating the necessary conditions for youth to be involved in the process. In this case, he describes a process where the teacher deliberately hides what he knows about the topic and allows youth to discover it. This idea was then further extended by Gerardo in a conversation with the researcher where we grappled with this emerging idea of guided discovery:

***Gerardo:*** *It's like a methodology, right? You throw out small ideas for them to discover something. It's a bit like how the project went.*

***Ezequiel:*** *What does that discovery mean to you and how do you define it?*

***Gerardo:*** *It's like a methodology, right? You throw out small ideas for them to discover something. It's a bit like how the project went.*

***Ezequiel:*** *So, they discovered something that you already knew?*

***Gerardo:*** *Yes, exactly, but you don't tell them the objective... You don't say they have to do this, this, this, and this to achieve the objective.*

***Ezequiel:*** *Right, I'm referring to the construction of that knowledge, because you told me that you didn't know anything about digital accessibility either.*

***Gerardo:*** *Right.*

***Ezequiel:*** *So, it's a guided discovery, but in a way, it seems you're also discovering something in the end, right?*

***Gerardo:*** *Yes, but that was accessibility. But during the game, for example, I thought we could achieve something specific for that class, which was the objective of that class. I already knew it, but I didn't want to tell them directly because it would lose its charm,*

*you know? It would lose that underlying motivation that I think kids should have to follow along, because otherwise, they get distracted after a while. "I've done it already," and they forget.*

**Ezequiel:** *Well, in a way, it's like the character in a video game who helps you as a guide to progress. You're playing the game, and suddenly there's a character that says, "Look, if you press this button, it will give you this superpower, and you'll be able to shoot. Now you'll be able to shoot, you'll be able to do this in the game."*

**Gerardo:** *And they start discovering. It's that. Guided discovery is actually based on that.*

Educators as guides who create the conditions for knowledge co-construction also appear in other cases. However, in those cases, the teachers identify that they did not hold the necessary knowledge to answer many of the youth questions, making a process of co-construction essential. Beatriz, from Miguelete, and Carlos, from Central, argued that because they were not familiar with the topic, they decided to be transparent about that and let the youth know that they would be collaborating.

Therefore, guided discovery can be a deliberate strategy from educators to engage youth in critical inquiry by not providing them with step-by-step instructions to engage in a discussion or it can be implemented as a result of educators' willingness to accept they just do not hold the knowledge to answer the questions.

### **Theme Summary**

Educators embrace an approach that Gerardo from Puertas, defined as guided discovery approach: *"I was a mediator between the game and them. You see, I give you a bit, you have another bit, so we can solve this. If I play the game for you, it doesn't make sense"*. This approach is evidence of a transformation in the role of teachers where they embrace a

collaborative and co-discovery approach, learning alongside students and reflecting on their own assumptions and practices.

The analysis of the teacher strategies shows that the guided discovery approach can be organized into five main components:

1. Engaging students through real-life experiences. In the case of Puertas, Gerardo employed guided discovery by engaging students in discussion about the materiality of data based on a real-life experience of a grandparent who had been scammed online and the news appeared in local media. Lucía, from Melgar, shared her experiences buying a sewing machine after seeing so many ads online. Beatriz discussed how the aftermath of a school fight could have implications for the future.
2. Promoting student-led discussions. Paula, from Pinares, employed guided discovery by encouraging open-ended discussions about delicate issues such as nudity in social media. She also allowed the youth to focus on issues that initially were not well-aligned with the curriculum such as grooming.
3. Encouraging knowledge co-creation. Carlos and Liliana implemented guided discovery by fostering students' agency in creating knowledge by finding coincidences among the experiences of the youth and the adults. This component also implies that educators need to acknowledge their own limitations regarding their personal data literacies.
4. Fostering creativity and imagination. Lucía and Matías, from Melchor, added their own elements to the speculative fiction to engage the youth. They added roleplaying events and dramatized several moments in the narrative to create a sense of suspense. Gerardo, from Puertas, would share his own speculations about the Nayah-Irú world to invite students to do the same.

In summary, the guided discovery approach engaged the youth in interacting with data with an exploratory mindset, allowing students to investigate and analyze themes that were relevant for them. It engaged the youth in open-ended discussions to support youth in developing a critical stance towards data practice and challenging discursive loops. Finally, this approach connected data literacy to the youth's own lives and experiences by incorporating real-life examples from their private experiences and empowering them to design alternative discourses to explain why digital platforms need to be addressed.

#### **Theme 4. Educators Remapping Challenges as Opportunities**

This theme explores question 2B in this study: In what ways do educators interpret the challenges and opportunities identified during the implementation of the curriculum?

##### **I Wander Around: Educator Remapping Struggles**

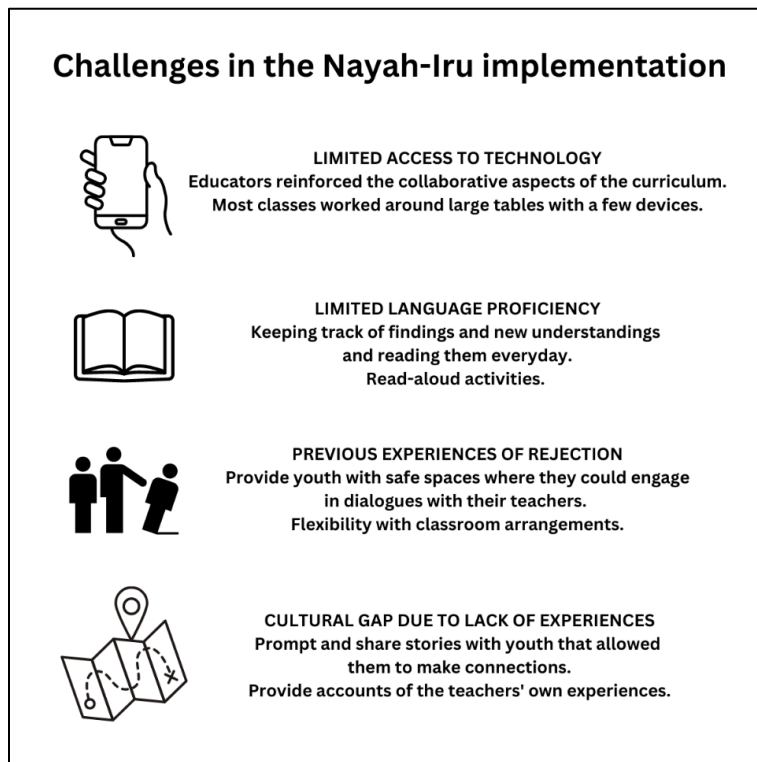


Figure 5-21 Challenges and Opportunities in the Implementation of Nayah-Irú



The CECAP educators had to navigate through many challenges during the implementation of this curriculum. In some communities, there was a lack of access to smartphones, computers, or reliable internet connections which limited the youth's exposure to digital platforms and their ability to engage with data practices effectively (Pinares). Teachers from all the centers argued that students also faced challenges due to limited language proficiency which affected their comprehension of written materials and their ability to express their thoughts effectively. Furthermore, the experiences of rejection most of the youth had to navigate created gaps in their knowledge and skills, making it challenging for them to grasp abstract or complex data literacy concepts. Finally, cultural factors influenced the youth's understanding of data literacy practices as they had limited experiences in the use of some platforms. Figure 5-21 summarizes the challenges faced by the educators and the strategies they implemented to overcome them and create new opportunities.

Educators engaged in multiple strategies to overcome the challenges presented in the CECAP contexts such as reinforcing the use of collaborative strategies to overcome the lack of access to mobile devices; keeping track of findings and new understandings on classroom boards to help youth make sense of their experiences. To promote the resilience of those youth with negative past experiences, they sought to provide a warm environment where everyone was welcome and showed their availability to listen to them. Paula shared how her peers often did not know how she got access to so much knowledge about the youth. She answered that her main strategy was to “wander around”:

*I get along with the kids from all the groups, so there are things about the kids, from all the groups, that they come and tell me. Sometimes I tell my colleague, "Hey, so-and-so is feeling down because they told me this and that." "How do you know about their life?"*

*they ask me. "Because this or that came and told me, what do you want me to say?" It just comes out, you know? I mean, I wander around there, and they're already looking for me to tell me things.*

This “wandering around” described by Paula was an active strategy identified in all cases, where educators kept identifying opportunities to bond with the youth and connect to their needs. Lucía, from Melchor, would invite kids who had no class due to a teacher’s absence to join them during a discussion even if they were not participating in the study. Carlos and Liliana invited a group of youth to share their experiences at the CREAJOVEN conference even when they were not related to the critical data literacy curriculum, because they felt they deserved to be heard too. Beatriz actively looked for youth to attend the conference who had never been invited to any of the field trips or community events organized by the CECAP.

### **Responding to the Cultural Gap in the Curriculum**

The major limitation, however, is that youth lacked enough experiences with digital platforms due to their positionality. Many of them had never used a credit card online, purchased a subscription, which made it difficult for them to understand how their data could be commodified to advertise products to them. This was further exacerbated by some lessons in the curriculum which showcased examples of datafication based on adults being tracked to offer them services and products. As Lucía explained:

*Sometimes it would stray so far from their context that it would complicate things for them, like figuring out what needed to be done. For us, it was easier because, well, we had different information, a different education, and different experiences that made it less obvious to us. But at times, they would get lost, so I knew I had to re-engage them*

*from a different angle and bring them back to what they needed to do to keep things on track.*

Educators addressed this challenge in different ways. Lucía, from Melchor, shared one of her experiences when purchasing a sewing machine after seeing more and more ads appearing on her social media:

*And I gave them the example of the sewing machine. I shared many things that happen to me. I told them "I'm going to tell you an embarrassing incident that makes me very ashamed, and it's true, totally true. I was sewing, and I don't know what happened, the machine got stuck until, goodness, I got mad and switched to another sewing machine without checking what was wrong with the first one... Well, then I started seeing advertisements online offering things related to sewing machines. So, of course, do you need this? Do you need that? And I would think, "Wow, this and that are great," and it's so embarrassing because the other machine was actually working", it just needed to be cleaned. I mean, how many times does that happen to us? So, yeah, they laughed a lot about that story. Then they start talking about their own stories, their actions, you know?*

Sharing stories and prompting youth to share their own was a fundamental part of the implementation of this curriculum. This is particularly important because most of the narratives the youth brought to the learning space eventually impacted on their selection of a research theme. Table 5-6 shows the alignment of the different stories shared by the youth during the implementation and their research theme.

In the case of Melchor, they also connected the youth to other community stakeholders. When the youth were interested in finding out about generative AI but could not grasp why it could be a negative thing for local artists. Matías and Lucía invited two local who gave them

permission to use their paintings. The youth extended the paintings out of the frames using generative AI and then showed the outcomes of the new image with the artists. That allowed them to connect the issues presented in the curriculum to the struggles that other people in the community experience.

Table 5-6 Local events and alignment with Research Themes

Cases	Local Event	Research Themes
<b>PUERTAS</b>	A youth had been involved in a car accident prior to the implementation of the curriculum which shifted their interest to accessibility issues in the community.	Accessibility in digital platforms.
	A grandmother of one of the youth was scammed online which led them to discuss how some people are more vulnerable than others.	
<b>PINARES</b>	Youth claimed that Netflix was a platform that mainly showed South Korean soap operas. Teacher shared her own Netflix dashboard to see the difference.	Anonymity in social media
	Youth argued that the curriculum argument that nudity photos are automatically moderated was not accurate. They found ways to share this data anyway.	
	A girl in the community experiences a situation of grooming and stalking from an older man in the community who harassed her online.	
<b>CENTRAL</b>	Youth had conducted a previous educational activity where they learned many of their peers were concerned about addictive behaviors online.	Personalization in social media
	Youth shared that their phone always seems to know what they like, even if they have not typed it.	
<b>MIGUELETE</b>	A local fight led to one student being expelled from the center. This led them to think about the nature of data.	Digital well-being and tracking applications.
	A youth found that Google Maps kept track of her location all the time.	
<b>MELCHOR (Study 1)</b>	Lucía shared her experience buying a sewing machine even when her old machine was still working. Youth shared similar examples.	Machine Learning limitations.
<b>MELCHOR (Study 2)</b>	The youth interviewed two local artists prior to the implementation and were interested in the development of the local culture as a result of the project.	Generative AI impacting local artists.

Teachers from Central, Miguelete and Melchor identified that allowing youth to experiment with technology could allow for opportunities to fill the gap between their lived experiences and the black-box nature of digital platforms. They may not be able to grasp how an algorithm may be impacting them, but they can be encouraged to design new experiences. Figure 5-23 shows the youth from Melchor creating a painting that would be later compared to a

creation by Dall-E, a generative AI tool, this led them to ask questions about the implicit bias in these technologies and how it would not align with the ideas they had when they wrote the prompts.



Figure 5-22 Youth in Melchor painting for their Generative AI project

### **Theme Summary**

Framing the struggles experienced by the youth in this project, the educators provided relevant findings to answer the question: In what ways do educators interpret the challenges and opportunities identified during the implementation of the curriculum? Instead of becoming paralyzed by the sheer number of challenges they faced during the curriculum implementation, educators were able to engage youth in intersecting their personal experiences with the speculative narratives in the curriculum, reinforced collaboration as a means to overcome limitations in technology access, “wandered around” to build mutual trust with the students and implemented literacy strategies to help youth with reading and writing limitations to follow the curriculum.

The interpretation the teachers made of the challenges they faced were not perceived with the sense of discursive closure described at the beginning. Instead, the educators found ways to

provide alternative options to encourage students to overcome the challenges they were experiencing.

### **Chapter Summary**

The cross-case analysis of the implementation of Nayah-Irú with youth and educators from five CECAP centers revealed several key findings. First, the incorporation of a speculative fiction narrative in the curriculum to support the YPAR process enhanced the emotional engagement of youth with the topic by creating a sense of a greater purpose and empowered them to propose alternate discourses to data literacy challenges grounded in the lived experiences of both students and teachers. The curriculum also prompted discussions about real-world applications of data algorithms, fostering critical thinking and ethical debates. Additionally, the youth demonstrated a nuanced understanding of data through their exploration of topics such as data exploitation, predictive algorithms, algorithmic bias, data privacy, generative AI and personalization on social media platforms, developing specific actions that disrupt hegemonic discourses about data practices. The results also highlighted the importance of grounding the research process in real-world situations and personal experiences to foster a deeper understanding of critical data literacy. Overall, the results showed that the curriculum effectively engaged youth in understanding and critiquing data while promoting their development of critical data literacy skills.

Educators implementing the Nayah-Irú curriculum developed strategies to promote data literacy among youth. They blended speculative fiction with authentic stories to create an immersive and relevant learning environment. Educators played a key role in infusing playfulness into the curriculum allowing youth to explore complex data-related topics. Educators served as collaborators and mediators, facilitating open-ended discussions and knowledge co-

creation. This approach allowed students to discover knowledge themselves while educators provided hints and support, thus transforming their roles as co-explorers in the research process. Educators also reframed several challenges as opportunities, such as limited access to technology and language barriers, by implementing collaborative strategies, creating a welcoming environment, and actively seeking connections with students. They addressed cultural gaps by sharing personal stories and encouraging students to share their own experiences, bridging the divide between the curriculum and students' realities. Overall, educators embraced a collaborative and co-discovery approach to empower students in critical data inquiry.

## CHAPTER 6. DISCUSSION

“Solo entonces comprendió que, de puro distraído, se encontraba de nuevo en su patria”

"Only then did he understand that, out of pure distraction, he was once again in his homeland."

(Mario Benedetti, *De Puro Distraído*, 1984, p. 74)

The protagonist of the story is a man who claims to have chosen self-imposed exile to avoid dealing with the growing chaos in the country. Instead, he prefers to explore distant lands and enjoy their wonders. By accepting displacement as the norm, he remains emotionally detached from any specific place and freely roams the world. This story aligns with the findings of this study, where educators and youth alike struggle to question the platforms, they engage with. Just like the character in the short story who relishes his travels, the act of disregarding our own reality and opting to explore various spaces, like digital platforms, can be an enjoyable experience. One of the significant challenges of critical data literacy lies in the fact that users often fail to recognize the pervasive nature of data-driven environments and are left in a state of insensitivity towards the challenges in their lives. This is because platforms provide them with tailored content for their enjoyment (Gerrard & Gillespie, 2019), making it almost inevitable to resist engaging with them. The educators' experiences during the curriculum implementation reflect a sense of inevitability (Markham, 2020), suggesting that individuals often feel they are inclined to live within a singular narrative.

In “A Puro Distraído”, the protagonist continues his wandering, crossing borders and complying mechanically with customs procedures at each checkpoint. When we travel, the customs process often feels automated, lacking any personal agency or involvement from the traveler. It becomes necessary to accept the structural conditions of immigration procedures in order to be allowed to inhabit the space. Similarly, the findings of this study revealed that youth



frequently felt powerless to take any action regarding their data practices, struggling to question them. As a result, they feel disqualified from challenging their own reality (Deetz, 1990), leading to a form of discursive closure. Matías, a teacher from Melchor, expressed this sentiment, saying, "It feels like we will continue to choose to do this. We will continue accepting the terms."

In the story, one day, the main character of "A Puro Distráido " is detained by immigration officers and taken to an interrogation room, where they blindfold him. The story concludes with the quote that opened this paragraph: "Only then did he understand that, out of pure distraction, he was once again in his homeland" (Benedetti, 1984, p. 74). This ending serves as a warning about the consequences of desensitization and displacement. When educators and youth are wrongfully forced to accept terms and conditions in digital platforms, they are also forced to disengage from making sense of place (McKittrick, 2006) in digital platforms. Without spatial awareness, they may find themselves metaphorically blindfolded, unaware of power imbalances within the spaces they inhabit, and unable to take meaningful action.

In the previous chapter, the findings discussed the youth understanding and critique of data literacies. The use of speculative fiction as a framework for the YPAR project provided young people with an emotional connection to the topic. This connection enabled them to shift from a closed mindset to engaging in conversations about data exploitation, predictive algorithms, algorithmic bias, data privacy, generative AI, and personalization on social media platforms. Furthermore, the YPAR component of the curriculum guided the youth in grounding their research process in their personal experiences. They developed various projects with different dispositions toward data, ranging from reactive to proactive actions.

During the analysis of the multiple trajectories that were visualized during these five case studies, it was possible to analyze how the youth enacted all the domains of the personal data

literacies framework (Pangrazio & Selwyn, 2019), which was used as part of the structure for this curriculum, including examples of engagement with data tactics, where youth engaged in different approaches to resist, obfuscate and repurpose data practices driven by a collective purpose. The analysis also showed that these domains were enacted at different moments during the curriculum and did not necessarily follow a linear pattern.

The study's findings on civic participation and resistance indicate that young people and educators possess the ability to break free from the aimless wandering described by Benedetti (1984). They can engage in reflective thinking and take action to create new collective maps that challenge the displacement perpetuated by online platforms. These platforms often trap users in cycles of uncertainty and hopelessness due to their discursive closure. By engaging in this curriculum, youth and educators also engaged in a form of mapmaking or cartography where they were able identify their current struggles while exploring new ways to represent the world. This process allowed them to visualize alternative spaces and futures through "what-if" questions. Taking a critical approach to educational interventions in data literacy, this perspective embraces the diverse experiences of young people and educators on digital platforms as potential avenues for change (Massey, 2005) and encourages them to map these platforms by sharing ongoing narratives based on their perspectives of these spaces as places (their lived stories in different spaces).

The findings from the two first research questions in this study support the importance of exploring critical data literacies following a place-based approach that focuses on the multiplicity and heterogeneity of stories, both speculative and real, to create alternative imaginaries through which to understand, critique and resist hegemonic discourses of datafication. For this to be possible, it was necessary for educators to implement a series of strategies that adapted the

curriculum to the local challenges and opportunities. The educators showed various examples of capitalizing on local challenges reframing them as learning opportunities, reinforcing the importance of educators shifting discursive closure situations to alternative discourses.

This chapter examines how the stories from the five CECAP centers illustrate different forms of place-making within an original theoretical framework called Cartographies of Possibility. This framework encompasses three domains: cartographies of struggle, where youth and educators make sense of the oppressive nature of digital platforms; cartographies of possibility, where they imagine alternative discourses to challenge the dominant narratives about the role of data in their lives; and cartographies of resistance, where youth and educators identify ways to creatively repurpose and resist, reshaping their personal data practices.

### **Cartographies of Struggle**

“It’s like they use our data against us.”

“Es como que usan nuestros datos contra nosotros”

(Ana, student from Central)

The acknowledgment of our marginality and sovereignty (L.T. Smith, 2013) drives the need to develop maps that investigate how oppression operates in our lives. To delve into the digital platforms as sites for struggle (Kersch & Lesley, 2019), educational interventions must emphasize the contextual aspects of literacy practices. Nevertheless, mapping the personal dimensions within the geographies of our relationships with digital platforms proves to be a challenging endeavor, often seen as futile given the presence of oppressive structures that instigate feelings of hopelessness and despair. The Cartographies of Struggles adapts the work of Mohanty (2013) to present the first layer of the Cartographies of Possibility framework by exploring how discursive closure operates to disengage youth from critically examining their

data literacies, and how educators in this implementation supported youth in breaking from those perceptions.

### **Mapping in the Face of Discursive Closure**

The study's findings describe emerging themes of inevitability regarding personal data literacy that provide new avenues to understand how discursive closure (Markham, 2021) operates. The sense of helplessness expressed by the youth is profound, as it reflects how the complexities of datafication render users unable to reflect upon and act against oppressive practices. Matías, the educator from Melchor, shared a similar experience, stating, *"And then, the kids would tell me, I really don't care, I am not interested in what they do with my data. I don't care because I am fed up now. It's the same. Don't you understand? It won't hurt me."* These words also speak to the inevitability and desensitization experienced by the youth in their digital platform interactions.

As a result, the open-ended question of *"what are your concerns about digital platforms?"* in their visual collage at the beginning of the implementation did not yield significant findings. In fact, out of 31 posts in their virtual collage, ten of them chose an image with the word "nada" (nothing), indicating the possible presence of discursive closure at the beginning of the curriculum implementation.

Analyzing the original research questions posed by the youth in their problem-framing log suggests that their initial focus was on protecting personal data that they consciously shared, such as revealing their full names or phone numbers on digital platforms. While this reinforces the current emphasis on cybersecurity, educators in this implementation sought to go beyond data safety issues and engage in understanding the processes involved in generating and utilizing certain types of data (Pangrazio & Selwyn, 2018).

If we were to conduct a YPAR study only centered around the youth's concerns about data safety, we would not break free from the discursive loop that arises when navigating digital platforms. These loops lead users to believe they are faced with a false dilemma (Damer, 2008; Markham, 2020), such as the privacy versus security debate explored in the Pinares study. In their research, Pinares and their peers were asked whether it would be beneficial to sacrifice personal data for the sake of safety. Unintentionally, the youth's design study reflected the same limitations in discourse that are promoted by the platforms themselves. Faced with a sense of inevitability and determinism, users naturally prioritize self-protection without fully grasping the critical implications of their own lived experiences.

The examples of discursive closure presented in the findings section expand the understanding of this notion. According to Markham (2020), discursive closure is a systemic process that reproduces ideological trends by ceding control to external stakeholders, thus limiting our ability to imagine radically alternative trajectories and strengthen frames of inevitability. Markham (2020) had identified four types of discursive closure: technological determinism, the notion that technology determines our future; false dilemma, the offer of either/or choices which force users to accept certain conditions to avoid being left out instead of considering alternative options; disqualification, the produced notion that expertise and professional qualification are central to voice opinions about the topic; and trajectorism, the idea that the future can be anticipated within an ethics of probability, making the future determined by unidirectional designs that close off opportunities for an ethics of possibility.

Based on the findings from this study, I argue there is one more element that contributes to discursive closure in critical data literacy education which is youth's state of suspension when it comes to enacting civic literacies. In the work of Michelle Bellino (2017), *Youth in Postwar*

*Guatemala*, she describes how youth often feel unable to meet expectations from adults about the future and can only wait for an opportunity to transition to social adulthood. This state of wait citizenship leaves youth with the impression that they have no capacity to impact their reality, forced to adapt to the circumstances they inherited rather than changing them. In some cases, Bellino (2017) explains, this lack of agency may lead to individual withdrawal or even risks youth to engage in criminal activity. As the author describes, they may not be able to control their lives, but they do have agency over death.

### **Discursive Closure Among Youth: Wait Digital Citizenship.**

The findings of this study indicate that youth experienced a similar structure, which I named “Wait Digital Citizenship” to describe how the structural context forces youth to hold their civic participation due to fear, violence, determinism, and disqualification. Wait Digital Citizenship operates in different ways across all the cases. The youth from Puertas did not care about the President of Uruguay not using alternative text but did feel disappointed when their favorite influencers did the same. The youth in Miguelete and Pinares were concerned about their digital behavior being monitored online and whether their social media posts were permanent in digital platforms. The youth in Melchor and Pinares claimed that they did not care about their data being tracked, but that they would hate it if other friends got access to their private information. The youth in Central, Pinares and Miguelete chose to directly deny the existence of certain structures, as Paula shared: *“We finished talking about online moderation, and they said to me. That’s not real. I don’t believe there are robots controlling what I post online.”* The following figure illustrates how Wait Digital Citizenship as a form of Discursive Closure is articulated in practice.

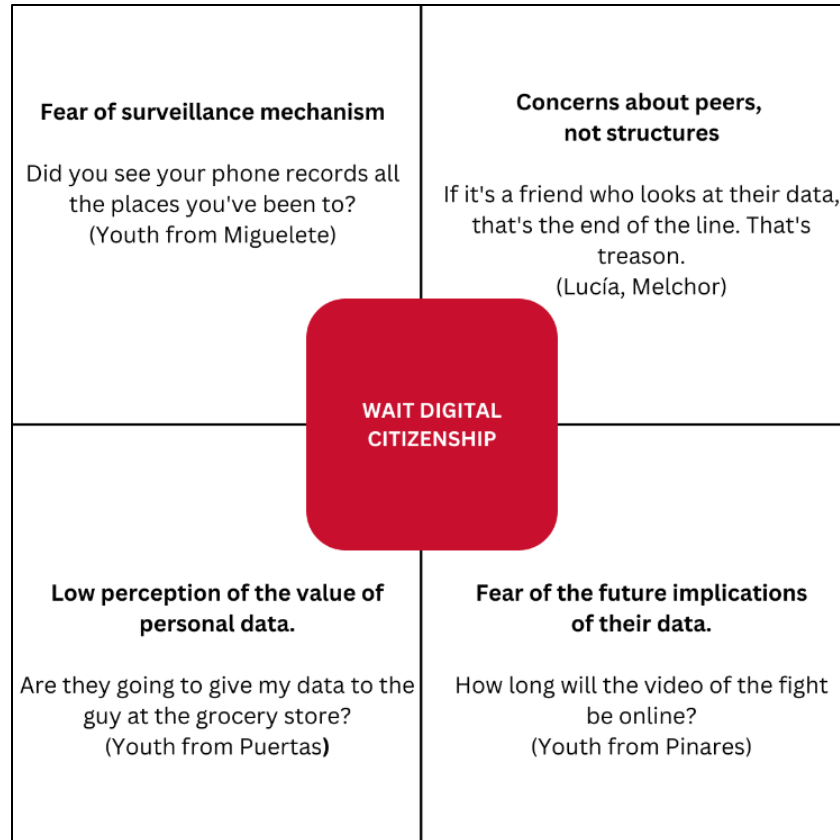


Figure 6-1 Articulations of Wait Digital Citizenship

Fear of surveillance was identified when youth emphasized data safety during the development of their research questions. They fear being observed by someone, and they often represent those fears by imagining hackers wearing hoods in front of a computer. This articulation of wait digital citizenship renders youth unable to question the rationale and implications of data tracking and surveillance. Fearing the unknown structures that are observing them, youth engage in a second articulation that leads to discursive closure which is their heightened concern about their peers accessing their personal data.

Youth lack of agency in the real world also makes them feel the personal data that is extracted from them today has little or no value, as one of Gerardo's students shared: "*What are they going to do with my data? Are they going to give my data to the guy at the grocery store?*" This understanding also makes them deny the existence of platforms that may be commodifying

their data, as Paula shared: Paula: “they said it couldn’t be. A person cannot choose what I can see or what I can’t see online. No, no, no. It can’t be. They were in denial.” Therefore, they are more concerned with their current digital practices having an impact on their future than the current implications of data practices. For example, the youth from Miguelete were concerned about whether the fight video would be permanently accessible online, but not about issues related to the use of their data today.

While the articulations of this structure of Wait Digital Citizenship may lead educators to feel powerless to enact any changes, Bellino (2017) argued that youth do not passively wait for things to change, and that they are capable of living their wait citizenship in different ways, devising forms of activism. The path to change is not just structural, as citizens can find ways to work together, and spark change enacting literacies that may not conform to adult ways of understanding activism. Therefore, discursive closure in the framework of Cartographies of Possibility is not seen as a rigid structure youth are subject to. Instead, the framework acknowledges that even though users are affected by different forms of closure, youth enact different forms of pedagogical ruptures (Hannegan-Martínez, 2022) that provide opportunities for new learning experiences that can nurture critical inquiry and civic participation.

In summary, the study extends the understanding of discursive closure by examining how the lack of agency youth experience in the real world regarding their civic literacies extrapolates to their perceptions of data and their role in digital platforms.

### **A Cartography of Struggle to Disrupt Wait Digital Citizenship.**

The multiplicity of distinct, though related, histories that merge into the classrooms where Nayah-Irú was implemented acknowledged the diverse trajectories students bring with them regarding their lived experiences (Comber, 2015) and opened opportunities to create cartographies that would allow them to identify their struggles. The narratives shared by youth



and educators opened discussions about the nature of personalized content in social media (Central), the implications of predictive algorithms (Melchor), or the gendered experiences of women in digital platforms (Pinares). In some cases, other intersecting narratives also impacted these trajectories, such as the traumatizing accident of a classmate in Puertas or the grooming situation in Pinares.

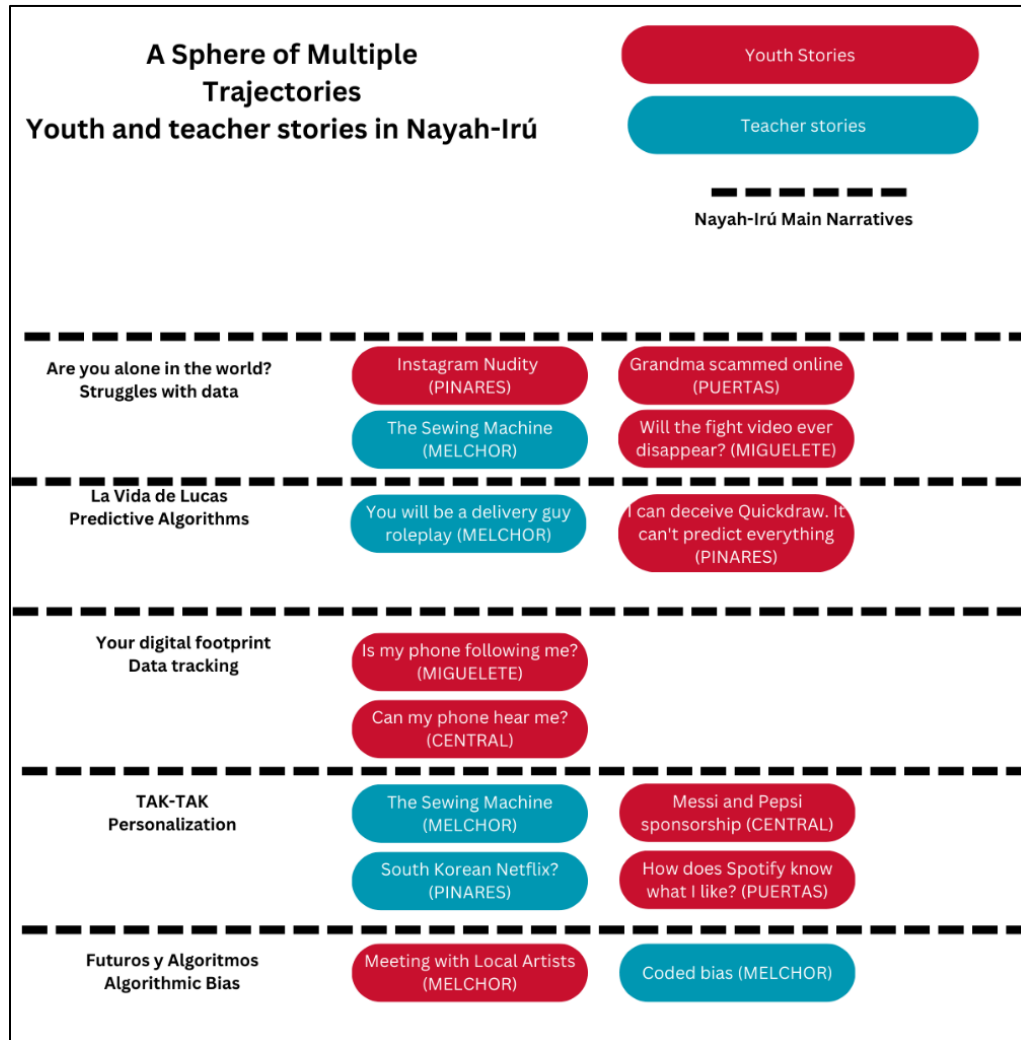


Figure 6-2 Multiple Trajectories in Nayah-Irú

These intersecting narratives grounded the imaginative Nayah-Irú curriculum in the lived experiences of the youth and educators to foster the development of alternative discourses that would lead to meaningful YPAR projects. In figure 6-2, we see how multiple narratives enacted

by the youth and the educators intersected across the Nayah-Irú curriculum. Many of these narratives are just stories-so-far (Massey, 2005), stories that were shared during the dialogues between educators and youth and which allowed for understandings of the implications of the curriculum stories in their personal histories.

Therefore, intersecting the youth and educator narratives with the speculative narratives allowed them to identify struggles through their narratives. Mapping struggles does not necessarily imply providing grim accounts of their place-based experiences but involves raising awareness of the implications of personal data generation and building understandings that allow youth to escape simplistic approaches that seek to limit or restrict access and use of digital platforms. Instead, it is about articulating mechanisms that engage the participation of educators and youth in a reflexive process regarding the implications of data and its recirculation.

For the mapping of struggles to lead to more proactive domains of personal data literacy, it is necessary to center the lived experiences with datified platforms of both the youth and educators. The findings from this study revealed that the educators' narrative accounts of their personal struggles with data, such as Lucía's decision to buy a sewing machine after seeing several online ads or Carlos acknowledging his unfamiliarity with digital platforms, fostered a relationship of trust and care. Ultimately, the main purpose of educators and youth sharing their experiences is to create the foundations for understanding the common context of community struggles against the exploitative structures and systems of digital platforms (Mohanty, 2003), thus fostering solidarity and hope within the community.

As described in the findings of the fourth research question in this study, educators in this project were able to turn complex challenges shared through the youth narratives into opportunities to engage in critical discussions and, in some cases, YPAR projects that sought to

make sense of these struggles. The teacher actions responding to those challenges could be classified into four categories:

- a. Educators sharing their experiences of struggle. This was done in different ways. Some teachers chose to share stories that aligned with the stories of the youth, while others shared alternative narratives that contrasted with the youth accounts.
- b. Making community connections. Educators found it effective to connect youth with other community stakeholders to expand their perspectives beyond the walls of the classroom.
- c. Provide opportunities for technical skills development. Educators invited their youth to experiment with algorithms using different types of experiments allowing them to play with the structures they were struggling to understand.
- d. Allow non-linearity in the youth discourses. As youth came up with new struggles, educators found ways to accommodate them even if they did not fit the research theme identified in the YPAR process.

The quote from the Central youth claiming, *"It's like they are using our data against us,"* is a statement recognizing a struggle. While their recognition may be limited in grasping who they are referring to, it becomes a common ground for their peers and teachers to acknowledge their limitations. This solidarity in identifying common struggles (Mohanty, 2013) allows our imaginations, which have been colonized by predetermined ways of imagining space, reducing our sense of agency, to engage in *"reclaiming the right to dream the future"* (marea brown, 2017, p. 164). This act of social dreaming becomes possible when youth and educators break down their datafied experiences, recognize their struggles, and allow themselves to imagine new worlds and alternatives from which they can envision possible ways to reconfigure and (re)map

narratives. Thus, they engage in the next series of narratives identified in this study: the cartographies of possibilities.

In summary, the Cartographies of Struggle layer of the Cartographies of Possibilities framework highlights the challenges of mapping personal data literacies within the geographies of relationships with digital platforms due to the discursive closure posed by digital platforms. Findings reveal a sense of helplessness and inevitability among youth, leading to a lack of concern about datafication. By introducing the concept of “Wait Digital Citizenship”, adapted from the work of Bellino (2017), this study describes how youth are forced to suspend their civic participation, leading to behaviors that may reinforce the discursive loop. The educators in this implementation overcame these obstacles by centering the lived experiences of youth and sharing their personal struggles with data, making community connections based on relationships of trust and care within the learning experience. They provided opportunities for technical skills development and embraced non-linearity in youth discourses to accommodate emerging struggles. By doing this, educators helped establish a common understanding of community struggles, fostering solidarity and hope, and shifting the curriculum from an analysis of data literacies from personal to collective experiences.

Figure 6-3 summarizes the Cartographies of Struggle. The maze in the figure represents the discursive closure present in digital platforms, while the broken clock in the middle symbolizes the concept of Wait Digital Citizenship. This image represents how youth are forced to suspend their civic participation, reinforcing the discursive loop posed by digital platforms. The educators find an alternative pathway, connecting with youth through the development of community connections, helping youth transition from a stance of individual struggle and helplessness to the formation of a collective capable of engaging in action.

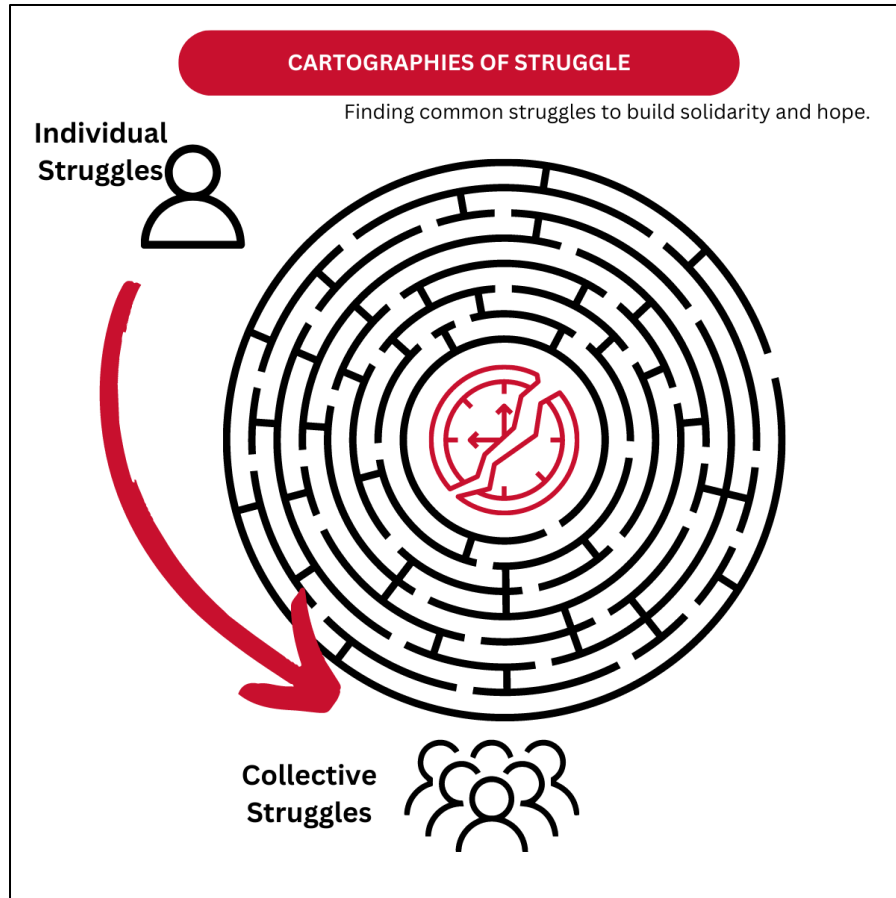


Figure 6-3 - Cartographies of Struggle

### Cartographies of Possibility

To disrupt the discursive loops surrounding our understanding of digital platforms, the narrative of Nayah-Irú was introduced to both youth and educators, presenting a speculative scenario. The intention behind this narrative was to depict a dystopian world that would enable the youth to challenge its boundaries, rather than simply witnessing a linear narrative portraying a future of inevitability.

Within this narrative, Nayah-Irú exists in a world where digital platforms have been outlawed, and she possesses fragments of narratives that may shed light on the potential negative consequences of datafication on human lives. These repercussions led to an unexplained crisis in Nayah-Irú world that resulted in the permanent prohibition of digital platforms. In this narrative,

the youth possess firsthand knowledge of their experiences within digital platforms but lack an understanding of the reasons that could have triggered the crisis in Nayah-Irú's world. The objective of the Youth Participatory Action Research (YPAR) project is to bridge this knowledge gap between Nayah-Irú and themselves. The youth are pondering how they can assist Nayah-Irú based on their current experiences, while Nayah-Irú seeks to reconstruct her own past with the help of the youth's knowledge (see Figure 6-4). By engaging in this collaborative process, the youth and Nayah-Irú can break free from the limitations of discursive closure and explore new possibilities for understanding digital platforms and creating alternative narratives that transcend the inevitability often associated with the future of technology.

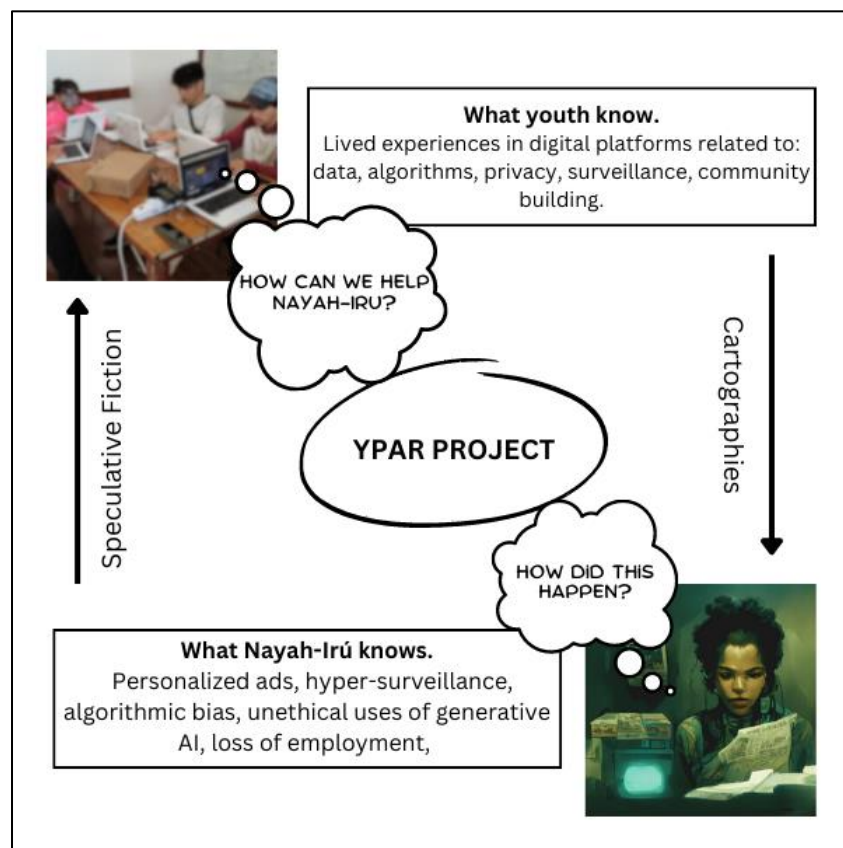


Figure 6-4 The Knowledge Gap in Nayah-Irú

### **Speculation as a Means to Overcome Discursive Closure**

Knowledge co-construction, as emphasized in PAR Entremundos (Torre and Ayala, 2009), becomes a central element in the speculative nature of this curriculum. Carlos, one of the educators from Central, shared: “There must be a central element of interest... that generates the development of actions and also of growth, of doubts, of questions, ... of not knowing everything, of us conducting an exploratory experience.” The fragmented nature of the Nayah-Irú vignettes, explained by the lack of resources available to her, creates the conditions for a YPAR project where knowledge creation becomes essential, as explained by Carlos: "In other words, there are things that are not given, things that are not yet anywhere. I mean, we are going to either find them or create them ourselves."

The analysis of the interviews depicting the lived experiences during the implementation of the curriculum demonstrated that youth engaged in different forms of speculative fabulation. For example, the educators at the Melchor CECAP, engaged in roleplaying an AI agent that would determine the career pathways of the youth to facilitate conversations about the oppressive nature of predictive algorithms. These speculative scenarios focused on teaching and learning about data beyond the boundaries of their lived experiences, thus decentering power structures and emphasizing the ethical relations needed for civic trust, collaboration, and worldbuilding (Garcia & Mirra, 2023). Thus, the Nayah-Irú curriculum is articulated as a speculative form of place-making, an alternative place not affected by the material conditions of the structures the youth navigate. By exploring how the Nayah-Irú’s world was brought into existence, youth and educators can develop alternative discourses (Montfort, 2017) to the grand narratives of digital platforms, pushing the boundaries of public imagination (Markham, 2020) and representing digital spaces, not as structures, but as a “sphere of a multiplicity of trajectories” (Massey, 2005, p.119).

The findings of this study describe that the educators engaged the youth in drawing connections between the speculative narrative and their lived experiences. Beatriz shared how the youth initially contested the narrative: *"They were saying that the video was an exaggeration, that in their life, that didn't happen. That's what I saw that caught their attention. Right? They always remembered that video, over and over again..."*

The curriculum afforded opportunities for the youth to start drawing more connections. Returning to the work of Freire (1970; 1998), Nayah-Irú supported youth in interpreting their lived experiences (reading the world) before they could engage in reflection and action to change the world (writing the world). This understanding was possible thanks to the narratives shared by both educators drawing connections from their lived experiences to make sense of the issues that may be affecting Nayah-Irú in the future.

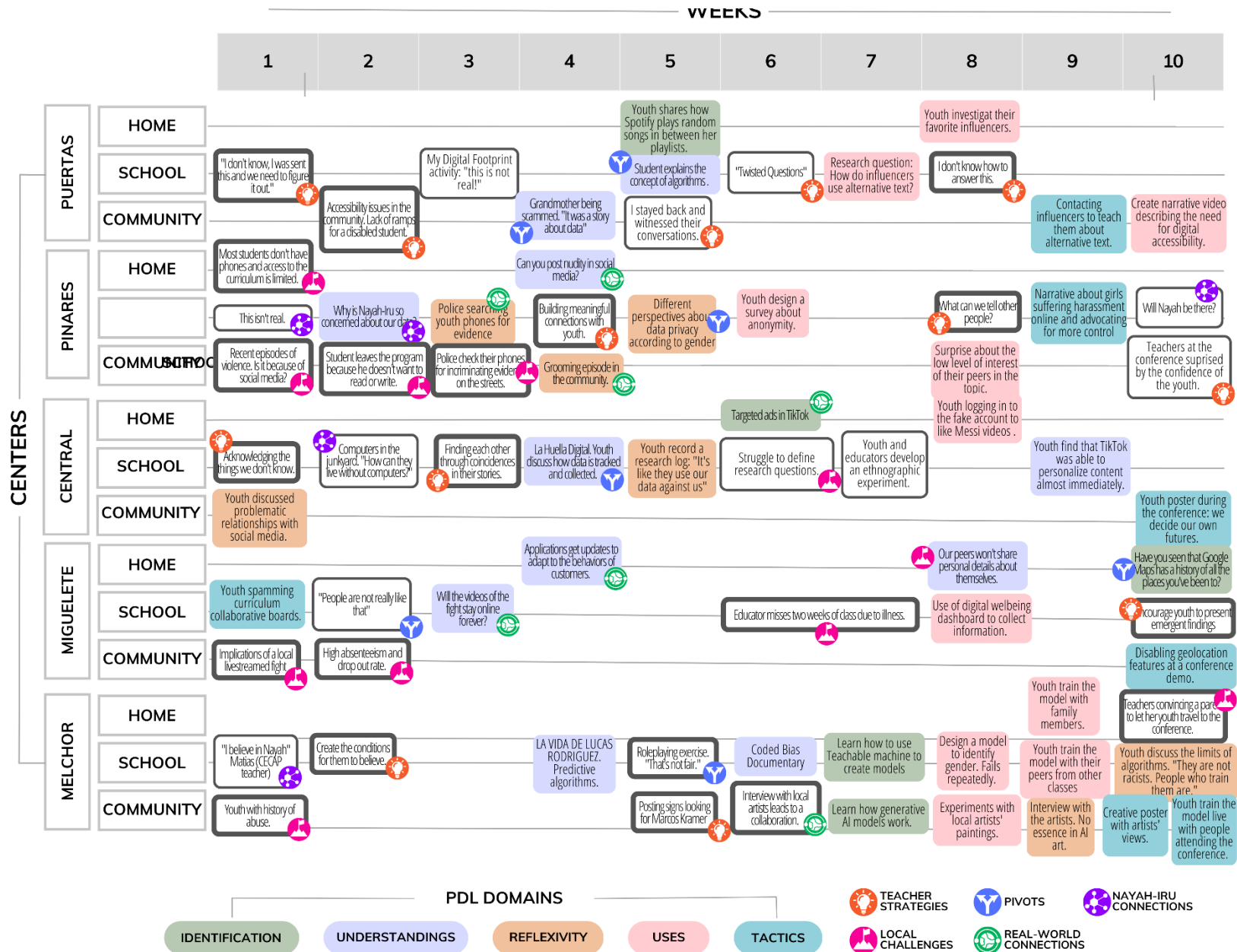
However, the findings also demonstrate that identifying and sharing narratives of struggle is not necessarily the starting point for a cartography of struggle. One example of this occurred in Central where Carlos found that during the data collection process, youth began to identify that the TikTok account they had created to examine the algorithm was clearly hinting them to like specific videos or products: *"when they created Messi's profile, they started to realize how TikTok looked different from their personal accounts"*. This experience has several implications to reframe our understanding of the Personal Data Literacies framework within the curriculum. It may be tempting to imagine a linear narrative of this implementation where youth would first identify the nature and materiality of data (data identification), examine how data is generated and circulated (data understandings), understand its implications (data reflexivity), build interpretive skills to examine data (data uses), and repurposing and resisting data practices (data tactics) (Pangrazio & Selwyn, 2019). However, these steps are not linear, but recursive in



nature. The youth engaged in data literacy following multiple trajectories which were mediated by pivotal moments, local challenges, and the intervention of the educators. Additionally, multiple spaces were involved in the development of the activities such as their homes and the wider community. Figure 6-5 is an iteration of the previous visual data literacies learning pathways presented in Chapter 5, which incorporates the multiple and heterogeneous storylines that mediated in the implementation of Nayah-Irú.

Seeking to engage youth in exploring digital platforms following a cultural-devoid analysis will not allow youth to ground their critical data literacies in ways that resonate with the histories and ways of knowing of their communities. When we are forced to inhabit oppressive places, the lines of the maps we are shown at school become representations of exclusion. Similarly, the oppressive nature of digital platforms has become normalized as the maps that represent our geographical spaces. Therefore, a critical approach to data literacy needs to be grounded in the understanding of place-based challenges to engage youth in creating alternative maps.

Based on Freire's (1992) notion of the "consciousness of the possible," the second layer in this framework is the Cartographies of Possibility. A mapping experience where youth and educators engage in a collective experience of place-building where they imagine and enact alternative literacy practices grounded in local ways of knowing. Identifying struggles (cartographies of struggle) can provide youth and educators with a common ground from which to develop mutual respect and solidarity. But they also need to engage in perceiving new alternatives where they can become active agents of change and where space is conceived as a mutable entity (the cartographies of possibility).



### **Alternative Discourses in Nayah-Irú**

The findings from this study suggest that youth were able to produce different forms of alternative data discourses:

- a. Technical data discourses: youth develop technical skills to repurpose the way in which the technologies had been designed.
- b. Conceptual data discourses: youth gain an understanding of a specific concept and its impact on their everyday lives.
- c. Aspirational data discourses: youth imagine possible ways to escape positions of entrapment by engaging in dialogues. .

There are several examples from the findings that illustrate these pathways to engage in alternative imaginaries. In the case of alternative technical discourses, the youth from Melchor first identified how facial recognition could be affected by algorithmic bias and target marginalized communities. The youth could have ended their study acknowledging this struggle. However, they imagined an alternative data imaginary, where they learned how to train a machine learning model and test it to visualize how their story could confirm the other narrative. Technical alternative imaginaries offered youth opportunities to incorporate skills related to the use and management of data, while imagining alternative explanations to critical data issues such as algorithmic bias in facial recognition.

Alternative conceptual discourses are those where youth engage in creating alternative definitions for complex concepts, thus fostering their own voices in communicating the black-box nature of the curriculum. Gerardo, from Puertas, described how the youth in his community, who was struggling to make sense of some areas of the curriculum, had been able to articulate what an algorithm is based on examples from popular streaming platforms such as Netflix or

Spotify. The youth eventually shared their definitions with other peers in the classroom to support each other in understanding the curriculum. By taking ownership of the knowledge-construction process, youth engage in alternative forms of knowledge dissemination.

Finally, the aspirational alternative discourse is the seed of resistance (Hannegan-Martínez et al., 2022) that need to be nurtured for promote youth civic participation in data literacy. This type of discourse is the result of youth engaging with conceptual and technical discourses that allow them to identify how data is produced and to understand its implications. In dialogues with their teachers, the CECAP youth recognized established practices and considered different forms of oppositional behaviors (Delgado Bernal & Solórzano, 2001). The clearest example of this practice occurred in the Miguelete case where the youth, after seeing how their phone was tracking their location, designed a workshop to train other peers to disable their geolocation features. The dialogical action of creating this workshop appeared as a result of creating a technical alternative discourse that allowed them to articulate how the technology operated. The youth from Puertas, disappointed with the lack of alternative texts on Twitter, engaged in creating direct messages to explain to these influencers and leaders how to set up alternative texts. In this case, the youth had to engage in designing a conceptual understanding of digital accessibility prior to engaging in specific forms of action. Table 6-1 describes a series of alternative discourses and imagines what the normative discourses could have been if the youth had not engaged in disrupting the narrative process.

Table 6-1 Types of Alternative Discourses in Nayah-Irú

<b>Struggle</b>	<b>Dominant Discourses</b>	<b>Alternative Discourses</b>	<b>Type of Alternative Discourses</b>
Users do not use accessibility features in Twitter.	Someone may need to create a solution. People should be forced to do it.	Send direct messages to influencers teaching them how to create alternative text.	Conceptual Aspirational
Participants in the research study do not agree on whether social media should require personal details.	It doesn't matter. We don't have a voice anyway. The companies decide.  You should stop using it if you don't like them.	Create a narrative describing the experiences of females in social media platforms.	Conceptual Aspirational
We spend more and more time in TikTok. It has become problematic.	You should stop using it if you don't like them.	Create an experiment to show other peers how TikTok personalizes content to keep you engaged.	Technical Aspirational
Your phone is always tracking your location.	Just disable it. It's optional.	Many users do not know about this feature, and we need to help them disable it by creating a workshop.	Technical Aspirational
Generative AI can generate amazing illustrations.	Artists will lose their jobs.  We will be replaced by AI.	Let's create art with the work of local artists and show them how to learn what they think about technology.	Technical Aspirational
Face surveillance mechanisms unfairly target communities of color.	Technology will get better with time.	Let's create a Machine Learning model to learn how they work.	Technical Conceptual

All these examples demonstrate ways in which youth can imagine possible maps to represent space. As Monfort (2017) described, speculative and alternative cartographies which hint at possible futures are not just imaginative tales about the future without any realistic implications. On the contrary, the youth in this study engaged in intentional designs, developing innovative research projects to explore alternative discourses that challenged the grand narratives that oppressed them.

In summary, if mapping struggles allowed the youth and the educators to find a common ground of struggle and develop their solidarity. The Cartographies of Possibility allow them to develop alternative imaginaries through which they can imagine other possible answers that disrupt hegemonic narratives.

The findings of this study reveal that youth were able to transition from discursive closure to alternative discourses where they mapped struggles but also dared to reimagine and hope to raise awareness and/or change the oppressive structures in digital platforms. By grounding their local experiences and connecting them to bridge the knowledge gap between their experiences and the fragmented memories of Nayah-Irú, they were able to make sense of their personal geographies by assembling the important pieces instead of cultivating grand narratives about digital platforms that have no impact on dominant studies. As Matías shared, connecting the knowledge co-construction to the narrative provided the research project with a greater purpose where they could help Nayah-Irú. As Matías described: *“And for me, Nayah's story creates a connection. It's not about me as a teacher, but about there being a person who needs you. It's for Nayah. She asks me for help.”* Developing a social justice lens through the Nayah- Irú curriculum is essential to understand how youth can engage in enacting civic literacies regarding their personal data literacies.

In summary, cartographies of possibility, engages youth and educators in imagining alternative discourses to hegemonic narratives about digital platforms by creating technical or conceptual discourses, where youth overcome the discursive closure posed by digital platforms, and ultimately engage in aspirational discourses where they envision ways of challenging hegemonic narratives. Figure 6-6 summarizes the second domain of this framework. In this case, we can still see the maze that represented discursive closure, but it has been overlaid with a

heart shaped maze. This is a representation of the alternative discourses flowing through stories across the still existing maze of digital platforms. We can also see how the technical and conceptual discourses use dialogue as a form of encounter which creates the condition to engage in aspirational alternative discourses.

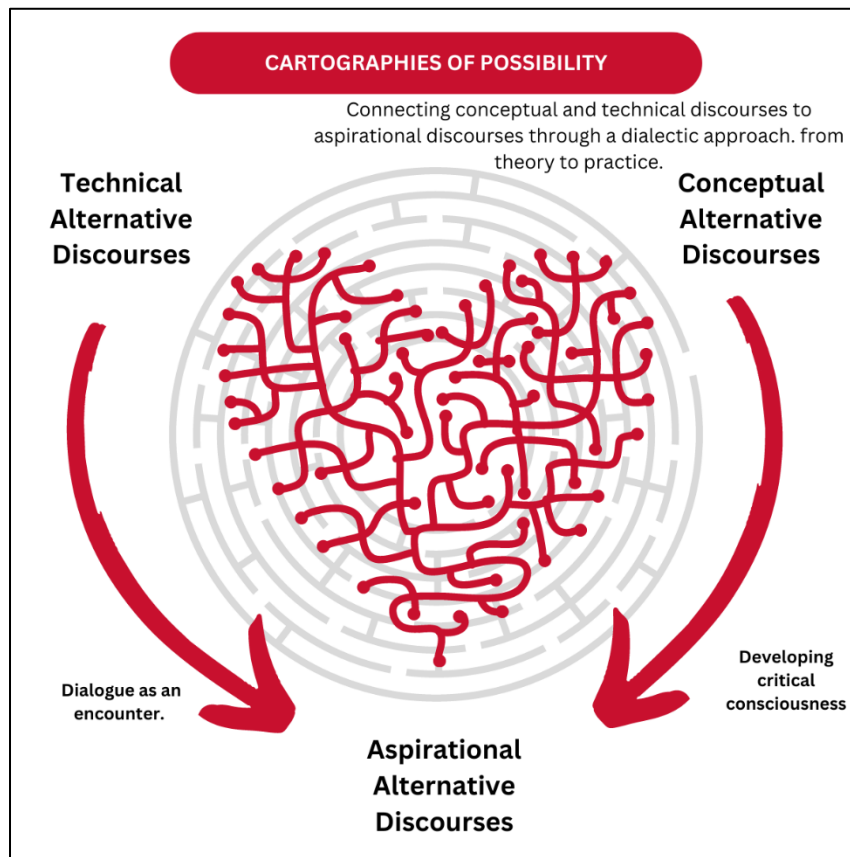


Figure 6-6 Cartographies of Possibilities

### Cartographies of Resistance

“obfuscation is contingent, shaped by the problems we seek to address and the adversaries we hope to foil or delay”

(Brunton & Nissebaum, 2017, p. 7)

Throughout this dissertation, the main objective of taking a critical approach to data literacy has been emphasized, which is to actively involve youth in challenging and resisting data practices. To effectively achieve this objective, it is crucial to encourage youth to critically examine the social structures that contribute to oppressive conditions and to foster their motivation towards achieving social justice (Solórzano & Delgado Bernal, 2001). The personal data literacies framework (Pangrazio & Selwyn, 2019) introduced the notion of data tactics to represent the ways in which youth can engage in proactively responding to current challenges in digital platforms by employing tactics of resistance and obfuscation and/or repurposing data for personal reasons.

The quote that begins this section is relevant because it describes how obfuscation in digital platforms can be made more relevant if youth are able to critically frame the struggles they experience in digital platforms. Without such critical understanding of the nature of digital platforms, youth may engage in acts of oppositional behavior that may be short-lived if they are not nurtured within a curriculum (Hanneman Martínez et al., 2022).

Based on the findings from this study, I argue it is necessary to expand our understanding of data tactics by developing a framework that incorporates a lens of social justice and transformational resistance. The youth in these five case studies engaged in different behaviors that could be classified within the transformational resistance framework proposed by Solórzano and Delgado Bernal (2001).

For example, during the avatar creation tool, the youth from Miguelete chose to identify as video game characters (Figure 6-7). One of them was Carl "CJ" Johnson, a fictional character from the 2004 video game *Grand Theft Auto: San Andreas* and Franklin, a low-life thug from the *Grand Theft Auto V* videogame. Spamming the avatar creation tool with images of these



characters and adding derogatory terms to identify themselves could be seen as a form of obfuscation. The youth were actively attempting to resist the pedagogical tool that had been implemented. However, this type of obfuscation lacks both a critique of the structures they may be resisting (this curriculum, for example), and it is not a result of a desire to engage in social transformation. Therefore, this example could constitute a case of reactionary behavior.

While reactionary behavior may have been identified as disruptive by their teacher, Hannegan-Martinez et al. (2022) suggest seeing these behaviors as seeds of resistance that need to be nurtured. For example, in the case of the avatars, a close analysis may show that although both characters are framed as violent men, they eventually develop more complexity in their engagement with their communities. Whether youth were using these characters as representations of their own lived experiences requires a different type of exploration. However, the fact that the youth from Miguelete all engaged in creating workshops to disable geolocation features in their peers' mobile phones speaks of oppositional behaviors that can be cultivated.

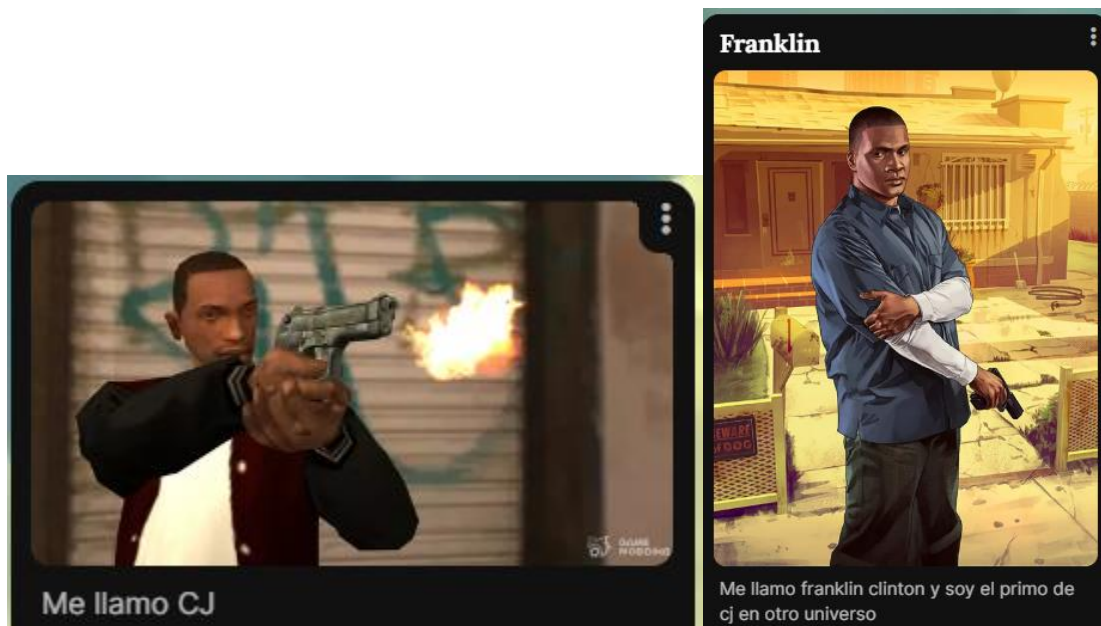


Figure 6-7 Avatars designed by the Miguelete youth.

The decision of the Miguelete youth to create a workshop to disable geolocation features could be framed as an example of self-defeating resistance. The youth critiqued the fact that the platform was tracking their behavior without their awareness, but they were not necessarily motivated by social justice as they mostly focused on preventing systems from accessing their data. Responding to Hannegal-Martinez et al's (2022) advice to see these behaviors as seeds of resistance, it would be possible to re-imagine future iterations of this project where youth examine the data from their geolocation features and speculate about the potential harms of these technologies.

In some cases, the youth engaged in acts of conformist resistance. For example, the girls from Pinares were motivated by a lens of social justice when they made the call to speak out about the harassment women experienced in social platforms, but they did not critique the digital platforms. Instead, they chose to blame users and advocated for more control from social media platforms. Once again, youth from Pinares could be supported to incorporate other methods where they can show how harassment in social media platforms could be exacerbated by digital platforms.

### **Extending Data Tactics with a Social Justice Lens**

Drawing from the transformational resistance framework (Solórzano & Delgado Bernal, 2001) and the notion of data tactics (Pangrazio & Selwyn, 2019) it is possible to imagine a form of mapping resistance. The findings from this study suggest that youth engaged in different types of oppositional behaviors. However, the understanding of these types of behavior needs to be adapted to the specific circumstances of resisting datafied structures. Youth from Melchor, Pinares, and Puertas refused to accept that learning about data in their lives was relevant to them, which could be considered a form of reactionary behavior, where the youth just sought to

disengage from the learning experience with their educators. However, we could also argue that in this case, the youth may also be engaging in forms of self-defeating resistance as they may acknowledge the struggles of data practices in their lives but find that there is little they could do about it.

This could be particularly true for many users, including the teachers who also felt forced to accept the terms and conditions of digital platforms. Another case that may need revision is conformist resistance, which is the type of resistance in which students are motivated by a desire to engage in activities that promote social justice, but then behave within more liberal traditions. In the analysis of the visual collage, it was possible to see that while they had been successful in identifying issues of social injustice in digital platforms, some of them still insisted on their capacity to protect their data by resorting to data safety mechanisms.

Given the complexity of digital platforms, it is not possible to consider the three quadrants of oppositional behavior as fixed structures. Instead, as suggested by Hannegan-Martinez et al. (2022), it is necessary to perceive oppositional behaviors as seeds, honoring the resistance capital present in their behaviors (Yosso, 2006). For example, the youth who initially resisted believing the nature of the curriculum were nurtured by their educators and the curriculum to start developing an emotional connection with the game character and their peers, which fostered their growing implication in more resistant practices. The implementation of YPAR also facilitated the nurturing of these seeds of resistance by providing youth with both a line of action that guided their behaviors and a venue where they could amplify their voices to engage in transformative forms of resistance.

During one of the sessions introducing predictive algorithms, Lucía, a teacher from Melchor, witnessed something that made her feel relieved about her role in the project: "*The*

*comic that said there is an algorithm that can tell you whether you should study or go to war made them jump. No one is going to tell me what I have to do!, they said. And when I heard that, I said, well, what we share is rebellion."* This statement speaks of the dialectic conversations the youth were able to maintain with their teachers allowing them to develop common goals in their process of converting technical discourses about algorithms into specific actions.

This quote from Lucía, from Melchor, is an example of how educators began to perceive differences in the way the youth manifested their engagement during the curriculum. The alternative discourses the youth developed may have led to different types of oppositional behaviors (Solórzano & Delgado Bernal, 2001). As described by Hannegan-Martinez et al. (2022), the framework of transformational resistance has often been misused to represent transformational resistance as a destination in the action and reflection process of the youth. Most importantly, there is a tendency to believe that it is the individual person who fits in different categories of the transformational resistance framework instead of their actions.

In summary, youth in this implementation of Nayah-Irú engaged in different tactics of resistance and obfuscation and also creatively repurposed data practices for personal and social reasons as described in the personal data literacies framework's description of data tactics (Pangrazio and Selwyn, 2019). However, one salient finding in this study is that the YPAR process allowed the youth to engage in collective action with a social justice lens. The Central youth conducted an experiment where they explored their interactions with the TikTok platform to discover why their peers were manifesting problematic relationships with social media. The Miguelete youth explored their peers' practices by looking at their digital wellbeing dashboards to help them manage their screen time, but eventually found the presence of other tracking and showed them how to disable them. The youth from Pinares wanted to denounce the vulnerability

of women in social media applications and their disappointment with the outcomes of their survey. The students at CECAP Melchor wanted other peers to realize the limitations of machine learning applications. Finally, the youth from Puertas sought to show social media influencers and their peers how digital platforms are still inaccessible for many people in their communities. I argue that the use of YPAR around data literacy practices is not just a form of data reflexivity, but it is an essential component of data tactics which provides the personal data literacies framework with a social justice lens.

Once central aspect of YPAR is that it speaks to questions of *why* research (Petroni et al., 2021). This form of research, inspired by Freire's critical pedagogy, seeks to build connections between learning, literacy, and action through multiple approaches. The data tactics approaches described by Pangrazio and Selwyn (2019) include obfuscation, resistance and creatively repurposing data uses. However, YPAR introduces a social justice lens which aligns with the Cartographies of Struggle layer of this framework where youth found a common struggle and provides avenues for youth to transform their alternative discourses into actions. YPAR is also beneficial for critical data literacy education because it provides affordances to allow youth to incorporate their lived experiences in authentic, relevant and culturally sustaining ways (Warren & Marciano, 2018). Finally, unlike other forms of resistance where youth engage in oppositional behavior without a social lens or a critique of the current structures, YPAR can have a central role in exposing tensions between the hegemonic discourses posed by digital platforms, and the alternative discourses the youth develop.

In summary, Cartographies of Resistance involves understanding different forms of behaviors as seeds of resistance that can be nurtured through the iteration of their research projects. Additionally, this understanding also expands the notion of data tactics by incorporating

the exploration of youth personal experiences through YPAR as central to data resistance since it provides a critical perspective with a social justice lens to acts of resistance and obfuscation in datified platforms. Additionally, a YPAR approach to data tactics provides opportunities to design culturally sustaining experiences, and create bridges with both the Cartographies of Struggle, by allowing youth to focus on common struggles, and the Cartographies of Possibility, by affording opportunities to turn alternative discourses into actions.

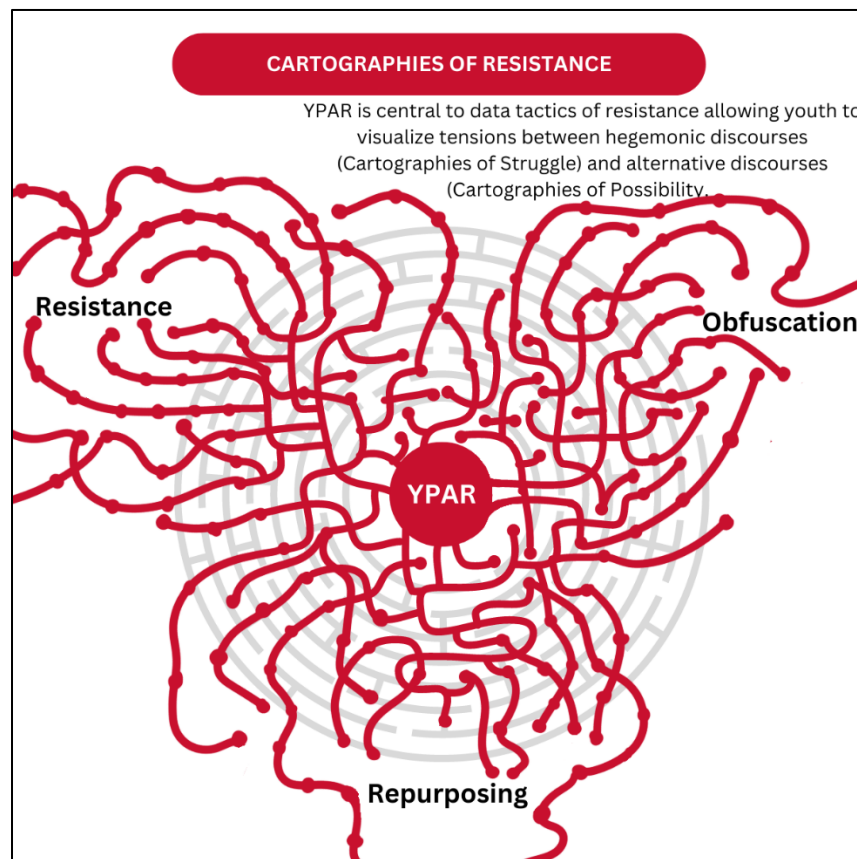


Figure 6-8 Cartographies of Resistance

Figure 6-8 describes the Cartographies of Resistance domain by representing the previous heart-shaped maze extending beyond the limits of the maze which represented the discursive closure posed by digital platforms. In the middle of the figure, we can see YPAR as the core of

the Cartographies of Possibilities framework affording opportunities to connect youth with different tactics of resistance, repurposing, and obfuscation.

### **The Guided Discovery Approach**

The guided discovery approach described in the findings section supported the three types of cartographies presented in this study. First, they support students in interacting with data and knowledge with an exploratory mindset. It allows them to investigate and analyze themes that are personally relevant to them. By initiating open-ended discussions based on mutual trust, students are supported in developing a critical stance towards data practices and challenging existing discursive loops. This approach to guided discovery creates the necessary conditions for the cartographies of struggle to manifest thus allowing opportunities for the development of a sense of community and solidarity.

Additionally, the guided discovery approach employed by the educators fosters creativity and imagination within the learning process. The teachers incorporated elements of speculative fiction, roleplaying events, and dramatic moments into the narrative, creating a sense of suspense and excitement. This approach encouraged students to think creatively and to speculate about the possibilities within the subject matter. Educators also shared their own speculations and encouraged students to do the same, further enhancing the imaginative aspect of the learning experience and favoring the development of alternative discourses. Furthermore, educators engaged youth in designing alternative discourses by engaging them in exploring concepts (alternative conceptual discourses), develop skills to experiment with data (alternative technical discourses) and helping them develop specific goals to escape discursive closures (aspirational technical discourses).

The guided discovery approach also involves mediating the YPAR process by creating connections for youth to use their alternative discourses and explanations to engage in different forms of action. By engaging with guided discovery, educators created a dynamic and immersive learning environment that promotes student agency and meaningful participation in the research process.

### **Summary of the Cartographies of Possibility Framework**

The Cartographies of Possibility framework (Figure 6-9) reimagines critical data literacy approaches by focusing on developing alternative discourses to overcome discursive closure, thus promoting agency and centering students' voices. The contributions from this framework are:

1. **Cartographies of Struggle.** This framework incorporates a new understanding of discursive closure, *Wait Digital Citizenship*, that focuses on how youth are subject to specific practices that limit their possibilities to voice their experiences. It also describes how mapping their struggles through stories allowed youth and educators to find common grounds of struggle which allowed them to shift from personal to collective stances of data literacies.
2. **Cartographies of Possibility.** This framework describes how speculative approaches to data literacy and a YPAR framing can support youth in developing technical and conceptual alternative discourses that can be transformed into aspirational alternative discourses where youth explore potential avenues to escape the entrapments of discursive closure in digital platforms.



3. Cartographies of Resistance: This framework expands the understanding of data tactics by reframing YPAR research as central to the development of data tactics and to create bridges with the other two domains of this framework.

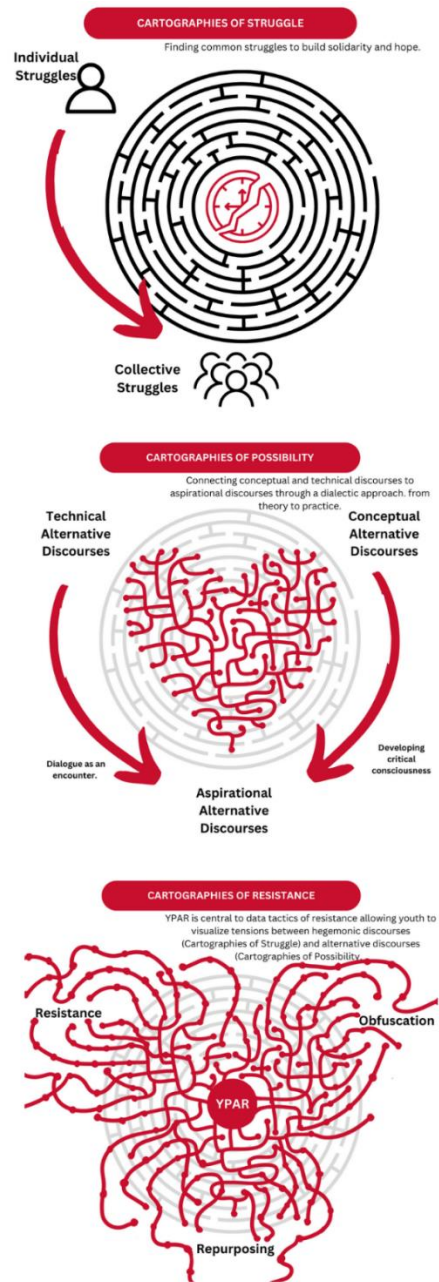


Figure 6-9 The Cartographies of Possibilities Framework

## CHAPTER 7. CONCLUSION

The Nayah-Irú curriculum engaged youth and educators in mapping their struggles, creating alternative discourses, and engaging in different forms of resistance within a critical data literacy curriculum using a YPAR structure. By introducing the speculative narrative of Nayah-Irú, the curriculum provided a framework for youth and educators to challenge the oppressive structures of digital platforms and imagine alternative narratives. Through the curriculum, youth were able to recognize the struggles inherent in their relationship with data-driven platforms and develop a sense of agency to address them.

The curriculum fostered knowledge co-construction and encouraged the youth to draw connections between the speculative narrative and their lived experiences. This process enabled them to critically analyze the implications of datafication, such as data privacy, predictive algorithms, and gendered experiences, and engage in meaningful Youth Participatory Action Research (YPAR) projects.

Mapping struggles became a starting point for the youth to raise awareness and understand the implications of personal data generation and recirculation. It was through these struggles that solidarity was built among the youth and educators, creating a foundation for collective action against the exploitative structures of digital platforms. By sharing their personal experiences, educators and youth developed a relationship of trust and care, fostering hope and a sense of community within the curriculum.

Furthermore, the curriculum went beyond mapping struggles and opened possibilities for reconfiguring narratives and envisioning alternative futures. The act of social dreaming became possible when youth and educators acknowledged their struggles and allowed themselves to

imagine new worlds and alternatives. Through cartographies of possibility, they engaged in a collective experience of place-building, seeking to inspire change in their communities after developing technical and conceptual understandings.

Finally, the study demonstrated the effectiveness of YPAR to support youth in identifying the tensions between hegemonic and alternative discourses regarding data-driven technologies and providing a critical lens to youth engagement with data tactics.

Overall, the Nayah-Irú curriculum provided a transformative educational experience that empowered youth to critically examine and challenge the oppressive structures of digital platforms. By engaging in cartographies of resistance, possibility, and struggle, the curriculum facilitated a critical data literacy curriculum that fostered agency, solidarity, and hope among the youth and educators involved.

In essence, the Cartographies of Possibilities framework developed as a result of this implementation, manifests the importance of exploring complex challenges by examining routes rather than roots of datafication in order to acknowledge and honor the multiplicity and heterogeneity of youth narratives. Nayah-Irú does not present a grand narrative seeking to explain the world to the youth but rather imagines a vulnerable place that requires the solidarity of the youth to identify their struggles, develop alternative discourses, and ultimately determine which actions they can take for the well-being of their communities.

### **Limitations**

One of the most significant limitations of a study focusing on the lived experiences of youth and educators in digital platforms lies in the rich and intimate nature of the digital representations of everyday life. The youth in this study navigated multiple emotions, engaged in visual storytelling, and heated discussions. The intimate nature of all this data forced me to take a

step back to respect the space of the teachers and educators in developing this curriculum. Furthermore, the decision not to interview the youth for this iteration of the study may have limited the analysis.

Also, the complexity and diversity of each case forced me to balance the depth and breadth of this analysis to be able to integrate and present the findings in a coherent way. This means that my selection of findings for further analysis implied leaving aspects of each case left out. Future directions in this study will require a more detailed analysis of each case finding to identify other areas that could expand the present study.

The nature of the day-to-day processes at CECAP also impacted this research process. High absenteeism rate, drop-outs, and teacher illnesses all led to a very heterogenous implementation of the curriculum, which could result in certain inconsistencies. Future iterations of this study need to include other research approaches which could allow me to directly observe the youth and educators' involvement in the curriculum.

This study is also affected by the fact there is a single researcher who designed and conducted research on the curriculum. This limitation was addressed by conducting peer-debrief sessions with my current supervisor and engaging in member-checking interviews with the participants to confirm some of my views.

### **Implications for Practice**

The findings of this study have demonstrated the effectiveness of the Nayah-Irú curriculum in engaging youth and educators in critical data literacy and fostering cartographies of resistance, possibility, and struggle. Still, and drawing from the implications of Social Design-Based Experiments (Gutierrez et al., 2020), it is essential to continue evaluating ways in which Nayah-Irú can be expanded to other contexts and communities without losing its context-

sensitive nature. Future iterations of Nayah-Irú need to incorporate other learning contexts that would allow the study to gain a better understanding of the youth and educators' responses to datafied practices, but the relationships which have been recently cultivated with the five communities which were part of this study, need to be nurtured by creating opportunities to explore alternative pathways and lines of inquiry that support the sustainability of the project over time.

The study also provided several hints regarding methodologies to establish respectful youth-adult partnerships where both engage in YPAR as co-researchers and co-designers through the guided discovery framework which was an emergent finding in this study. Practitioners interested in developing educational responses to datafication may consider the affordances of the strategies utilized by the educators in this study.

Also, many of the outcomes from the YPAR projects represent forms of disruptive and original local knowledge. Therefore, it is important to engage the communities in sharing their findings with other peers and stakeholders as well as in academic outlets. This will require creating dissemination platforms for youth voices to be amplified such as the CREAJOVEN research conference and other similar efforts.

The Nayah-Irú curriculum will need to be refined and improved based on the feedback and evaluation from the educators. Some of the most pressing issues regarding the upcoming new iteration of Nayah-Irú is finding ways to integrate the narratives of the youth who participated in this implementation in a new version of the curriculum that will need to address some of the issues presented by the youth for this iteration. Also, the elements of the curriculum that were identified as problematic due to a cultural gap which made it difficult for the youth to interpret the stories, will need to be adapted.

By pursuing these future steps, the study can contribute to a growing body of knowledge and practices that promote critical data literacy, empower youth, and foster transformative action in relation to digital platforms.

### **Recommendations for CECAP Teachers**

The recommendations for CECAP teachers are a reflection of the strategies they implemented during the curriculum that may be incorporated by educators willing to implement this curriculum in the future.

First, CECAP teachers were successful at fostering agency by recognizing and acknowledging the struggles faced by students in their relationships with data. The educators encouraged students to express their concerns and frustrations and created a supportive and inclusive classroom environment where they can be heard. Recommendations, in this case, include being open to listening to youth discuss digital experiences without being judgmental or dismissive, and feel comfortable acknowledging the limitations teachers may have in navigating some platforms.

While not all teachers may be willing to use the story of Nayah-Irú to engage students, the experience of the CECAP educators using drama, roleplay, and other speculative fabulations fostered a sense of hope and possibility and allowed the youth to develop emotional connections with the curriculum.

It is important to engage in a process of co-construction of knowledge with the youth where teachers are allowed to share their personal lived experiences with data. Most importantly, teachers should look for common struggles that allow youth to develop a sense of solidarity regarding the topic they will learn about.

Finally, it is important to be aware of the recursive nature of personal data literacies. Most students will not follow linear steps to move from data identification to data tactics or from mapping struggles to mapping resistance. In fact, for many youth, the process may occur in a completely different manner.

### **Recommendations for Future Research**

This study has implications for researchers across the Cartographies of Possibility framework. First, it is necessary to continue exploring and extending our understanding of discursive closure as it pertains to data literacy education. The presence of hegemonic discourses still reflecting on some of the YPAR projects in this curriculum speaks of the limitations youth experience when attempting to find their voices in reclaiming their rights and futures regarding digital platforms.

The understanding of Wait Digital Citizenship needs to be explored and extended. Current efforts in data literacy have focused on introducing data literacy concepts in novel ways, but the literature describing how youth experience oppressive structures in digital platforms has potential to be expanded. Most importantly, it is necessary to continue exploring how youth engage in different acts of resistance and obfuscation in their private practices in order to identify other potential avenues for civic participation in the future. This is particularly relevant in the case of literacies that extend beyond the digital platforms and permeate other spaces the youth navigate.

Regarding the notion of alternative discourses present in this study, it is necessary to engage in deeper forms of discourse analysis to evaluate how youth articulating complex concepts such as data and algorithm can provide opportunities to engage in other aspirational discourses. Analyzing how popular social media platforms communicate these concepts to youth

is also essential as these platforms may already be informing (and disinforming) youth about conceptual and technical discourses related to data-driven technologies.

The notion of cartographies of resistance needs to be explored further through other case studies to evaluate how youth can be supported to continue these projects over time.

Additionally, it is necessary to consider how the transformational resistance framework, revisited by Hanneman-Martínez et al. (2022) could be used as a lens to interpret different types of oppositional behavior in other cases. I argue that a lens of transformational resistance may expand our interpretation of what counts as acts of resistance in data-driven platforms.



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## APPENDIX A: INSTITUTIONAL REVIEW BOARD

**Date:** 11/11/2022  
**To:** Ezequiel Aleman Evrin Baran  
**From:** Office of Research Ethics  
**Title:** Developing tactical responses to datafication through participatory research with youth  
**IRB ID:** 22-345  
**Submission Type:** Initial Submission **Exemption Date:** 11/11/2022

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The project referenced above has been declared exempt from most requirements of the human subject protections regulations as described in 45 CFR 46.104 or 21 CFR 56.104 because it meets the following federal requirements for exemption:

2018 - 1: Research, conducted in established or commonly accepted educational settings, that specifically involves normal educational practices that are not likely to adversely impact students' opportunity to learn required educational content or the assessment of educators who provide instruction. This includes most research on regular and special education instructional strategies, and research on the effectiveness of or the comparison among instructional techniques, curricula, or classroom management methods.

2018 - 2 (ii): Research that only includes interactions involving educational tests (cognitive, diagnostic, aptitude, achievement), survey procedures, interview procedures, or observation of public behavior (including visual or auditory recording) when any disclosure of the human subjects' responses outside the research would not reasonably place the subjects at risk of criminal or civil liability or be damaging to the subjects' financial standing, employability, educational advancement, or reputation.

The determination of exemption means that:

- **You do not need to submit an application for continuing review. Instead, you will receive a request for a brief status update every three years. The status update is intended to verify that the study is still ongoing.**
- **You must carry out the research as described in the IRB application.** Review by IRB staff is required prior to implementing modifications that may change the exempt status of the research. In general, review is required for any *modifications to the research procedures* (e.g., method of data collection, nature or scope of information to be collected, nature or duration of behavioral interventions, use of deception, etc.), any change in *privacy or confidentiality protections*, modifications that result in the *inclusion of participants from vulnerable populations*, removing plans for informing participants about the study, *any change that may increase the risk or discomfort to participants*, and/or any change such that the revised procedures do not fall into one or more of the [regulatory exemption categories](#). The purpose of review is to determine if the project still meets the federal criteria for exemption.

- All **changes to key personnel** must receive prior approval.
- **Promptly inform the IRB of any addition of or change in federal funding for this study.** Approval of the protocol referenced above applies only to funding sources that are specifically identified in the corresponding IRB application.

**Detailed information about requirements for submitting modifications for exempt research can be found on our [website](#).** For modifications that require prior approval, an amendment to the most recent IRB application must be submitted in IRBManager. A determination of exemption or approval from the IRB must be granted before implementing the proposed changes.

Non-exempt research is subject to many regulatory requirements that must be addressed prior to implementation of the study. Conducting non-exempt research without IRB review and approval may constitute non-compliance with federal regulations and/or academic misconduct according to ISU policy.

Additionally:

- All research involving human participants must be submitted for IRB review. **Only the IRB or its designees may make the determination of exemption**, even if you conduct a study in the future that is exactly like this study.
- **Please inform the IRB if the Principal Investigator and/or Supervising Investigator end their role or involvement with the project** with sufficient time to allow an alternate PI/Supervising Investigator to assume oversight responsibility. Projects must have an [eligible PI](#) to remain open.
- **Immediately inform the IRB of (1) all serious and/or unexpected [adverse experiences](#) involving risks to subjects or others; and (2) any other [unanticipated problems](#) involving risks to subjects or others.**
- **Approval from other entities may also be needed.** For example, access to data from private records (e.g., student, medical, or employment records, etc.) that are protected by FERPA, HIPAA or other confidentiality policies requires permission from the holders of those records. Similarly, for research conducted in institutions other than ISU (e.g., schools, other colleges or universities, medical facilities, companies, etc.), investigators must obtain permission from the institution(s) as required by their policies. **An IRB determination of exemption in no way implies or guarantees that permission from these other entities will be granted.**
- Your research study may be subject to [post-approval monitoring](#) by Iowa State University's Office of Research Ethics. In some cases, it may also be subject to formal audit or inspection by federal agencies and study sponsors.
- Upon completion of the project, transfer of IRB oversight to another IRB, or departure of the PI and/or Supervising Investigator, please initiate a Project Closure in IRBManager to officially close the project. For information on instances when a study may be closed, please refer to the [IRB Study Closure Policy](#).

Please don't hesitate to contact us if you have questions or concerns at 515-294-4566 or [IRB@iastate.edu](mailto:IRB@iastate.edu).

## APPENDIX B. LIST OF QUOTES IN ORIGINAL LANGUAGE

List of original quotes and translations from participants  
All the quotes in Spanish were translated into English by the researcher.

Quote 1. Gerardo (Puertas)

¿Viste cómo los chiquilines sienten que pueden hacer cualquier cosa y son inmortales, ¿verdad? Pero fue bueno porque fue como volver a la realidad y decir: "uhh, sí". Y uno de ellos dijo, por ejemplo, le paso a mi abuela, no recuerdo exactamente qué situación había ocurrido. No fue en el banco, fue otra situación, pero se trataba de datos, como una tarjeta o algo así, y pasaron por muchas quejas, reclamos, y al final, ella no recuperó el dinero. ¿Verdad? Y los gurises lo miraron con los ojos bien abiertos porque era un caso real. Digo... Y se trataba de datos. Sobre datos personales que habían sido robados.

[Did you see how kids feel like they can do anything and are immortal, huh? But it was good because it was like coming back down to earth and saying, "oh, yeah." And one of them said, for example, it happened to my grandmother, I don't remember exactly what situation had happened. It wasn't about the bank, it was another situation, but it was about data, like a card or something, and they went through a lot of complaints, complaints, and in the end, she didn't recover the money. Right? And the kids looked at him with big eyes because it was a real case. I mean. And it was about data. About personal data that had been stolen.]

Quote 2. Gerardo (Puertas)

Si, no? Porque en realidad, esto nos afectó a todos. Empezamos a especializarnos, a aprender y a tener conversaciones, principalmente sobre cómo manejar las cosas... quizás nos empoderó para mejorar como equipo, y todos estábamos preocupados por tratar de mejorar en ese aspecto (accesibilidad). Pero ya estábamos avanzando en esa dirección y queríamos cambiar el enfoque más allá de las sillas de ruedas y las rampas... Y pensar en la accesibilidad digital nos ayudó a crecer.

[Right? Because actually, it affected all of us. We started specializing, learning, and having conversations, mainly about how to handle things... maybe it empowered us to improve as a team, and everyone was concerned about trying to improve in that aspect (accessibility). But we were already moving towards that and wanted to shift the focus away from just wheelchairs and ramps.... And thinking about digital accessibility helped us grow.]

Quote 3. Gerardo (Puertas)

Se quedaron impactados con el poquísimo porcentaje que lo utilizaba y más que nada... porque lo hicimos con un personaje que ellos siguen, no es que yo les pasé a Lacalle Pou o el presidente de Rusia o gente que ellos no tiene ni idea, capaz o no le interesa... y como que se decepcionaron un poco con esa persona.

[They were shocked by the very low percentage of people who used it, mainly because we did it with a person they follow. It's not like I introduced them to Lacalle Pou or the president of Russia or people they have no idea about... and they were somewhat disappointed with those individuals.]

Quote 4. Gerardo (Puertas)

“Es como una metodología, no? Les vas tirando pequeñas ideas para que descubran algo... Pero, no le decis el objetivo final. Solamente le das un objetivo que los va a llevar a lograr otro”

[It's like a methodology, right? You throw them small ideas so they can discover something... But you don't tell them the final objective. You just give them an objective that will lead them to achieve another one].

Quote 5. Paula (Pinares)

Y ellos la miraban raro. Y esta en qué idioma escribe? me decían. Quién es? Porque ahí más raro les pareció todo y uno medio que ahí empezó a darse cuenta y miraba a través de la luz y no se daba cuenta. Y otra después se dio cuenta y se puso en la ventana y ahí sacaron. Ay bueno ta, también habla español! Eso estuvo re-bueno. Sí, y hay como que empezaron a engancharse.

[They were looking at it strangely. "In what language is this?" they asked me. Who is it? Because everything seemed even stranger there, and one of them started to notice something and looked through the light without realizing it. Another one realized later and stood by the window, and they all got it. Oh well, it speaks Spanish! That was really cool. Yes, and they started to get hooked on it.]

Quote 6. Paula (Pinares)

Cuando salió el tema de una de las chicas que dijo que la policía puede entrar a tu casa y te revisa todo y sin permiso. Y si. Pasa. Esto de violentar los derechos del otro es tremendo y bueno. Y te agarran el teléfono, te lo revisan y no pasa nada. Entonces existe esta dualidad de que, bueno, protejo mi dato, pero después viene otro y te los revisa y no pasa nada.

[When the topic came up about one of the girls saying that the police can enter your house and search everything without permission. And yes, it happens. This violation of someone else's rights is terrible, and well, they grab your phone, search it, and nothing happens. So there's this duality where, well, I protect my data, but then someone else comes and searches it and nothing happens.]

Quote 7. Paula (Pinares)

El debate salía muy espontáneo entre ellos, como que se generaban en el grupo la confianza y empezaban con eso de las tetas. O sea, yo no sé si una clase permite que una alumna diga no, porque fulanita pone las fotos de unas tetas así y yo así... muzarella. Claro, como que se generaron preguntas y ellos se sintieron con confianza.

[The debate arose very spontaneously among them, as if trust was generated within the group, and they started talking about boobs. I mean, I don't know if a class allows a student to say, like, 'because so-and-so posts pictures of boobs like this and I was like... mozzarella (quiet). Of course, questions arose and they felt comfortable expressing themselves.]

Quote 8. Paula (Pinares)

Verlos desde otro lugar. En la clase de electricidad, por ejemplo, Carla no tiene buena relación con la profe porque a ella no le gusta la clase. Y Mariana, la profe, se quedó sorprendida de cómo se paraba y se ponía a hablar y como exponía. Y yo le decía, ay Mariana subile la nota.

[To see them from another perspective. In the electricity class, for example, Carla doesn't have a good relationship with the teacher because she doesn't like the class And Mariana, the teacher was surprised by how she stood up and started talking and presenting. And I said to her, "Oh, Mariana, give her a higher grade."]

Quote 9. Paula (Pinares)

"Viste que esto del futuro y no sé que no sé cuánto, los Chiquilines me preguntaron: va a estar Nayah-Irú en el evento? Ta, la vamos a conocer a Nayah? O me miraban y me decían, sos vos Nayah?"

["You see, with this future thing and I don't know what, the kids asked me: Is Nayah-Irú going to be at the event? Okay, are we going to meet Nayah? Or they would look at me and say, are you Nayah?"].

Quote 10. Paula (Pinares)

“Porque en el grupo se generó una cosa buenísima. Casi somos 15, pero con los demás? Con los que iban a hacer la encuesta y preguntaban: para qué es esto? Les deberíamos haber contado mas.”

[Because something really great was generated within the group. We're almost 15, but what about the others? Those who were supposed to do the survey and asked, "What is this for?" We should have told them more.]

Quote 11. Paula (Pinares)

Verlos desde otro lugar. En la clase de electricidad, por ejemplo, Carla no tiene buena relación con la profe porque a ella no le gusta la clase. Y Mariana, la profe, se quedó sorprendida de cómo se paraba y se ponía a hablar y como exponía. Y yo le decía, ay Mariana subile la nota. [To see them from another perspective. In the electricity class, for example, Carla doesn't have a good relationship with the teacher because she doesn't like the class And Mariana, the teacher was surprised by how she stood up and started talking and presenting. And I said to her, "Oh, Mariana, give her a higher grade."]

Quote 12. Transcript from the first frame in the Nayah-Iru vignettes.

“Las computadoras en el futuro viven en los basureros. No sabes todo lo que tuve que hacer para conseguir la computadora desde donde te escribo.”

["The computers in the future live in the garbage dumps. You don't know everything I had to do to get the computer from which I'm writing to you."]

Quote 13. Conversation among three youth in a voice recording.

Ana: Empezamos a ver como estas empresas sabian tanto de nosotros. Nuestros datos, donde vivimos.

Pedro: Si. Y nos dimos cuenta de que estas empresas nos roban los datos.

Ana: Claro, y usan los datos para recomendarnos cosas. Entonces, cuando vemos una publicidad en las redes, no deberíamos confiar.

Lucia: Si. Es como que usan nuestros datos en nuestra contra.

[Ana: We started thinking about how these companies knew so much about us. Our data, where we lived.

Pedro: Yes. We began to notice that these companies take our data.

Ana: And they use the data to recommend things to us. So, when we see an ad in social media, we shouldn't trust that.

Lucia: Yes, it's like they use our data against us.]

Quote 14. Carlos (Central)

“la primera sensación que me da es que ya casi no estamos hablando de un ser humano sino de un conjunto de datos sobre el cual se toman decisiones, que tampoco se sabe bien quien las toma... es casi un proceso de deshumanización y mas a edades tan tempranas”

["The first feeling I get is that we are hardly talking about a human being anymore, but rather about a set of data on which decisions are made, and it's not clear who makes them... It's almost a process of dehumanization, especially at such young ages."]

Quote 15. Original title of a newspaper article

“Inteligencia artificial: con algoritmos predicen que liceales pueden abandonar o repetir y haran listas” [“Artificial intelligence: with algorithms, they predict which high school students may drop out or repeat grades and will create lists.”].

Quote 16. Liliana (Central)

“vos vas a ser un bichito de laboratorio y vas a estar marcado. Porque si no estas en el amarillo o en el verde, entonces estás en el rojo y no vas a poder hacer determinadas cosas o vas a poder hacerlas. Ahi, se complica un poquito.”

[“You're going to be a little lab bug and you are going to be marked. Because if you're not in the yellow or in the green, then you are in the red and you won't be able to do certain things or you will be able to do them. That gets a little complicated.”

Quote 17. Liliana (Central)

no tenemos que sentirnos inseguros. No, vos tenés la seguridad que estás trabajando con algo nuevo, que se va a investigar y se va a conocer desde ambas partes. Entonces, si lo planteas desde ese lugar de que vamos a aprender juntos y juntas, bueno, ahí ya está, ya se habilita también a la participación, cuidando la diferencia de roles, pero atendiendo a la horizontalidad en la clase. Me parece que eso está súper rico de Nayah-Iru.

[“We don't have to feel insecure. No, you have the certainty that you are working with something new, which will be investigated and understood by both parties. So, if you approach it from the perspective of learning together, well, there it is; it also enables participation while respecting the different roles but attending to the horizontal dynamics in the classroom. I think that aspect of Nayah-Iru is really enriching.”]

Quote 18. Research log entry from the Miguelete Youth

Viendo los intereses de los usuarios, comentarios, valoraciones, etc. Si alguna aplicación o juego es popular tenlo por seguro que se actualizara a cada rato. Eso se debe a que escucha los intereses o simplemente la propia piensa que es lo mejor y lo pone en una actualización.

[Looking at the users' interests, comments, ratings, etc., if an application or game is popular, you can be sure that it will be updated all the time. This is because it listens to the interests or simply thinks that it knows what is best and includes it in an update.]

Quote 19. Findings in the Miguelete research poster

“También nos dijeron que a veces pierden la noción del tiempo en juegos en línea. Este consumo genera un círculo vicioso que te invita a que sigas consumiendo a través de incentivos y premios”

[“They also told us that sometimes they lose track of time in online games. This consumption creates a vicious cycle that encourages you to keep consuming through incentives and rewards”]

Quote 20. Beatriz (Miguelete)

yo vi que ellos estaban comodísimos con lo que estaban diciendo y en realidad eran ellos. No tenían un libreto aprendido ni nada y ellos explicaba lo que a ellos les salía, lo que ellos acordaban. En ese proceso la verdad es que yo estoy gratamente sorprendida con ellos. No es que esperara menos no? Pero como eran en clase, o sea, vi como otro alumno totalmente diferente.

[I saw that they were very comfortable with what they were saying, and it was truly them. They didn't have a rehearsed script or anything, and they explained things as they came to them, as they agreed upon. In that process, I'm truly pleasantly surprised by them. Not that I expected



any less, right? But how they were in class, I mean, I saw them as a completely different student.]

Quote 21. Lucia (Melchor)

O sea, se fue del liceo porque le hacían bullying, porque porque tenía sobrepeso. Entonces, para alguien con todos esos antecedentes, o sea, con episodios que vos la ves, que a veces ella no puede con la vida y que se deprime y que necesita... verla, superarse y enfrentar. O sea, casi lloro, no? O sea, lloré de hecho. Lo que vinieron trabajando con Nayah, en realidad se fueron empoderando de ese conocimiento, fueron tomando profundidad con el tema al punto de qué fueron capaces de pararse y transmitir ese conocimiento. Eso es brutal.

[So, she left school because she was being bullied, because she was overweight. So, for someone with all that background, I mean, with episodes that you see, that sometimes she can't handle life and gets depressed and needs... to see her, overcome and face it. I mean, I almost cried, you know? I mean, I actually cried. What they have been working on with Nayah, they have actually empowered themselves with that knowledge, they have gained depth on the subject to the point where they were able to stand up and transmit that knowledge. That's amazing.]

Quote 22. Lucia and Matias describing a conversation with friends. (Melchor)

Matias: Es como estoy fascinado con la historia y más que como me siento un gurí, chico, tengo expectativas. Quiero saber qué más, qué más pasa, cómo va, cómo le vamos a ganar al gobierno y cómo es eso.

Lucia: El otro día estábamos hablando.

Matias: Lo hable en un grupo de amigos en un asado, verdad?

Lucia: Claro, nosotros somos más Gurises que los gurises en ese sentido, No, porque nosotros nos entusiasmos tanto como ellos.

Matias: Les conté básicamente la historia muy una gurisa de 17 años, 2300 en Uruguay. Así, así, esa parte les explotó la cabeza.

Lucia: Era interesante proyectarse en esa cosa de de de pensar en un futuro en lugar de la realidad actual. Me dejó pensar mucho más.

[Matias: It's like I'm fascinated with the story, and more than that, I feel like a kid. I have expectations. I want to know what else, what else happens, how it's going, how we're going to defeat the government, and how it all works.

Lucia: The other day we were talking about that with some friends.

Matias: I talked about it with a group of friends at a barbecue, right?

Lucia: Exactly, we are more "Gurises" (kids) than the kids in that sense. No, because we get just as excited as they do.

Matias: I basically told them the story of a 17-year-old girl, 2300 in Uruguay. Yeah, that part blew their minds.

Lucia: It was interesting to project ourselves into that idea of thinking about the future instead of the current reality. It made me think a lot more.]

Quote 23. Transcript of findings in the Melchor research poster.

“Los algoritmos, a veces, generan una definición no real de las personas. Esto afecta directamente en el futuro de cada unx” [“Algorithms often generate an inaccurate definition of people. This directly impacts their future”]

Quote 24. Matias (Melchor)

Matias: Y entonces ahí, ahí ellos me decían no me importa la verdad, no me interesa lo que hagan con mis datos, no me importa porque yo ahora estoy podrida. Me da lo mismo. Usted no entiende? No me hace daño. Pero entonces? le preguntaba yo. Y ahí fue el lugar de pero a ver si una persona conocida les hace eso, porque habíamos hablado previamente de todo eso y era como que no le molestaba si la persona era alguien que no conocían, una persona de otro país. Les molestaba que invadieran su privacidad las personas que conocían.

[Matias: And then, there, they would tell me, "I don't care about the truth, I don't care about what they do with my data, it doesn't matter to me because I'm fed up. It's all the same to me. Don't you understand?" I asked them. And that's where it became a matter of, "Well, what if someone they know does that?" Because we had previously discussed all of this, and it was like it didn't bother them if the person was someone they didn't know, someone from another country. It bothered them when people they knew invaded their privacy.]

Quote 25. Lucia (Melchor)

“la investigación participativa es como una gran incógnita, no? Y es difícil involucrarte en algo que tampoco sabes bien qué es”

["Participatory research is like a big mystery, right? And it's difficult to get involved in something when you don't really know what it is."]

Quote 26. Matias (Melchor)

“Eso también es un proceso. Lo tienen que vivir, no se los puedo planificar” [That is also a process. They have to experience it, I can't plan it for them”.

Quote 27. Matias (Melchor)

“Es como que los vamos a seguir eligiendo. Vamos a seguir aceptando los términos”

["It feels like we will continue to choose doing this. We will continue accepting the terms."]

Quote 28. Matias (Melchor)

“Y para mí la historia de Nayah lo que genera es una vinculación. No es conmigo como docente, sino con que hay una persona que te necesita. El propósito de investigar los datos no es la escuela. Es Nayah. Ella me pide ayuda.”

["And for me, Nayah's story creates a connection. It's not about me as a teacher, but about there being a person who needs you. The purpose of researching about data is not for the school. It's for Nayah. She asks me for it."].

Quote 30. Gerardo (Puertas)

“Era un mediador entre el juego y ellos. Viste, te doy un poco, ustedes tienen otro poco, así podemos solucionar esto. Si yo juego el juego por vos, no tiene sentido”

[I was a mediator between the game and them. You see, I give you a bit, you have another bit, so we can solve this. If I play the game for you, it doesn't make sense.].

Quote 31. Paula (Pinares)

A los jóvenes de CECAP los rebotan de otros liceos. Es que no encuentran como un lugar donde tenga un acompañamiento y un apoyo para estudiar. Un chico tuvo dos o tres peleas en el liceo. Ya lo ficharon que era como alguien conflictivo y peleador y que no puede hacer nada, que es incapaz. Y acá encaramos desde otro lugar, hay que enfocarse desde otro lugar.

The youth CECAP are rejected by other schools. It's because they can't find a place where they have guidance and support to study. One kid had two or three fights at school. They've already labeled him as someone who is confrontational and a fighter, and they believe he can't do

anything, that he is incapable. But here, we approach it from a different perspective; we need to focus on it from a different angle.

### Quote 32. Paula (Pinares)

Y la profe, que fue conmigo, sí recorrió y me dice ahí están con experimentos de inteligencia artificial. No lo puedo creer. Estaba copado porque ella le gusta todo eso también. Después me dice “Y justo una persona fue y probó el modelo y no le reconocía el rostro, le decía que era hombre y era mujer y no, no, no puedes creerlo”, me decía, “tuvieron que arreglar el sistema para que la reconocieran”. Estaba copadísima con eso.

[And the teacher, who went with me, did explore the other poster sessions and she tells me, "They are doing artificial intelligence experiments. I can't believe it." It was cool because she also likes all that stuff. And she added “and just then, someone went and tried the model, and it didn't recognize their face, it was saying they were a man when they were a woman, and no, no, you can't believe it”, she told me. “They had to fix the model for it to recognize her”. She was really excited about that.

### Quote 29. Youth Publications in the Collage and alignment with personal data literacies domains

	Youth publications	Translation
1	Nada, si eres precavido no tienes en que temer	Nothing, if you're cautious, you have nothing to fear.
2	que cada vez mas te invaden con muchos anuncios y te obligan por tu paciencia a comprar una subscripcion para no ver esos anuncios, re ratas	More and more, they invade you with many ads and force you to buy a subscription to avoid seeing those ads, damn rats.
3	el posible uso de nuestros datos ilegalmente	They use our data illegally.
4	La manera en las que las personas hablan con desconocidos para encontrarse sin saber si es esa persona o alguien que se hizo pasar por otra , y que muestran mucho el cuerpo teniendo cuentas en pública , entonces cualquiera puede ver esas fotos y hacer algo inapropiado o subirlas en otro lugar y eso despues no se borra mas.	The way people talk to strangers to meet up without knowing if it's really that person or someone pretending to be them, and they expose their bodies on public accounts, so anyone can see those photos and do something inappropriate or upload them elsewhere and that won't ever be deleted.
5	cada vez hay mas inseguridad con los datos personales y se distribuyen entre las empresas para ponerte anuncios invasivos, ademas de que puedes conocer a gente de otros lados no sabes si esas personas tienen buenas intenciones, por un simple error como tener una direccion de alguien y pegarlo en un lugar indevido se te puede ir la vida a la shit	There is increasing insecurity with personal data, which is distributed among companies to bombard you with invasive ads. Additionally, you can meet people from other places, but you don't know if those people have good intentions. Just a simple mistake like pasting someone's address in the wrong place can ruin your life.
6	Para ingresar a una red social debes registrar información, la cual pueden ser pública. También otro problema es las intenciones maliciosas de otras personas sin moral, las cuales suelen utilizarte para adquirir dinero en estafas o robarte algo. La venta de tus datos, esta es muy común, esta se basa en la venta de tu información a terceros. TU, si no tomas las medidas necesarias eres una víctima más. Y el ultimo problema es... La falta de respeto y las opiniones con malas que existe. La realidad que las redes sociales dan más "libertad" y se sienten más seguros, así que se aprovechan de eso para poner cosas como información falsa y exigir respeto cuando ellos no respetan a nadie.	To join a social network, you have to register information, which can be made public. Another problem is the malicious intentions of immoral people who often use you to acquire money through scams or steal something. The sale of your data is very common, based on selling your information to third parties. If you don't take the necessary measures, you become just another victim. And the last problem is... the lack of respect and the existence of negative opinions. The reality is that social networks provide more "freedom" and people feel safer, so they take advantage of that to post things like false information and demand respect when they don't respect anyone.
7	Hablar con desconocidos, subir fotos con tu cuenta pública porque pueden hacerse pasar por vos con tus fotos y subir tu ubicación porque cualquier persona puede seguir tu pasos	Talking to strangers, uploading photos with your public account because someone can impersonate you with your photos, and revealing your location because anyone can track your movements.